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Laparoscopic appendicectomy for complicated appendicitis at Sebokeng Hospital.

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Abstract:
Introduction: *There is a concern that laparoscopic appendicectomy for complicated appendicitis is associated with high incidence of intraabdominal abscess. But conflicting results are reported in the literature. Interestingly more and more appendicectomy are performed laparoscopically where resources are available. In this study we endeavoured to assess the incidence of intraabdominal abscess post appendicectomy for complicated appendicitis.*
Objective: *To determine the incidence of intra-abdominal abscess (IAA) post laparoscopic appendicectomy for complicated appendicitis and the overall outcome of the patients.*
Method: *This is a retrospective review of prospectively collected data of all complicated appendicitis treated laparoscopically both in paediatric and adult population at Sebokeng Hospital from November 2011 to October 2012. All patients without intraabdominal pus collection were excluded irrespective of the histological finding.The parameters we looked at were patient demographics, hospital stay, ICU (intensive care unit) admission, relook, mortality, 30 days re-admission, histology result (where available), site of IAA at initial surgery and post operative, surgical team.*
Result: *We performed167 laparoscopic appendicectomies between November 2011 and October 2012. 34.1% (57 patients) had complicated appendicitis. There were 40 males and 17 females. The mean age was 24 years (5-75). 21% (12 patients) developed IAA of which 5 patients required relooks and the remaining 7 patients were treated conservatively.5.2% (3/57) of patients were admitted in ICU and there was no mortality.Overall 91.3% (52/57) of patients did not require reintervention.*
Conclusion: *Laparoscopic appendicectomy for complicated appendicitis was associated with a 21% incidence of IAA of which more than a third required relook.*

I. Introduction

Laparoscopic appendicectomy has proven to be efficient and at least equal to the open procedure in the management of acute appendicitis[1,11-13]. when it comes to complicated appendicitis , it is believed that laparoscopic appendicectomy has an higher incidence of intra-abdominal abscess (IAA). However this remains a controversial issue[1-7,13,14]. With some studies reporting rather higher incidence in open surgery[4].The definition of complicated appendicitis is not uniform in the literature. Likewise comparing laparoscopic appendicectomy with open appendicectomy through limited right iliac fossa incision (as in uncomplicated appendicitis) may not highlight the merit of laparoscopy. The benefit of laparoscopy is hypothesized to be apparent when comparison is rather made with complicated appendicitis that requires full midline laparotomy in which situation the incidence of wound complications (dehiscence, sepsis), pneumonia and relook laparotomy is likely to be of significance in the open procedure and would underscore the advantage of laparoscopy especially in obese patient[8,10]. Besides, open procedure is associated with higher stress response when compared to laparoscopy[9]. More importantly the outcome of any of the options should not overlook the expertise of the surgeons and the volume of referral for these two factors were proven to affect the outcome; doctors with high volume had a better outcome than those with lower volume [15] . Moreover, laparoscopy has the additional advantage of adequate visualization of the abdominal cavity to rule out other causes of acute abdomen mimicking appendicitis which could have been missed by open surgery through limited incision. Laparoscopy is therefore expected to decrease the incidence of negative appendicectomy[15]. In this study , we defined complicated appendicitis as an appendicitis associated with IAA irrespective of the histology report..This definition is intended to eliminate the confusion with complicated appendicitis defined by the degree of advanced inflammation on histological ground alone (acute suppurative or gangrenous, perforated appendicitis associated with serositis). We put emphasis on IAA in order to assess the efficacy of laparoscopic wash out evidenced by

the post-operative incidence of IAA.When there is pus collection, adequate drainage is paramount to minimize the incidence of IAA and to expedite recovery. In open surgery this is best achieved with a midline laparotomy to access all involved compartments.

The focus of this study is therefore to present our data in the laparoscopic management of complicated appendicitis at Sebokeng hospital, South Africa, a regional hospital that trains registrars (trainees).

