Incidence of anaesthesia-related complications following gynaecological surgery at a tertiary hospital in Pretoria, South Africa

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Background. Anaesthesia-related postoperative complications vary widely in severity, ranging from mild issues to those causing permanent disability or death. Contributory factors include comorbidities, anaesthetic technique, and medications administered perioperatively.
Objectives. To determine the incidence and nature of anaesthesia-related complications in patients undergoing gynaecological surgery at a South African tertiary hospital.
Methods. This was a prospective, descriptive cross-sectional study. Patients undergoing gynaecological surgery who met the inclusion criteria were recruited for the study. The complications were sorted in descending order according to frequency of occurrence. Stata version 18 was used to analyse the data.
Results. A total of 149 patients were interviewed, but two were excluded because they had undergone non-gynaecological procedures. All eligible patients were recruited. Their mean (standard deviation) age was 43.7 (12.42) years. HIV infection and hypertension were the most common comorbidities. Of the 147 patients, 54.4% (n=80) had an abdominal hysterectomy under general anaesthesia. An endotracheal tube was used in 88.4% of the patients (n=130). The most common complication reported was a sore throat, followed by hoarseness of voice and nausea. None of the patients experienced intraoperative awareness.
Conclusion. Sore throat was the complication most often reported. This can be attributed to intubation, since almost all the patients had general anaesthesia with an endotracheal tube inserted. None of our patients reported accidental awareness. Future studies should document airway management variables such as tube size, cuff pressure and intubating stylet use to identify modifiable risk factors.

Keywords. Complications, anaesthesia, gynaecological, surgery.

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Lesedi Mmethi, Amahle Nkosi, Nokulunga Mazibuko, Mire Allan, Lindokuhle Mdlui, Karabo Makhubela and Noluthando Hlophe did the research reported in this article. Currently 6th year medical students, they were in third year when they conceptualised the study and wrote the research protocol and in fourth year when they started with data collection and writing of the manuscript. They all have an interest in pursuing a career in anaesthesiology in the future. Dr M Motiang is a specialist in the Department of Anaesthesiology.

Anaesthesia-related postoperative complications can range from mild to severe, with some leading to permanent disability or even death. Contributing factors include comorbidities, anaesthetic technique, and medications administered perioperatively. Patients commonly report nausea and vomiting, headache, sore throat and dental damage, among other issues. Postoperative nausea and vomiting (PONV) have been reported in up to 70 - 85% of women undergoing laparoscopic gynaecological surgery. Prophylactic use of antiemetics has been recommended for patients at high risk of developing PONV.[1]

Seki *et al.*[1] conducted a study to determine whether combined epidural and general anaesthesia could reduce the risk of PONV. This was to minimise the use of opioids, which are well known to increase the incidence of PONV. A rescue dose of an antiemetic was also administered 24 hours following the procedure. However, the study found no reduction in the 24-hour incidence of PONV or in the use of rescue metoclopramide following laparoscopic gynaecological surgery.

In a study investigating propofol-based anaesthesia, the technique (patients received 100 µg/kg/min of propofol and 1 µg/kg/h of fentanyl; volatile agents were not used) was associated with significantly lower rates of postoperative vomiting and faster recovery when used for laparoscopic gynaecological procedures, compared with standard anaesthesia using thiopentone and isoflurane.[2]

Accidental awareness during anaesthesia is a psychologically distressing complication, with potential medicolegal implications for the anaesthetist, and may result in long-term psychological consequences following certain types of surgery. The incidence is estimated at 0.1 - 0.2%, although it may be as high as 1 - 2% in certain cases. The use of neuromuscular blockade has been identified as a contributing factor.[3]

The aim of this study was to determine the incidence and nature of anaesthesia-related complications in patients undergoing gynaecological surgery. Our hypothesis was that the complication rate would be high because hysterectomy – a major gynaecological procedure – is common at the study hospital.

Methods

This prospective, descriptive, cross-sectional study was conducted at Dr George Mukhari Academic Hospital, a tertiary institution north of Pretoria, South Africa (SA). The hospital is affiliated to Sefako Makgatho Health Sciences University. The study received ethical approval from the Sefako Makgatho Research Ethics Committee (ref. no. SMUREC/M/55/2023:UG). Data collection was scheduled to take place from April to June 2023. Owing to shortage of linen, collection was extended up to August 2023, as there were no lists for most of the days. All patients who underwent gynaecological surgery and met the study inclusion criteria (age ≥18 years, booked for elective gynaecological surgery, signed informed consent provided) were recruited. No eligible patients declined participation during the study period. Patients were interviewed 24 - 48 hours after the operation.

