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SURGICAL CHALLENGES AND PRIORITIES IN RURAL AREAS



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Cover image: *This panoramic view is from Misty Crown, approximately 50 km east from Polokwane, close to Haenertsburg in the Magoebaskloof Mountains, a lush green mountainous area, covered by natural evergreen subtropical forest. This is an area where the small kingdom of Makgoba lived before they were conquered by Afrikaners who occupied the Tzaneen area prior to 1905. Currently, it is a tourist attraction area which shows off its natural wonders such as the Debengeni Waterfalls and many forest hiking trails. Breath-taking views of the Ebenezer Dam and its natural surroundings make it a serene haven for all seeking experience of spectacular beauty and outdoor living.*

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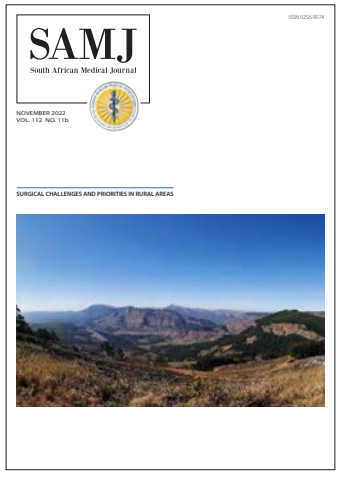
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An introduction to surgical challenges and priorities in rural areas

Historically, there has been a critical shortage of surgeons in rural areas, particularly in Africa, and this lack has been increasingly acknowledged in the medical literature. In addition, a plethora of measures has been advocated to deal with it.[1,2]

One conspicuous problem with the recommended strategies, however, is that they are typically proposed by surgeons and surgical departments with a developed-world perspective, and many of the suggested approaches lack the detail necessary to deal with the intricacies involved in building strong rural surgical departments.

This special issue of the *SAMJ* is dedicated to rural surgery, and represents an attempt to alleviate the above shortcoming by sketching the surgical reality from a coalface perspective.

It has been estimated that on average there is only one surgeon per 250 000 people in Africa, with only one per 2.5 million in rural areas – this despite the fact that surgical diseases constitute at least 10% of the total global burden of disease.[2,3]

Recruiting for, motivating and sustaining surgical departments in rural areas is a challenging task. Although financial compensation can assist, it remains very difficult to attract and maintain surgeons of high calibre to work in these complex rural situations.

Delivering appropriate and effective surgical care in rural areas remains a daunting challenge. We strongly believe that home-grown, home-trained surgeons are the most essential building block for an effective rural surgical workforce, and that they will ultimately improve surgical care across the rural areas. Other temporising measures such as humanitarian missions may be of assistance in the short term, but the fully trained rural general surgeon is the key to a bright rural surgical care worldwide.

This special edition of the *SAMJ* consists of three parts.

- The first part (articles 2 and 3) provides a general introduction to and overview of typical rural surgery.
- The second part (articles 4 - 9) consists of reports from various surgical specialists who were closely involved in initiating, growing and developing surgical departments in a rural setting.
- The third part (articles 10 - 20) provides a number of case reports typical of the rural setting.

We sincerely hope that the interested reader will find satisfaction and develop a deeper insight from our experiences in building up world-class rural surgical care, and we hope to assist key role-players in developing surgical services in rural areas.

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Challenges and opportunities in training surgeons in rural areas

Surgery and perioperative care have been severely neglected in rural areas, with funding priorities in Africa typically targeting infectious diseases, although it is a well-known fact that basic surgical care at district hospitals is typically more cost-effective than, for instance, antiretroviral therapy for HIV.[1] Globally, injuries constitute the greatest surgical burden, followed by cancers, congenital anomalies, and complications of childbirth.[2] The number of surgical procedures performed in Africa is dwarfed by the number in the developed world.[3] There is very little accurate information on surgical specialists in rural areas, while national surveys are generally lacking.[4] Most surgical procedures in rural areas are performed by generalists.[5] While subspecialty training centres for rural areas have been planned through regional surgical associations, support for programmes of this type remains poor. Rural postgraduate surgery struggles to recruit trainees, as the majority of undergraduates prefer positions in the field of infectious diseases.[6] Occupational exposure to infectious diseases, poor working conditions and infrastructure, inadequate compensation, and length of training all contribute towards putting young doctors off the idea of a surgical career in rural areas. The World Health Organization has attempted to alleviate the situation with the development of the Integrated Management for Essential and Emergency Surgical Care programme, which was implemented co-jointly with ministries of health, academia, professional societies and non-governmental organisations to strengthen capacities of district hospitals in low-income countries through the Global Initiative for Emergency and Essential Surgical Care.[7,8]

The two essential strategies for developing a successful rural surgical training ground are: (*i*) supporting recruitment and retention of rural surgeons by preparing trainees across a range of surgical specialties for rural practice; and (*ii*) facilitating high-quality cost-effective surgical services to rural areas.[9] The problems with establishing a training ground for surgeons in rural areas are multiple and complex, and revolve around a number of issues. The clinical load for each training specialist precludes having sufficient time to study. Typically, rural trainees are inundated with clinical cases, as the number of surgical patients per doctor is far higher in rural areas because of the shortage of medical staff. In addition, there is typically an acute lack of the high-quality teaching and training consultants who would galvanise academic training in central academic complexes. Apart from shortages of personnel, there are also often considerable gaps in diagnostic infrastructure such as computed tomography and magnetic resonance imaging, as well as in therapeutic infrastructure such as operating theatres and catheterisation laboratories, all of which are essential for appropriate 21st-century academic surgical training.

Historically, two approaches to improving surgical care in rural areas have been described. The first (bottom-up) approach is to improve basic health and district health at grassroots level and to use this as the main platform to build up a more sophisticated healthcare system. The model proposes that basic healthcare leads to improved regional healthcare and eventually to improved academic healthcare. The other (top-down) approach is the establishment of a well-equipped and modern tertiary healthcare system, thereby attracting high-quality specialists who would otherwise never have relocated to rural areas. The presence of these specialists will then create a critical mass, attracting more specialists and also generalists, who can then be employed in regional and district hospitals that cover the entire rural area.

As we reported previously, Limpopo Province is unique in that it has been implementing these two approaches simultaneously to improve its surgical service from a very low base.[10,11] This approach has not only proved to be rather successful in improving rural surgical care in the province, but in addition has the further benefit that the surgical training ground has been substantially extended. For example, during the past two years a number of subspecialist units have been established and are now rapidly expanding. These include cardiothoracic surgery, ear, nose and throat surgery, plastic surgery, orthopaedic surgery, gastroenterology and vascular surgery. In this special edition of the *SAMJ*, we specifically report on the difficulties encountered by a number of these units. Although significant progress has been reported, the ongoing need is still substantial and includes surgical trauma units and intensive care units. We are currently busy focusing on these areas and hope to report on them in the near future. Training to become a surgeon in rural areas may have its challenges, but it also has rewards. To become not just a surgeon, but a resilient surgeon, has proved to be of great benefit in the long term.[12]

Resilience cannot be taught, but has to grow through experience. Finding a sense of purpose is pivotal to building resilience.[13] Just *being* in a place of need offers a great sense of purpose. Working in an under-resourced rural area will enhance your own ability to cope with the stresses of life, which can also build resilience. The word 'resilience' is derived from the Latin verb '*resilire*', which means to leap or spring back, and implies the ability to recover or bounce back from stressful events. Instead of being static and passive, it describes the capacity of a dynamic system to adapt successfully to disturbance.[14] Surgeons will become more confident in their own abilities, including the ability to respond to and deal with ongoing crises, further enhancing resilience for the future. Rural areas have a tendency to stimulate activities – finding creative solutions instead of simply waiting for a problem to go away on its own, which usually prolongs the crisis. Starting to work on resolving issues immediately reduces stress. While there may not be any fast or simple solution, just taking immediate steps towards improving a situation makes surgeons more resilient. Another great way of building resilience is by focusing on the achieved change and progress made, and there is no doubt whatsoever that a surgeon trained in a rural area can change more for the better than a surgeon trained in an age-old stale academic institution.

Surgeons of the future, build resilience … and train rural!

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An audit of emergency admissions to the adult general surgery department at Pietersburg Hospital, Polokwane, Limpopo Province, South Africa, during an 8-month period in 2021

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Background. Emergency general surgery represents illnesses of very diverse pathology, related only by their urgent nature. The burden of general surgery emergency admissions at Pietersburg Hospital in Polokwane, Limpopo Province, South Africa, is currently unknown.
Objectives. To describe the demographic characteristics and clinical presentation of general surgical patients admitted to Pietersburg Hospital, as well as their surgical management, in order to plan future resource allocation.
Methods. This was a retrospective descriptive audit of patients admitted to the adult general surgery department over the 8-month period April - November 2021.
Results. A total of 893 surgical emergency patients treated during the study period were included in the analysis. Of these, 357 were trauma and 536 non-trauma emergency cases. The majority of the patients (61%) were managed non-operatively. Of the 39% who required surgical management, only 24% had their operation performed within the first 24 hours, with the remainder only operated on after a delay owing to unavailability of space in theatre and/or unavailability of an intensive care unit (ICU) bed.
Conclusion. The lack of a dedicated surgical emergency theatre and the shortage of ICU beds are burning issues at Pietersburg Hospital and should be addressed as a matter of the greatest urgency.

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Emergency general surgery represents illnesses of very diverse pathology, related only by their urgent nature.[1] Its burden is substantial, particularly in low- and middle-income countries where workforce, operational, organisational and financial challenges continue to have a negative impact on the rendering of timely, safe and affordable emergency surgery care.[2] In Limpopo Province, South Africa (SA), emergency surgical procedures often result in cancellation of elective surgery owing to the lack of an emergency operating theatre. The addition of emergency cases was found to have seriously interrupted 64.4% of the elective lists at Pietersburg Hospital.[3] Pietersburg Hospital is a teaching hospital for the University of Limpopo, located 30 km east of Polokwane, the provincial capital. The hospital shares referral responsibilities with Mankweng Hospital for regional and district hospitals in the province. There is as yet no dedicated trauma unit to deal with trauma cases at this hospital, so all trauma and other general surgical emergency cases are managed in the same unit by the same team. The Accident and Emergency Unit (AEU) at Pietersburg Hospital has 5 treatment rooms with 11 beds in total shared among all specialties in the hospital excluding obstetrics. In addition, the unit has 2 resuscitation rooms with a total of 6 beds. The unit admits an average of 20 patients per day. As a result of unavailability of beds, patients often stay in the AEU for more than 24 hours, partly because the COVID-19 pandemic has made it necessary to allocate surgical wards in the hospital to patients infected with the virus for purposes of infection control. Every day, an average of 7 patients from the previous day remain waiting in casualty for a hospital bed. The actual burden of general surgical emergency admissions to the AEU at Pietersburg Hospital is not known, so this study was designed to describe the demographic characteristics and clinical presentation of general surgical patients admitted to the AEU, as well as their surgical management. This information should guide the appropriate use and allocation of available resources. Accurate allocation will reduce unnecessary surgical delays, which are known to have a negative impact on patient outcome.

Methods

We conducted a retrospective descriptive audit of patients admitted to the adult general surgery department at Pietersburg Hospital over the 8-month period April - November 2021. The patient data were captured by the admitting doctor using a data collection tool. All adult patients reported to have been admitted the previous day were included in the study. We excluded all patients managed in and discharged from the AEU, and patients who died in the AEU. The senior consultant recorded the information using the same data collection tool during the daily weekday morning meeting. The data recorded included gender, age, presenting symptoms, provisional diagnosis, surgical intervention, and affected body site. In addition, if the surgical intervention required had not yet been performed, reasons for not performing the operation were recorded. The clinical diagnoses were further classified into trauma and non-trauma (medical emergency) cases. Trauma cases were subdivided according to the nature of the injury suffered. The collected data were captured using Microsoft Excel 2010 (Microsoft Corp., USA). The data were analysed using Stata software, version 16 (StataCorp., USA). Patient ages were grouped into categories. Categorical variables are expressed as proportions, and continuous variables as means and standard deviations.

Results

A total of 908 adult general surgical patients were entered into the Excel worksheet during the 8-month study period. Fifteen were removed from the list because of spoiled data collection tools, so 893 were included in the analysis. Reasons for admission of patients to the general surgery department via the AEU are presented in Fig. 1. The mean age of all the patients was 40 years, 71% were males, and trauma (40%) was the most common reason for presentation to the AEU and subsequent admission to the general surgery department. The majority of the non-trauma (medical emergency) patients presented with an acute abdomen (*n*=328), followed by upper gastrointestinal bleeding (*n*=63), diabetic and ischaemic foot (*n*=40), malignancies (*n*=18) and other conditions (*n*=87). When we analysed the data according to calendar month, the busiest month was October, with 67 trauma and 69 non-trauma emergency cases (Fig. 2). Motor vehicle accidents (*n*=82) were the most common trauma surgical emergency (Fig. 3). A large proportion (*n*=195/357; 55%) of trauma admissions to the AEU were related to interpersonal violence including stab wounds, assaults and gunshot wounds. Victims of mob assaults constituted 4% of the total trauma admissions. Patients injured in mob assaults were all males and typically sustained crush injuries. Suicide attempts (1.7%) and burn injuries (2.5%) contributed a relatively small number of reasons for admission (*n*=15). Of those who attempted suicide, 5 were males. Ingestion of car battery acid and self-inflicted grinder injuries were the mechanisms of self-harm in half of the suicide attempts. The majority of patients (47%) admitted to the general surgery department were young adults aged 18 - 35 years (Fig. 4). Nearly 60% of this age group were admitted for trauma. Although 39% (*n*=350) of the patients admitted needed emergency surgical intervention, only 24% had the operation performed on the day of admission. In the majority of cases (76%) the operation had to be delayed owing to unavailability of space in theatre (no dedicated surgical emergency theatre) and/or a shortage of ICU beds.

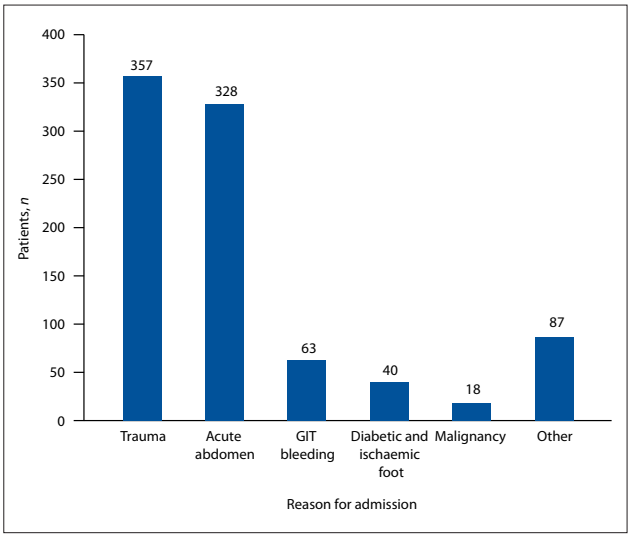
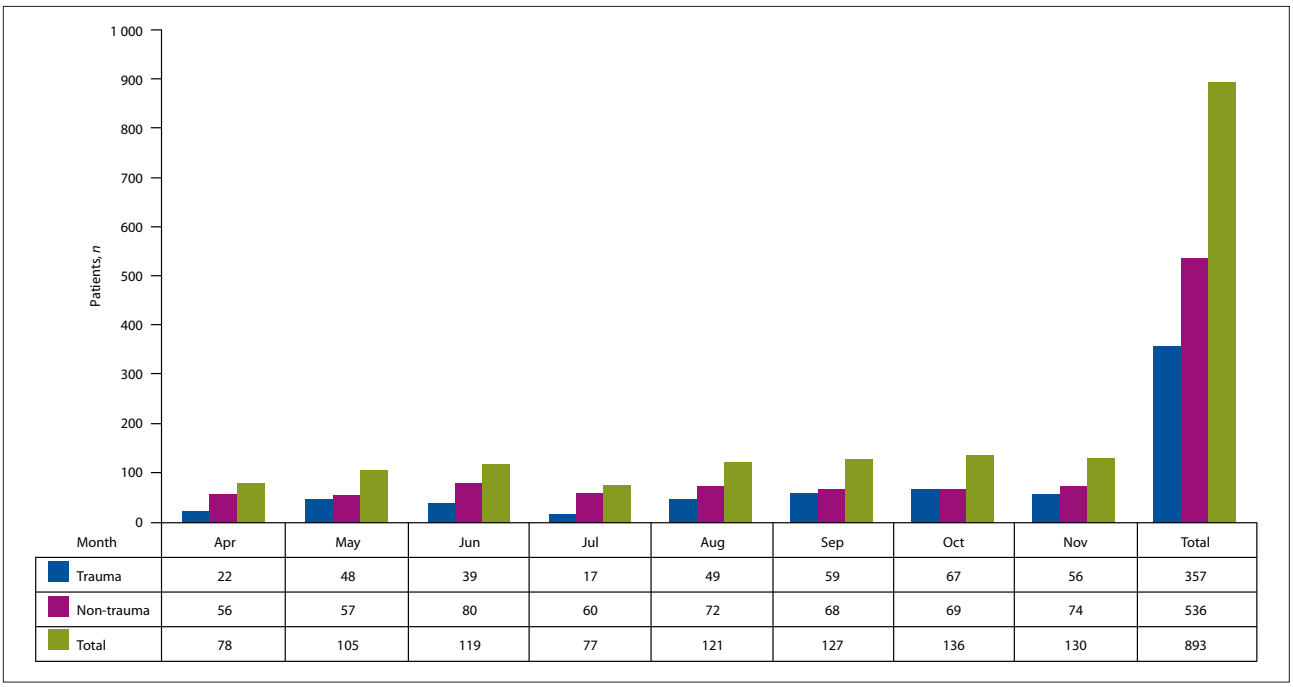


Fig. 1. General surgical admissions to the Accident and Emergency Unit. (GIT = gastrointestinal tract.)

Discussion

We have described the spectrum of general surgical emergency admissions at a tertiary hospital in Limpopo Province, SA. Nearly three-quarters of patients admitted to the unit were males. Men living in rural areas are known to be self-reliant individuals and persons in positions of power and strength,[4] who may not want to be perceived as weak by seeking medical care when they are not feeling well. They may therefore delay seeking medical care until their condition worsens. Compared with females, men are also known to indulge more in risky behaviours such as drinking and driving late at night, exposing them to a greater risk of injury. Males constituted 62.4% of the workload in a non-trauma surgical emergency unit in Lagos State University Hospital.[5] A Chinese study reported a 89.68% male predominance among patients screened for alcohol-related trauma in Suzhou, China.[6]

Nearly 50% of the patients admitted to the AEU at our hospital during the study period were young adults aged 18 - 35 years, and nearly 60% of this age group were admitted for trauma (Fig. 4). We observed



Month	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
Trauma	22	48	39	17	49	59	67	56	357
Non-trauma	56	57	80	60	72	68	69	74	536
Total	78	105	119	77	121	127	136	130	893

Fig. 2. Monthly general surgical admissions to the Accident and Emergency Unit.

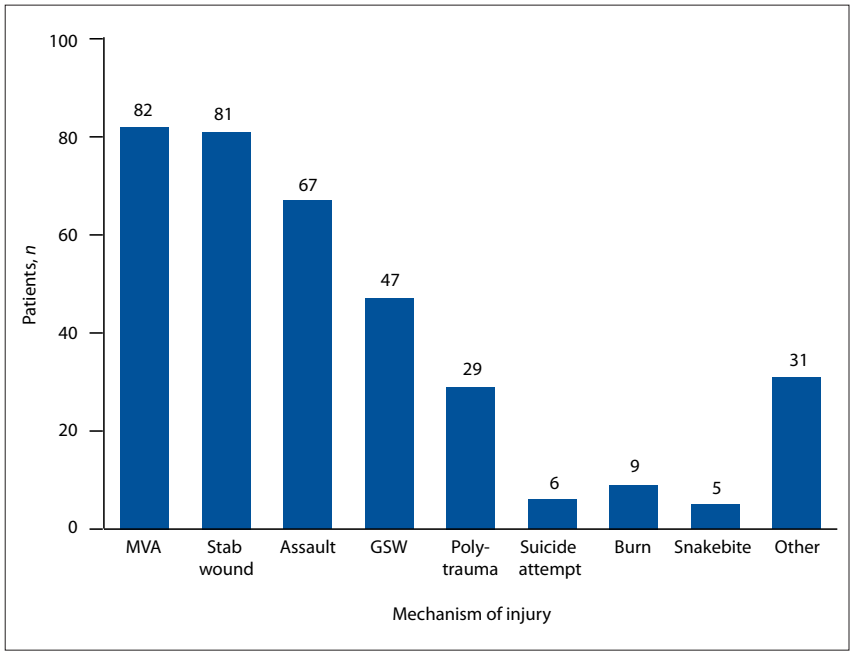


Fig. 3. Mechanisms of injury of general surgical trauma admissions to the Accident and Emergency Unit. (MVA = motor vehicle accident; GSW = gunshot wound.)

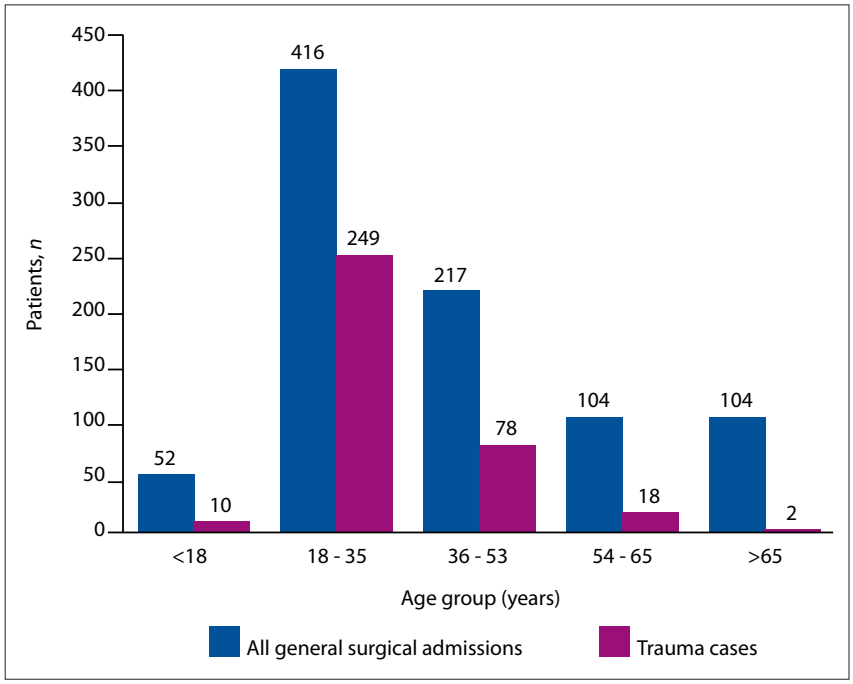


Fig. 4. Age distribution of surgical patients admitted to the Accident and Emergency Unit.

a decline in trauma-related emergencies with age, with patients progressively more likely to be admitted due to non-trauma (medical emergency) the older they were. The predominance of trauma surgical emergencies in our study may explain the young adult peak. The proportion of young adult (20 - 39 years) trauma admissions was also found to be high in the Princess Marina Hospital emergency department, Botswana.[7] We found that trauma constituted 40% of general surgical admissions during the study period. Our facility has not yet been able to establish a dedicated trauma unit, so all trauma and non-trauma general surgical emergencies are managed in a single clinical emergency unit. The most common cause for admission in the young age group (18 - 35 years) in the present study was interpersonal violence-related injuries including stab wounds, injuries due to assault and gunshot wounds (n=195 out of 357 trauma admissions; 55% of all admissions due to trauma). In their study on interpersonal violence in SA, Bola *et al.*[8] found that 38% of trauma admissions were due to interpersonal violence. Interpersonal violence was responsible for 69.4% of trauma admissions in a study by Lewis and Wood[9] in KwaZulu-Natal. In our study, mob assaults were responsible for 4% of the trauma admissions. Mob assault is generally associated with extra-legal justice ('kangaroo court') being meted out by community members. The victims are typically young adult males accused of robbing people of their belongings. In our study, all victims of mob assault were males aged between 23 and 41 years. Although the proportion (4%) was numerically small, it was clinically significant because all victims of mob assault presented to the AEU with the clinical features of crush syndrome. Of all interpersonal violence-related injuries, those sustained in mob assaults are associated with the highest proportion of fatalities. An analysis of mob justice fatalities in SA showed that 50.6% of the victims died on the scene, while 49.4% of those who were admitted to hospital died within 24 hours of admission.[10]

The majority of cases in the present study (60%) were non-trauma general surgical emergencies, of which acute abdomen (37% of total admissions) was the most common. This finding contrasts with a Nigerian study at a tertiary hospital, in which non-trauma surgical emergencies constituted 41.6% of the population studied.[11] In the present study, the majority of patients (61%) were managed non-operatively. Of the 39% who required surgical management, only 24% had their operation performed within the first 24 hours. The remaining patients were only operated on after a delay owing to unavailability of space in theatre and/or unavailability of an ICU bed. Lack of an emergency theatre is shown to be a problem that significantly reduces the effectiveness of the surgical department. This ineffectiveness comes at a huge price in terms of both financial cost and emotional trauma.[3]

Conclusion

Our 8-month audit of emergency cases demonstrates the large burden of trauma in our surgical department. We treated a total of 908 surgical emergency patients during this period. Of the 893 analysed, 357 were trauma cases and 536 non-trauma emergency cases. The most common mechanisms of injury were motor vehicle accidents (n=82), stab wounds (n=81), blunt assaults (n=67) and firearm-related injuries (n=47). Less common mechanisms of injury were suicide attempts (n=6), burns (n=9) and snakebites (n=5). The majority of the non-trauma (medical emergency) patients presented with signs and symptoms

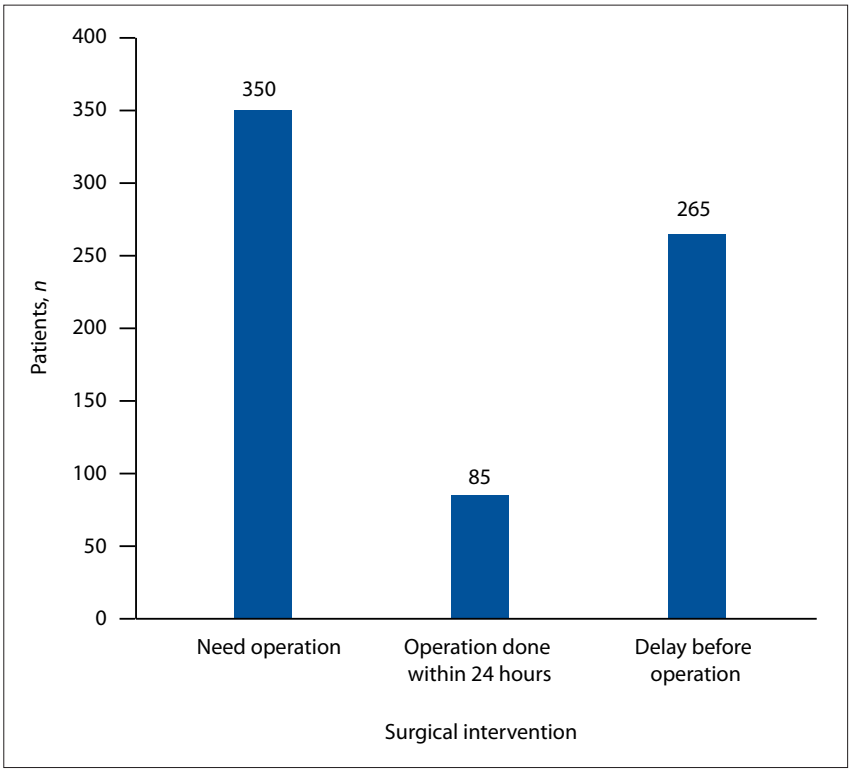


Fig. 5. Number of patients who required surgical intervention.

of acute abdomen (*n*=328), upper gastrointestinal bleeding (*n*=63), diabetic and ischaemic foot (*n*=40), malignancies (*n*=18) and other conditions (*n*=87). The striking epidemiological features of this audit are the high proportion of males (71%) compared with females, and the large number of patients in the young age group (18 - 35 years), which comprised 47% of all admissions. Another striking finding is the very high proportion of delayed surgical procedures due to the unavailability of a dedicated surgical emergency theatre and/or a shortage of ICU beds. We have repeatedly reported on the shortage of theatre availability;[3,12,13] however, we are still waiting for the problem to be resolved.

