Incidence and histological outcomes of appendectomies in a South African regional hospital, 2022 - 2023: A retrospective study

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Background. Acute appendicitis is one of the most common surgical emergencies in South Africa (SA), yet local histopathological data on appendectomies remain limited.
Objective. To determine the incidence and histological patterns of appendicitis at an SA regional hospital over a 2-year period.
Methods. A retrospective review was conducted on all appendectomies performed at Tambo Memorial Hospital (TMH) in Boksburg, SA, from 1 January 2022 to 31 December 2023. Histological data, using Gomes score, which was correlated with microscopy and macroscopy from the SA National Health Laboratory Service, as well as patient demographics, were analysed. Logistic regression and χ^2 tests were used to assess associations between variables.
Results. A total of 283 appendectomies were reviewed. None was excluded. The cohort was predominantly male (64%), with a mean age of 26.99 years. Histologically normal appendices (grade 0) were found in 25.4% of cases. Grade 4 appendicitis (gangrenous/perforated) was the most prevalent pathological finding (39.9%). Males were significantly more likely to present with appendicitis, particularly advanced grades of appendicitis (p=0.00005; odds ratio (OR) 3.305, 95% confidence interval (CI) 1.869 - 5.915). Lymphoid hyperplasia was significantly associated with grade 0 appendices (p=0.00205; OR 0.282, 95% CI 0.125 - 0.631), suggesting possible alternative diagnoses such as gastroenteritis, mesenteric adenitis or pelvic inflammatory disease. Appendicular neoplasms (2.1%), faecoliths (17.3%) and parasites (1.4%) were not uncommon. No significant monthly variation was observed. The overall negative predictive value of clinician-directed appendectomy at TMH was 25.4%, in keeping with or better than rates reported at various tertiary hospitals – despite TMH lacking afternoon sonography and having no after-hours sonographic or radiological reporting services.
Conclusion. Appendicitis at TMH showed a high rate of complicated cases, especially among males. Male sex was a significant predictor of appendicitis, whereas lymphoid hyperplasia was associated with negative histology and may represent an important clinical differential diagnosis. Other findings included benign neoplasms, faecoliths and parasites. These findings highlight clinical acumen in a resource-limited setting and the value of histological confirmation in appendicitis diagnoses.

Keywords: appendicitis, appendectomy, histology

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Acute appendicitis is one of the most common surgical emergencies in South Africa (SA), with local statistics indicating a rate of 15 per 100 000 persons, with a lifetime risk of 7 - 14%. This contrasts with global statistics, with a rate of 229.9 per 100 000 persons.[1,2] The pathophysiology is a topic of contention, with two major theories predominating: obstructive theory and inflammatory/non-obstructive theory. In obstructive theory, a mechanical blockage occludes the appendicular lumen. This results in commensal bacteria, including *Escherichia. coli*, *Peptostreptococcus*, *Bacteroides* and *Pseudomonas*, multiplying in the intestinal lumen, causing the appendix to become oedematous and inflamed, and purulent matter produced. As the intraluminal pus volume grows, so does the intraluminal pressure, resulting in ischaemia, pressure necrosis, gangrene and eventually complicating in appendicular rupture. This rupture may be locally contained, whereby an abscess forms or spreads through the abdomen, leading to sepsis and potential patient mortality if left untreated.[1-5] In inflammatory theory, the bacteria invade the lymphatic tissue in the appendicular wall, causing inflammation. The lumen, unlike the obstruction theory, is not occluded, and thus necrosis, gangrene and perforation are unlikely to occur, and therefore this is the lesser supported theory on aetiology.[1-3,5]

The aetiology of appendicitis is therefore, for the most part, an appendicular lumen occlusion due to various causes, such as hypertrophic lymphatic tissues/nodes, intestinal parasites, faecoliths and appendicular tumours.[3,6,7] In a recent systematic review, there did not appear to be any significant difference in sex incidence, even when accounting for age.[2] However, it is essential to note that the causes of luminal obstructions vary by age group, thereby

highlighting the need for age-specific considerations when evaluating and managing appendicitis in patients.