The questionnaire included predefined complication categories based on commonly reported adverse events, such as sore throat, hoarseness of voice, nausea, vomiting, shivering, and awareness under anaesthesia. The presence of complications was assessed via direct patient interviews conducted by trained medical students under supervision.

To assess intraoperative awareness, patients were asked a series of structured questions (e.g. 'What is the last thing you remember before surgery?', 'Do you recall anything in between?', 'Do you remember any dreams you had during surgery?').

The complications were sorted in descending order according to frequency of occurrence. A one-sample proportion *z*-test was used to determine whether the overall complication rate was significant. Binary logistic regression was used to evaluate the association between categorical variables (comorbidities, anaesthetic technique, surgical procedure, surgical technique, airway device used, intraoperative awareness) and complications. Data analysis was performed using Stata version 18 (StataCorp, USA).

Results

Of a total of 149 patients interviewed, two were excluded because they had undergone a non-gynaecological procedure. All eligible patients were recruited. Their mean (standard deviation) age was 43.7 (12.42) years.

Fifty-eight patients (39.5%) had no comorbidities, while 55 (37.4%) had been diagnosed with HIV infection. Sixteen of the patients with HIV (10.9%) also had hypertension (Fig. 1).

Most of the patients (n=122; 83.0%) were operated on under general anaesthesia (Table 1).

Hysterectomy, either abdominal or vaginal, was the most common procedure performed (n=80; 54.4%) (Table 2). Only 16 patients (10.9%) had a radical hysterectomy for cervical cancer. The most common surgical technique was laparotomy (n=84; 57.1%) (Table 3).

An endotracheal tube was the airway device used in most patients (Fig. 2).

Overall, 128 patients (87.1%) reported at least one postoperative complication. The most frequently reported complication was sore throat (n=73; 49.7%), followed by hoarseness of voice (n=14; 9.5%) and nausea (n=13; 8.8%). None of the categorical variables had a significant association with nausea (p>0.05). Other complications reported included headache (n=13; 8.8%), vomiting (n=6; 4.1%), shivering (n=5; 3.4%) and difficulty in breathing (n=4; 2.7%). No patient reported loss of teeth. These accounted for a combined total of 28 patients (19.0%). Owing to their low frequency and heterogeneity, they are grouped under 'Other' in Fig. 3. No patient reported intraoperative awareness based on structured questioning.

The complication rate was found to be statistically significant (p<0.001) using the one-sample proportion *z*-test. None of the categorical variables showed a significant association with the occurrence of complications (p>0.005).

Discussion

Postoperative complications have been reported following various types of surgery, regardless of how minimally invasive they are. Laparoscopic surgery is one of the minimally invasive procedures performed in gynaecology. It offers better cosmetic results than laparotomy owing to the smaller incision that is made, and patients typically have a shorter postoperative recovery period.[1] Studies that investigated complications following laparoscopic gynaecological surgery reported lower incidences.[4,5] Most of our patients underwent a laparotomy for their procedures.

Epidural anaesthesia is the regional anaesthetic technique of choice when conducting lower abdominal surgery, as it is associated with minimal complications when performed by an experienced anaesthesiologist.