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Establishing high-tech surgical procedures in the Limpopo Academic Complex, Polokwane, South Africa

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Background. The two hospitals comprising the Limpopo Academic Complex are the only referral institutions for Limpopo Province, which is the fifth most populated province of South Africa. The Department of General Surgery has a policy of establishing high-tech surgical procedures to improve patient care.
Objectives. To review the model of establishing high-tech surgical procedures in the Limpopo Academic Complex.
Methods. The Department of General Surgery followed the DIRA model (D = Directive, I = Informative, R = Reconfiguration, A = Appraisal), which is dynamic and continuously evolving. The high-tech surgical procedures performed after a departmental workshop in January 2022, at which the DIRA model was conceptualised, are included in this survey.
Results. There were 48 laparoscopic procedures performed during the period 23 February - 8 June 2022, and 13 interventional endoscopy procedures performed during the period 10 January - 31 May 2022, at Pietersburg Hospital, which is part of the Limpopo Academic Complex.
Conclusion. We strongly advocate use of the DIRA model, and believe that our experience may be useful to others seeking to establish high-tech surgical procedures in rural settings.

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Limpopo Province, with 6.01 million inhabitants in 2021,[1] is the fifth most populated province of South Africa (SA). Health services in the province's public sector are delivered by 40 public hospitals, including two tertiary hospitals, Pietersburg Hospital and Mankweng Hospital, which comprise the Limpopo Academic Complex. These hospitals are the only referral institutions in the province for patients who need tertiary healthcare. Both provide the specialised services required.

Technological innovations are one of the main levers to improve the efficiency and quality of care at healthcare institutions. Slow adoption and utilisation of beneficial technology can result in an inefficient, poor-quality healthcare system. However, adoption of technological innovations before their efficiency has been proved may waste healthcare resources and harm patients.[2-5]

Our objective was to review the model of establishing high-tech surgical procedures in the Limpopo Academic Complex.

Methods

High-tech surgical procedures were established in the Limpopo Academic Complex following the DIRA model. The acronym DIRA stands for:

- **Directive (D).** Departmental policy with clear direction to adopt the high-tech surgical procedures.
- **Informative (I).** Providing necessary information on the adoption of the high-tech surgical procedures to all stakeholders, including administrators, policymakers, department staff, support staff, procurement staff, financial staff and healthcare industry representatives (Fig. 1).
- **Reconfiguration of services (R).** Implementing the model of subspecialty surgical units that provide subspecialty as well as general surgical services. All surgical units are encouraged to be involved in high-tech surgical procedures performed by colleagues with technical expertise. Recruiting persons with technical expertise is a part of re-figuration of existing services.
- **Appraisal (A).** Assessing the assimilated high-tech surgical procedures on a regular basis at daily morning department meetings and weekly mortality and morbidity meetings.

The high-tech surgical procedures performed in the Limpopo Academic Complex after a departmental workshop in January 2022, at which the DIRA model was conceptualised, are included in this survey. High-tech surgical procedures prior to that meeting are excluded.

Results

High-tech procedures in the Limpopo Academic Complex comprise three areas: vascular surgery, laparoscopic surgery and interventional endoscopy. We intend to report on high-tech vascular procedures in a future article on vascular surgery.



Fig. 1. Laparoscopic hernia workshop in progress.

Forty-eight laparoscopic procedures, consisting of diagnostic laparoscopy (*n*=7 procedures), laparoscopic cholecystectomy (*n*=11), laparoscopic appendicectomy (*n*=9), laparoscopic splenectomy (*n*=1), laparoscopic hernia repair (*n*=14), laparoscopic diaphragm repair (*n*=1), laparoscopic adhesiolysis for intestinal obstruction (*n*=1), laparoscopic resection of the colon (*n*=1), laparoscopic Hartmann colostomy reversal (*n*=1), laparoscopic omental patch for perforated peptic ulcer (*n*=1) and laparoscopic wash-out for abdominal sepsis (*n*=1), were performed during the period 23 February - 8 June 2022 at Pietersburg Hospital in the Limpopo Academic Complex (Fig. 2).

Thirteen interventional endoscopy procedures, consisting of therapeutic endoscopic retrograde cholangiopancreatography (*n*=9), insertion of a partially covered self-expanding metal stent for advanced oesophageal cancer (*n*=1) and pneumatic balloon dilatation for oesophageal stricture (*n*=3), were performed during the period 10 January - 31 May 2022 at Pietersburg Hospital (Figs 3 - 5).

Discussion

In the current medical literature, there is no shortage of high-level policy-focused commentaries relating to technology adoption in healthcare systems, and policymakers' attempts to improve the efficiency and quality of healthcare by encouraging technical innovations and accelerating their wider adoption. However, diffusion of these technical innovations within healthcare organisations is a huge, diverse and complex process. Even in the current literature, articles on the subject tend to lack clear and distinct recommendations and conclusions.[2,6] The Limpopo Academic Complex is not exempted from the complexity of these processes or from lack of clear direction.

Establishing high-tech surgical procedures in the Limpopo Academic Complex is directed by departmental policy. The present academic head, who is also chief of the province's surgical services, has clearly outlined the department's policy on adopting high-care technologies, including high-tech surgical procedures. This departmental policy has been the directive step towards establishing high-tech surgical procedures in the Limpopo Academic Complex. The numerous organisational factors contributing to the complexity of diffusion of technical innovations within a healthcare institution and determining whether it will be successful include the hospital culture, the influence of opinion leaders, the institution's readiness to accept innovations in technology, decision-making policy processes, and the power balance between supporters of and opponents to innovations in technology.[2,6] However, in the literature, three main preconditions have been recommended for healthcare organisations pursuing an efficient healthcare system. These are: (*i*) the provision of necessary information to all stakeholders; (*ii*) a system of government appropriate for relevant accountable parties; and (*iii*) sufficient will and capacity to pursue efficiency objectives.[7]

Spearheaded by the academic head, we provided the relevant information on high-tech surgical procedures to all stakeholders in the Limpopo Academic Complex as the 'informative step' in establishing these procedures. We felt that this was one way to overcome the complexity of the process of diffusion.

During this informative step, we conducted many departmental workshops and formal meetings with stakeholders, including management, administrators, the finance department, procurement, support staff, and health industry representatives. We met these stakeholders in informal ways and took opportunities to provide information on the essence of adopting high-tech surgical procedures. In our experience, such informal meetings and 'buddy-like' communication are very productive in terms of providing the required information to all stakeholders.

Health practitioners play a major role as the key target for initiatives to improve efficiency in healthcare. They are responsible for the allocation of a large proportion of healthcare resources. It has been reported that there are immense variations in costs and uses of resources between healthcare providers, highlighting the importance of a 'reconfiguration of services' in which organisational weaknesses are identified and skills are transferred from efficient service providers.[7]

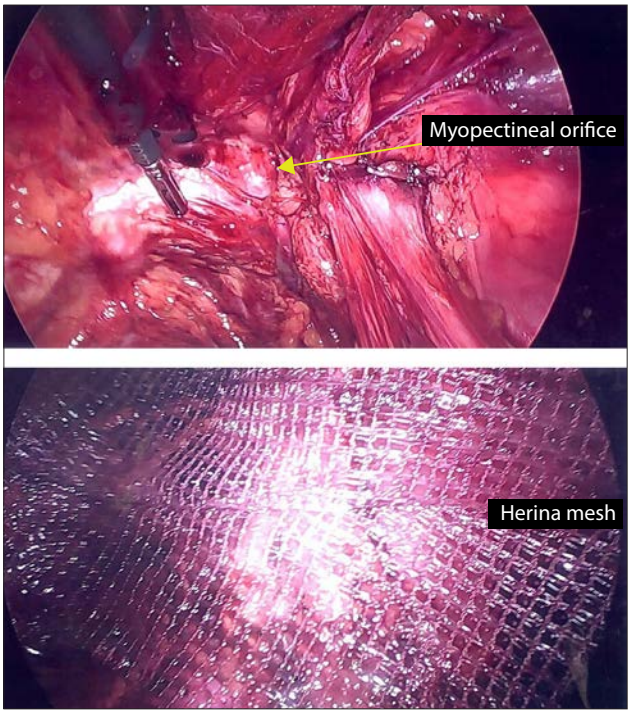


Fig. 2. Laparoscopic view of totally extraperitoneal inguinal hernia repair.

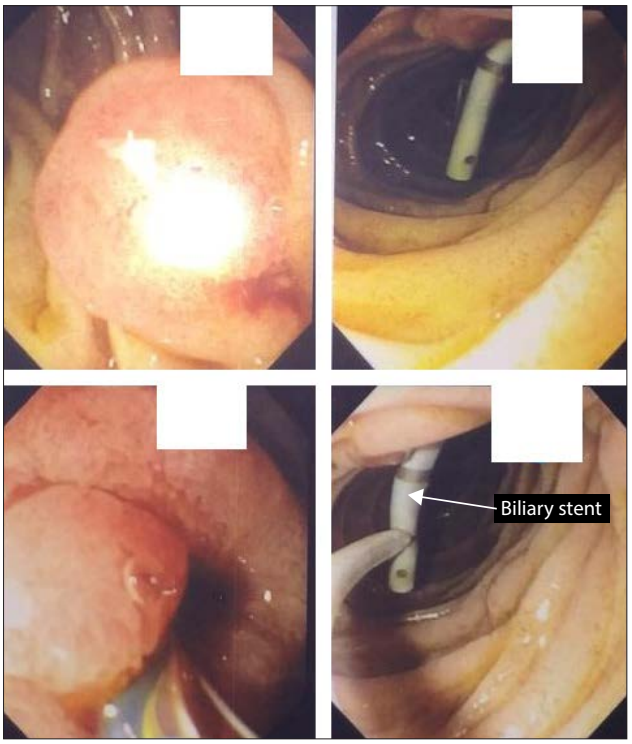


Fig. 3. Endoscopic view of biliary stent.

The reconfiguration of services in the Limpopo Academic Complex is an integral and crucial component in the process of establishing high-tech surgical procedures. The academic head chaired the department workshops and consultant meetings. A major item on the agenda has been to establish subspecialty units, which are vital for adopting technological innovations. Because the academic head was also chief of the province's surgical services, Limpopo's unique healthcare requirements were always on the meeting agenda. In view of SA's current healthcare challenges as well as the capacity of well-trained health practitioners,[8,9] headhunting and recruiting practitioners with technical expertise is one of the priorities in the reconfiguration of services. Recently, two vascular surgeons, two specialist surgeons with a special interest in surgical gastroenterology and two cardiothoracic surgeons have joined the Limpopo Academic Complex workforce.

During this reconfiguration stage, the Department of General Surgery in the Limpopo Academic Complex has established surgical subspecialty units with a unique set-up. Every surgical unit is encouraged to establish a centre of excellence in its field. However, every surgical unit is independent in terms of performing its own high-tech surgical procedures. The procedures take place with support from colleagues with the necessary technical expertise. In our experience, this process prevents monopolising of the high-tech procedures by only one unit and avoids academic rivalry among colleagues, creating a balance between establishment of centres of excellence and academic independence.

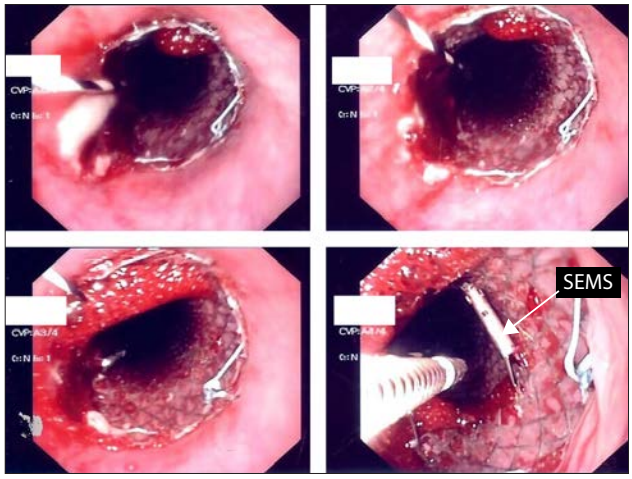


Fig. 4. Endoscopic view of SEMS. (SEMS = self-expanding metal stent.)

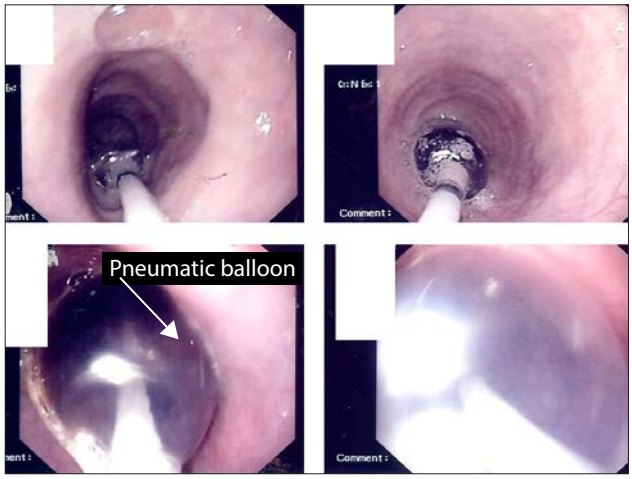


Fig. 5. Endoscopic view of pneumatic balloon dilatation.

Mortality and morbidity (M&M) meetings are an integral part of current surgical practice. Traditionally, an M&M meeting is an educational conference at which the surgical management of a case and any resulting complications are discussed. However, the role of M&M meetings has evolved over time from a primarily educational process to an important guide to improve surgical practice. A well-conducted M&M meeting can be a platform for continuing professional development, applying clinical governance frameworks and improving health systems.[10-13]

M&M meetings are the essential component of the appraisal stage in establishing high-tech surgical procedures in the Limpopo Academic Complex. We conduct weekly M&M meetings, weekly academic meetings and daily morning hand-over meetings. Although these meetings are not conducted in the context of perfect, well-defined formats, we sincerely try to identify the factors that are crucial in making them effective, as outlined by Vreugdenburg *et al.*[10] in their article published in 2018. In our experience, daily hand-over meetings can be as effective a platform as M&M meetings, especially when they include feedback on high-tech surgical procedures performed in the department.

Conclusion

The establishment of high-tech surgical procedures in the Limpopo Academic Complex continues to be a dynamic and evolving process. We utilised the DIRA model (an integration of Directive, Informative, Reconfiguration and Appraisal components) to initiate, develop and grow these procedures. We strongly advocate utilisation of this model, with its limitations, to establish high-tech surgical procedures in more rural areas. We believe that our experience in this regard may contribute positively to endeavours to improve efficiency of healthcare systems, especially for medical institutions with limited resources.

Declaration. None.

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Author contributions. Equal contributions.

Funding. None.

Conflicts of interest. None.

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An audit on the preliminary results of endoscopic retrograde cholangiopancreatography performed in the Limpopo Academic Complex, Polokwane, South Africa

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Background. Endoscopic retrograde cholangiopancreatography (ERCP) is an endoscopic procedure that is an important treatment modality for the management of hepatic, pancreatic and biliary diseases. The ERCP unit in the Limpopo Academic Complex in Polokwane, South Africa, was established at the end of 2021.
Objectives. To identify areas for improvement in the new ERCP unit.
Methods. All ERCP procedures were audited in five components: (*i*) room set-up; (*ii*) endoscope, guidewires and consumable accessories; (*iii*) fluoroscopy; (*iv*) sedation and analgesia; and (*v*) ERCP endoscopist and staff. These were considered the essential pillars of an ERCP unit. The quality of each component was graded in every ERCP procedure as grade 1 (very poor), grade 2 (below average), grade 3 (average), grade 4 (above average), and grade 5 (highly satisfactory).
Results. Nine therapeutic ERCP procedures were performed during the period 10 January - 31 May 2022. Eighteen theatre slots were allocated for ERCP procedures during the study period, but only seven of them were utilised. The quality of ERCP unit components was highest for the sedation and analgesia component (mean grade of 4) and lowest for fluoroscopy (mean 1.8).
Conclusion. Establishing a new ERCP service is a task with many challenges. We present the preliminary results of the Limpopo Academic Complex ERCP unit with a view to adding our experience to the current knowledge.

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Endoscopic retrograde cholangiopancreatography (ERCP) is a minimally invasive endoscopic procedure performed using a side-viewing endoscope for direct visualisation of the ampulla of Vater, as well as direct access into the biliary and pancreatic ducts. The procedure is typically performed with the patient under deep sedation or general anaesthesia.[1]

The first successful cannulation of the ampulla of Vater was reported in 1968. After this technical breakthrough, the side-viewing endoscope was invented, mostly as a result of research activities of Japanese working groups and endoscope manufacturers. ERCP has subsequently evolved as a modality for both diagnostic procedures and therapeutic interventions in various hepatic, pancreatic and biliary diseases.[2]

Limpopo Province, with 6.01 million inhabitants in 2021, is the fifth most populated province of South Africa.[3] Health services in the province's public sector are delivered by 40 state-owned hospitals, including two tertiary hospitals, Pietersburg Hospital and Mankweng Hospital, which comprise the Limpopo Academic Complex. These are the only referral institutions in the province for patients requiring tertiary healthcare. However, although these hospitals provide a range of specialised healthcare services, there was no ERCP unit in the Limpopo Academic Complex until the end of 2021.

Through an audit, we hoped to identify areas for improvement in the newly established ERCP unit in the Limpopo Academic Complex.

Methods

All ERCP procedures performed in the Limpopo Academic Complex from 10 January to 31 May 2022 were included in the audit. The procedures were performed in the Monday theatre slot, which was allocated to a surgical firm. The team that performed the ERCPs included one gastrointestinal endoscopist and one endoscopy nurse with the necessary experience in assisting ERCP procedures. If no nursing staff with the necessary skills were available, representatives from the ERCP consumable accessories suppliers filled the role of endoscopy nurse. Before the procedure, the patient's fitness was assessed according to the American Society of Anesthesiologists (ASA) classification. All ERCPs were performed under fluoroscopy, utilising a mobile radiological C-arm machine operated by a radiographer, with the patient under either deep sedation or general anaesthesia, administered by an anaesthetist. Procedures were rescheduled if the fluoroscopy service was unavailable. A side-viewing endoscope was used to view the ampulla of Vater and to gain access to the biliary system. The consumable accessories for the ERCP procedures, such as sphincterotomes, guidewires and stents, were purchased on an *ad hoc* basis from commercial suppliers committed to helping establish our ERCP service, aiding in quality control and supporting ERCP staff.

Five components, (*i*) room set-up; (*ii*) endoscope, guidewires and consumable accessories; (*iii*) fluoroscopy; (*iv*) sedation and analgesia; and (*v*) ERCP endoscopist and staff, were considered the essential pillars of our ERCP unit. The quality of each of these components was graded in each ERCP procedure, as follows: grade 1 (very poor); grade 2 (below average); grade 3 (average); grade 4 (above average); and grade 5 (highly satisfactory). A procedure was only defined as successful if the therapeutic aim of ERCP in that particular patient was achieved.

Results

Nine patients (2 males and 7 females) with a mean age of 45.4 years (range 28 - 76) had ERCP performed at the Limpopo Academic Complex during the period 10 January - 31 May 2022. With

regard to their fitness for ERCP, 2 were classified as ASA II, 6 as ASA III and 1 as ASA IV. The indications for the procedure were obstructive jaundice due to cancer of the pancreatic head (*n*=2 cases), sclerosing cholangitis (*n*=1), cholangiocarcinoma (*n*=3), periampullary tumour (*n*=1) and choledocholithiasis (*n*=2).

Seven ERCP procedures (*n*=7/9) were successful and achieved their therapeutic aim. Two procedures were not successful because of gastric outlet obstruction. Therapeutic procedures performed were endoscopic sphincterotomy (*n*=7/7), needle-knife pre-cut papillotomy (*n*=1/7) and biliary stenting (*n*=5/7) (Figs 1 and 2). One diabetic patient (*n*=1/9) developed post-ERCP pancreatitis, but required conservative management only. There were no procedure-related deaths. Eighteen theatre slots were allocated for ERCP procedures from 10 January to 31 May 2022, of which only seven were utilised (Fig. 3). The reasons for not utilising allocated slots (*n*=11/18) were no patients requiring ERCP at that time (*n*=1/11), unavailability of consumable accessories (*n*=2/11), and unavailability of the fluoroscopy service (*n*=8/11).

The quality of the ERCP unit pillars, as assessed using the five grades described above, is shown in Table 1.

Discussion

An epidemiological study by Gear *et al.*[4] published in 1990 suggested that 50 ERCP examinations are needed per 100 000 population each year, while in 1991 the Working Party of the Clinical Services Committee of the British Society of Gastroenterology[5] reported that the use of ERCP was rising and provided estimates of likely workload. With the advent of non-invasive tests such as magnetic resonance cholangiopancreatography and endoscopic ultrasound, ERCP has become a procedure used mostly for therapeutic purposes, and rarely for diagnostic indications.[6,7] From this perspective, the ERCP requirements reported in the epidemiological study[4] may not apply today. However, it would be difficult for a health system to provide comprehensive healthcare without ERCP services. The ERCP unit at Limpopo Academic Complex was established to provide therapeutic ERCP procedures as part of the healthcare service for the province.

The fundamentals and essentials of ERCP procedures have been extensively described in the medical literature.[2,8] Based on the available information, the ERCP unit in the Limpopo Academic Complex identified the five essential pillars of (*i*) room set-up; (*ii*) endoscope, guidewires and accessories; (*iii*) fluoroscopy; (*iv*) sedation and analgesia; and (*v*) ERCP endoscopist and staff.