A study in Johannesburg, SA, found that the mean age of presentation was 8.76 years,[4] compared with global studies indicating the mean age of presentation at 15 - 19 years.[2] The vast majority of cases occurring in the paediatric population reflect a benign aetiology, with histology reflecting 50% complicated appendicitis, 8.4% normal appendices, 40.5% uncomplicated appendicitis and 1% other. A study at Chris Hani Baragwanath Hospital[8] found that of patients who underwent an appendectomy, 28.7% were found to have a perforated appendix, 6.6% gangrenous appendix, 26% inflamed appendix, 10.9% normal appendix and 28.7% no appendix taken on histology; therefore, a true negative rate of almost 40%. Parasitic infection was noted to be quite rare in SA, with one study reflecting only four samples with parasitic infection, three of which were *Enterobius vermicularis* and one *Ascaris ova*. Only a single (paediatric) patient in one study had a low-grade neoplasm. No comment on faecoliths or lymphoid hyperplasia could be found.[2,4] Internationally, most paediatric cases have been attributed to lymphoid hyperplasia and faecoliths.[6]

In the adult population, acute appendicitis did not have a clear cause, with only 11% of patients having a specific aetiology other than acute appendicitis, such as 'mucocele, acute diverticulitis, follicular hyperplasia and fibrous obliteration'. Malignancy has been found to cause appendicitis in only 1.9% of the population internationally.[7] To date, there are no SA studies examining the histological diagnosis on causes of appendicitis, and so a local comparison cannot be made.

Given the limited number of studies done in SA and limited number of specific histological diagnoses, this study was pivotal in providing insight into the aetiology of appendicitis in the SA setting.

Methods

Study design and population

The present study is a retrospective record analysis involving all patients who underwent an appendectomy, with a histological diagnosis, from 1 January 2022 to 31 December 2023 at Tambo Memorial Hospital (TMH), a regional hospital in Boksburg, SA.

The inclusion criteria were: all patients who underwent an appendectomy at TMH from 1 January 2022 to 31 December 2023, with a histological diagnosis; and any patient who underwent an exploratory laparotomy for peritonitis, of any aetiology, in which appendicitis was visualised and a sample sent for histological evaluation at TMH from 1 January 2022 to 31 December 2023.

Our study centre had a low threshold for appendectomy, where it was conducted on any patient, both adult and paediatric, with: Alvarado score >7; Alvarado score ≥4 with peritonitis; or appendicitis confirmed either on ultrasound or computed tomography scan during daytime operational hours, including patients not meeting the previous two clinical criteria.

Exclusion criteria were the absence of recorded age and sex.

Primary and secondary outcomes

The primary outcome was to determine the incidence and histological trend of appendicitis at TMH from 1 January 2022 to 31 December 2023. The secondary outcomes was to determine the demographic associations of appendicitis at TMH from 1 January 2022 to 31 December 2023.

Data collection, preparation and pre-processing

The data set was compiled from a pre-existing histology book at the TMH surgery department, which captures age, sex, retroviral disease (RVD, namely HIV) status and appendicular histological diagnosis. The total number of appendectomies was stored in the TMH theatre book. The data were then entered into a password-protected Excel sheet (Microsoft, USA) for cleaning and data harmonising. The final data subsets were subjected to checks to remove records with implausible or inconsistent values. However, no patients were excluded in keeping with the above criteria.

The following variables were collected:

- total number of appendectomies per month and year in 2022 and 2023
- age
- sex: male or female
- appendicular gross histology/morphology as per Gomes classification: grade 0 (normal), grade 1 (acute inflammation), grade 2 (local suppuration), grade 3 (gangrenous appendicitis) and grade 4/5 (gangrenous perforation, four-quadrant sepsis or peritonitis); this was correlated with the report by a senior pathologist at the National Health Laboratory Service of SA. Grade 4 and grade 5 Gomes were combined into a single category of 'grade 4', as this cannot be distinguished on the histology report, where histology is the gold standard for diagnosis.
- parasites: present (if present, parasite specified)/absent
- lymphoid hyperplasia: present/absent
- appendicular stone/feacolith: present/absent
- appendicular neoplasm: present (specified with grade of tumour)/absent.