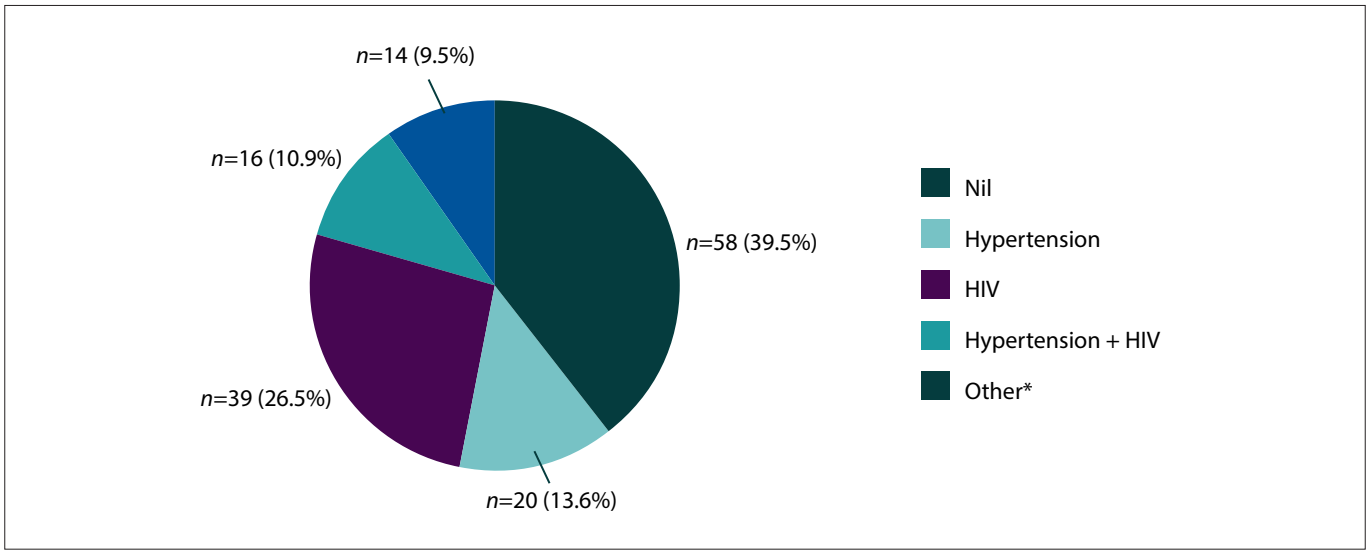

*Fig. 1. Comorbidities (N=147). (*Diabetes, hyperthyroidism, arthritis, cardiac conditions.)*

Table 1. Anaesthetic techniques used

Technique	*n* (%)
GA	122 (83.0)
Spinal	11 (7.5)
GA + spinal	12 (8.6)
GA + epidural	2 (1.4)
Total	147 (100)

GA = general anaesthesia.

Table 2. Procedures performed

Procedure	*n* (%)
Total abdominal hysterectomy	65 (44.2)
Vaginal hysterectomy	15 (10.2)
Tubal ligation	7 (4.8)
Other	60 (40.8)
Total	147 (100)

Table 3. Surgical techniques used

Technique	*n* (%)
Laparotomy	84 (57.1)
Laparoscopy	43 (29.3)
Other	20 (13.6)
Total	147 (100)

A study examining complications after the use of epidural analgesia for gynaecological surgery reported only on length of stay, mortality and gynaecology-related complications.[6] No anaesthesia-associated complications were noted.[6] It is difficult to comment on the effect of epidurals in our study, as only two patients received combined general and epidural anaesthesia.

Anaesthesia-related postoperative complications can range from mild to severe, and in some cases may lead to permanent disability or death.[1] Of the 147 patients recruited for this study, 128 (87.1%) experienced complications. The most commonly reported complication was sore throat (*n*=73; 49.7%), followed by hoarseness of voice. Only 19 patients (12.9%) did not report any postoperative complications.

An incidence of PONV as high as 70 - 85% has been reported in women undergoing laparoscopic gynaecological surgery.[1] A study conducted in the West Indies looked at minor complications following elective gynaecological and orthopaedic procedures in the first 48-hour period after recovery from anaesthesia.[7] The study also looked at overall satisfaction with anaesthesia care. Sore throat, nausea, vomiting and thrombophlebitis were the most frequently reported complications, which did not cause severe distress according to the mode of the Verbal Numerical Rating Score. A comparatively high incidence of minor postoperative complications (83%), with a low severity of symptoms, was reported.

Nausea without vomiting was reported by only 13 patients in our study (8.8%). This low figure can be attributed to routine perioperative antiemetic administration. None of the categorical variables had a significant association with nausea ($p>0.05$).

Postoperative sore throat is a well-documented complication of tracheal intubation, with reported incidences as high as 60%. A stylet-loaded endotracheal tube has been identified as a contributing factor.[8] A study by Bekele and Melese[9] reported a similar incidence of 61.8%. Our findings showed a high incidence as well (49.7%), which is consistent with the widespread use of general anaesthesia and endotracheal tubes. The use of stylets during intubation was not documented.

A study in Nigeria by Eyelade *et al.*[10] concluded that comorbidities did not significantly affect anaesthetic outcomes in elective surgical patients. The most common comorbidities reported were hypertension, anaemia, asthma and diabetes mellitus.