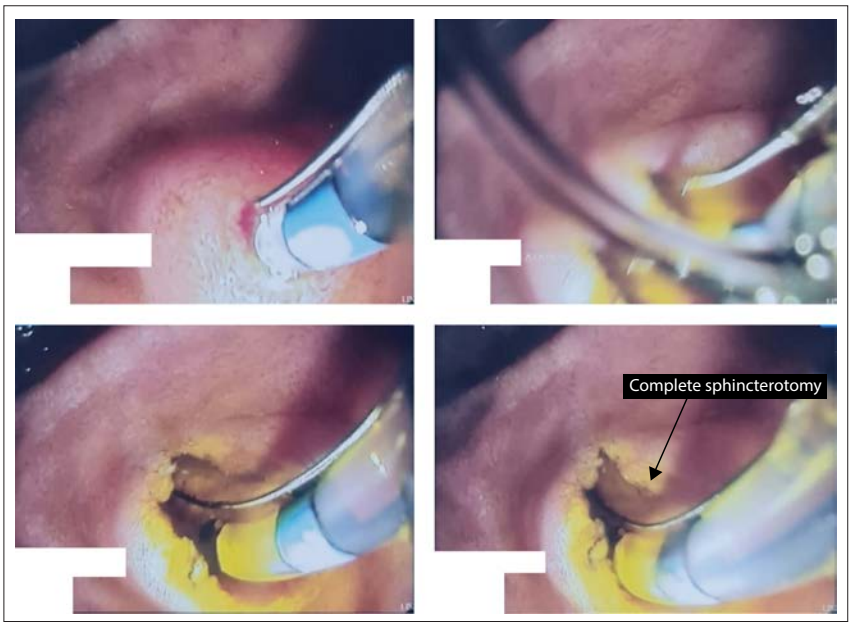


Fig. 1. Endoscopic view of endoscopic sphincterotomy.

Table 1. Grading of the ERCP unit pillars

	Grade	Comments
Room set-up	Mean 3.5 (range 3 - 4)	• Not enough space for C-arm, endoscope stack, lack of endoscopic accessories
Endoscope, guidewires and accessories		
Endoscope	Mean 2.8 (range 2 - 3)	• Only one outdated endoscope available
Accessories	Mean 3.5 (range 3 - 4)	• One representative from the ERCP consumable accessories suppliers always present for all ERCP procedures • Unavailability of right diathermy connection for intervention procedures • Unavailability of diathermy with ENDO CUT mode
Fluoroscopy	Mean 1.8 (range 1 - 3)	• Unavailability of quality fluoroscopy and trained radiographer
Sedation and analgesia	Mean 4 (range 3 - 5)	• One qualified anaesthetist always available for all ERCP procedures
Endoscopist and staff		
Endoscopist	Mean 3.8 (range 3 - 4)	• Only one gastrointestinal endoscopist performed all ERCP procedures during the study period
Endoscopy nurse with experience in assisting ERCP	Mean 3 (range 2 - 4)	• No nursing staff with required skills available during the study period • The representatives from the ERCP consumable accessories suppliers filled the role of endoscopy nurse in ERCP procedures performed during the study period
Enthusiasm of ERCP team members	Mean 4.5 (range 3 - 5)	• Strong enthusiasm of the ERCP team for establishing the unit demonstrated in all ERCP procedures

ERCP = endoscopic retrograde cholangiopancreatography.

Although the important role of ERCP is well established, evaluation of ERCP procedures is a complex process. Its clinical success may be obvious in certain procedures, such as removal of stones from the common bile duct or relief of obstructive jaundice by biliary stenting. However, in scenarios such as chronic pancreatitis or sphincter dysfunction, evaluation may not be as simple. Cost and patient satisfaction should also be considered in evaluating ERCP procedures.[2,5-7] Our initial results of successful ERCPs included 7 patients with obstructive jaundice, 2 of whom had common bile duct stones and 5 malignant lesions. In all these cases, ERCP achieved obvious clinical success. However, in patients with advanced malignant lesions, it was very difficult to judge whether treatment was worthwhile in terms of both its cost and the patients' expectations. For these patients, therapeutic ERCP offered only a palliative minimally invasive treatment and enabled them to avoid palliative surgical procedures.

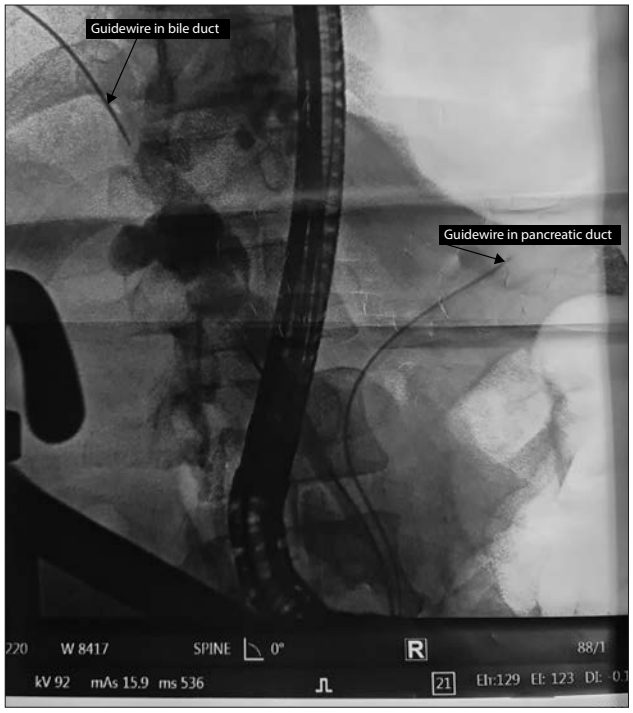


Fig. 2. Double-guidewire technique in a case of severe bile duct stricture.

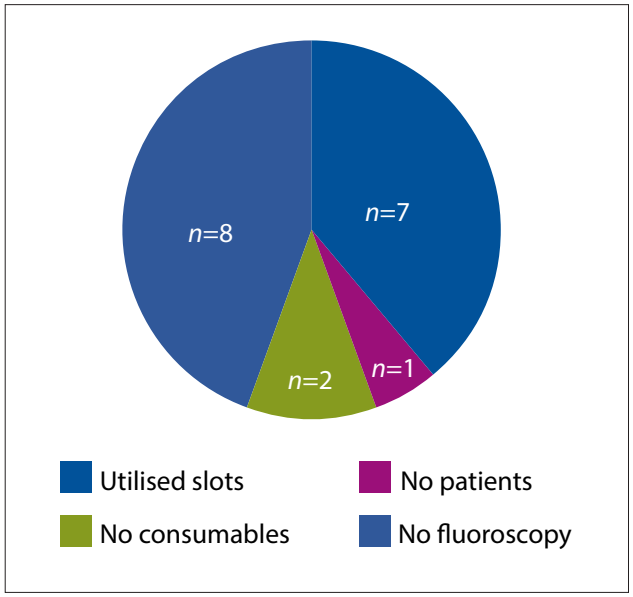


Fig. 3. Theatre slots allocated for endoscopic retrograde cholangiopancreatography (N=18).

Cotton[2] favoured the term 'unplanned events' over the more common 'complications' and 'adverse events'. Since ERCPs are technically very demanding endoscopies and therapeutic modalities, it can be difficult to determine at what level an unplanned event should be considered an adverse ERCP event.[2] One of our patients, who had diabetes, underwent ERCP to clear her bile duct stones, and developed post-ERCP pancreatitis. In our operation record, it was classified as an uneventful ERCP procedure. Her bile duct was cannulated with a guidewire-assisted technique, and there were no inadvertent pancreatic duct cannulations. However, we had to use a cutting diathermy mode to perform endoscopic sphincterotomy, as there was no diathermy machine with ENDO CUT mode, which is a better way to perform endoscopic sphincterotomy, in our ERCP unit. We agree with the literature that although ERCP is recognised as a relatively safe procedure, it does have high complication rates. The most common complication is post-ERCP pancreatitis. The importance of standardised recording for every ERCP procedure has also been emphasised in the literature.[9]

We performed our ERCPs with the patient under either deep sedation or general anaesthesia, in every case administered by an anaesthetist, in line with the ASA recommendation[10] that a qualified anaesthetist should always be available, especially for ASA III and IV patients. There was no procedure-related mortality in our series, and we consider that the presence of an anaesthetist, to administer sedation or anaesthesia during the ERCP, was a major contributing factor in this regard.

ERCP is a complex endoscopic procedure, and the staff involved require a specialised set of skills and knowledge.[11] To achieve proficiency in all aspects of ERCP requires several years of practical training and continuous refinement of knowledge. Moreover, the shift towards ERCP being an endoscopic procedure used mostly for therapeutic indications has posed further challenges in terms of training and transfer of skills to young endoscopists.[12-15]

Our new ERCP unit has not been exempted from the challenges posed by lack of skilled staff. However, with the enthusiasm of the ERCP team (graded as a mean of 4.5 and a maximum of 5), we are optimistic that the process of skills transfer will be implemented successfully in the near future (Fig. 4).

ERCP is an endoscopic procedure that uses radiological imaging. It is vital for every ERCP unit to have quality fluoroscopy with minimal radiation exposure to the staff.[2,16] In our initial audit, fluoroscopy



Fig. 4. The endoscopic retrograde cholangiopancreatography team in the Limpopo Academic Complex.

was graded as a mean of only 1.8, with a maximum of 3. This is an area that we are trying to improve.

During the study period in our initial audit, only 9 patients had therapeutic ERCP performed, 5 of whom had advanced cancer. For these procedures, we utilised 7 of 18 available theatre slots. As ours is the only ERCP unit in the public health sector in Limpopo, with its over 6 million population, these low figures could indicate a need for improvements in our current referral system and in health education for the public.

Availability of the necessary information is one of the preconditions that has been recommended to achieve an efficient healthcare system.[17] During the period of our study, there were 18 theatre slots allocated for ERCP procedures, of which only 7 were utilised. In one case, the slot was not used because no patients required ERCP at that time. However, 2 slots were not used because of unavailability of consumable accessories and 8 because no fluoroscopy service was available. These figures in our initial audit highlight areas to which we should direct extra efforts for further improvements.

Conclusion

Establishing a new ERCP service is a task with many challenges. However, ERCP is an integral part of a healthcare system providing the necessary care to the community it serves. We hope that the results of this audit will contribute to the current knowledge and assist other units in establishing ERCP services in the future.

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Conflicts of interest. None.

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The challenges of starting a tertiary orthopaedics centre in a rural area

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Rural areas are known to be less well resourced than urban areas. Starting new subspecialty centres in an urban area may be challenging; starting them in rural areas is often even harder. In this article we explore various factors that make starting a tertiary orthopaedics unit difficult. We first discuss the background, followed by general challenges of initiating specialised units in rural areas and then the more specific challenges with regard to orthopaedic surgery, and we finish by discussing some socioeconomic and family issues.

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South Africa (SA) faces numerous socioeconomic challenges, ranging from poverty and unemployment to social injustices. Limpopo Province is SA's fifth-largest province in terms of population (Fig. 1).[1] It comprises five districts, each with a substantial population (Fig. 2).[1] Some of the challenges faced by rural health practitioners are also encountered by health practitioners in urban areas, but the rural context increases these challenges,[2] often leading to social neglect of those areas that are regarded as the 'rural of the rural'. These communities continue to have poor access to clinics and hospitals for basic services, and most importantly, very limited access to tertiary services. Healthcare service delivery in rural areas is complex, with multiple challenges. According to Atkinson,[3] ~40% of the SA population resides in rural areas. The rural setting is characterised by availability of only a few health facilities, few health practitioners and lack of resources, all factors that compromise healthcare delivery. For healthcare to be effective, it should be widely available, of good quality and easily accessible. The international literature also reports negative trends in terms of rural healthcare, and difficulties in recruiting and retaining a skilled rural health workforce.[4] The National Center for Health Statistics in the USA published a report in 2004 in which US counties were classified according to their urbanisation level.[5] The unintentional injury mortality rate for the most rural counties was 54.1 per 100 000 population, a rate nearly two times higher than in counties with a predominantly metropolitan population. In rural areas that contained a small city, the rate was nearly 1.5 times higher (Fig. 3).

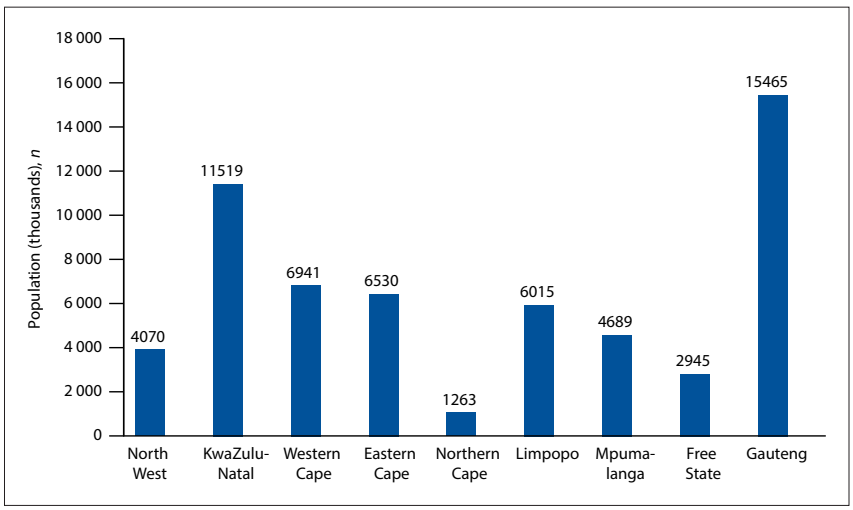


Fig. 1. Population per province of South Africa, 2020.[1]

General challenges of starting a specialised surgical unit in a rural area

Most rural communities have poor access to health facilities owing to distance or lack of financial resources for transportation. Many people who live in rural areas are unemployed, increasing the difficulty of accessing healthcare. Health facilities in rural areas are generally set up specifically to provide basic primary healthcare.[6] Some of the health conditions faced by rural communities are similar to those in urban areas, and complicated cases require treatment at tertiary facilities. To increase access to tertiary health services, tertiary health centres may be built in rural areas, but this comes with its own challenges.[7] Rural areas have a high burden of trauma, which differs from trauma in urban areas. Trauma in rural areas is commonly due to pedestrian-vehicle accidents, falling from wild fruit trees, falling on uneven surfaces owing to poor lighting, and animal bites.[8] Because of the lack of health facilities in rural areas, tertiary centres often apply an 'open-door' policy for all services, so patients who live close to a tertiary facility go there for treatment of health conditions that should ideally be attended to at primary healthcare level. This additional load increases the already large number of patients who need to be seen at central hospital emergency and outpatient departments, leading to substandard service delivery. The majority of patients who require tertiary services live far from the tertiary centres and rely on transportation provided by the provincial government to

access the specialised treatment they need. This imbalance in tertiary access leads to delayed presentation and complicated surgical intervention, with subsequent increased complication, morbidity and mortality rates. Most rural regional and secondary hospitals have limited resources, including human resources, which further leads to inadequate support for those patients who require tertiary services and in turn increases waiting times and delayed presentation to the tertiary centres.

Specific orthopaedic surgical services needed in rural areas

Correctable congenital anomalies such as clubfoot, rickets and Blount's disease are often regarded as 'acceptable variants' in rural communities. Affected children therefore tend to grow up with these deformities, and unfortunately many of them remain disabled for life. Only few of them present to tertiary centres, typically very late, at a point where surgical correction may be detrimental. Rural communities are also known to have strong religious and belief systems. As a result, patients with conditions that require urgent tertiary intervention may only present to the tertiary service after a considerable delay due to religious and cultural beliefs.[9] In addition, many patients with septic and neoplastic conditions also present late, and often refuse surgical intervention as it is against their personal belief system. Many of these patients believe that witchcraft is the cause of their condition, and prefer to try traditional and religious healing before surgical intervention. This further perpetuates delay in providing an effective tertiary service to the community.

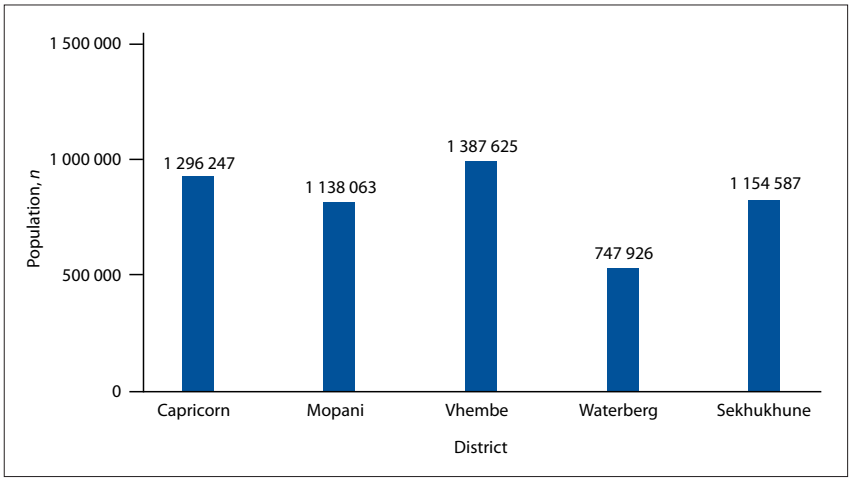


Fig. 2. Population per district of Limpopo Province, 2020.[1]

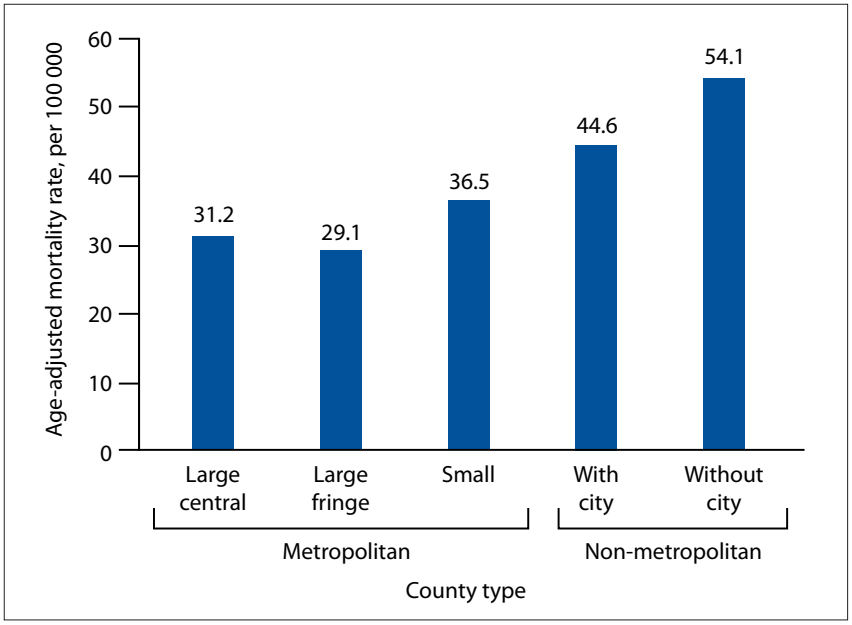


Fig. 3. Age-adjusted mortality rates for unintentional injuries in metropolitan v. non-metropolitan US counties.[5]

Tertiary orthopaedic procedures such as joint replacements, ligament reconstruction and spine procedures require very closely monitored rehabilitation and patient compliance after discharge. Compliance is likely to involve the patient needing access to clean water, proper ablution facilities, and flat surfaces on which to use walking aids. According to Badenhorst *et al.*,[10] poor compliance is common in rural communities, and rehabilitation is also often poor owing to poor follow-up with physiotherapy and occupational therapy. It is well known that social and economic marginalisation of rural tertiary centres makes it difficult to recruit and retain specialists.[4] Tertiary centres in rural areas generally receive a limited budget, and the subsequent financial constraints limit the amount of equipment that the province can invest in. Many subspecialties may not be able to function without certain equipment, ranging from diagnostic machines such as magnetic resonance imaging scanners to interventional equipment such as arthroscopic instruments.

Socioeconomic and family issues

Most specialists and their families would rather live in big cities with better facilities,

Table 1. Allocation of hospitals and orthopaedic surgeons in Limpopo Province per district and according to level of care

District	Regional hospitals	Tertiary hospitals	Public service orthopaedic surgeons	Population, *n*
Capricorn	0	2	6	1 296 247
Vhembe	1	0	0	1 387 625
Sekhukhune	2	0	2	1 154 587
Mopani	1	0	1	1 138 063
Waterberg	1	0	1	747 926

including schools, and a wider range of entertainment options than are available in rural areas. Rural tertiary centres therefore depend on relatively few specialists who are expected to provide service delivery to hospitals, including district hospitals (Table 1). In addition, these specialists are expected to teach both under- and postgraduate students. This overwhelming academic load together with the service delivery responsibilities can easily result in overworking of personnel.[11]

Finally, there is only a limited relationship between private and public services in most rural areas. This lack of inter-relations limits exposure of personnel to the different dynamics of both private and public health facilities, while precluding private practitioners from assisting with teaching and training of under- and postgraduate students.

Conclusion

There is a significant shortage of specialised surgical units in rural areas, affecting rural patients in terms of prognosis, morbidity and mortality. Apart from typical general factors that make it difficult to start up subspecialist units in rural areas, initiating an appropriate orthopaedic surgical service for correctable congenital abnormalities, as well as for septic and neoplastic conditions, is specifically adversely influenced by religious and belief systems prevalent in rural areas. These factors aggravate a situation already compromised by poor socioeconomic conditions and transport problems.

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Conflicts of interest. None.

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Evaluation of the performance of lecturers in general surgery by 4th- and 6th-year MB ChB students at the University of Limpopo, Polokwane, South Africa

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Background. Students' evaluation of teaching performance is one of the important means of measuring the quality of higher education worldwide. Students are valuable contributors to improvement of the teaching performance of lecturers. For any academic institution, it is very important to receive feedback on teaching quality from students.
Objectives. To determine lecturers' performance as evaluated by undergraduate students in general surgery, with the aim of identifying the lecturers' strengths and planning tactics for any necessary improvement measures.
Methods. This study followed a descriptive research design to evaluate seven lecturers in general surgery by 4th- and 6th-year MB ChB students at the University of Limpopo, Polokwane, South Africa.
Results. Seven lecturers were evaluated by the students. From the study results, there is strong evidence that the majority of the participants were satisfied with 5/7 lecturers' interpersonal skills and communication and presentation style, including an overall rating ($p<0.0001$). Two lecturers were considered by the students to require some level of improvement in performance ($p<0.0001$).
Conclusion. General surgery students expressed satisfaction with the teaching performance of most members of the academic staff. However, some lecturers need to improve with regard to audibility and preparation for slide presentations.

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Students' evaluation of teaching performance is one of the important means of measuring the quality of higher education worldwide.[1,2] Informal student evaluations of faculty members were started in the 1960s by enterprising college students.[3] Student evaluation can be used as a component of faculty evaluation for personnel decisions such as tenure, promotion and merit.[4]

Students are important contributors to improvement of the teaching performance of lecturers. For any academic institution, it is very valuable to obtain feedback from the students on their lecturers.[5] Lecturers teach regularly, and they need to know whether the teaching initiatives and strategies they use are effective and well received by students.[6] Course and lecturer evaluation by students is an important exercise that should be undertaken on a regular basis by academic institutions. It enables both lecturers and the institution to know what students think of the courses being taught, the people who are teaching, and the institution itself.[5]

Evaluation of lecturers' teaching effectiveness by students is probably a highly accurate measure of student satisfaction generally.[3] The process of improving the quality of higher education is a dynamic one, and universities should continuously improve their teaching based on students' perceptions.[7] Utilising students' perceptions to improve the quality of higher education is a common practice in almost every university across the globe.[8] Evaluating courses through student feedback has been included as one of the key mechanisms in internal quality-assurance processes as a way of demonstrating institutions' performance in accounting and auditing practices.[9]

An evaluation may impart important information that a teacher can use for formative change in the classroom. Evaluations by students are vital and a catalyst for improvement in the classroom: 'a good evaluation should assist faculty to help their students learn their best'.[4] Interaction between class size and response rate has a significant effect on students' evaluation of instructors and courses in higher education.[10] It is essential for academic institutions to know students' opinions about their lecturers; this also provides an opportunity to outline students' needs.[11]

The 6-year MB ChB course at the University of Limpopo in Polokwane, South Africa, started in 2016. General surgery is included in the 4th and 6th years, with 5- and 6-week modules, respectively. Every 5 or 6 weeks, a new group of students rotates through general surgery. The first group of 4th-year MB ChB students rotated through general surgery in 2019, followed by the first group of 6th-year students in 2021. No formal evaluation of teachers by the students was conducted in the general surgery department at this time. General surgeons are involved in teaching in addition to their core clinical work. One consultant is responsible for one surgical firm/unit for clinical activity. The main purpose of the study reported here was to determine the performance of lecturers in general surgery as evaluated by undergraduate students. It was hoped that providing feedback to the lecturers on their teaching performance would enable them to do some self-reflection and ultimately take the necessary steps to improve their performance. Identifying lecturers' strengths and weaknesses would also help the head of the Department of General Surgery and the university to tactically plan any necessary improvement measures in the near future.

Methods

This study followed a descriptive research design to evaluate seven lecturers in general surgery by 4th- and 6th-year MB ChB students at the University of Limpopo. General surgery is included in the 4th and 6th years of study, with the duration of the modules 5 and 6 weeks, respectively. In total, ~100 - 110 students rotated through the department in both the 4th and 6th years, with an average of

10 - 14 students in the 4th-year groups and 10 - 12 students in the 6th-year groups. The 48 participants in the study comprised two groups of students, from the 4th and 6th years. The questionnaires were administered in such a way that the students were anonymous, to avoid fear of victimisation. The questionnaires were distributed in the lecture rooms and collected after completion. Each student was given seven forms for seven lecturers, who were coded with numbers 1 to 7 as their unique identifiers. Each lecturer was uniformly evaluated by a maximum of 23 students selected randomly from the population of 48, so that an equal number of students evaluated the lecturers. Descriptive statistics, frequencies, means and standard deviations were used to analyse the data. One-way analysis of variance was used to assess the level of difference between the participants' evaluations of the lecturers' performance on the two indicators evaluated, i.e. interpersonal skills, and communication and presentation style. The overall rating was analysed in a similar manner. Open-ended comments and suggestions were also considered and presented in themes for analysis.