Descriptive statistics

Descriptive statistics were generated using the TableOne package for R (3.3.0+) (R Project, Austria). The analysis was grouped by the outcome variable, appendicitis histological diagnosis. A χ^2 test or Fisher's exact test for categorical variables was used, and the Kruskal-Wallis test for non-parametric continuous variables was used where appropriate.

Univariate logistic regression analysis

Univariate logistic regression was performed on each characteristic to assess its individual effect on the probability of histological diagnosis. Variables with $p<0.05$ were considered statistically significant. The results are presented as odds ratios (ORs) with 95% confidence intervals (CIs).

Temporal trend analysis

The incidence of appendectomies was calculated on both a monthly and a yearly basis. Incidence was plotted along with 95% CIs to visualise any temporal trends. A Kruskal-Wallis test was used to assess for trends in the number of appendectomies per month in 2022, 2023 and over the total study period.

Statistical methods

All statistical analyses were performed using RStudio (3.3.0+). The level of significance was set at $\alpha=0.05$.

Ethical approval

Given the retrospective nature of the study, both the need for informed consent and consent to participate were waived by the chief executive officer and the head of surgery at TMH. Ethical approval was granted by the University of the Witwatersrand Human Research Ethics Committee (ref. no. M2410114).

Results

Demographic and clinical outcomes

A total of 283 appendectomies were performed over the 2-year period at TMH. Of the 283 patients, 181 (64%) were male and 102

(36.0%) were female. The mean age was 26.99 years. Histological grade 0 (normal appendix morphology) comprised 25% (*n*=72) of all cases. The overall positive predictive value was 74.64%. The negative predictive value (NPV) was 25.35% for the 2-year period. RVD status was not recorded for 89% (*n*=252) of all patients, and therefore no further analysis of RVD was conducted in the present study. Faecolith presence was noted in 17.3% (*n*=49) of appendectomies. Appendicular neoplasms, specifically appendicular neuromas, were found in 2.1% (*n*=6) of cases. The medical subject headings (MeSH) age groups of the patients presenting with appendiceal neoplasms were 1 adolescent, 3 adults and 2 middle-aged individuals. Parasites were identified in 1.4% (*n*=4) of cases. The specific parasite differed in each case, and included *Entamoeba histolytica*, *Taenia saginata*, *Echinococcosis granulosus* and degenerative schistosomal ova. Lymphoid hyperplasia was present in 12.4% of cases (Table 1).

A statistically significant association was observed between sex and appendicitis grade (p=0.00005). Among males, the highest frequency was observed in grade 4, whereas grade 0 was the most common among females. Lymphoid hyperplasia demonstrated a significant association with appendicitis grade 0 (p=0.00205) (Table 2).

Further tests were run to ascertain the relationship between lymphoid hyperplasia, sex and age. Chi-squared tests between sex and the presence of lymphoid hyperplasia revealed no significant association (p=0.2779) between the variables. Likewise, Fisher's exact test showed no significant association (p=0.399556) between MeSH age category and the presence of lymphoid hyperplasia (Table 3).

Table 1. Demographic, clinical and histopathological characteristics of appendectomy cases in 2022 and 2023 at Tambo Memorial Hospital