Another study assessed the effect of the type of anaesthesia on outcomes in patients with comorbidities.[11] Compared with those who received general anaesthesia, patients who had neuraxial anaesthesia had lower odds of major complications, regardless of age or comorbidity status.

In our study, the presence of comorbidities, mainly HIV and hypertension, did not significantly influence postoperative outcomes.

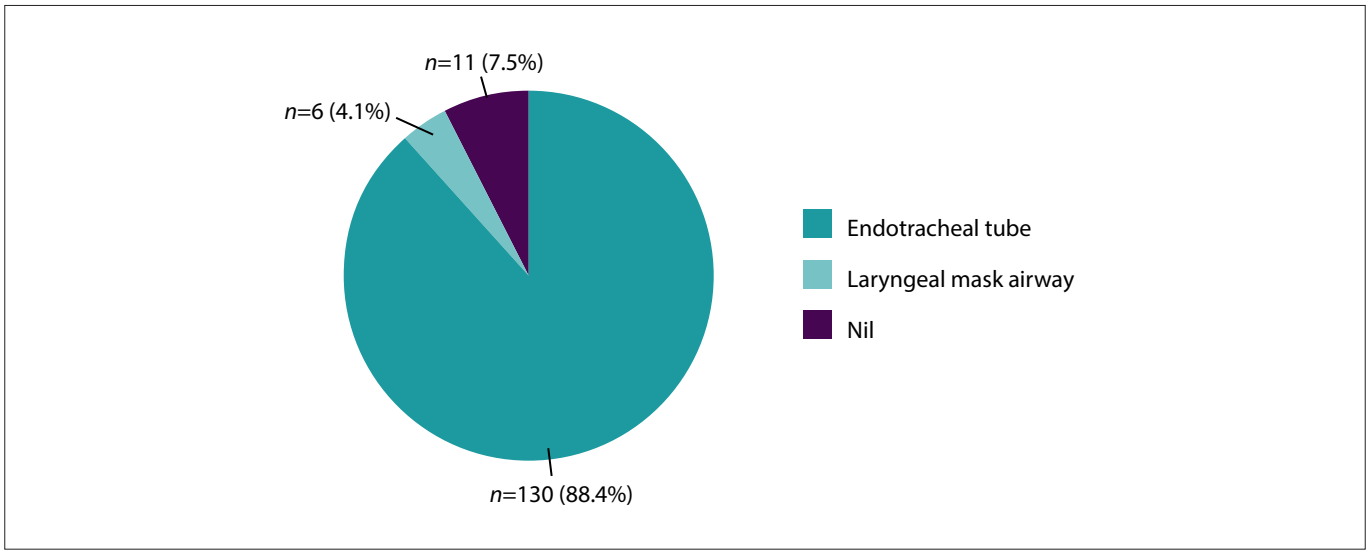

Fig. 2. Airway devices used (N=147).