On the questionnaire, the student indicated their year of study, the lecturer's name, the module and the academic year. An introduction to the questions emphasised the importance of the survey and why students should take it seriously.

The evaluation form comprised two sections: section A on interpersonal skills, and section B on communication and presentation style. Each section had sub-questions, 8 on interpersonal skills and 15 on communication and presenting style, making a total of 23 questions. Categorical scoring of 0 - 3 was used, i.e. 'never' = 0 points, 'seldom' = 1 point, 'usually' = 2 points, and 'always' = 3 points. Scoring each component using these scales resulted in a total point range of 0 - 69 by 23 participants per lecturer. The scored items were translated to a percentage out of 69 total points and then to scores for analysis. Finally, students gave an overall rating between 1 and 10 points (1 being very poor and 10 highly excellent) for each lecturer. One form was used for each lecturer.

After the data were collected, analysis was done using the Statistical Package for the Social Sciences (SPSS), version 28 (IBM Corp., USA). Forms were excluded from the analysis if the lecturer's name was not given. The questionnaires were captured on an Excel spreadsheet, version 2013 (Microsoft Corp., USA) for cleaning and prepared for analysis. Evaluations of seven individual lecturers were analysed. Formal permission to conduct this study was granted in the form of a letter from the School of Medicine, and permission was also obtained from the students. Confidentiality and anonymity were ensured by omitting the participating students' personal details.

Results

The results are summarised in Tables 1 and 2. For interpersonal skills, 5 of the 7 lecturers (lecturers 1, 2, 3, 6 and 7) scored >92%, equivalent to a score of 2.76, meaning that these lecturers have excellent interpersonal skills. Lecturers 4 and 5 scored <90%, equivalent to a score <2.7, with 2.65 for lecturer 4 and 2.60 for lecturer 5. The results show that the lecturers were considered to have significantly different interpersonal skills, with lecturers 6 and 7 scoring higher (94.8%, equivalent to a score of 2.84) in interpersonal skills than the others ($p<0.05$).

For communication and presentation style, 5 of the 7 lecturers (lecturers 1, 2, 3, 6 and 7) scored >90%, which is equivalent to a score of 2.7 meaning that these lecturers have excellent communication and presentation style. Lecturers 4 and 5 scored <90%, equivalent to a score of <2.70, i.e. 2.45 for both. Good communication and presentation style included the following: usually sets out outcomes for each lesson; transfers information in an understandable way; asks questions in class; is enthusiastic about the subject; gives opportunities for students to ask questions in class; gives opportunities for exercises in class; relates subject matter to the workplace; is always on time for class; has a dynamic and interesting presentation style; speaks clearly and audibly in class; notifies the students when he/she will be absent; is prepared for lectures; ends the lecture at the correct time; uses a variety of educational media (e.g. data projector); and applies a wide range of teaching strategies (e.g. group discussions, on-line activities, tutorials, field excursions). The results show significant differences in scores for communication and presentation style, with lecturer 6 scoring higher (95.0%, equivalent to a score of 2.85) than the others ($p<0.0001$) (Table 1).

Lecturer 6 therefore had both excellent interpersonal relationship skills (2.84) and communication and presentation style (2.85), which were superior to those of the other lecturers.

With regard to overall rating, the students gave lecturer 7 the highest score, 9.26 out of 10, equivalent to excellent performance. Table 2 correlates the overall rating with both interpersonal relationship skills and communication and presentation style. The results indicated that there is a strong correlation between participants' overall rating (mean score 2.62) and interpersonal relationship skills (mean score 2.75; Pearson correlation coefficient 91.8%; $p<0.0001$) and communication and presentation style (mean score 2.71; Pearson correlation coefficient 90.4%; $p<0.0001$). Participants' feelings about lecturers' interpersonal skills and communication and presentation style therefore correlate positively with their overall feeling about the lecturers. When participants' rating of lecturers' performance in terms of the performance indicators was compared with comments emerging from the open-ended questions, lecturer 7 scored higher for both the performance indicators in relation to the comments provided, while lecturers 4 and 5 scored lower.

The study presents strong evidence that the majority of the undergraduate students in general surgery who participated are happy with regard to the interpersonal skills and communication and presentation style of lecturers 1, 2, 3, 6 and 7, including the overall rating ($p<0.0001$). However, lecturers 4 and 5 require some level of improvement, as reflected by attitudes to their performance on the part of the students ($p<0.0001$).

Discussion

This study explored the evaluation of lecturers in general surgery by undergraduate MB ChB students in their 4th and 6th years. It is the department's first step towards assessing teachers' performance by student evaluation. We will gradually extend our assessment methodologies in line with the students' evaluation to improve the performance of teachers in the department. In this study, all the lecturers' performance was rated good; the average score in all 23 components was >2.5 out of 3, with an overall rating >7 out of 10. However, the results also revealed certain challenges, related to individual lecturers as well as departmental matters.

While it is of course common practice for lecturers to assess students' performance in various ways, students only have limited means of assessing their lecturers' performance and expressing their opinion. Course and lecturer evaluation by students reflects on qualities associated with good teaching such as lecturers' knowledge, clarity, classroom management and course organisation.[6]

Although course and lecturer evaluation by students is increasingly considered to be an important exercise in academic environments, it appears that students sometimes do not attach a lot of importance to it. One key issue in students' evaluation of teachers and lecturers is the question of how competent students are to make judgements on teaching and course quality.[12] In our study, the scores provided

Table 1. Descriptive summary of the students' evaluation of the lecturers

Variable	Questions, *N*	Average %	Score	SD	*F*	df	*p*-value	*F* crit
Interpersonal skills					3.3859	55	0.0071	2.2904
Lecturer 1	8	92.6	2.78	0.0539				
Lecturer 2	8	93.1	2.79	0.0578				
Lecturer 3	8	92.2	2.77	0.0409				
Lecturer 4	8	88.2	2.65	0.0522				
Lecturer 5	8	86.8	2.60	0.042				
Lecturer 6	8	94.8	2.84	0.0337				
Lecturer 7	8	94.8	2.84	0.049				
Communication and presentation style					10.3257	104	<0.0001	2.1925
Lecturer 1	15	94.2	2.83	0.0505				
Lecturer 2	15	94.2	2.83	0.0551				
Lecturer 3	15	94.7	2.84	0.0354				
Lecturer 4	15	81.6	2.45	0.1133				
Lecturer 5	15	81.7	2.45	0.1008				
Lecturer 6	15	95.0	2.85	0.0273				
Lecturer 7	15	91.5	2.74	0.0848				
Overall rating								
Lecturer 1	1	90.4	9.04					
Lecturer 2	1	92.2	9.22					
Lecturer 3	1	91.74	9.17					
Lecturer 4	1	77.83	7.78					
Lecturer 5	1	75.22	7.52					
Lecturer 6	1	91.74	9.17					
Lecturer 7	1	92.61	9.26					

SD = standard deviation; df = degrees of freedom; *F* crit = *F* critical value.

Table 2. Correlation analysis between overall rating and components of performance

Variable	Analysis
Overall rating	
Mean (SD), %	87.4 (7.5)
Pearson correlation coefficient	1
p-value	-
N	7
Interpersonal relationship skills	
Mean (SD), %	91.8 (3.1)
Pearson correlation coefficient	0.959
p-value	<0.0001
N	7
Communication and presentation style	
Mean (SD), %	90.4 (6.1)
Pearson correlation coefficient	0.964
p-value	<0.0001
N	7

SD = standard deviation.

by the students in the interpersonal skills performance indicators, with a mean of 2.75, correlated positively with the overall rating of 9 (Pearson correlation coefficient 91.8%; $p<0.0001$), as did the scores for communication and presenting style, with a mean of 2.71 and an overall rating of 9 (Pearson correlation coefficient 90.4%; $p<0.0001$). However, according to Inko-Tariah,[13] many people believe that students may not be sufficiently objective in evaluating their lecturers.

Student evaluations have high levels of reliability and validity and should always be part of the process used to evaluate teaching. There are certain aspects of a course that students are in no position to evaluate, however, including whether the course learning objectives are appropriate, whether the content is in line with the current state of knowledge in the field, and whether the course adequately prepares the students for subsequent courses in the curriculum. These aspects can only be evaluated by knowledgeable peers.[14] Keane and Labhrainn[12] reported that colleagues can assess a lecturer through peer observation, that the head of department can also do this, and that self-reflection can be used. All these methods can be used in conjunction with another method.[12]

Pezzella *et al.*[15] compared the performance of students in classes of large size with that of students in small classes to assess the efficacy of student learning in large classes.[15] The results of that study indicated that large classes are as efficacious as small classes. In our study setting, the number of students was relatively low (between 10 and 14 students per group). Although students' comments about all the lecturers were generally positive, the majority of the students complained that certain lecturers were not audible in class. We therefore recommend that heads of departments should engage with these lecturers where indicated.

There is evidence in the literature that higher evaluations of teachers are given by students who found the course easier than they expected compared with those who found it harder than they initially anticipated.[16] We could not analyse this aspect in the present study because we did not look at the students' credentials, and we also kept participants anonymous.

Other student comments complained about rescheduling tutorial times, which negatively affected their preparation for the topic. Although the criticism is justified, it has to be borne in mind that consultants are primarily responsible for their clinical work and patient care takes priority, particularly in emergency situations.

There is a shortage of doctors in Limpopo Province, particularly of specialists in general surgery,[17,18] and the current specialist allocation is only one per surgical firm. The Department of Health in conjunction with the university should recruit more surgeons, which would improve clinical work performance as well as our teaching efficacy. Returning to the student comments that certain lecturers were not clearly audible, in spite of making a good effort, this can be explained by the fact that several of our lecturers are from different parts of the globe and therefore have a range of accents, but they are performing well in clinical work. However, transfer of knowledge will be more effective and productive if it is done in clearly spoken language, and these lecturers should make an effort to improve their English. With a reminder that it is important to practise one's accent in order to improve one's spoken English, Maurin[19] has provided some useful tips for doing this. In addition to increased efforts on the part of the lecturers personally, we recommend that the university assist by organising English courses for those lecturers who need them. This will be of considerable benefit to the students.

The performance of students who have completed a course is another way of evaluating a lecturer's performance, but this may not always be adequate.[5] However, if students consistently report that someone's teaching is good or bad, they are almost certainly right.[14] To be an excellent lecturer, one needs to master delivery techniques and to establish a good relationship with the students.[20] Education has been changing rapidly over time, and modernisation has greatly influenced the current curricula. The learning style and preferences of students have been in accordance with these trends.[21] The university should provide the utmost support to teacher development programmes to achieve effective teaching.

Conclusion

Students generally expressed satisfaction with the teaching performance of the academic staff in general surgery. However, some lecturers need to improve with regard to preparation for slide presentations and ensuring that they speak clearly and audibly. On the basis of the study results, we recommend workshops and teacher development programmes in order to facilitate more effective teaching. Furthermore, we recommend that the Department of Health in conjunction with the university recruit more surgeons in order to improve performance of clinical work as well as teaching efficacy.

Declaration. None.

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Breast cancer: Factors influencing late-stage presentation at the Mankweng Hospital breast cancer clinic, Polokwane, Limpopo Province, South Africa

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Background. Female breast cancer remains the most common cancer in many parts of the world. According to GLOBOCAN (2021), female breast cancer has become the most commonly diagnosed cancer, surpassing lung cancer. Women in low- and middle-income countries are reported to seek medical help at an advanced stage of the disease, which negatively affects the prognosis, irrespective of the care available.
Objectives. To determine factors influencing late-stage diagnosis of breast cancer in women at the specialist breast cancer clinic at Mankweng Hospital in Polokwane, Limpopo Province, South Africa.
Methods. The study was conducted at the Mankweng breast cancer clinic in the rural province of Limpopo over the 18-month period July 2020 - December 2021 and applied a quasi-experimental design to determine the stage of breast cancer at the time of presentation to the clinic, and factors influencing late-stage presentation.
Results. Of the study sample, 269 patients were female (98%) and 5 male (2%). The majority of the females (*n*=203; 75%) had late-stage cancer at presentation, only 66 (25%) being in the early stages.
Conclusion. Most of the patients (76%) presented with late-stage disease. The main reason for the delay was lack of knowledge about breast cancer and its symptoms (not painful, not considered serious). Of concern is the higher proportion of educated patients presenting with late-stage disease compared with the group with a lower level of education.

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Female breast cancer remains the most common cancer in many parts of the world.[1,2] According to GLOBOCAN (2021),[3] breast cancer has become the most commonly diagnosed cancer, surpassing lung cancer. Estimates of its incidence increased from 2.1 to 2.3 million new cases over the period from 2018 to 2020, with the incidence continuing to be highest in developed countries. Breast cancer has a very good prognosis in comparison with many other types of cancer, with an 84 - 89% survival rate at 5 years reported in high-income countries. However, in low- and middle-income countries (LMICs), the majority of women diagnosed with breast cancer succumb to the disease. Women in LMICs have a 17% higher mortality rate compared with women in affluent countries[3] and are reported often to seek medical help only at an advanced stage of the disease, which negatively affects the prognosis irrespective of the care available.[4]

Factors influencing delay in seeking medical help after initial discovery of symptoms have been studied in urban breast centres in South Africa (SA).[4,5] The contributing factors reported in the literature include lack of knowledge about breast cancer and its symptoms, low levels of education, negative attitudes towards breast cancer symptoms, fear of cancer treatment, poverty, traditional healers' beliefs, spiritual beliefs and need to care for others.[5-7]

A study of the barriers to early presentation of breast cancer among women in Soweto, Johannesburg, showed that limited education and lack of breast cancer knowledge and awareness as well as health system inefficiencies were associated with an advanced stage at diagnosis.[8] Rayne *et al.*[4] also found low levels of education to be a prominent factor delaying diagnosis. They recommended direct access to a specialist breast cancer clinic to reduce delays in presentation and improve time to diagnosis and care. The SA National Department of Health launched a breast cancer policy in 2017,[9] outlining standards to which healthcare providers should adhere when providing care. The provincial Department of Health in Limpopo provides transport for patients to designated referral facilities to ensure ease of access. However, despite all the measures in place, breast cancer patients continue to present with late-stage disease. Our previous study on the profile of breast cancer in Limpopo reported a 69% prevalence of stage 3 and 4 disease.[10] The present study is the first to determine factors influencing late presentation of breast cancer patients in Limpopo. Understanding these factors is essential if we are to improve survival rates for patients with breast cancer.

The main objectives of this study were to determine the stage of breast cancer at the time of patients' presentation to the breast clinic, to determine factors influencing late stage at presentation, and to recommend solutions for modifiable factors.

Methods

This study was conducted at the Mankweng Hospital specialist breast cancer clinic in the rural province of Limpopo, SA, over the 18-month period 1 July 2020 - 31 December 2021, and applied a quasi-experimental design to determine the stage of breast cancer at the time of presentation to the clinic, and factors influencing late-stage presentation. New breast cancer patients were approached

by a trained research assistant during their first visit to the breast cancer clinic for screening and to assess whether they met the inclusion criteria for the study. A survey questionnaire was used to collect data after written consent had been obtained. The study sample size was 274 from a population of 350, representative of the population. The questionnaire was translated from English into the three main local languages, Sepedi, Xitsonga and Tshivenda. Participants were asked questions regarding their demographic characteristics, socioeconomic situation, education level, whether they had consulted a traditional healer, self-perceived proximity to the nearest healthcare facility (km), date of first presentation to the healthcare facility, and time interval between first healthcare facility visit and breast cancer clinic visit. The participant's information was then linked to the clinical stage at presentation as documented in the patient file. Stages at presentation were divided into two categories, early (stages 0, I and II) and late (stages III and IV). Education was categorised into low (primary and no formal education) and higher (secondary and tertiary) levels. Late presentation was defined as a patient who presented at their nearest healthcare facility >2 months after symptoms were noticed, and late referral as when it took >2 months for the patient to be referred from their local healthcare facility to the Mankweng breast cancer clinic.

Data were analysed using descriptive statistics and a χ^2 test to determine the stage and factors associated with late presentation in patients diagnosed with breast cancer. The collected data were entered onto an Excel spreadsheet, version 2013 (Microsoft Corp., USA). The Statistical Package for the Social Sciences (SPSS), version 28.0 (IBM Corp., USA) was used for data analysis. For continuous variables, results are presented using means and standard deviations (SDs), while categorical variables are described using proportions and frequency tables. Ethical approval was obtained from the Pietersburg-Mankweng Research Ethics Committee (ref. no. PMREC-29 January UL 2020/A).

Results

Details are reflected in Tables 1 - 4.

Demographic characteristics

Of the study sample, 269 patients were female (98%) and 5 male (2%). Of the female participants, the majority (*n*=203/269; 75%) had late-stage disease at presentation, with only 66/269 (25%) in the early stages. All but one of the men (*n*=4/5) were in the late stages at presentation. These results show no significant association between gender and stage at presentation (Table 1). The mean (SD) patient age was 54.01 (15.29) years, with the youngest patient aged 20 years and oldest 96 years, and the majority aged >50 years (*n*=146; 53%). The majority of the participants were black Africans (*n*=265; 97%), and of these, the majority (*n*=201/265; 76%) were at a late stage of disease at presentation and only 64 (24%) at an early stage. There was no significant association between race and stage at presentation ($p>0.05$). The majority of participants were married (*n*=136; 50%) at the time of presentation, and of these 99 (73%) were at a late stage of disease and 37 (27%) at an early stage. There was no significant association between marital status and stage at presentation ($p>0.05$). The most affected district was Vhembe (*n*=92; 34%). The majority of the patients were unemployed (*n*=209; 76%), and of these the majority were at a late stage at presentation (*n*=157/209; 75%). There was no significant association between employment status and stage at presentation ($p>0.05$). Similar results were noted for educational level, with the majority of patients with both low and high levels of education at a late stage at presentation. More patients had high school or tertiary education than lower levels of education (*n*=163; 59% v. *n*=111; 41%, respectively). There was no significant association between level of education and stage at presentation ($p>0.05$).

Stages at the time of presentation since noticing the lump for the first time

The majority of the patients (*n*=150; 55%) presented at the nearest health facility more than 2 months after they noticed the lump in the breast, with 124 (45%) presenting before the 2 months threshold. However, the majority of both groups had late-stage disease, and there was no significant association between delay after first noticing the lump and stage at presentation.

Causes of delay

The most common reasons for delaying for >2 months before presenting at the nearest health facility were lack of knowledge about breast cancer and its symptoms (not painful, not considered serious) (*n*=99; 36%), initially seeking help from a traditional healer (*n*=17; 6%), suffering from COVID-19, and other effects of the pandemic (*n*=13; 5%), and financial problems (*n*=10; 4%) (χ^2=271.982 with 11 degrees of freedom; $p<0.0001$).

Discussion

This study was designed to determine factors contributing to late presentation of patients to the breast cancer clinic, and the relationship between demographic and socioeconomic characteristics of patients with delayed presentation and late stage at diagnosis. It was anticipated that late presentation would be related to advanced stage at diagnosis of breast cancer.

Patient age has been reported to influence the timing of presentation to a health facility. Marcus *et al.*[11] reported that middle-aged women (45 - 64 years) sought healthcare within 3 months of noticing symptoms, while younger women (<45 years) were found to attend the health facility after 6 months. In the present study, the majority of patients were aged >50 years (*n*=146; 53%), and most of them had late-stage disease at presentation (*n*=106; 73%, v. *n*=40; 27% who were at an early stage). Of the 128 patients aged ≤50 years, the majority also presented at a late stage (*n*=101; 79%). The majority of patients with breast cancer were female, were married, had a high level of education, were unemployed, were aged >50 years, and were from Vhembe district. The majority of the patients travelled <20 km to the clinic (*n*=223; 81%). We found no significant association between demographic characteristics and presentation at a late stage ($p>0.05$) (Table 1). Public primary healthcare in SA is provided through clinics and community health centres, available within 5 km to >90% of the population and free at point of use.[12] However, we found that clinic proximity did not influence patient behaviour in terms of seeking medical attention at earlier stages of the disease.

Moodley *et al.*[5] reported that 50% of their patients made four or more visits to a healthcare provider before being referred to the one-stop breast clinic at a tertiary hospital. The reasons for multiple visits and longer decision-making at primary level need thorough investigation if prompt interventions are to be achieved.

An SA study on breast cancer screening knowledge, attitudes and practices among women found that a low level of education (no formal education and primary education) was associated with minimal understanding of disease presentation and symptom identification, and therefore a late decision to seek medical help.[6] A low level of education was found to be associated with an increased risk of late presentation (odds ratio 3.059) in a study in Nigeria.[13] Patients with a low level of education were found to have larger tumours ($p<0.05$) in Area 2, KwaZulu-Natal Province.[14] However, Trupe *et al.*[15] found

Table 1. Demographic characteristics and tumour stage at presentation

Variable	Early stage, *n* (%)	Late stage, *n* (%)	Total, *n* (%)	χ^2	df	*p*-value
Gender				0.055	1	0.8151499
Female	66 (24)	203 (74)	269 (98)			
Male	1 (0.4)	4 (1)	5 (2)			
Total	67 (24)	207 (76)	274 (100)			
Age (years)				1.467	1	0.225818
≤50	27 (10)	101 (37)	128 (47)			
>50	40 (14)	106 (39)	146 (53)			
Total	67 (24)	207 (76)	274 (100)			
Race				0.397a	1	0.5284933
Black African	64 (23)	201 (73)	265 (97)			
White	3 (1)	6 (2)	9 (3)			
Total	67 (24)	207 (76)	274 (100)			
Marital status				1.809a	2	0.4048034
Divorced	3 (1)	6 (2)	9 (3)			
Married	37 (14)	99 (36)	136 (50)			
Single	27 (10)	102 (37)	129 (47)			
Total	67 (24)	207 (76)	274 (100)			
District				1.316a	4	0.8586284
Capricorn	15 (5)	55 (20)	70 (26)			
Mopani	11 (4)	37 (14)	48 (18)			
Sekhukhune	7 (3)	26 (9)	33 (12)			
Vhembe	25 (9)	67 (24)	92 (34)			
Waterberg	9 (3)	22 (8)	31 (11)			
Total	67 (24)	207 (76)	274 (100)			
Employment status				0.087a	1	0.7676476
Employed	15 (5)	50 (18)	65 (24)			
Unemployed	52 (19)	157 (57)	209 (76)			
Total	67 (24)	207 (76)	274 (100)			
Education level				2.813a	1	0.0935127
Low	33 (12)	78 (28)	111 (41)			
High	34 (12)	129 (47)	163 (59)			
Total	67 (24)	207 (76)	274 (100)			

df = degrees of freedom; early stage = 0, I and II; late stage = III and IV; low education = primary and no formal education; high education = secondary and tertiary levels.

Table 2. Stages at the time of presentation since noticing the lump for the first time

Variable	Early stage, *n* (%)	Late stage, *n* (%)	Total, *n* (%)	$\chi 2$	df	*p*-value
Time of presentation				1.746	1	0.1864188
≤2 months	35 (13)	89 (32)	124 (45)			
>2 months	32 (12)	118 (43)	150 (55)			
Total	67 (24)	207 (76)	274 (100)			

Early stage = 0, I and II; late stage = III and IV; df = degrees of freedom.

no association between education and knowledge regarding care-seeking behaviour. We found that the majority of participants with a high level of education were at a late stage at presentation (59%). However, the association between level of education and stage at presentation was not significant. Moreover, Trupe *et al.*[15] found that the level of knowledge did not predict care-seeking behaviours or attitudes in the population they studied. Damiani *et al.*[16] reported that women of intermediate and high occupational class were more likely to use screening methods compared with those in the lowest class. Our findings provide new information with regard to healthcare-seeking behaviour and level of education. Educated people have access to websites providing information about the side-effects of cancer treatments such as surgery, chemotherapy and radiation therapy. It is possible that some women read about and are afraid of experiencing such negative effects.

Lack of understanding of the severity of breast cancer was found to be the reason for presenting late for 40% of the participants in the study in rural KwaZulu-Natal.[14] The SA study by Rayne *et al.*[4] found that the average delay time for patients with locally advanced cancer was 2.5 months from the time of noticing symptoms.[4] The present study showed an association between a delay of >2 months and the following: lack of knowledge regarding the breast cancer symptoms (not painful, not considered serious); attending a traditional healer; COVID-19; and financial problems ($p<0.0001$) (Table 3).