Description	2022, *n* (%)*	2023, *n* (%)*	Total, *n* (%)*
Total appendectomies	147 (51.9)	136 (48.1)	283
PPV, %	70.07	79.41	74.64
NPV, %	29.93	20.59	25.35
Age, years, mean (SD)	27.11 (14.97)	26.85 (13.97)	26.99 (14.4)
MeSH age group			
Infant	0 (0.0)	0 (0.0)	0 (0.0)
Child	25 (17.0)	20 (14.7)	45 (15.9)
Adolescent	30 (20.4)	28 (20.6)	58 (20.5)
Adult	73 (49.7)	71 (52.2)	144 (50.9)
Middle-aged	16 (10.9)	16 (11.8)	32 (11.3)
Aged	3 (2.0)	1 (0.7)	4 (1.4)
Grade			
0	44 (29.9)	28 (20.6)	72 (25.4)
1	18 (12.2)	16 (11.8)	34 (12.0)
2	20 (13.6)	24 (17.6)	44 (15.5)
3	5 (3.4)	15 (11.0)	20 (7.1)
4	60 (40.8)	53 (39.0)	113 (39.9)
Sex			
Male	91 (61.9)	90 (66.2)	181 (64.0)
Female	56 (38.1)	46 (33.8)	102 (36.0)
RVD status			
Positive	8 (5.4)	13 (9.6)	21 (7.4)
Negative	1 (0.7)	9 (6.6)	10 (3.5)
Not recorded	138 (93.9)	114 (83.8)	252 (89.0)
Stone/Faecolith			
Present	20 (13.6)	29 (21.3)	49 (17.3)
Absent	127 (86.4)	107 (78.7)	234 (82.7)
Appendicular neoplasm			
Present	2 (1.4)	4 (2.9)	6 (2.1)
Absent	145 (98.6)	132 (97.1)	277 (97.9)
Parasite			
Present	1 (0.7)	3 (2.2)	4 (1.4)
Absent	146 (99.3)	133 (97.8)	279 (98.6)
Lymphoid hyperplasia			
Present	22 (15.0)	13 (9.6)	35 (12.4)
Absent	125 (85.0)	107 (78.7)	248 (87.6)

PPV = positive predictive value; NPV = negative predictive value; SD = standard deviation; MeSH = medical subject headings; RVD = retroviral disease.
*Unless otherwise indicated.

Univariate logistic regression

Univariate logistic regression analysis was performed to identify factors associated with histologically confirmed appendicitis, using cases with grade 0 histology compared with all cases with histological grade >0 (Table 4).

The above-mentioned results were confirmed with a multivariate analysis, where histologically confirmed appendicitis using cases with grade 0 histology were compared with all cases where there was a histological grade >0. Sex and the presence of lymphoid hyperplasia were the only variables with significant results (Table 5).

Temporal analysis

Of the 283 appendectomies that were performed between 2022 and 2023 at TMH, 147 (51.9%) were conducted in 2022 and 136 (48.1%) in 2023 (Table 1, Fig. 1). No monthly trends were observed in the number of appendectomies per month in 2022, 2023 and over the total study period (2022: p=0.8731, 2023: p=0.7819, overall: p=0.9822) (Fig. 1).

Discussion

Internationally, in high-income countries, a NPV of 15 - 25% is considered acceptable for appendectomies.[9] However, there is no agreed-upon NPV in SA.[8] An adult population study at a tertiary academic hospital in Gauteng Province, SA, had a 40% NPV,[8] with other studies in KwaZulu-Natal Province (KZN) academic hospitals showing a NPV ranging from 17 to 22.4%.[10,11] It is clear that there is heterogeneity in the SA literature regarding negative appendectomy rates, with most studies meeting high-income country requirements. Our study had a NPV of 25.4%, just falling short of high-income setting requirements. This performance is likely the result of limited resources. TMH does not have a formal sonographer after 13h00, nor are there reporting radiology services after 16h00. Likewise, there are frequent laboratory breakdowns for haematology and chemistry, and thus the capacity to detect appendicitis is largely based on clinician astuteness and Alvarado scoring.

This study identified male sex as a significant predictor of appendicitis, at 3.52:1. This is concordant with other local

Table 2. Association between histopathological appendicitis grades and clinical or histological variables in appendectomy patients, 2022 and 2023 (*N*=238)

Characteristic	*n*	Test	*p*-value
Age	283	Kruskal-Wallis	0.3474
Male, grade		χ^2	0.00005*
0	30		
1	19		
2	33		
3	15		
4	84		
Total	181		
Female, grade		χ^2	0.00005*
0	42		
1	15		
2	11		
3	5		
4	29		
Total	102		
Stone/faecolith, grade		Fisher's exact	0.40464
0	12		
1	10		
2	7		
3	2		
4	18		
Total	49		
Appendicular neoplasm, grade		Fisher's exact	0.06850
0	3		
1	2		
2	1		
3	0		
4	0		
Total	6		
Parasite, grade		Fisher's exact	0.25203
0	1		
1	2		
2	0		
3	0		
4	1		
Total	4		
Lymphoid hyperplasia, grade		Fisher's exact	0.00002*
0	17		
1	9		
2	5		
3	4		
4	0		
Total	35		

*Statistically significant ($p<0.05$).