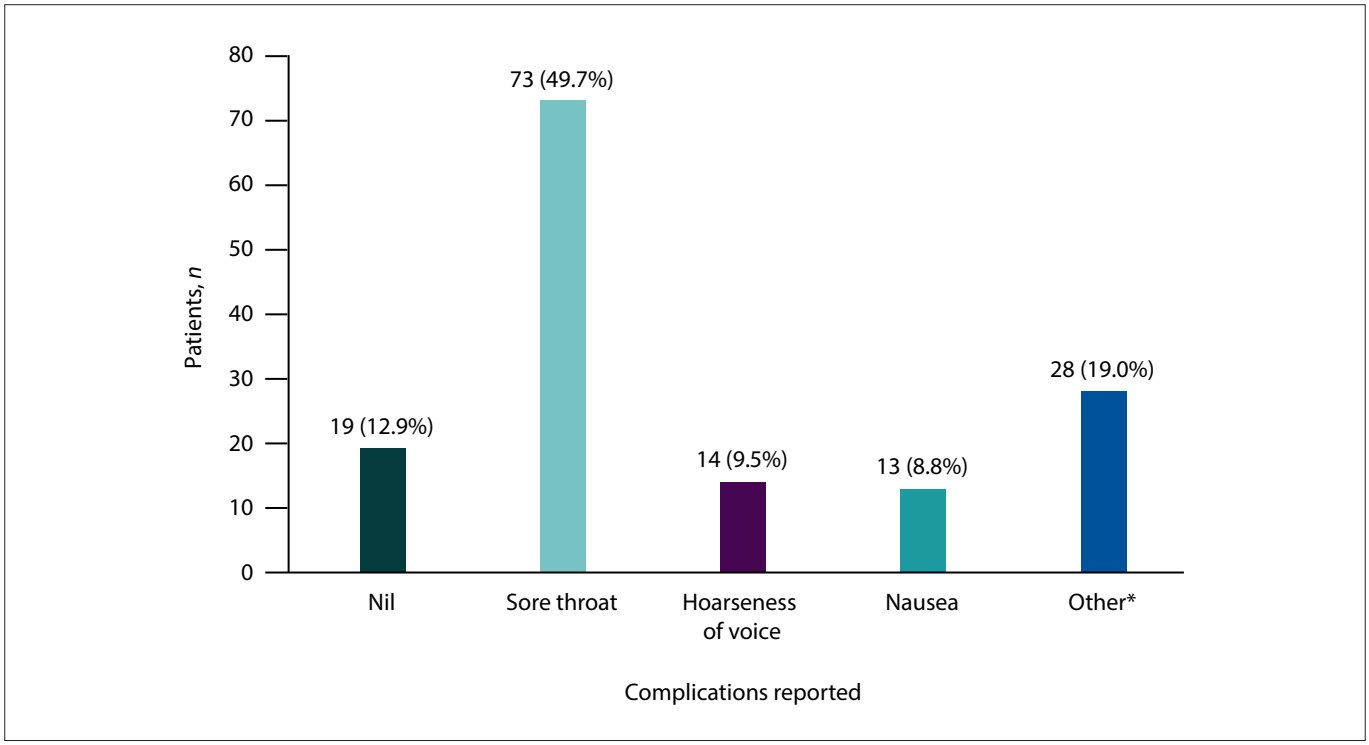

*Fig. 3. Complications reported by patients (N=147). (*Headache, vomiting, shivering, difficulty in breathing)*

Accidental awareness during anaesthesia is a psychologically devastating complication, with an estimated incidence of 0.1 - 0.2%, rising to 1 - 2% in high-risk settings.[3] Neuromuscular blockade has been identified as a risk factor. None of the patients in our study experienced accidental awareness.

Postoperative aphasia, which could be related to a residual effect of anaesthesia, has been reported after extubation in patients who had total intravenous anaesthesia for laparoscopic hysterectomy.[12] Tracheal intubation may also cause luxation of the arytenoid cartilage and laryngeal nerve injury.[12] In our study, 14 patients (9.5%) reported hoarseness of the voice, which could be attributed to endotracheal intubation, although no aphasia was observed.

Total intravenous anaesthesia is more likely than epidural anaesthesia to delay the restoration of attentional networks in middle-aged women having an elective hysterectomy.[13]

While the present study provides valuable insights into anaesthesia-related complications in an SA tertiary setting, several limitations should be acknowledged. It was a single-centre study conducted in a resource-limited environment, so the findings may not be widely generalisable. The severity and duration of complications were not graded, and reliance on patient self-reporting within 24 - 48 hours may have resulted in under-detection of delayed or subtle symptoms. Additionally, documentation of certain variables, such as endotracheal tube cuff pressures and stylet use, was not available.

Conclusion and recommendations

Sore throat was the most common complication. It can be attributed to intubation, because almost all the patients had general anaesthesia with an endotracheal tube inserted.

None of the patients reported accidental awareness.

Anaesthesiologists are encouraged to pay meticulous attention to use of the intubating stylet and cuff pressure measurement.

It is recommended that future studies should document use of the intubating stylet, the size and cuff pressure of the endotracheal tube used, and the effect of these postoperatively. They should also include severity grading of complications and standardised assessment tools, and consider broader multicentre designs to allow for statistical modelling of risk factors.

Declaration. This research for this original study was conducted by the student authors for their Research Selective Module, as part of their undergraduate medical training.

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Author contributions. LM, KM, AN, NH, LM, NM and MA were responsible for the conception of the study, data collection and writing the manuscript. MM (research supervisor) was responsible for reviewing and editing the manuscript.

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Data availability statement. The data sets generated and analysed during the current study are available from the corresponding author (LM) upon reasonable request.

Conflicts of interest. None.

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