The study in KwaZulu-Natal found that a small proportion of patients (8%) presented to health facilities late because of financial

Table 3. Causes of delay in presentation for >2 months after noticing symptoms

Variable	*n* (%)	χ^2	df	*p*-value
No delay (presentation ≤2 months)	124			
Causes of delay (presentation >2 months), *n*=150		271.982	11	<0.0001
Breastfeeding caused delay	4 (1)			
COVID-19	13 (5)			
Fear of hospital/operation	4 (1)			
Lack of knowledge (not painful, not considered serious)	99 (36)			
Waiting for mammogram	1 (0.4)			
Financial problems	10 (4)			
Pregnancy	1 (0.4)			
Refusing by herself	1 (0.4)			
Attended traditional healer	17 (6)			
Total	274 (100)			

Table 4. Time interval between attending the nearest health facility and presentation at the Mankweng breast cancer clinic

Time interval	*n* (%)
≤2 months	93 (34)
>2 months	181 (66)
Total	274 (100)

issues.[14] The SA public health system has provision for planned patient transport, which is probably why we also recorded few patients presenting late due to financial problems (4%). In contrast, late presentation was found to be associated with lack of money, especially for patients living far from the health facilities, in a study by Asoogo *et al.*[7] A Bangladeshi study found that 40% of breast cancer patients did not seek medical help because of lack of finances.[17]

Traditional healing is a common practice in Africa.[12] We found that attending a traditional healer was associated with presentation after >2 months compared with not attending one (p<0.0001). Although the number of patients who visited traditional healers was small (n=17), they all came to the nearest facility after 2 months, and 16 presented with late-stage disease. Another concern in the present study was late referral from local healthcare facilities to the Mankweng breast cancer clinic. We found that many patients (66%) experienced delays in transfer and arrived at the clinic >2 months after first attending their nearest heathcare facility (Table 4). This time interval needs to be shortened. Moodley *et al.*[5] also reported that many patients experienced delays in transition of care, sometimes owing to poor healthcare provider knowledge and misdiagnosis.

Early detection and diagnosis are of paramount importance in increasing the survival rate of breast cancer patients. Timely diagnosis also enables more effective and simpler management, which reduces costs. It is therefore essential that primary healthcare units and district hospitals disseminate awareness of and education on early signs and symptoms to the community. Much of this information, including education on signs and symptoms of breast cancer, self-examination of the breasts and management, is included in the National Department of Health's breast cancer prevention and control policy,[9] so it is imperative to implement the policy as outlined in the document. The findings of the present study also support the need to include women of younger age in routine screening, as recommended by Lince-Deroche *et al.*[18]

Conclusion

Most of our patients (76%) presented with late-stage breast cancer, and the main reason for the delay was lack of knowledge (not painful, not considered serious). More younger women had advanced disease compared with those who were older, and of concern is the high number of educated patients presenting with late-stage disease.

Many of our patients came from the Vhembe and Capricorn districts. All 17 patients who attended a traditional healer presented late, and nearly all of them (n=16) had late-stage breast cancer. Marital status had no obvious influence on presentation. Many patients experienced delays in transition of care from local healthcare facilities.

Recommendations

- A health education and breast cancer awareness campaign for women in Limpopo is of critical importance, and should include those attending primary healthcare for any other reason.
- We recommend that the Limpopo provincial health monitoring and evaluation committee emphasises the implementation of breast cancer policy.
- Reasons for barriers to early referral to the one-stop breast clinic at Mankweng Hospital should be identified and possible solutions suggested, so that the current chain causing delay can be broken.

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Profile of burn patients at Mankweng Hospital, Polokwane, Limpopo Province, South Africa

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Background. Burn injuries are a common cause of preventable morbidity and mortality. In all societies, burns continue to constitute a medical, psychological and economic problem. Burn wounds are one of the most common surgical emergencies leading to hospitalisation.
Objectives. To understand the profile of patients with burn injuries presenting to Mankweng Hospital in Polokwane, Limpopo Province, South Africa.
Methods. This was a retrospective study using a descriptive quantitative design to analyse the profile of all patients admitted consecutively to the Mankweng Hospital burns unit from 1 January 2018 to 31 December 2020.
Results. During the study period, a majority of males (*n*=412; 56.7%) were admitted, indicating a significant sex difference.
Conclusion. Children aged <5 years were found to be more affected than any other age group. Males were more affected than their female counterparts. Scalds and flame burns were the most common burn injuries.

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Burn injuries are a common cause of preventable morbidity and mortality.[1-4] In all societies, burns continue to constitute a medical, psychological and economic problem.[5] Burns are one of the most common surgical emergencies leading to hospitalisation.[6] Burns are not only life-threatening emergencies, but also have long-term effects.[6,7] Apart from physical consequences that are functionally important, cosmetic and psychological factors also play a significant role, and patients with extensive burns are likely to suffer long-term effects of this trauma.[6] The severity of burn injury varies from mild to severe, depending on the cause and the duration of exposure to the inciting agent.[2] In scald burn injuries, the temperature of the injuring agent determines the severity of the injury.[2] Other types of burn injuries include flame, chemical and electrical burns. Scald and flame burns are the most common types of burns.[6] Scald burns constitute the majority of cases (71.1%), with 53% attributable to hot liquids related to cooking, including coffee and tea.[1] As unintentional burn injuries account for the majority of morbidity in the paediatric population,[1,3,7] prevention of burns is crucial.[2] Treatment of burns should be focused on wound care to prevent infection and minimise further fluid loss,[2] and a multidisciplinary team forms an integral part of managing patients with burn injuries to achieve optimal outcomes.

The burns unit at Mankweng Hospital in Polokwane serves as the only referral unit for burn patients in the remote province of Limpopo in South Africa, serving a population of ~6 million people. The province has five districts, namely Capricorn, Vhembe, Mopani, Sekhukhune and Waterberg, and patients are referred from all these districts to our centre. The burns unit has a total capacity of only 19 beds (8 paediatric beds, 4 female beds, 3 male beds and 4 high-care beds), and patients from all districts have to share this limited number of beds.

There is a paucity of information on the profile of patients with burn injuries presenting to Mankweng Hospital. The main objective of this study was to understand this profile, including determination of: (*i*) the most common mechanism of burns; (*ii*) the most affected gender; (*iii*) the age group most commonly affected by burns; and (*iv*) the peak burns season. We hope that the results presented will enable healthcare professionals to adequately allocate resources to improve the management of patients with burn injuries in Limpopo. In addition, we hope that the results will educate clinicians in referral hospitals and people in the communities to be aware of the most common causes of burn injuries, so that the communities can form part of both prevention and early intervention strategies to tackle the scourge of these injuries. Awareness will enable the hospital staff to better manage and allocate the limited bed spaces available.

Methods

This was a retrospective study using a descriptive quantitative design to analyse the profile of all patients admitted consecutively to the Mankweng Hospital burns unit over the 3-year period 1 January 2018 - 31 December 2020. The data were collected by scrutinising the admission books for all patients admitted to our unit as a study frame. Patients who were seen and treated in and discharged from the accident and emergency unit, as well as those who were admitted to wards other than the burns unit, were excluded from the study. The data collected were documented in a data collection sheet comprising gender, the mechanisms of burn injuries, age at the time of injury, seasonal variations, total body surface area (TBSA) of burn, and burn injuries from each district in Limpopo as variables of the study. A total of 726 patients were included. Data were analysed using descriptive and inferential statistics. Descriptive statistics entailed measures of central tendencies and means, frequencies and percentages, and inferential statistics applied one-way analysis of variance with an *F*-test to assess the level of significance in the number of patients with burn injuries over the 3-year period. A *p*-value of 0.05 was used to test the level of significance. The Statistical Package for the Social Sciences (SPSS) version 28.0 (IBM Corp., USA) was used for data analysis.

Ethical approval was obtained from the Pietersburg-Mankweng Research Ethics Committee (ref. no. PMREC 17 FEBRUARY 2021/A) and the provincial Department of Health (ref. no. LP_2021-03-007).

Results

Detailed results of the study are reflected in Tables 1, 2 and 3. A total of 726 patients were admitted to the burns unit over the 3-year study period. During this period, 237 patients were admitted in 2018, 246 in 2019 and 243 in 2020, indicating a consistent average yearly admission rate. The majority of patients admitted were male (*n*=412 (56.7%), v. *n*=314 (43.3%) female) (Table 1), the results indicating a significant difference (*F*=46.62; *p*=0.0024<0.05). Of the patients, 472 (65.0%) were discharged and 174 (24.0%) were stepped down to other wards with the aim of creating more bed availability in the burns unit. Patients who were stepped down were those who had minor burn injuries, those who were healing well, and those waiting to be discharged who were subsequently discharged. The results further showed that 68 patients (9.4%) died, 11 (1.5%) signed RHT (refusal of hospital treatment) and 1 (0.1%) absconded. There was a significant difference in outcome between patients who were discharged, died, stepped down to other wards, signed RHT and absconded. The majority of patients were discharged compared with other outcomes (*F*=384.05; *p*<0.0001). Of the patients admitted, 361 (49.7%) were from Capricorn district, 111 (15.3%) from Vhembe, 93 (12.8%) from Waterberg, 81 (11.2%) from Sekhukhune and 78 (10.7%) from Mopani, while 2 patients (0.3%) were transferred from Mpumalanga Province (Table 1). The majority of the patients were from Capricorn district, with an average over the study period that differed significantly from the other districts (*F*=189.45; *p*<0.0001). Most of the burn patients admitted were aged 1 - 5 years (*n*=336; 46.3%) (Table 1). Hot water was the the most common mechanism of burn injury (61.4%), followed by open fire burns at 22.9% (Table 3). Most burns (44.9%) involved <10% of TBSA, which differed significantly from other categories (*F*=90.46; *p*<0.0001) (Table 2). Seasonal variations were observed, with most admissions of burn patients (28.0%) in winter, which differed significantly from the other seasons (*F*=11.85; *p*=0.0026), and the lowest number of admissions in spring (22.7%) (Table 2).

Discussion

This 3-year retrospective, consecutive study analysed data from all patients admitted to our burns unit from 1 January 2018 to 31 December 2020. During this period, the unit treated a total of 726 acutely burned patients, with no significant variation between the years: 237 patients were admitted in 2018, 246 in 2019 and 243 in 2020. Males were more affected than females (*n*=412; 56.7% v. *n*=314; 43.3%, respectively), which is a significant difference (*p*=0.0024<0.05). This finding is in contrast to a study by Hemeda *et al.*[5] in Egypt, in which females (53.1%) were found to be more vulnerable to burns than males (46.8%), but is in line with other studies that found males to be more commonly affected than females in all age groups (*p*<0.0001).[3,7] There were seasonal variations, with a peak of burn admissions during winter that significantly differed from the other seasons (*p*=0.0026<0.05). We assume that this peak was due to an increased need for hot water in winter and more fires burning to keep the household warm. Other studies have also found seasonal variations with peaks in winter.[3,5,6,8] The literature indicates that most burns of females occurred in the home (mostly housewives and female children), while most males sustained burns at outdoor locations.[3-5] A study by Fernandes-Morales *et al.*[9] in Spain found

Table 1. Descriptive summary of burn patients (*N*=726)

Variable	Year, *n* (%)			Total, *n* (%)	Mean	Variance	*F*	df	*p*-value	*F* crit	Significant
	2018	2019	2020								
Total admissions	237 (32.6)	246 (33.9)	243 (33.5)	726 (100)							
Gender							46.6214	5	0.0024	7.7086	*
Male	131 (55.3)	137 (55.7)	144 (59.3)	412 (56.7)	137.3	42.3333					
Female	106 (44.7)	109 (44.3)	99 (40.7)	314 (43.3)	104.7	26.3333					
Age (years)							196.5538	14	0.0000	3.4780	*
<1	18 (7.6)	22 (8.9)	29 (11.9)	69 (9.5)	23.0	31.0000					
1 - 5	120 (50.6)	109 (44.3)	107 (44.0)	336 (46.3)	112.0	49.0000					
6 - 12	24 (10.1)	31 (12.6)	30 (12.3)	85 (11.7)	28.3	14.3333					
13 - 55	60 (25.3)	65 (26.4)	57 (23.5)	182 (25.1)	60.7	16.3333					
>55	15 (6.3)	19 (7.7)	20 (8.2)	54 (7.4)	18.0	7.0000					
Outcome							384.0494	14	0.0000	3.4780	*
Discharged	149 (62.6)	163 (66.3)	160 (65.8)	472 (65.0)	157.3	54.3333					
Died	23 (9.7)	17 (6.9)	28 (11.5)	68 (9.4)	22.7	30.3333					
Step down to other wards	62 (26.2)	64 (26.0)	48 (19.6)	174 (24.0)	58.0	76.0000					
RHT	3 (1.7)	2 (0.8)	6 (2.5)	11 (1.5)	3.7	4.3333					
Absconded	0	0	1 (0.4)	1 (0.1)	0.3	0.3333					
District							189.4456	17	0.0000	3.1059	*
Capricorn	116 (48.9)	120 (48.8)	125 (51.4)	361 (49.7)	120.3	20.3333					
Vhembe	37 (15.6)	36 (14.2)	38 (15.6)	111 (15.3)	37.0	1.0000					
Mopani	22 (9.3)	22 (8.9)	34 (14.0)	78 (10.7)	26.0	48.0000					
Sekhukhune	25 (10.5)	35 (14.2)	21 (8.6)	81 (11.2)	27.0	52.0000					
Waterberg	36 (15.2)	33 (13.4)	24 (9.9)	93 (12.8)	31.0	39.0000					
Other province	1 (0.4)	0	1 (0.4)	2 (0.3)	0.7	0.3333					

df = degrees of freedom; *F* crit = *F* critical value; RHT = refusal of hospital treatment.
*$p<0.05$.

that 65.8% of burn accidents occurred in the home. Children were mainly reported to be victims of scalds and flame burns.[3,5,6] In the present study, the most commonly affected age group was 1 - 5 years. Almost half of the total number of patients fell into this age group (n=336; 46.3%), a significant difference (p<0.0001). In keeping with our observation, Frans *et al.*[6] reported that most burned patients in their study were in the age group 0 - 4 years. Lee *et al.*[1] found that 73.2% of all burn patients were between the ages of 0 and 6 years. In younger children, a 'bib pattern' burn distribution is sustained when the child pulls a container of hot liquid down from a higher surface.[3,4,5] Institution of preventive measures is therefore very important. Some of the steps that can be taken to prevent these injuries are setting the hot water heater to a maximum of 49°C to limit scald injuries from bathing, and keeping children out of the kitchen while cooking, microwaving or using the oven.[2]

Scalds and flame burns were the burn injuries most commonly seen in the Mankweng Hospital burns unit, accounting for a significant 70.8% and 22.9%, respectively (p<0.0001). In line with this observation, Lee *et al.*[1] reported figures of 71.1% for scalds and 20.8% for flame burns, while Frans *et al.*[6] found that the most common cause of burns was scalds (47.9%), followed by flame (22.3%). Among all the scald burns in the present study, the most common cause was hot water (61.4%). Hemeda *et al.*[5] and Sahu *et al.*[3] found that scalds were mostly associated with partial (36.8%) rather than full-thickness (10%) injuries.[5] Flame burns may result from household fires or fires from a motor vehicle accident. Lee *et al.*[1] found that in the teenage group, flame burns were the most common (53.8%). Data from hospitalised burn patients worldwide reveal incidence rates for assault by fire and scalds ranging from 3% to 10%.[10]

Table 2. Classification of admissions according to TBSA and different seasons (N=726)

	Year, *n* (%)			Total,						
Variable	**2018**	**2019**	**2020**	***n* (%)**	**Mean**	**Variance**	***F***	**df**	***p*-value**	***F* crit**	**Significant**
TBSA, %							90.4653	11	0.0000	4.0662	*
<10	100 (42.2)	104 (42.3)	122 (50.2)	326 (44.9)	108.7	137.3333					
10 - 20	75 (31.6)	76 (30.9)	60 (24.5)	211 (29.1)	70.3	80.3333					
20 - 40	52 (21.9)	56 (22.8)	55 (22.6)	163 (22.5)	54.3	4.3333					
>40	10 (4.2)	10 (4.1)	6 (2.5)	26 (3.6)	8.7	5.3333					
Season							11.8596	11	0.0026	4.0662	*
Summer	52 (21.9)	59 (24.0)	61 (25.1)	172 (23.7)	57.3	22.3333					
Autumn	62 (26.2)	62 (25.2)	62 (25.5)	186 (25.6)	62.0	0.0000					
Winter	68 (28.7)	67 (27.2)	68 (28.0)	203 (28.0)	67.7	0.3333					
Spring	55 (23.2)	58 (23.6)	52 (21.4)	165 (22.7)	55.0	9.0000					

TBSA = total body surface area burned; df = degrees of freedom; *F* crit = *F* critical value.
*p<0.05.

Table 3. Mechanisms of burn injuries (N=726)

	Year, *n* (%)			Total,						
Mechanism of burn	**2018**	**2019**	**2020**	***n* (%)**	**Mean**	**Variance**	***F***	**df**	***p*-value**	***F* crit**	**Significant**
Total burns	237 (32.6)	246 (33.9)	243 (33.5)	726 (100)	242	21	264.8079	44	0.0001	2.0374	*
Scalds	163 (68.8)	167 (67.9)	185 (76.1)	515 (71.0)	171.6	137.3					
Water	138 (58.2)	148 (60.2)	160 (65.8)	446 (61.4)	148.7	121.3					
Oil	4 (1.7)	5 (2)	10 (4.1)	19 (2.6)	6.3	10.3					
Tea	12 (5.1)	6 (2.4)	9 (3.7)	27 (3.7)	9.0	9.0					
Steam	4 (1.7)	0	3 (1.2)	7 (1)	2.3	4.3					
Soft porridge	2 (0.8)	6 (2.4)	3 (1.2)	11 (1.5)	3.7	4.3					
Soup	2 (0.8)	1 (0.4)	0	3 (0.4)	1.0	1.0					
Milk	1 (0.4)	0	0	1 (0.1)	0.3	0.3					
African beer	0	1 (0.4)	0	1 (0.1)							
Flame burns											
Open fire	63 (26.6)	58 (23.6)	45 (18.5)	166 (22.9)	55.3	86.3					
Other burns	11 (4.6)	21 (8.5)	13 (5.3)	45 (6.2)	15.0	28.0					
Electrical	6 (2.5)	14 (5.7)	8 (3.3)	28 (3.9)	9.3	17.3					
Chemical	5 (2.1)	4 (1.6)	2 (0.8)	11 (1.5)	3.7	2.3					
Stove	0	0	3 (1.2)	3 (0.4)	1.0	3.0					
Fireworks	0	1 (0.4)	0	1 (0.1)	0.3	0.3					
Sunburn	0	1 (0.4)	0	1 (0.1)	0.3	0.3					
Hot floor polish	0	1 (0.4)	0	1 (0.1)	0.3	0.3					

df = degrees of freedom; F crit = F critical value.
*p<0.05.

Most of the burn injuries in the present study had a positive outcome, with a significant 646 eventual hospital discharges (89.0%), but our mortality rate was 9.4%. The proportions of patients who were discharged and who died differed significantly over the study period (p<0.0001). The results further indicated that 44.9% of patients admitted had sustained minor burn injuries involving <10% of TBSA, which was associated with positive outcomes and reduced length of hospital stay. The reason for admitting such patients was the admission criteria adopted from the American Burn Association.[11] These outcomes are comparable with the study by Frans *et al.*,[6] in which 42.4% of the patients had burns involving <10% of TBSA. Shields *et al.*[7] found that 66.5% of burn injuries were <10% TBSA, whereas Hemeda *et al.*[5] found that the most common TBSA was 25 - 59%.[5] Peck *et al.*[10] found that the average proportion of TBSA burned in an assault by fire or scalds was ~20%. In US burn centres from 1999 to 2008, 2% of admissions were due to assault by burning (including child abuse), and <1% due to self-harm or attempted suicide.[10,12] The distribution of burn injuries according to district in Limpopo showed that Capricorn had the most admissions (n=361; 49.7%), which differed significantly from other districts in the province (Vhembe n=111 (15.3%), Waterberg n=93 (12.8%), Sekhukhune n=81 (11.2%), Mopani n=78 (10.7%), and transfers from Mpumalanga n=2 (0.3%)) (p<0.0001). The most likely reason for the finding that Capricorn district had the largest number of admissions is that Mankweng Hospital is located in Capricorn, and most of these patients would have arrived as self-referrals.

Conclusion

Burn injuries are one of the most common surgical emergencies in Limpopo. Children aged <5 years were found to be affected more than any of the other age groups. Males were more affected than their female counterparts. Scalds and flame burns were the most common burn injuries. There were seasonal variations, with burn admissions peaking in winter, followed by autumn.

This study was the first to determine the epidemiology of burn injuries in Limpopo. The results and findings will provide a basis for recommendations to the Department of Health to educate the communities about burns, especially scald and flame burns, and preventive measures to reduce the frequency of burns and burn-related deaths.

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Advanced oesophageal cancer treated with endoscopic stent insertion: A case report

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The majority of oesophageal cancers are squamous cell carcinomas. They have a poor prognosis. Dysphagia is regarded as the most distressing symptom of oesophageal cancer, with a profound impact on quality of life. Insertion of a self-expanding metal stent (SEMS) is one of the most effective ways to relieve dysphagia. We present a case of advanced oesophageal cancer in which a SEMS was inserted using a modified endoscopic technique.

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In some parts of South Africa, the incidence of oesophageal squamous cell carcinoma is 160 per 100 000. Squamous cell carcinoma accounts for the majority of oesophageal carcinomas and has a poor prognosis. The most distressing symptom for patients with advanced oesophageal cancer is dysphagia – difficulty in swallowing, which can be uncomfortable or painful. One of the most effective ways to relieve dysphagia is inserting a self-expanding metal stent (SEMS) into the area of cancer blockage.[1,2]

Case report

A 64-year-old man was referred with a diagnosis of advanced oesophageal cancer. He was suffering from severe dysphagia. According to the referring doctors, he had already had an oesophagoscopy performed. A malignant-looking lesion had been identified at the level of 25 cm from the incisor teeth. Subsequent fluoroscopy demonstrated that it was associated with a tracheobronchial fistula. Biopsy of the lesion showed it to be an invasive, moderately differentiated, keratinising squamous cell carcinoma.

In view of the patient's severe dysphagia and the advanced stage of the oesophageal cancer, we decided to place an oesophageal stent as the initial palliative treatment. A partially covered SEMS (PC-SEMS) was inserted using the following technique:

- The procedure was performed using a forward-viewing endoscope and fluoroscopy control.
- The lesion was at 25 cm from the incisor teeth endoscopically, as reported by the previous endoscopist, and the oesophageal lumen was almost completely obliterated by tumour.
- A sphincterotome with a thin, floppy-tip guidewire was introduced into the endoscope.
- The guidewire was used to identify the obliterated oesophageal lumen by applying gentle pressure while the sphincterotome was being steered into the lumen.
- Contrast was injected through the sphincterotome only after the guidewire was located in the correct position in the oesophageal lumen.
- The path into the stomach was confirmed with the radiological finding of the coiled guide located in the stomach and visualisation of the gastric mucosa after contrast injection on fluoroscopy.
- Under fluoroscopic control, a new surgical blade was strapped on the patient's chest wall where the upper margin of the lesion was identified endoscopically.
- Because of the fluoroscopic finding of an advanced lesion, we decided to insert the stent without prior dilatation of the stricture, so as not to cause more damage to the diseased oesophagus.
- The endoscope was removed while the guidewire was kept in place for stenting.
- The delivery system with a 23 × 150 mm PC-SEMS was inserted under fluoroscopic control. It was not difficult to pass the delivery system through the stricture (Fig. 1).
- The endoscope was introduced again to check the position of the SEMS and to secure the SEMS to the oesophagus with three metal clips (Fig. 2).

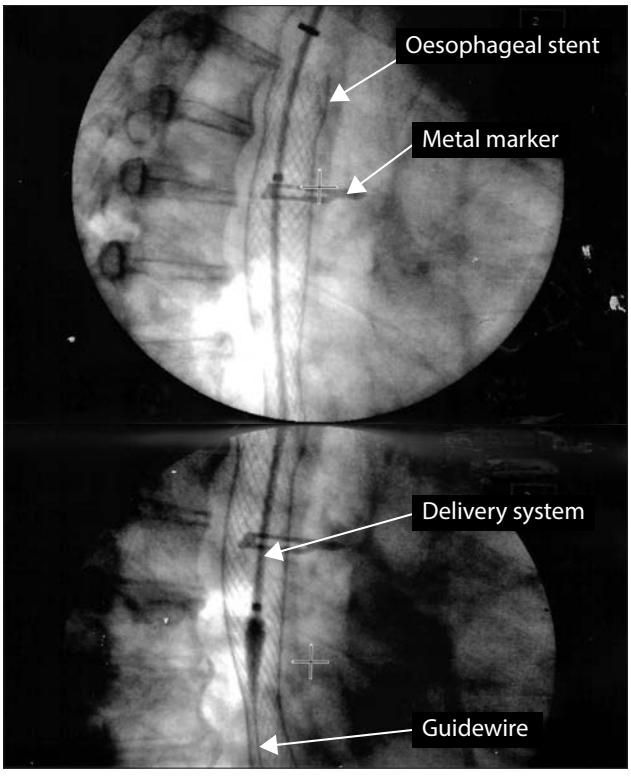


Fig. 1. Fluoroscopic view of PC-SEMS. Note the relation between the marker and the SEMS as well as the position of the delivery system and SEMS. (PC-SEMS = partially covered self-expanding metal stent.)