Table 3. Association between the presence of lymphoid hyperplasia and demographic characteristics in appendectomy patients, 2022 and 2023

Characteristic	Lymphoid hyperplasia, *n*	Test	*p*-value
Sex		χ^2	0.2779
Male	16		
Female	19		
Total	35		
MeSH age group		Fisher's exact	0.399556
Infant	0		
Child	5		
Adolescent	5		
Adult	22		
Middle-aged	2		
Aged	1		
Total	35		

MeSH = medical subject headings.

and international studies that found male predominance varying from 1.6:1 to 3.2:1.[1,2,8,11] Males were significantly more likely to present with advanced grades of appendicitis (p=0.00005; OR 3.305, 95% CI 1.869 - 5.915). Although this study found that the mean age of presentation was 26.99 years, it was not a statistically significant predictor of appendicitis. This is in keeping with local studies, which had a similar age of presentation, varying from 23 - 26 years.[8,11] However, this is discordant with an international systematic review, which reported a mean presentation age of 15 - 19 years, with sub-Saharan age-standardised data ranging from 5 to 12.5 years.[2] These data favoured private medical aid billing as the main source of data globally, and thus were unlikely to be a true reflection of the sub-Saharan population at large, or to reflect the public healthcare sector in SA, which services 85% of the population demographics.[2] Our study found that a significant proportion (39.99%) of patients presented with grade 4 appendicitis. This is in keeping with local studies showing a complicated rate of 30 - 46.4%.[8] We suspect that this high rate of complicated appendectomies at TMH is the result of delayed patient presentation, as well as the limited-to-absent sonography services available at TMH.

Histological examination of the specimens also showed faecoliths, neoplasms and parasites in a number of appendices, as we discuss below.

A total of 17.3% of specimens were positive for a faecolith, with 37.5% of those being associated with grade 4 appendicitis. Locally, as well as globally, the literature is limited to a few recent reviews on faecoliths in appendix specimens. Locally, studies in KZN[10,11] found that 3.4 - 6.2% of specimens were positive for faecoliths. However, internationally, a study from the USA[12] found that faecoliths were present in 18.1% of acute appendicitis cases and in 28.6% of negative appendectomies, while perforated appendicitis showed faecoliths in 39.4% of specimens, and non-perforated specimens showed a rate of 14.6% faecoliths. These findings are more concordant with this study. We suspect that this heterogeneity with other local populations may be due to Gauteng Province being more urbanised and having a different socioeconomic profile than many parts of KZN. Urban diets often involve lower fibre intake and higher processed food consumption. Low-fibre diets can slow bowel transit time and increase the risk of faecolith formation.[3]

Only 2.1% of specimens were positive for neoplasia, all of which were identified as appendicular neuromas. Of these, three neuromas were associated with a normal appendix, two with grade 1 appendicitis and one with grade 2 appendicitis. The MeSH age groups present with a wide age spread, including one adolescent, three adults and two middle-aged individuals. No malignant specimens were identified. Local studies report an incidence rate of 0.7 - 1.06% of appendices positive for neoplasia.[11,13] The most common neoplasm was found to be carcinoid tumour, followed by adenocarcinoma; neuromas were found to present 0.75% of the total sample, counted separately from neoplasia.[11,13] Similarly, on the international scale, the prevalence of neoplasms/neuromas was found to be 0.59% of appendectomies,

with an age range of 23 - 43 years.[14] Local studies were not able to comment on age. It is suspected that this heterogeneity of data between our study and local studies can be attributed to their larger sample size and more diverse data set.