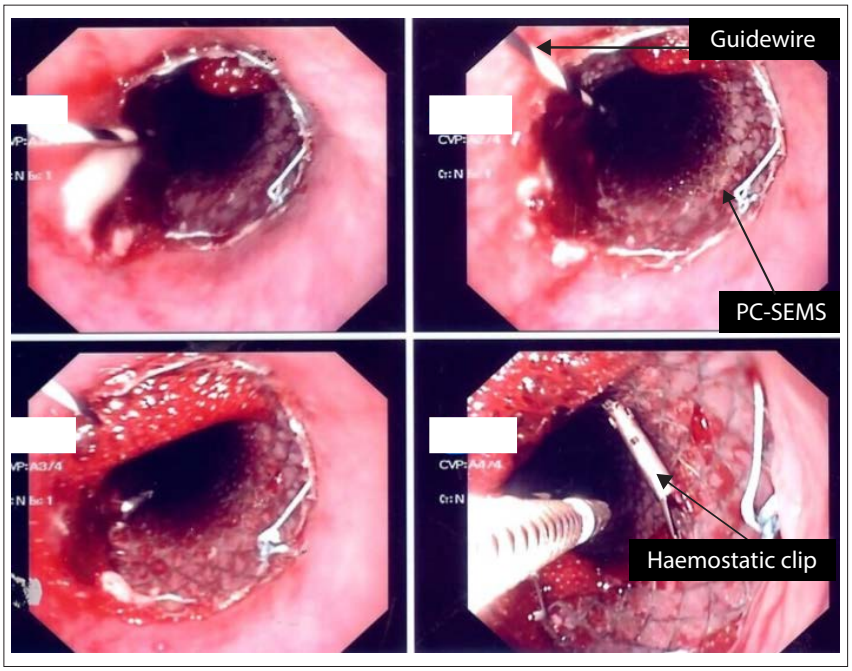


Fig. 2. Endoscopic view of PC-SEMS. (PC-SEMS = partially covered self-expanding metal stent.)

The patient's dysphagia improved markedly after stent insertion. He was advised not to consume solid food, as it could block the stent, and was prescribed medication to minimise the acid reflux that could result from the stent insertion.

Discussion

Oesophageal cancer is known to be a disease with a poor prognosis, with 5-year survival rates of only 10 - 15%. Most patients with advanced disease have a mean survival of only 3 - 5 months. The main symptom of oesophageal cancer is dysphagia, which has profound effects on social and physical function as well as other aspects of quality of life (QoL), especially in patients with advanced disease. It is essential to provide treatment that provides prompt and lasting palliation of dysphagia, but is associated with minimal procedure-related complications and minimal compromise of other aspects of QoL. SEMS has been recommended as a treatment that can provide rapid initial relief of dysphagia, with fewer adverse effects and lower re-intervention rates than other endoscopic therapies.[1-5] In our case, a PC-SEMS was inserted to relieve the patient's disabling dysphagia.

SEMS are available in three types: uncovered (UC-SEMS), fully covered (FC-SEMS) and PC-SEMS. A variety of covering materials (most commonly polytetrafluoroethylene) are used to prevent tumour and granulation tissue ingrowth, which occurs when a UC-SEMS is used. FC-SEMS do not have any exposed bare metal, but they are known to be more prone to migration. PC-SEMS have a small portion of bare metal at the proximal and distal ends to allow embedding into the oesophageal wall with granulation tissue, which provides the benefit of preventing stent migration, but they have the additional benefit of covering materials that protect against the ingrowth of tumour through the SEMS.[6]

In our department, we generally use PC-SEMS for malignant lesions and FC-SEMS for benign ones. When we do use PC-SEMS for benign strictures, they are removed within 2 weeks after insertion so that they do not become permanently embedded into the oesophageal wall by granulation tissue. We only use UC-SEMS in a few exceptional cases. For malignant strictures, the stent must be long enough to bridge the stricture and extend 2 - 4 cm beyond the proximal and distal ends.[6]

Radio-opaque markers are used to identify the extent of the strictures. In our case, we used a new surgical blade to mark the proximal end of the stricture. In addition, the position of the stent was confirmed by fluoroscopy as well as by endoscopy during and after the procedure.

Although insertion of SEMS is classified as a minimally invasive procedure, they are known to have immediate as well as late complications. Immediate complications include chest pain, fever, bleeding, gastrointestinal reflux, globus sensation, perforation and stent migration. Late complications include tumour ingrowth, stent migration, stent occlusion, development of an oesophageal fistula and recurrence of the stricture.[6-8] In our practice, dietary advice, lifelong oral proton pump inhibitors and regular follow-up are part of routine management after stent insertion. Thanks to technical advances, SEMS deployment is no longer a complex endoscopic procedure. However, in patients with high-grade strictures and those with a tortuous lumen, stent placement can pose major challenges. There are many ways to bypass these difficult strictures, such as prior oesophageal dilatations using paediatric scopes.[6] However, these can be technically challenging and can cause procedure-related complications.

Endoscopic retrograde cholangiopancreatography (ERCP) is one of the endoscopic procedures that requires technical accuracy to prevent procedure-related complications.[9] Guidewire-first cannulation has been recognised as one way to achieve technical accuracy in interventional ERCP procedures.[10] We perform this guidewire-first cannulation ERCP technique for SEMS insertion, especially when we encounter high-grade oesophageal strictures and/or a tortuous oesophageal lumen.

Conclusion

We concur with the existing medical literature on the importance of providing efficient and safe palliative treatment for patients with advanced oesophageal cancer.[2-5] We present a case of advanced oesophageal cancer in which a PC-SEMS was placed by applying the principle and technique of guidewire-first cannulation in ERCP.

Declaration. None.

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A rare case of follicular thyroid carcinoma with metastasis to the scalp

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Follicular thyroid carcinoma accounts for 10% of thyroid carcinomas. Cutaneous metastases are rare and usually indicate an advanced tumour stage. We present a case of follicular thyroid carcinoma with scalp metastases.

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Thyroid cancer is the most common malignant disease of the endocrine system. Follicular thyroid carcinoma accounts for 10% of thyroid carcinomas and is rare in young populations. It is most common in iodine-deficient areas and tends to occur in an older age group than papillary thyroid cancer.[1] Follicular thyroid cancer has a propensity to spread haematogenously to bone, lung or liver.[2] Cutaneous metastases are rare and usually indicate an advanced tumour stage. Scalp metastases are a rare presentation, seen in 2.5 - 5.8% of follicular thyroid carcinomas.[3]

Case report

A 60-year-old woman was referred to our department by a neurosurgeon. She had a newly developed scalp tumour, suspected to be of metastatic origin from a thyroid gland. It was a parieto-occipital mass ~7 × 5 cm in size, and the patient's forehead veins were very distended (Fig. 1). There was no significant anterior neck swelling, or history of dysphagia or voice changes. An excisional biopsy specimen from the mass had features of an underlying neoplastic infiltrate. The patient underwent full metastasis work-up. The results of thyroid function tests were within normal limits. A thyroid ultrasound scan showed multinodular goitre (TIRADS 5), and fine-needle aspiration of the gland showed features of follicular neoplasm. A computed tomography scan showed thyroid carcinoma with skeletal and pulmonary metastases (T3b, N1b, M1) as well as dilated biliary ducts. She developed obstructive jaundice while awaiting further surgical treatment. Liver function test results confirmed the clinical suspicion of obstructive jaundice. Subsequently, endoscopic retrograde cholangiopancreatography (ERCP) was performed and the patient was found to have a peri-ampullary tumour that was causing obstructive cholangiopathy. A biliary stent was inserted to relieve obstruction, and biopsy of the tumour showed it to be benign (Fig. 2).

The patient's jaundice subsided clinically and biochemically after the ERCP, and she underwent elective thyroidectomy. The thyroid gland was hard, deeply extended to the trachea and left recurrent laryngeal nerve. A near-total thyroidectomy was



Fig. 1. Distended forehead veins.



Fig. 2. Endoscopic finding of peri-ampullary tumour.

performed, leaving a small amount of thyroid tissue to avoid damage to the vital cervical structures. There were no postoperative complications and the patient's recovery was uneventful. She was discharged and referred to our nuclear medicine department for further management with radioactive iodine therapy.

Discussion

Metastatic thyroid carcinoma of the scalp can be a diagnostic challenge. Scalp metastases of thyroid carcinoma appear as solitary or multiple reddish nodules. In a world literature review, only 38 cases of scalp metastases from thyroid carcinoma were reported.[4] The most common histological type was follicular carcinoma (46%). A follicular neoplasm is potentially malignant, but it is impossible to differentiate cytologically between a follicular adenoma and carcinoma.[5] The treatment of patients with scalp metastases includes total thyroidectomy and excision of the scalp lesion, followed by administration of radioiodine therapy.

Conclusion

We present a rare case of metastatic follicular thyroid carcinoma. Any slowly growing scalp nodule should raise the suspicion of a metastatic thyroid carcinoma.

Declaration. None.

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Author contributions. Equal contributions.

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Penetrating trauma in rural areas – a public health disease: A report of 2 cases

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It has been recommended that all penetrating trauma to the head, neck and torso, and to the extremities proximal to the elbow and knee, should be managed in specialised trauma centres. We present two cases of penetrating trauma that presented to Pietersburg Hospital, part of the Limpopo Academic Complex. Both of them were the result of interpersonal violence.

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Limpopo Province, with 6.01 million inhabitants in 2021, is the fifth most populated province in South Africa (SA).[1] The Limpopo Academic Complex, comprising Pietersburg Hospital and Mankweng Hospital, is the only referral centre for the public health sector in the province.

As a part of the Limpopo Academic Complex, Pietersburg Hospital renders its tertiary surgical services to the entire province and its emergency surgical services to the local community. Its emergency surgical team is headed by a surgical specialist and supported by other surgical subspecialty emergency teams, such as paediatric surgery, ear, nose and throat surgery, orthopaedic surgery, urology, plastic surgery and neurosurgery.

Case 1

A 34-year-old woman with penetrating trauma was referred from a district hospital on 5 June 2022. She had been stabbed with a panga, a broad, heavy knife similar to a machete, just below the chin. This incident was reportedly due to domestic violence. After receiving primary care at the district hospital, she was transferred to Pietersburg Hospital for further surgical management. Although the panga was still *in situ*, she was in a sufficiently stable condition for further investigations before emergency surgery. An urgent computed tomography (CT) scan with CT angiography (CTA) of the neck was requested to exclude possible major organ damage radiologically. However, the radiologist on call advised that this should not be performed because the panga, being a large metal object, could interfere with the radiological images. Emergency surgical exploration of the neck was therefore performed under general anaesthesia, and the panga was removed. Fortunately, no major organ damage was found (Fig. 1). The patient's postoperative recovery was uneventful.

Case 2

A 24-year-old man with penetrating trauma was referred from a district hospital on 14 July 2022. He had been stabbed in the back, reportedly in a homicide attempt. He also received primary care at a district hospital and was transferred to Pietersburg Hospital for further management. Similar to the first case, the assailant's knife was still embedded in the patient's back (Fig. 2). A lateral chest radiograph showed the tip of the blade to be in close proximity to the descending thoracic aorta (Fig. 3). An urgent CT scan with CTA indicated that the knife had penetrated in close proximity to the vertebrae and thoracic aorta (Fig. 4). Remarkably, the patient's condition remained stable. Emergency surgery was performed under general anaesthesia. Because of the radiological findings, the surgical team was alerted to the potential for major organ damage due to this penetrating injury. An orthopaedic surgeon assisted with the operation, while the specialised neurosurgical and vascular



Fig. 1. Case 1. Penetrating neck trauma with a panga still in situ.



Fig. 2. Case 2. Penetrating back trauma with a knife blade still in situ.

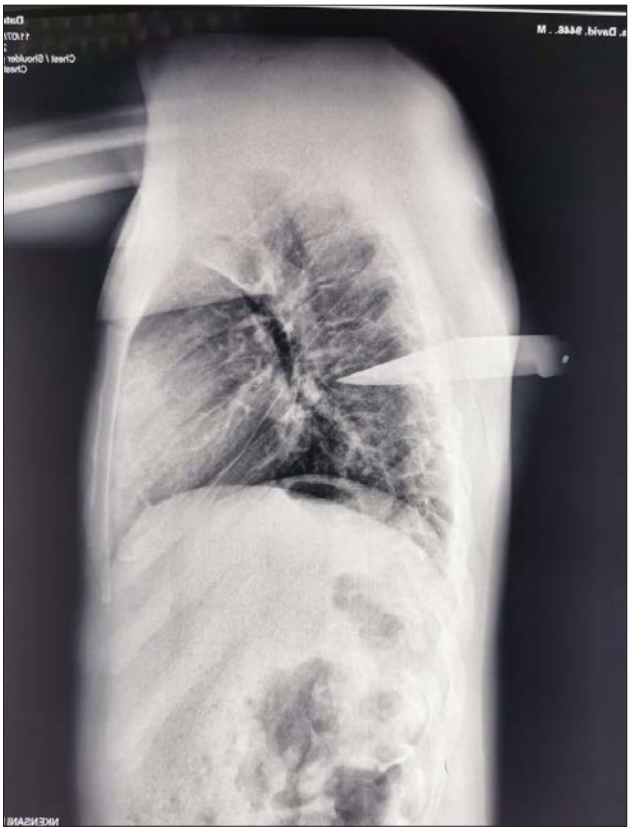


Fig. 3. Case 2. Chest radiograph, lateral view.

surgical teams were in attendance to provide immediate support if necessary. Fortunately, the knife was successfully removed without causing injury to any vital structures. The patient's postoperative recovery was uneventful.

Discussion

SA, a developing country, is in the midst of a health transition. This transition, characterised by epidemic infectious diseases and a rise in non-communicable diseases, has exposed the suboptimal performance of the health system, particularly at district level. Some particular challenges are: (*i*) a maturing and generalised HIV epidemic with a high prevalence of tuberculosis; (*ii*) high maternal and child mortality; (*iii*) non-communicable diseases such as cardiovascular disease, type 2 diabetes, cancer, chronic lung disease and depression; and (*iv*) last but not least, violence and injuries.[2]

We have described two cases of penetrating trauma that were managed by the emergency surgical team at Pietersburg Hospital. Both of them were the result of violent assault and were attended by a single surgeon during a 6-week period while he was leader of the emergency surgical team.

The care of critically ill trauma patients with penetrating injuries begins before the time of injury. A properly set-up emergency medical team is essential for efficient medical care as well as the safety of medical staff. There are clear guidelines for management of trauma patients with penetrating injuries. All patients with penetrating injuries to the head, neck and torso, and to the extremities proximal to the elbow and knee, should be transferred to the highest-level trauma centre available. Patients who are physiologically unstable should be transported to the nearest centre that is able to provide appropriate trauma care.

Both our patients were transported to the highest-level trauma centre available. Pietersburg Hospital, although currently still without its own established trauma unit, is relatively well equipped to deal with such major trauma cases. Both the patients received appropriate medical care from its emergency surgical team.

Operative management has been regarded as the gold standard for management of penetrating trauma. The physiological status of the victim dictates the need for urgent surgical intervention, with the goals of controlling active bleeding and controlling contamination from hollow viscus injuries. With the advent of newer-generation CT scanners, the appropriate use of CT imaging has become an integral part of the preoperative work-up in penetrating trauma patients who are haemodynamically stable.[3]

In line with the existing literature,[4] preoperative CT scans were requested in both our cases before emergency surgery. Both patients had an uneventful recovery postoperatively.

In 1997, Brandon Hamber and Sharon Lewis published the research report entitled 'An overview of the consequences of violence and trauma in South Africa'[5] for the Centre for the Study of Violence and Reconciliation. In its introduction, South Africans were referred to as living in a 'culture of violence'; in a society that endorses and accepts violence as an acceptable and legitimate way to resolve problems and goals. It also reported that the majority of victims of violent crimes are likely to feel unsupported and hopeless, and understandably continue to lose faith in the effectiveness of the criminal justice system.

Children exposed to violence will more readily become perpetrators of violence themselves.[5,6] Women who were beaten are at least twice as likely to beat their children compared with mothers who were not abused.[5]

It is very difficult to estimate the exact prevalence of penetrating trauma due to violence in the local community served by Pietersburg Hospital's emergency surgical team. However, the two cases of penetrating trauma due to violence we report here presented to

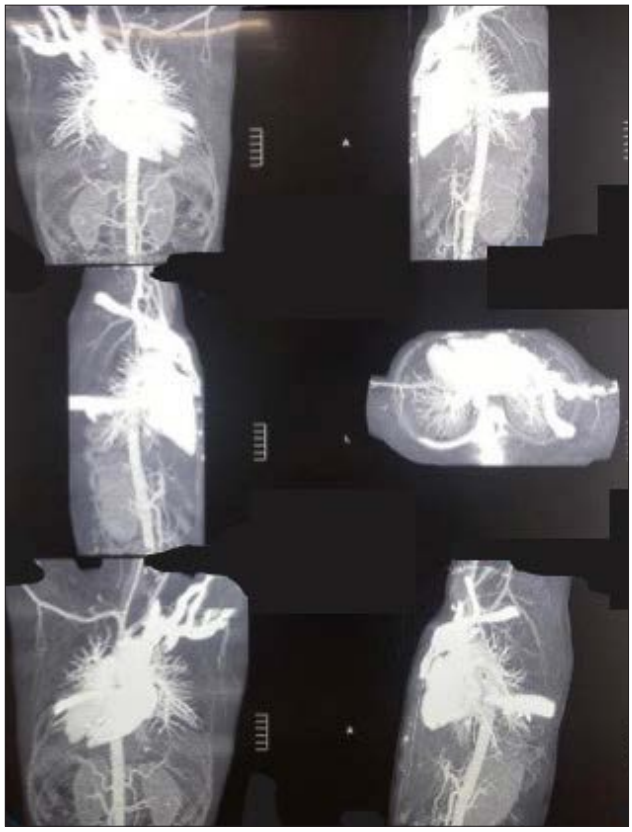


Fig. 4. Case 2. Preoperative computed tomography angiography imaging.

a single surgeon over a brief period of 6 weeks, reflecting a high prevalence of penetrating trauma and violence in our community.

It has been suggested in the literature that penetrating trauma and violence should be approached by using a variety of preventive techniques and preventive health programmes.[7] It is possible to elucidate the causes of violence, and to suggest interventions to reduce its incidence. Multiple levels of prevention are necessary to combat violence and trauma. These include primary prevention (e.g. education), secondary prevention initiatives (e.g. psychosocial and medical services), and finally tertiary preventive services (e.g. trauma counselling).[5,8]

Conclusion

The two cases reported highlight the prevalence of violence in our community. Care of trauma patients should start before the time of injury. We strongly support community-based injury prevention programmes and are of the opinion that they should be part of the armamentarium of combating trauma and violence in rural areas.

Declaration. None.

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A traumatic means of diagnosing gastrointestinal stromal tumour: A case report

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Blunt abdominal trauma (BAT) is known to cause intra-abdominal organ damage and haemorrhage, especially after severe impact to the body. We present a case in which a gastrointestinal stromal tumour became symptomatic after BAT.

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Gastrointestinal stromal tumour (GIST) is one of the most common malignant mesenchymal tumours of the stomach. Currently there are no imaging modalities that can be used to diagnose GIST conclusively. The diagnosis can be confirmed only with histological and immunohistochemical investigations.[1] We present a case of GIST that became symptomatic after blunt abdominal trauma (BAT).

Case report

A 52-year-old man was brought to the accident and emergency department at Pietersburg Hospital in Polokwane, Limpopo Province, South Africa, after being involved in a head-on motor vehicle collision. He had been driving, while fastening his seat belt at the same time. Although he was fully conscious, he could not recall the details of the accident. He had a high body mass index. On examination, there were bruises all over his body. His abdomen was tender and distended. Although he was clinically stable and plain radiographs revealed no skeletal fractures, focused assessment with sonography for trauma (FAST) showed a significant amount of fluid in the abdominal cavity. His haemoglobin concentration was 10 g/dL when he arrived and dropped to 8 g/dL while he was waiting for further imaging in the form of a computed tomography (CT) scan. Because of this drop, the CT scan was cancelled and an urgent exploratory laparotomy was performed.

During the operation, no injured intra-abdominal organs were identified, but a large soft-tissue mass arising from the stomach with some haemorrhages within was found (Fig.1). No other soft-tissue masses or possible metastases were identified. A wedge resection of the stomach was performed (Fig. 2). The soft-tissue mass was removed together with the resected part of the stomach.

The patient remained haemodynamically stable during surgery, and his postoperative recovery was uneventful.

Histological examination of the gastric mass showed features consistent with a GIST. The mitotic rate was 1/5 mm^2. No necrosis was identified, and the resection margins appeared clear of tumour. The pathological stage classification was T4NxMx, stage IIIB.

Discussion

BAT is one of the types of abdominal trauma most commonly seen in the emergency department and can result in substantial morbidity and mortality. The majority of BAT cases are related to motor vehicle collisions or vehicle-pedestrian accidents. A sudden and pronounced rise in abdominal pressure, blunt force compressing the viscera against the vertebrae, a shear force on the intra-abdominal organs from deceleration, and damage caused by associated bone fractures are mechanisms responsible for intra-abdominal damage after BAT, especially in the case of motor vehicle accidents.[2,3]

In our patient, the initial concerns were possible intra-abdominal organ damage and/or intra-abdominal haemorrhage. Instead, a giant soft-tissue tumour was found that became symptomatic after BAT, probably as a result of one or more of the mechanisms described above.

CT has been recognised as an important investigation in the management of BAT. It has a very high accuracy in detecting intra-abdominal injuries, with sensitivity of 97 - 98% and specificity of 97 - 99%. FAST is a non-invasive imaging modality that is indicated in all cases of BAT.[2-4] However, it is not as accurate as a CT scan, especially in uncooperative patients, morbidly obese patients and patients with bowel distension.[5]



Fig. 1. Intraoperative finding of a soft-tissue mass arising from the stomach.



Fig. 2. Wedge resection of the stomach to remove the gastric tumour.

The current recommendation for the treatment of GIST without metastases is surgical resection. This recommendation is based on the fact that all GISTs are potentially malignant. Miettinen *et al.*[6] reported that small gastric GISTs (size <2 cm) have a 100% cure rate after surgical resection. In managing GISTs, early diagnosis and surgical resection are therefore important in improving prognosis.[1]

In our case, the lesion was much bigger than 2 cm, but no metastases were detected during the operation. Histological examination showed that the resection margins were clear of tumour.

Although GIST is one of the most common mesenchymal tumours of the stomach, its clinical symptoms are nonspecific and depend on tumour size and location. Small GISTs are usually asymptomatic and only detected during investigations or surgical procedures for unrelated medical conditions.[1,7] Our patient's GIST was >16 cm in size and weighed >3 kg. It is very unusual for a tumour of this size to be asymptomatic, but our patient only became symptomatic after he sustained BAT.

Conclusion

In all surgical procedures, even those performed for trauma, there is always the possibility of finding unexpected pathologies. Surgeons should remain alert for these, and they should also have the sound knowledge and judgement to deal with such findings.

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Splenic injury after colonoscopy: An unexpected complication

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Colonoscopy is a useful diagnostic and therapeutic modality, but has a number of reported complications. Splenic injury, although a rare complication, can easily be mistaken for other injuries. We report a case of splenic rupture post colonoscopy that occurred at Job Shimankana Tabane Hospital in Rustenburg, North West Province, South Africa.

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Colonoscopy is a surgical procedure frequently performed for investigation of gastrointestinal symptoms. Commonly reported complications include perforation of the bowel (0.1 - 2.5%) and intraluminal bleeding (0.3 - 2.1%), usually after a biopsy.[1] Rarer complications are mesenteric tear, pneumothorax, incarceration of hernia, volvulus, septicaemia, portal vein gas, appendicitis, gas explosion, retroperitoneal abscess, emphysema, pneumomediastinum and splenic injury.[1,2] The first case of splenic injury during a colonoscopy was reported in 1974 by Wherry and Zehner.[3] Since then, >100 cases have been reported. The incidence has been reported as ~0.00005 - 0.017%, with a 5% mortality rate.[1] The low incidence could be due to under-reporting, as symptoms of pain or discomfort could be attributed to residual bowel gas from the insufflation or inadequate analgesia. We report a case of splenic rupture post colonoscopy that occurred at Job Shimankana Tabane Hospital in Rustenburg, North West Province, South Africa.

Case report

A 68-year-old white woman had an elective colonoscopy after she presented with constipation, loss of weight and lumbosacral back pain. Her previous surgical history included caesarean sections and hysterectomy. The findings on colonoscopy were reported as essentially normal. Soon after the procedure, the patient complained of severe abdominal pain in the left upper quadrant and was admitted for observation. Her abdomen was not distended, but was tender in the left upper region. Soon after admission she went into hypovolaemic shock with a pulse rate of 68 bpm, a blood pressure of 91/51 mmHg and a haemoglobin level of 3.5 g/dL. An urgent laparotomy revealed a ruptured spleen with no bowel perforation (Fig. 1). She required some inotropic support in the intensive care unit and was discharged home 4 days later.

Discussion

The mechanism of injury in our patient is not clear. The cause of splenic injuries during colonoscopy is not well known, although three theories have emerged. Firstly, some endoscopic manoeuvres can cause excessive tension on the splenocolic ligament [2,4-7] The second theory is that previous intra-abdominal inflammation or surgical procedures cause traction due to splenocolic adhesions.[1,2] Our patient had had previous lower abdominal surgical procedures for obstetric reasons. Lastly, there may be direct trauma to the spleen as the colonoscope loops around the splenic flexure.[1,2,5] Predisposing patient factors such as splenomegaly, use of antiplatelets, coagulopathies and inflammatory bowel disease, and even patient position during colonoscopy, have also been identified as possible causes.[8] Our patient was in the supine and left lateral positions during her procedure. A review of 66 cases of splenic injury during colonoscopy did not find age, previous abdominal surgery, ease of colonoscopy or biopsies performed during the procedure to be risk factors for the injury.[1] There have been more cases in females than in males, but the reasons for this are uncertain. A high index of suspicion is necessary, as excessive insufflation of gas during the procedure, inadequate analgesia or bowel perforation are commonly mistaken for rupture of the spleen. Most patients (74%) develop symptoms within the first 24 hours.[1] Approximately one-third of patients present with pain in the left upper quadrant. Most patients do not have symptoms of nausea, vomiting, abdominal distension or guarding, and ~40% present with haemodynamic instability. Our patient complained of left upper quadrant pain as soon as she was off sedation and developed abdominal distension within 24 hours.

Delay in the diagnosis of splenic injury is common. In addition to routine blood tests when perforation is suspected, radiographs,



Fig. 1. Postoperative spleen specimen.

abdominal ultrasound scans or computed tomography scans can be performed depending on availability and how stable the patient's condition is. Management depends on the grade of injury; it can be conservative or may require operative intervention (laparoscopic or open, depending on haemodynamic stability).

Conclusion

Complications of colonoscopy do occur, and patients should be carefully monitored after the procedure. Splenic injury, although uncommon, may go unnoticed and result in significant morbidity and mortality. It should always be borne in mind as a possible complication.

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An unusual case of pyogenic liver abscess during pregnancy

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Pyogenic liver abscess (PLA) is a condition involving bacterial abscess formation within the liver parenchyma. Despite significant changes in medicine involving improved diagnostic techniques and management strategies, the incidence of PLA has remained largely unchanged. We present an unusual case of PLA during pregnancy.

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Since the first article on pyogenic liver abscesses (PLAs) was published in 1938 (cited by Townsend *et al.*[1]), the incidence of the condition has decreased, with a change in epidemiology and aetiology. We report a case of PLA in a young pregnant woman with no predisposing medical conditions.

Case report

A 22-year-old woman was referred to the Department of Internal Medicine at Pietersburg Hospital in Polokwane, Limpopo Province, South Africa. An ultrasound scan at her local district hospital had confirmed that she was 18 weeks pregnant. She had no known medical conditions, and gave a complicated history of her course of illness. She had initially presented to her local hospital a month earlier after an acute onset of general malaise, fever and abdominal pain. She was diagnosed with a liver abscess, aetiology unknown, and managed conservatively with antibiotics. She reported that she had improved significantly and had been discharged. However, her original symptoms returned 1 week later, this time accompanied by a productive cough, shortness of breath and orthopnoea.

On arrival at Pietersburg Hospital she was tachycardic and tachypnoeic, with a normal blood pressure, temperature and oxygen saturation on room air. She was unable to lie flat, and appeared acutely unwell. She had conjunctival pallor and bilateral pretibial pitting oedema extending to the knee, but showed no jaundice. Cardiovascular examination revealed only a tachycardia, while respiratory examination revealed decreased air entry in the right mid zone, with absent breath sounds in the right lower zone. On abdominal examination the abdomen was found to be soft, with no rebound tenderness or peritonism. The liver was palpable 2 cm below the costal margin, with dullness to percussion giving an approximate liver span of 20 cm. She had a gravid uterus 2 cm below the umbilicus. A chest radiograph showed a significantly raised right hemidiaphragm, with collapse consolidation of the right lower lobe and a pleural effusion. Blood tests showed a normocytic anaemia with normal iron levels, serum folate and vitamin B_{12}, normal renal function, elevated canalicular enzymes, prothrombin time and septic and inflammatory markers, and a decreased serum albumin level. HIV serology was negative.

Because of the recent diagnosis of liver abscess and no definitive proof of resolution, the diagnosis of an unresolved liver abscess was made, complicated by a nosocomial pneumonia with concern regarding a hepatic pleural fistula and subsequent spread of the abscess. She was started on antibiotics, intravenous fluids and supportive management. An abdominal ultrasound scan demonstrated a large cystic structure within the right lobe of the liver measuring 10 × 16 cm, with significant displacement of the right hemidiaphragm. A pleural effusion was also noted, increasing concern regarding rupture into the pleural space. Because of the size of the lesion and the high risk of complications, surgical drainage was planned. The magnetic resonance imaging scanner was unfortunately out of order, so a computed tomography (CT) scan of the upper abdomen and chest was performed. It showed a solitary encapsulated abscess in the right lobe of the liver, with no clear diaphragmatic rupture or hepatic pleural fistula, complicated by collapse consolidation of the right lower lobe of the lung (Fig. 1). Serological tests were negative for amoebic or hydatid disease, and the diagnosis of a PLA was therefore confirmed.

Based on the large size of the structure with no indication for open surgical drainage, the decision was made to prepare the patient for percutaneous drainage. Prior to the procedure, she received 2 units of cross-matched red blood cells and was counselled extensively on the risks it involved. Tests confirmed that her haemoglobin concentration, platelet count and clotting profile were adequate. Under ultrasound guidance, a drain was inserted into the abscess. Confirmation of drain placement was achieved by successful aspiration of pus and a repeat ultrasound scan after the procedure. Specimens were aspirated and sent for microbiological analysis. A total of 2 000 mL of purulent material was drained in the first 48 hours. After the procedure, the patient reported a significant improvement in her symptoms. Her condition remained stable and she opted for outpatient management. She was educated on drain and wound care, counselled on the dangers associated with a percutaneous drain, and discharged with the drain *in situ*, with regular follow-up scheduled. The laboratory was able to isolate a strain of *Escherichia coli* with a resistant pattern to second-generation cephalosporins and some penicillin-like antibiotics. At the time of submission of this case report, the patient was being followed up as an outpatient and remained stable. As the exact aetiology of the abscess is unclear, she will require further investigations to ensure her safety during the remainder of her pregnancy.

Discussion

Ochsner *et al.*[2] analysed 47 cases of PLA and performed the first-ever serious literature review of PLAs in 1938.[1] They noted that the incidence of the condition was higher in men than in women, with a large proportion of cases attributed to intra-abdominal infections, most commonly appendicitis.[2] They noted significantly

raised mortality rates in patients with multiple abscesses, and 100% mortality in patients who were managed conservatively. As a result of advances over the past 80 years, the incidence of the disease has decreased and management principles and mortality and morbidity have improved significantly. With improvements in diagnostic imaging and antibiotic therapy and an ageing population, the epidemiology of the condition has shifted. Patients can present with numerous symptoms, some of which may be nonspecific. In all settings, patients who present with symptoms such as right upper quadrant pain, jaundice and tenderness on palpation of the right upper quadrant should receive urgent imaging, as a number of diagnoses with high morbidity and mortality rates share these presenting features. However, this specific constellation of symptoms is limited to ~10% of all cases,[1] and patients may present with any combination of the nonspecific symptoms of fever, rigors, generalised abdominal pain, nausea and vomiting, and malaise. There may also be nonspecific results on laboratory testing, which may indicate systemic inflammation or liver pathology. Ultimately, diagnostic imaging is required to evaluate these patients. Plain radiographs are of limited use, as they will only display air-fluid levels within the abscess (if present), or potential displacement of nearby structures should the abscess be large enough to cause a mass effect. Ultrasound and CT are useful in the diagnosis of liver abscess, as they make it possible to evaluate the parenchyma of the liver, and assess for space-occupying abscesses/cysts. CT scans are more sensitive than ultrasound in the detection of liver abscesses (97 - 85%).[3] However, both can be useful, with ultrasound playing a role in the low-resource setting. The aetiology of PLA has evolved significantly, with biliary tract sepsis becoming the leading cause. Other processes include translocation of bacteria from the intestines into the splanchnic venous system with haematological spread, penetrating trauma, and potentially cryptogenic causes.[4] While the micro-organism isolated from the abscess may indicate the aetiology, it is only a presumption and further work-up will be required to confirm.[3]

The approach to management of PLAs has improved dramatically since the implementation of percutaneous drainage, with surgical drainage reserved for patients with complicated disease or evidence of rupture. Indications for surgical drainage include evidence of rupture of the abscess such as peritonitis and failed percutaneous drainage.[5] In the past, multi-loculated abscesses were seen as an indication for open surgical drainage. However, even in these cases there is benefit in attempting percutaneous drainage before moving to a more invasive technique, as success with percutaneous techniques has been demonstrated.[6]

It is important to note that types of liver abscess other than pyogenic are prevalent, because management principles differ according to the causative organism. The other main type of liver abscess encountered is amoebic liver abscesses (ALAs). ALAs differ from PLAs in that, if they are detected early and remain uncomplicated, they can be managed with antibiotics alone.[7] Unfortunately, presenting features, imaging and biochemical and haematological testing are unlikely to distinguish between PLA and ALA, and serological and microbiological testing will be required.[8]

Conclusion

Patients with liver abscesses may present with nonspecific signs and symptoms. It is important to have a high index of suspicion when pathology is suspected in the right upper quadrant, while ensuring that one keeps an open mind and allows for a broad differential diagnosis. While early diagnosis and intervention in these patients are crucial to reduce associated complications, morbidity and mortality, it is important to not rush to invasive management techniques, as these may not be in the best interests of the patient.

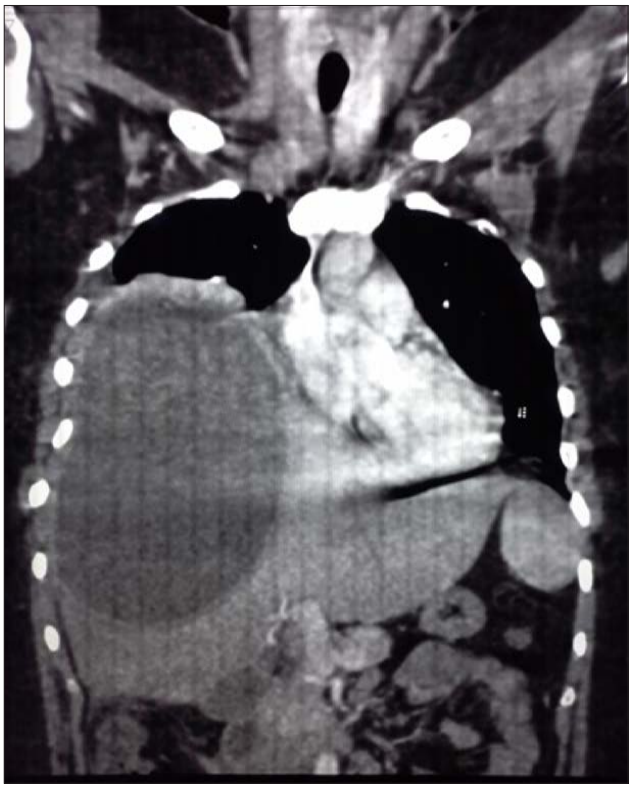


Fig. 1. Coronal view: computed tomography scan showing large liver abscess.

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Aneurysm caused by intimomedial mucoid degeneration: A case report

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Intimomedial mucoid degeneration (IMMD) is characterised by aneurysm formation following mucin deposition in the intima and media, with elastic tissue degeneration of the arterial wall. IMMD aneurysms have been sporadically reported, with a series of 22 cases by Abdool-Carrim *et al.* emanating from the University of Natal, Durban, South Africa. We report on a patient who presented with a ruptured abdominal aortic aneurysm. IMMD was confirmed on histological examination of a biopsy specimen taken during open repair of the aneurysm.

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Aneurysms due to intimomedial mucoid degeneration (IMMD) are rare. They were first described in South Africa (SA) by Decker *et al.* in 1977.[1] Subsequently, a case series from the University of Natal was reported by Abdool-Carrim *et al.*[2] Katz *et al.*[3] stated that to their knowledge, only 24 cases had been reported in the medical literature at the time of writing. IMMD is characterised by aneurysm formation following mucin deposition in the intima and media, with subsequent degeneration of elastic tissue in the arterial wall. We report on a patient with IMMD operated on at Pietersburg Hospital in Polokwane, Limpopo Province, SA.

Case report

A 49-year-old woman was referred from Tshilidzini Hospital, Shayandima, Limpopo, with a ruptured abdominal aortic aneurysm. On arrival at Pietersburg Hospital, she was hypotensive and had a low haemoglobin concentration and renal impairment. The hospital's massive blood transfusion protocol was initiated and activated. A computed tomography scan performed prior to referral to the Department of General Surgery demonstrated a ruptured infrarenal aortic aneurysm. The patient was prepared for open surgical repair. Intraoperatively, the diagnosis of IMMD was suspected because no intraluminal thrombus was identified, while the aortic wall was found to be thin and frail. The surgical repair was difficult owing to copious oozing from the suture line despite all the necessary precautions. Fresh-frozen plasma and platelets were given intraoperatively, and postoperatively the patient was admitted to the intensive care unit on high doses of inotropes for ongoing resuscitation. During the postoperative period, she developed acute renal failure requiring dialysis. She recovered gradually, was transferred to the normal surgical ward, and was discharged after 3 weeks in a stable condition. She is being followed up and monitored, in particular because of her renal function, which was recovering at the time of writing.

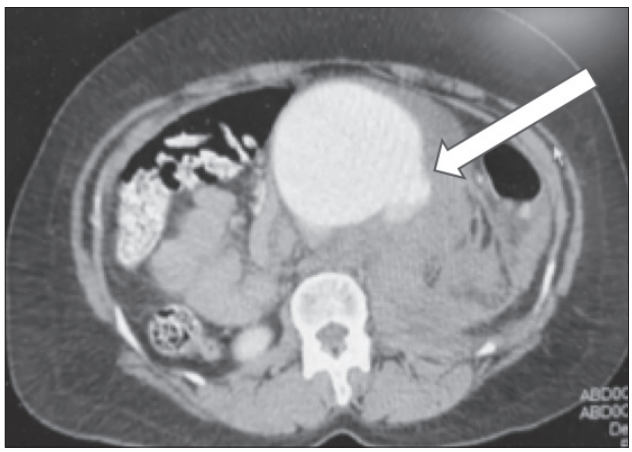


Fig. 1. Axial abdominal computed tomography scan with intravenous contrast, demonstrating the abdominal aneurysm with the retroperitoneal contained leak (arrow).

Discussion

IMMD was first described in SA in 1977,[1] and since then 87% of cases have been reported in black hypertensive females who were relatively younger than patients with atherosclerotic aneurysms. The patients identified by Abdool-Carrim *et al.*[2] were mostly black women (average age 52 years for patients with IMMD, with a range of 20 - 71 years, v. 65 years for those with atherosclerotic aneurysms), with an unknown aetiology. Our patient, a black woman aged 49 years, fits the previously reported profile. In the medical literature, there have been some reports of IMMD in the non-black population, but very few compared with cases in blacks.

The exact cause of IMMD remains unknown. It has mostly been reported in the large and medium vessels, but Georgios *et al.*[4] reported a case in the peripheral vessels, indicating that IMMD can affect other vessels, and questioning its earlier description as a disease of large and medium vessels only. IMMD does not have distinctive clinical features, and the diagnosis can only be confirmed on postoperative histological examination of the resected specimen. However, cases of IMMD are rare, and can be missed if the pathologist is not specifically looking for this condition.[5] If there are clinical grounds for suspecting IMMD, we suggest that this should be mentioned to the pathologist.

Conclusion

IMMD remains a rare disease, with unknown aetiology. It should be suspected in younger patients, particular females, who present with large aneurysms with no other underlying causes. Care should be taken to avoid complications related to this rare disease.

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Conflicts of interest. None.

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Unilateral congenital nasal pyriform aperture stenosis and unilateral choanal atresia – a novel finding: A case report

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Congenital nasal pyriform aperture stenosis (CNPAS) is a rare cause of upper airway obstruction in infants, with an incidence of 1 in 25 000 live births. Choanal atresia (CA) is a more common cause of upper airway obstruction, with an incidence of 1 in 5 000 - 8 000 live births. These two conditions often occur independently of each other. Radiologists frequently misinterpret CNPAS as CA. We present a case in which unilateral CNPAS and unilateral CA occurred in the same patient on opposite sides of the nose. The patient had none of the associated craniofacial abnormalities or syndromes. The CNPAS was successfully treated with a sub-labial approach and drilling of the stenotic pyriform aperture, while the CA was dilated with Lister dilators.

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Infants are obligate nasal breathers during the first few months of life, so congenital nasal obstructions are life threatening. In diagnosing these potentially lethal conditions, it is important to distinguish between the various types of nasal obstruction. The very rare congenital nasal pyriform aperture stenosis (CNPAS) can easily be confused with choanal atresia (CA), which is more common. Other causes of nasal obstruction include nasal hypoplasia, septal dislocation, meningocele and dermoid cysts. It is important to detect any nasal obstruction at an early stage as it can lead to potentially fatal respiratory failure or asphyxia.

Case report

A 1-month-old male infant with a diagnosis of bilateral nasal obstruction, difficulty in breathing, noisy breathing and bilateral discharge of thick white nasal mucus was referred from Malamulele Hospital to the Department of Ear, Nose and Throat Surgery at Pietersburg Hospital in Polokwane, Limpopo Province, South Africa. He had difficulty suckling from his mother's breasts and was failing to thrive. He had been born at term to a 25-year-old primipara via a normal vaginal delivery, with a birth weight of 3 300 g. On arrival at our unit, he had an oropharyngeal airway secured to his mouth with Elastoplast and a feeding tube on the side. He weighed 3 200 g (less than his birth weight). Stertorous breathing with suprasternal and subcostal recessions were noted. His oxygen saturation was 94% with nasal prongs at 1 L/min. Echocardiography of the chest showed no structural abnormalities other than hyperdynamic left ventricular dysfunction. The radiologist reported the presence of left CA, but missed the right pyriform aperture stenosis. The pyriform aperture diameter measured 6.2 mm. A single central mega incisor was present, with a triangular hard palate (Figs 1 - 3). A magnetic resonance imaging scan did not identify any findings to suggest a holoprosencephaly phenotype. The hypothalamic infundibular axis appeared normal.

Surgical management

The upper gingival sulcus and nasal floor were injected with lidocaine 1% and epinephrine 1:100 000. A 2 cm sub-labial incision was made down to the maxillary bone, taking care not to disrupt any tooth buds. A sub-periosteal flap was raised to expose the anterior nasal spine and the floor of the nose. On the right, the floor was raised sufficiently to insert a 2 mm diamond burr, which was used to widen the pyriform aperture laterally and medially. Care was taken to avoid injury to the tooth buds inferiorly and the nasolacrimal duct laterally. Drilling was deemed adequate when a 3.5 mm endotracheal tube (ETT) could easily pass through. The incision was closed in a multi-layered fashion. For the CA on the left, Lister dilators of various sizes were used. A 3.5 mm ETT was left in place for 2 weeks to prevent re-stenosis. At the time of writing, the patient has been followed up for 3 months postoperatively. He continues to have patent nares bilaterally, and his suckling has improved.



Fig. 1. Axial computed tomography scan view of pyriform aperture measuring 6 mm (arrow).



Fig. 2. Axial computed tomography scan of the head, demonstrating a single central mega incisor (arrow).

Discussion

CNPAS was first described by Brown *et al.*[1] in 1989 and is a rare cause of airway obstruction in infants. It is estimated to occur in only ~1 in 25 000 live births.[2] As infants are obligate nasal breathers until the age of 4 months, nasal obstruction may lead to respiratory and feeding difficulties and can be potentially life-threatening. Stenosis of the pyriform aperture occurs secondary to bony overgrowth of the nasal processes of the maxilla.[2] A pyriform aperture measuring <11 mm on radiographic imaging is considered stenotic. Furthermore, radiological findings of a central mega-incisor, which is present in approximately 60% of cases, help confirm the diagnosis.[3] One theory is that CNPAS is a form of holoprosencephaly resulting in anomalies of the forebrain and facial midline.[4]

CA, on the other hand, is congenital narrowing or obstruction of the posterior nasal apertures, leading to failure of the posterior nasal cavity to communicate with the nasopharynx. Its incidence is 1 in 5 000 - 8 000 live births. The developmental deformity consists of an enlarged vomer and medialisation of the pterygoid plates and lateral nasal walls. CA was first described by Johann George Roederer in 1755 (in Ha and Vijayasekaran[5]). CA is far more common than CNPAS. The pyriform aperture is a pear-shaped opening bounded by nasal bone superiorly, the nasal process of the maxilla laterally and the maxillary horizontal process inferiorly. A literature search by Ha and Vijayasekaran[5] on Medline, Embase and PubMed databases did not show any study in which CA and CNPAS coexisted. They were the first to report presence of the two conditions in one patient. Their patient appeared to have bilateral nasal pyriform aperture stenosis (NPAS), whereas in our case the NPAS was unilateral, with CA on the contralateral side. In our case, conservative management by the paediatricians at the referring hospital failed, and the infant was failing to thrive, was on supplemental oxygen to maintain his saturation, and was in obvious constant respiratory distress. We therefore decided that operative management was indicated.



Fig. 3. Axial computed tomography scan of the head, demonstrating left choanal atresia (arrow).

Because CNPAS is such a rare condition, radiologists frequently miss the diagnosis and typically incorrectly report the airway obstruction in newborns as CA. This happened in our case, where the radiologist reported only the CA on the left side and missed the NPAS on the right. It is therefore very important for otolaryngologists to be able to read their own scans.

Conclusion

We report a case of unilateral pyriform aperture stenosis together with a contralateral CA in the same patient that to the best of our knowledge, after performing an extensive literature review, has not yet been described. In addition, since NPAS can be missed by radiologists, we consider that otolaryngologists should be clinically astute and able to accurately read their own CT scans, so that they do not miss the diagnosis and are able to manage their patients appropriately.

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Conflicts of interest. None.

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Primary neuroendocrine invasive breast carcinoma: A case report and literature review

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Primary neuroendocrine breast cancer (NEBC), also known as breast cancer with neuroendocrine differentiation, comprises a heterogeneous group of rare invasive breast carcinomas. The diagnosis depends on excluding metastasis from other sites, because the two entities require different management approaches. In this case report, we seek to explore and share our experience of primary NEBC, and provide a literature review.

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Primary neuroendocrine breast cancer (NEBC) is currently considered rare, being thought to account for ~0.3 - 0.5% of all breast cancers, and for this reason there are no data from prospective clinical trials on its optimal management.[1,2] Also known as breast carcinoma with neuroendocrine differentiation, NEBC comprises a heterogeneous group of rare invasive breast carcinomas[2] that have historically been poorly defined owing to different definitions of what constitutes a neuroendocrine carcinoma.[3] Several theories on the histogenesis of primary NEBC have been proposed in the literature, the most widely recognised suggesting that it is derived from the divergent differentiation of a neoplastic stem cell in both epithelial and neuroendocrine cells.[3] Another theory hypothesises a derivation from neural crest cells that migrate to the mammary glands, or an origin from neuroendocrine cells present in breast tissue.[3] The observation that NEBCs often resemble breast tumours histologically supports the hypothesis that NEBCs derive from the differentiation of an epithelial progenitor cell.[3] Furthermore, the term neuroendocrine carcinoma of the breast was revised to carcinomas with neuroendocrine features in the 2012 *WHO Classification of Tumours of the Breast*.[4] The diagnosis is based on morphological features similar to those of lung and gastrointestinal neuroendocrine tumours, and neuroendocrine markers.[2] The World Health Organization (WHO) has stratified neuroendocrine neoplasms based on their histological differentiation into low, intermediate and high grade, with majority of NEBCs being hormone receptor positive and human epithelial growth factor receptor 2 (HER2) negative.[5-7] In 2019, the WHO classified NEBCs with neuroendocrine tumours of other organ systems into differentiated neuroendocrine tumours (low Nottingham grade) and poorly differentiated neuroendocrine carcinomas (high Nottingham grade). The group previously named intermediate is excluded, only two groups being recognised.[8] Further classifications and new findings in the future may shed more light on tumours of this histological type. Neuroendocrine tumours commonly occur in the gastrointestinal system (70%) and bronchopulmonary system (20%), with the mammary glands accounting for <1%.[6] Early-stage tumours are usually treated with the same strategy used for other types of invasive breast cancer.[1,2]

The main objective of this case report is to share our experience with NEBC as an addition to the existing literature. The patient gave written informed consent to publish. Ethical approval was obtained from Pietersburg-Mankweng Research Ethics Committee (ref. no. PMREC 25 AUGUST UL 2021/F).