A total of 1.4% of specimens were positive for parasites. The parasites were identified as follows: *Entamoeba histolytica*, *Taenia saginata*, *Echinococcosis granulosus* and degenerative schistosomal ova. *Entamoeba histolytica* and degenerative schistosomal ova were associated with grade 0 and grade 4 appendicitis, respectively, and *Taenia saginata* and *Echinococcosis granulosus* were associated with grade 1 appendicitis. This is concordant with a local study in Gauteng Province,[13] which found that parasites were seen in 1.96% of appendectomies. In that study,[13] the following were identified in decreasing order of prevalence: *Schistosomiasis*, *Enterobius vermicularis*, *Amoebiasis* and *Ascaris lumbricoides*. Internationally, a study[14] found that 0.44% of appendectomies were positive for parasites, with the four most common being *Enterobius vermicularis*, *Schistosomiasis*, amoebic appendicitis and *Ascaris lumbricoides*. We suspect that the heterogeneity of parasitaemia in comparison with international studies may be because higher-income countries tend to have greater access to healthcare and fewer exposures to parasitic infections than lower-income countries such as SA.[15] We also suspect that the heterogeneity of parasite species is largely dependent on the prevalence of local parasites, which differs per region.

The present study found that lymphoid hyperplasia was a significant negative predictor of appendicitis. Of the 35 patients with lymphoid hyperplasia, 48.6% presented with grade 0, and none presented with grade 4. Internationally, an Australian study[14] found that 0.88% of specimens positive for acute appendicitis were also positive for lymphoid hyperplasia, suggesting that lymphoid hyperplasia is a poor predictor, or perhaps negative, for acute appendicitis. Lymphoid tissue is present within the appendix as a normal occurrence, with hyperplasia thereof manifesting as a cellular reaction to viral infection within the body, as opposed to being a causative mechanism of acute appendicitis.[1-3] The typical differential diagnoses for lymphoid hyperplasia are mesenteric adenitis and viral gastroenteritis, most commonly diagnosed in the paediatric population, and pelvic inflammatory disease in adults.[6] The study found that although lymphoid hyperplasia occurred more frequently in the female sex,

Table 4. Univariate logistic regression analysis of factors associated with histologically confirmed appendicitis (*N*=238)

Characteristic	*p*-value	OR (95% CI)
Sex	0.00001*	3.523 (2.031 - 6.190)
MeSH age group	0.32118	1.563 (0.645 - 3.818)
Stone/faecolith	0.86640	1.063 (0.533 - 2.249)
Appendicular neoplasm	0.18277	0.332 (0.060 - 1.828)
Parasite	0.98370	1.024 (0.129 - 20.883)
Lymphoid hyperplasia	0.00124*	0.302 (0.145 - 0.628)

OR = odds ratio; CI = confidence interval; MeSH = medical subject headings.
*Statistically significant ($p<0.05$).

Table 5. Multivariate logistic regression analysis of factors associated with histologically confirmed appendicitis (*N*=238)

Characteristic	*p*-value	OR (95% CI)
Sex (male)	0.00005*	3.305 (1.869 - 5.915)
Age	0.2291	1.013 (0.993 - 1.035)
Stone/faecolith	0.47954	1.341 (0.613 - 3.149)
Appendicular neoplasm	0.50184	0.557 (0.094 - 3.329)
Parasite	0.91863	0.884 (0.100 - 18.987)
Lymphoid hyperplasia	0.00205*	0.282 (0.125 - 0.631)

OR = odds ratio; CI = confidence interval.
*Statistically significant ($p<0.05$).