Case report

A 39-year-old obese woman had had a lump in the right breast for 18 months. She had gone to her local hospital when she noticed the lesion. A core biopsy was done and she was referred to the breast oncology clinic at Mankweng Hospital in Polokwane, Limpopo Province, South Africa, for further assessment and management. She had previously been healthy, with no known comorbidities and no family history of malignancy. On enquiry about her gynaecological history, she stated that her menarche had been at age 12, and she was still having normal periods and on contraception. She had a 15-year-old child, born when she was 24. After the birth of this child she had two more pregnancies, both resulting in unexplained stillbirths at term. She had no history of pregnancy-induced hypertension or any medical conditions diagnosed during pregnancy. After her discovery of the breast lump she was diagnosed with young-onset hypertension. There were no associated weight changes, and she was HIV negative. On examination she had a scar on the right upper quadrant, no palpable axillary lymph nodes, an elevated blood pressure (150/93 mmHg, pulse rate 88 bpm) and a high body mass index (37.7 kg/m^2). The rest of the vital signs and the findings on systemic examination were unremarkable. On examination of the breast, the tumour was clinically staged as T3N0M0, making it stage IIB. Histological evaluation showed nests of cells infiltrating extensively throughout the tissue. The cells were hormone receptor (oestrogen and progesterone) positive, the HER2 score was 3+ and the Ki-67 proliferation index was 50 - 60%. Synaptophysin (SYP) and chromogranin (CGA) cytoplasmic staining was positive within the tumour cells, features in keeping with grade 3 invasive carcinoma showing neuroendocrine differentiation. A mammogram (Fig. 1) revealed poorly marginated density with a speculated mass noted on the upper inner quadrant at 1 o'clock on the middle portion of the right breast. The mass expended anteriorly to the retro-areolar space causing minimal traction of the peri-areolar skin and nipple. There were associated architectural distortions and trabecular

thickening. The retromammary space was grossly normal bilaterally. There was no thickening of overlying skin, and no dilated ducts bilaterally. Regional benign calcifications were noted in the left breast. No axillary lymph nodes were visualised bilaterally. For further evaluation, a computed tomography (CT) scan (Figs 2, 3 and 4) was done and revealed multiple enlarged lymph nodes in the right axillary region. The right breast was ill defined with trabecular thickening and nipple retraction. The breast mass did not extend into the retromammary space, and the pectoralis muscle was grossly normal. Hypodense areas were noted in the thoracic and lumbar vertebrae, with involvement of the posterior elements. The right scapular blade and spine also had multiple hypodense areas. The lung parenchyma, the visualised liver, the stomach and the rest of the visualised bowel and the kidneys were grossly normal. With this evidence, the patient was diagnosed as having primary NEBC, with features suggestive of metastasis to the bones. A bone scan revealed widespread metastases in the skull and throughout the spine, pelvic bone, proximal femur and sternum. In view of this finding, the patient was re-assessed as having clinical stage IV disease. The management approach changed to focus on palliative care. There was no surgical intervention, and the patient was referred to the medical oncology clinic for further management, to come back if the need for surgical palliation arose.

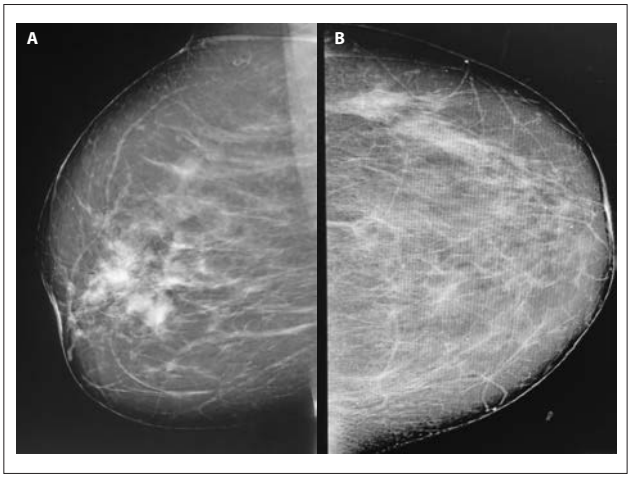


Fig. 1. Mammogram of right breast (A) and left breast (B): poorly marginated density with a speculated mass noted on the upper inner quadrant at 1 o'clock on the middle portion of the right breast.

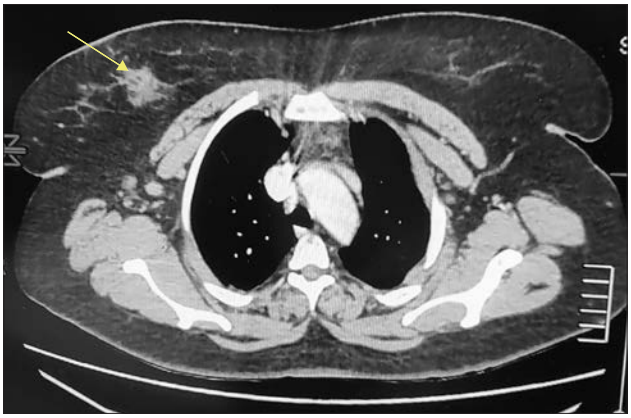


Fig. 2. Computed tomography scan, transverse view. There is an ill-defined right breast mass (arrow) with trabecular thickening and nipple retraction. It does not extend into the retromammary space, and the pectoralis muscle is grossly normal.

Discussion

Primary NEBCs are rare and the diagnosis therefore depends on excluding metastasis from other sites, because the two entities require different management approaches.[9] Diagnostic tools include the use of tumour markers such as CGA and SYP immune reactivity, which is significantly associated with a neuroendocrine neoplasm.[1,10] Importantly, elevated CGA levels are also associated with hypertension, obesity and heart failure,[11] among other conditions. On breast imaging with mammography and/or ultrasound, secondary NEBCs are oval in shape, with circumscribed or microlobulated margins.[12] Triple assessment is mandatory; however, histopathological assessment and immunohistochemistry staining are the mainstay of diagnosis.[1,13,14] Clinically, the presentation of NEBCs cannot be distinguished from other types of breast cancer. It has also been postulated that, unlike other breast cancers, NEBCs can present with clinical features related to hormonal secretion because of ectopic production of adrenocorticotrophic hormone, norepinephrine or calcitonin.[15] Our patient was obese and hypertensive, with SYP- and CGA-positive cytoplasmic staining within the tumour cells. More knowledge and research on the possible association between the tumour markers and clinical syndromes could play a vital role in patient

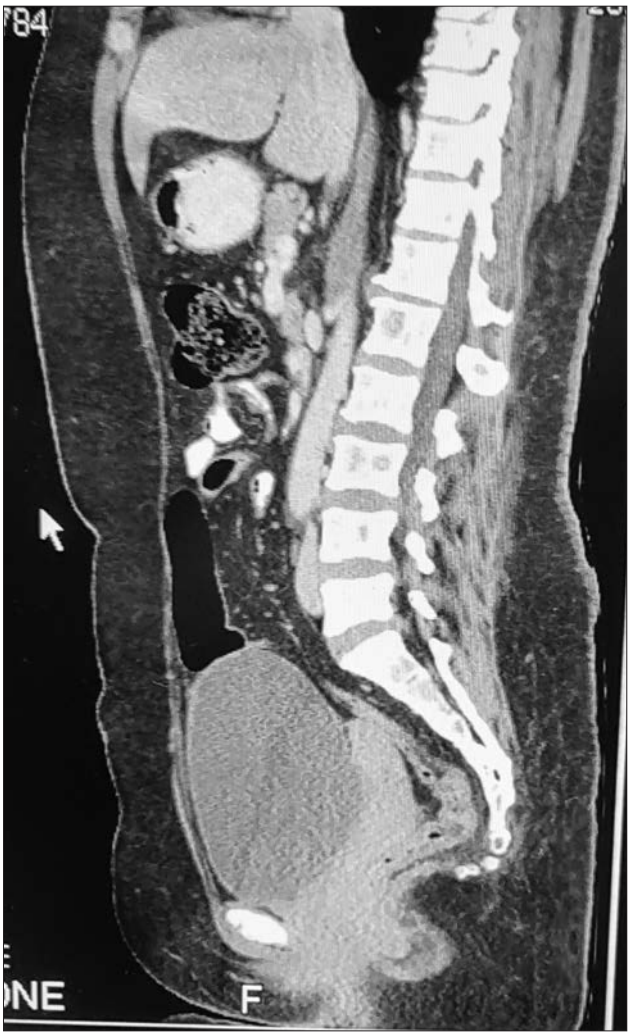


Fig. 3. Computed tomography scan, sagittal views. Multiple enlarged lymph nodes noted in the right axillary region. Hypodense areas noted in the thoracic vertebrae with involvement of the posterior elements. The right scapular blade and spine also have multiple hypodense areas.

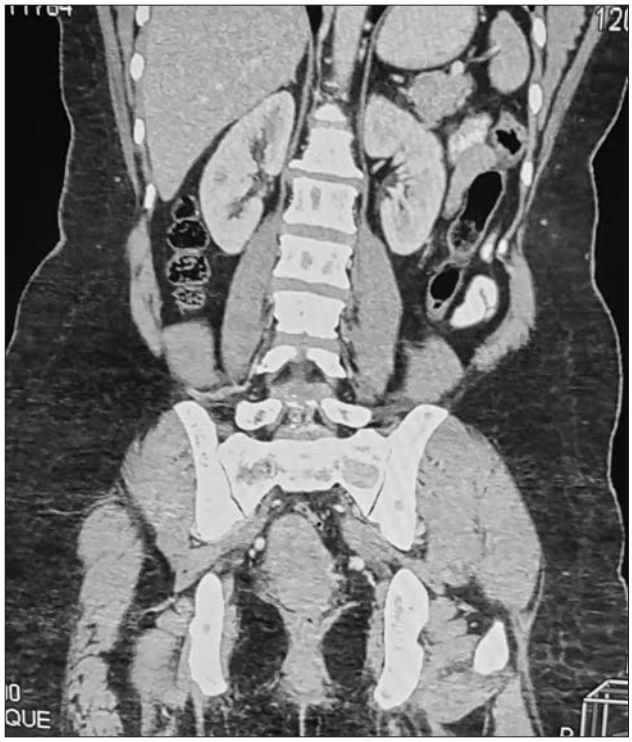


Fig. 4. Computed tomography scan, chest and abdomen, coronal section. Hypodense areas noted in the thoracic vertebrae. The lung parenchyma, visualised liver, stomach, the rest of the visualised bowel and the kidneys are grossly normal.

management, so further evidence on this association is of crucial importance. So far, there are no available research data specifying radiological pathognomic features in the diagnosis of NEBCs. As in our patient, mammographic and CT scan findings are similar to those in other histologically different types of breast cancer, and imaging therefore cannot be used alone. It is vital to distinguish between primary NEBCs and metastatic neuroendocrine tumours from another site, because treatment of the two is different.[15] The CT scan findings in our case suggested that the patient had advanced breast cancer with metastasis to the thoracic vertebrae, right scapular blade and spine. With no specific management strategies for advanced neuroendocrine breast malignancies, the management principles are currently the same as for other types of breast cancers. A multimodality therapeutic strategy includes chemotherapy, endocrine therapy, peptide receptor radionuclide therapy, radiation therapy or surgery, or combinations of the above. It is hoped that better knowledge of the biology of these tumours will provide new therapeutic targets for personalised treatment in the near future.

Conclusion

Owing to the rarity of NEBCs, there is not enough evidence to guide specific management, so the treatment is the same as that for invasive breast carcinoma of no special type. Further studies are indicated to elucidate the clinical behaviour of the tumour.

Declaration. None.

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Primary thyroid cavernous haemangioma: Report of a case with review 3 years after operation

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A 51-year-old man presented with progressive symptomatic anterior neck swelling. Thyroid scintigraphy showed a multinodular goitre predominantly on the left side, and left thyroid lobectomy was performed. Histological examination of the specimen showed cavernous haemangioma. Cavernous haemangiomas of the thyroid are seldom suspected preoperatively, as they are very rare. Only a few cases have been reported in the literature. Three years after the operation, the patient was reviewed and found to be clinically well with no thyroid-related symptoms. The prognosis after surgery is good. In this case report, we share our experience of primary thyroid cavernous haemangioma and provide a literature review.

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Primary thyroid cavernous haemangiomas are very rare and have seldom been reported in the literature.[1] Haemangiomas are benign, non-reactive vascular tumours caused by an increase in normal- or abnormal-appearing blood vessels or poorly formed vessels.[2] Based on the main vessel type, haemangiomas have been further subclassified pathologically. A multidisciplinary consensus has emerged on the division of benign vascular lesions into two biological categories, tumours and malformations, as a result of advances in the understanding of the pathophysiology of this heterogeneous group of lesions.[2]

In general, lesions formerly referred to as venous haemangiomas and cavernous haemangiomas, as well as some intramuscular haemangiomas, are included in the category of venous malformations. The majority of cases are sporadic, although a small proportion are syndromic or associated with specific genetic alterations.[3] Lesions comprising more vessels with thick, unevenly attenuated muscle walls were historically referred to as venous haemangiomas, whereas those comprising more vessels with massive, thin walls were typically identified as cavernous haemangiomas.[4]

The main objective of this case report is to share our experience of primary thyroid cavernous haemangioma, with a literature review. The patient gave written informed consent to publish.

Case report

A 51-year-old man with no known comorbidities presented to Mankweng Hospital in Polokwane, Limpopo Province, South Africa, with progressive anterior neck swelling of 5 years' duration. He was symptomatic, with neck pain, a sore throat, a hoarse voice, dysphagia, a decreased range of neck movement, anxiety, weight loss and palpitations. There was no history of trauma. Thyroid scintigraphy demonstrated that both lobes were grossly enlarged, with the left lobe being more enlarged than the right. There was inhomogeneous uptake of tracer, with the impression of cold nodules occupying both lobes, as well as the upper and mid poles. No prominent hot nodules were visualised. There was also extension of the thyroid towards the sternal notch, but not beyond. The findings were consistent with a multinodular goitre. Neither fine-needle aspiration nor computed tomography (CT) were performed. The results of thyroid function tests were within normal limits.

The patient underwent left thyroid lobectomy, and the resected specimen was sent for histological examination. The thyroid lobe measured 80 × 50 × 50 mm and weighed 180 g. On section, a solitary haemorrhagic mass measuring 75 × 45 × 45 mm with a central necrotic area was identified. This was found to be a benign vascular proliferation compatible with cavernous haemangioma. The patient was followed up, and on review 3 years after the operation he did not have any thyroid-related symptoms, although he reported dryness in the throat and nostrils, fatigue and weight gain. The findings on physical examination of the neck and the results of thyroid function tests were normal.

Discussion

Haemangiomas are common benign soft-tissue tumours that usually occur on the skin, liver and other organs.[5] However, thyroid haemangiomas are rare, with only a few cases reported. Primary thyroid haemangiomas are associated with abnormal development resulting from failure of the angioblastic mesenchyma to form canals.[6] Secondary thyroid haemangiomas are typically associated with trauma, fine-needle aspiration and other neck procedures.[6] In our case, no history of trauma or procedures that might have caused the haemangioma was identified; the patient presented with a gradually progressive anterior neck mass that had developed over a 5-year period. Other symptoms were neck pain, a sore throat, a hoarse voice, dysphagia, a decreased range of neck movement, anxiety, weight loss and palpitations. The most common presenting symptoms reported in previous studies are progressive neck swelling resulting in discomfort, dysphagia and hoarseness. Additional symptoms such as dysphagia, dyspnoea, tracheal deviation and unilateral vocal cord paralysis have also been described.[7,8] Most case studies report an average size of 3 - 7 cm.[7] Our patient had a thyroid haemangioma with a size of 7.5 × 4.5 × 4.5 cm. It has proved difficult to diagnose thyroid haemangioma before operation because there are no typical pathognomonic findings on fine-needle aspiration cytology, ultrasound scans, radiographs or CT scans.[9]

Thyroid haemangiomas are most often located in the left lobe of the thyroid, with the incidence slightly higher in males than females.[10] Our case, in a male with the left side of the thyroid affected, is consistent with previously reported findings. On ultrasound scans, cavernous haemangiomas have a similar pattern to a number of other thyroid diseases, making it difficult to differentiate between them. Magnetic resonance imaging, which shows a serpentine pattern with heterogeneous signal intensity, can be used to help with the diagnosis.[5] Other investigations include a technetium-99 erythrocyte-labelled scan, which can show poor perfusion and delayed filling of the haemangioma.[6,11] When surgically removing the thyroid nodule, it is important to avoid rupture of the haemangioma, to prevent accumulation of blood during the procedure.[12] Surgery is indicated only when the lesion is symptomatic. We reviewed our patient 3 years after the operation, at which time he was clinically well, euthyroid, and without any thyroid-related symptoms. The prognosis of thyroid haemangiomas is good.

Conclusion

Primary thyroid cavernous haemangioma is a very rare tumour. It usually affects the left lobe and most commonly affects males. Surgery is only indicated when the lesion is symptomatic, and the prognosis after surgery is good.

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Author contributions. Equal contributions (concept, acquisition of data, analysis of data, drafting of the manuscript and critical revision for important intellectual content).

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Conflicts of interest. None.

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Colonoscopy performed with selective use of sedation: A case report

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Colonoscopy is the gold standard for diagnosis of colonic disease. We present a patient with chronic diarrhoea and a caecal tumour that was diagnosed with colonoscopy.

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Colonoscopy is the visual examination of the inner lining of the large intestine with a camera on a flexible tube passed through the anus.[1] The most important indications for colonoscopy are evaluation of abnormalities observed on imaging studies, investigation of gastrointestinal (GI) bleeding, investigation of iron deficiency anaemia, investigation of unexplained diarrhoea, surveillance of patients with inflammatory diseases, and screening for and follow-up of colorectal cancer (CRC).[2,3]

Case report

A 45-year-old woman was referred to our endoscopy unit for colonoscopy as a further work-up on her chronic diarrhoea. She reported that she did not have any other chronic medical diseases or a family history of CRC. She had taken bowel preparation medication. The procedure was explained to her in detail, including the sedation that would be used if necessary. The procedure-centred pain (PCP) score was used to assess the patient's requirement for sedation during the procedure. Colonoscopy revealed a malignant-looking lesion in the caecum (Fig. 1), and it was biopsied for histological diagnosis. No concomitant pathologies such as polyps or colitis were detected endoscopically. The patient did not require any sedation during the procedure, as her PCP score remained grade III. It was not possible to pass the colonoscope into the ileum owing to the lesion in the caecum, so the procedure was recorded as an incomplete colonoscopy. Histological examination of the biopsy specimen showed the lesion to be a moderately differentiated invasive adenocarcinoma.

Discussion

Colonoscopy is regarded as the gold standard for diagnosis of colonic diseases. It can detect both cancers and premalignant neoplasms by visualising the entire colon. It also offers the advantages of detection and removal of polyps, as well as diagnostic sampling of cancers.[1,4-7] In our case, the caecal lesion was diagnosed as a malignancy on colonoscopy, and this was confirmed on histological examination of a tissue sample.

GI endoscopic procedures, including colonoscopy, are widely accepted and performed globally. However, these procedures are invasive and often unpleasant. For this reason, procedural sedation has become a fundamental aspect of GI endoscopy to fulfil patients' expectation of a painless procedure without compromising on its quality. There are various options for sedation, ranging from light sedation (anxiolysis) to general anaesthesia, depending on the procedure being performed, the centre of expertise and the individual patient. The wide range of practices include endoscopist-directed sedation, nurse-administered sedation and monitored anaesthesia care (MAC), the use of which depends on individual countries and regions. All of these techniques have certain advantages and disadvantages in terms of utilisation of resources. There are also concerns regarding the safety of the various sedatives, especially the rapid progression from moderate sedation to general anaesthesia, the risk of cardiopulmonary adverse events, and the increased risk of bowel perforation.[8-10]

Our PCP score is conceptualised on the basis of patients' expectation of a painless, high-quality procedure. The score is intended to balance the quality of endoscopy with the risks of sedation, especially at institutions with limited healthcare resources.

PCP is scored as follows:

- The patient is told the nature of the procedure and that some discomfort can be expected. If the patient is still anxious after this explanation, PCP is scored as grade IV, and it is recommended that endoscopist-directed light sedation (anxiolysis) be provided.
- If the complete procedure can be performed without sedation and with only minimal patient discomfort, PCP is scored as grade I.
- If the patient suffers severe discomfort, but this resolves with adjustments in endoscopic manoeuvres, PCP is scored as grade II.
- If the patient suffers severe discomfort and this does not resolve with adjustments in endoscopic manoeuvres, but the discomfort resolves when the endoscope is completely withdrawn and the procedure is able to proceed again, PCP is scored as grade III.

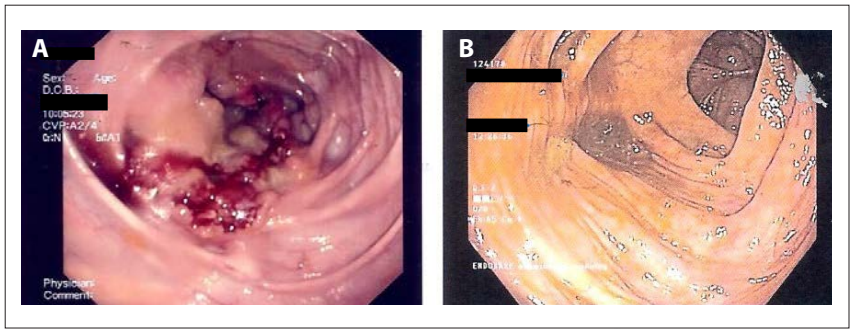


Fig. 1. Endoscopic view of the caecum. (A) The caecal tumour, and (B) a normal caecum.

- If the patient suffers severe discomfort even after the endoscope is withdrawn, but the discomfort resolves with endoscopist-directed light sedation (anxiolysis), PCP is scored as grade IV.
- If the patient suffers severe discomfort even after endoscopist-directed light sedation has been provided, PCP is scored as grade V and MAC is highly recommended to assist in monitoring the patient and excluding procedure-related complications.

We did not use any sedation for our patient, as her PCP score was grade III.

There is a need for more qualified endoscopists worldwide to meet patients' expectations of high-quality lower GI endoscopy. There are many training methods in endoscopy: simulators, animal models, and computerised or virtual reality devices. However, colonoscopy training largely remains an apprenticeship on real patients, and this can involve many challenges for the trainees in terms of acquisition of skills.[2] We follow a colonoscopy technique that was acquired and modified from the techniques of Prof. G J Oettle (University of the Witwatersrand) and Prof. F Seow-Choen (National University of Singapore). The skills are acquired by means of apprentice-model training. In this technique, there are 12 essential steps to perform a safe and high-quality colonoscopy:

- Keep the scope straight during the procedure. Always keep the lumen at 12 o'clock and target at 6 o'clock.
- There are only two fixed points in colonoscopy, the anus and the caecum. If the scope reaches the caecum within 75 cm from the anus, the procedure is almost always painless.
- Only minimal air insufflation should be used, to prevent the so-called balloon effect. Always use water immersion to pass the kinked areas of the colon (Fig. 2).
- Friction at the perineum, stretching the mesentery with scope loops, massive air insufflation and bowel perforation are causes of a painful procedure.
- A painless procedure does not preclude complications, especially in a patient with a difficult splenic flexure.
- Always withdraw the scope as you proceed. Always change the patient's position to take advantage of gravity on mobile bowel.
- Always identify the appendix orifice after passing over the ileocaecal valve. Only cannulation of the terminal ileum means a complete colonoscopy (Fig. 3).
- Palpate the patient's abdomen frequently during the procedure.
- Use clockwise torque to prevent a loop at the sigmoid colon, as well as to shorten the scope.

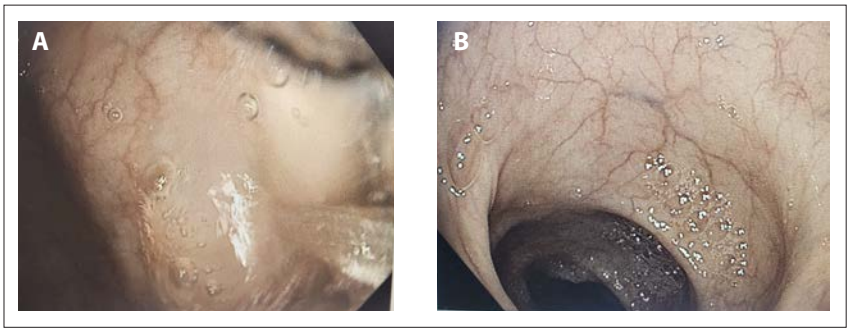


Fig. 2. Water immersion technique to pass the rectosigmoid junction. (A) Water immersion at the rectosigmoid junction, and (B) the scope passes through the rectosigmoid junction.

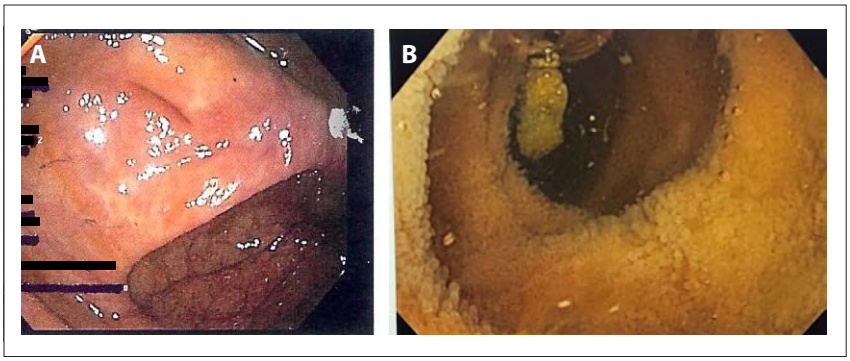


Fig. 3. Complete colonoscopy. (A) Endoscopic view of the appendix, and (B) endoscopic view of the terminal ileum.

- There must be a one-to-one ratio of scope movements, inside and outside the abdomen.
- The duration of scope withdrawal must be at least the same as the duration of scope insertion. Every mucosal fold must be checked during scope insertion as well as during scope withdrawal.
- Always perform a digital rectal examination before starting the procedure, and always check the anal canal with a retroflexed scope before completing the procedure.

In our patient, a caecal tumour was diagnosed endoscopically and confirmed by subsequent histological examination of a tissue sample. The patient did not require any sedation and was therefore not exposed to any sedation risks.

Conclusion

In our opinion, sedation is not a substitute for performing poor-quality endoscopy. We share our experience with the PCP score and our colonoscopy technique, both of which can be applied to endoscopic procedures at medical institutions with limited resources.

Declaration. None.

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