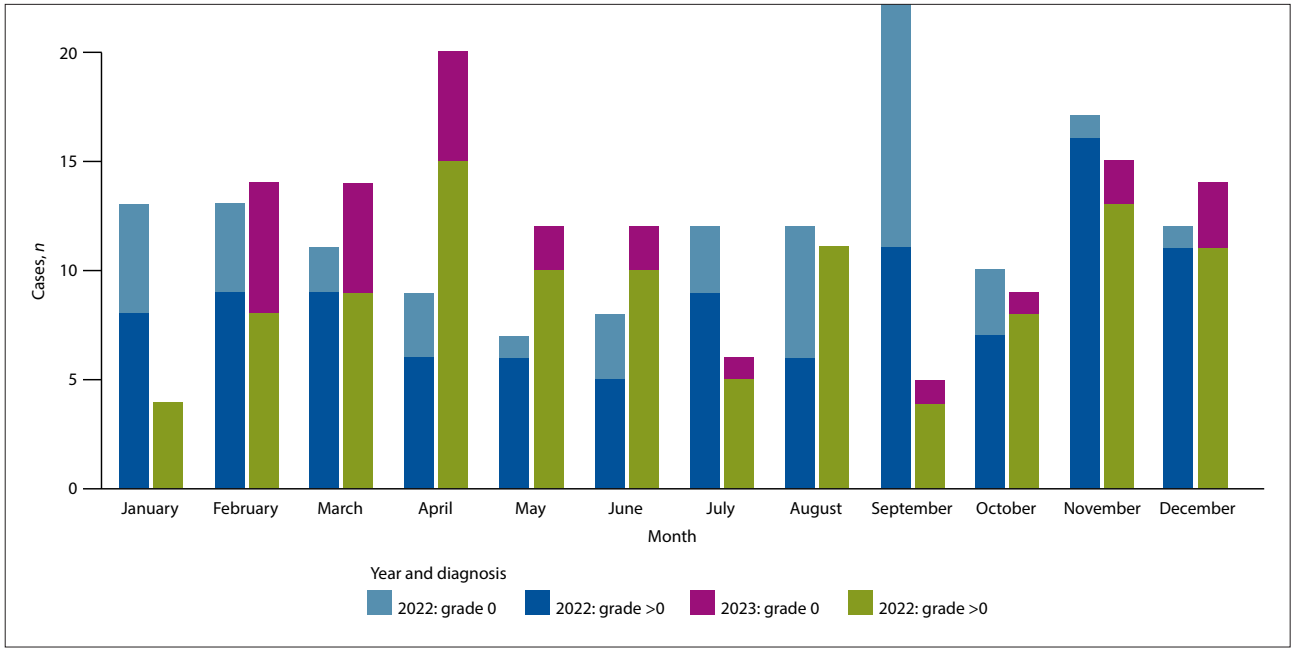

Fig. 1. Temporal patterns in appendicitis severity and case load: A month-on-month and year-on-year comparison at Tambo Memorial Hospital (2022 - 2023).

neither age nor sex was statistically associated with the diagnosis of lymphoid hyperplasia. This in keeping with Chang,[16] who found that normal appendices (or those with lymphoid hyperplasia) were more common in females, again supporting a differential diagnosis.

Recommendations

As a result of these study findings, we recommend adhering to current best practice of submitting appendectomy specimens for histological analysis to identify the various pathologies. Clinical vigilance for appendicitis should be heightened in male patients, given their increased risk of complicated presentations. Lymphoid hyperplasia must be considered as a differential diagnosis, particularly in females presenting with nonspecific abdominal pain. Enhancing access to after-hours imaging may help to reduce unnecessary surgeries and the rate of negative appendectomies. Further multi-centre studies are warranted to validate these findings across varied SA healthcare settings.

Study limitations

The limitations of the study are twofold. The study sampled appendectomies from a single district hospital in Boksburg. This may not be reflective of the true incidence and associations of appendicitis in the general SA population. Additionally, the retrospective nature of the study is subject to human data collection and storage error, such as the many patients without an RVD status recorded, as well as with faecoliths, which may not always have been retrieved or sent for analysis if crushed or lost in the abdomen. Given its retrospective nature, this study cannot accurately predict a temporal relationship. Another limitation is diagnostic bias. However, given the limited to unavailable resources, no other accommodations could be made. A final limitation is that no comparison was made between NPV during daytime working hours, where radiology services are available, and after hours, where diagnoses are based purely on clinical judgement.

Conclusion

Appendicitis at TMH showed a high rate of complicated cases, especially among males. Male sex was a significant predictor of appendicitis, whereas lymphoid hyperplasia was associated with negative histology, and may represent an important clinical differential diagnosis. Other findings included benign neoplasms, faecoliths and parasites. These findings highlight the clinical acumen used in a resource-limited setting, and the value of histological confirmation in appendicitis diagnosis.

Data availability. Requests for raw anonymised data, on reasonable request, can be made to the corresponding author.

Declaration. None.

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Author contributions. As primary author, AHS, together with all other authors, conceptualised the study. The data set was provided by AHS and LN. AHS, LB, JN and NNT cleaned and analysed the data. AHS, JN and LB prepared, reviewed and edited the manuscript, with supervision and editing by AS and LN.

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