II. Objective

To determine the incidence of intra-abdominal abscess (IAA) post laparoscopic appendicectomy for complicated appendicitis and the overall outcome of the patients

III. Methods.

This is a retrospective review of all complicated appendicitis treated laparoscopically both in paediatric and adult population at Sebokeng Hospital between November 2011 and October 2012. This is a super-selection of advanced appendicitis demonstrated intraoperatively by the presence of IAA in the pool of patients with or without available histological report (acute suppurative or gangrenous appendicitis associated or not with perforation). The IAA were either localized, regional or diffuse.We defined localized as periappendicular or pelvic and "regional" as involving the lower quadrant (pelvic, adjacent interloop and periappendicular). Exclusion criteria comprises all similar histologies of advanced appendicitis without IAA.

The parameters we looked at were patient demographics, hospital stay, ICU (intensive care unit) admission, relook, mortality, 30 days re-admission, histology result, site of IAA at initial surgery and post operative, surgical team. Ethic approval for the study was obtained from the Human Ethics Committee of the University of the Witwatersrand.

This observational descriptive study uses mean, range for continuous data and proportion by ratio or percentage for categorical data.

IV. Results

Of the 167 laparoscopic appendicectomies performed during the one year study period, 34.1% (57/167) had complicated appendicitis.The patients' demographics are depicted in table 1.Table 2 and 3 presents the results. The respective contribution of the surgical team is showed in table 4

Table 1. Patient demographics (N=57)

Male, n (%)	40 (70.1)
Female, n (%)	17 (29.1)
Male: female ratio	2.3:1
Age (years), mean (range)	24 (5-75)
Blacks, n (%)	56 (98.2)
Paediatric patient ≤15 years, n (%) - Male, n (%) - Female, n (%) - Age (years), mean (range)	26 (45.6) 10 (38.4) 16 (61.4) 10 (5-15)

The intra-operative percentage of localised, regional and diffuse IAA at initial surgery was 50.8% (29/57), 21.0% (12/57) and 28.0% (16/57) respectively. All available histopathological reports were in keeping with either acute suppurative or gangrenous appendicitis with serositis associated or not with perforation.

Table 2. Results (N=57)

Hospital stay (day), mean (range)	7 (2-51)
ICU admission, n (%)	3 (5.2)
Appendicectomy+ drainage of IAA, n (%)	44 (77.1)
Drainage of IAA, without appendicectomy, n (%)	13 (22.8)
Post operative IAA, n (%)	12 (21)
Relooks	5 (8.7)
Conservative management, n (%)	7 (12.3)
Enterocutaneous fistula, n (%)	2 (3.5)
Mortality, n (%)	0 (0)
30 days readmissions, n (%)	10 (17.5)

Table 2 shows that 21% (12/57) of patients developed post operative IAA.5 were relooked on clinical ground and 7 were treated conservatively. These 7 patients had evidence of pus draining from the port site without peritonitis. Of the 5 relooks, 4 were single relook laparoscopy and one was multiple relooks (one laparoscopy followed by three laparotomy). Two patients from the relook group (including the one with multiple relooks) developed low output enterocutaneous fistula that healed spontaneously.

Table 3. Characteristics of the 12 patients complicated with IAA

Age (years)	Gender	Site of IAA at surgery	Appendicectomy performed	Site of IAA post surgery	Investigation	Relook operation
7	F	Diffuse	Yes	Diffuse	-	Multiple
5	F	Diffuse	No	Regional	Ct scan	Single
11	M	Regional	No	Pelvic	-	Single
15	M	Regional	Yes	Pelvic	-	Single
36	F	Diffuse	Yes	Pelvic	-	Single
30	M	Regional	No	Pelvic	Ct scan	Conservative
39	M	Peri-appendicular	No	Regional	Sonar	Conservative
16	F	Peri-appendicular	Yes	Abdominal wall	Sonar	Conservative
75	F	Regional	Yes	Pelvic	Sonar	Conservative
9	F	Peri-appendicular	Yes	Pelvic	Sonar	Conservative
12	M	Peri-appendicular	No	Pelvic	Sonar	Conservative
19	F	Peri-appendicula	Yes	Pelvic	Sonar	Conservative

F= Female, M= male

Table 4. Surgical team: Percentage of involvement

Expertise	Involvement: N, (%)	Performing the operation:N(%)
Consultants	30 (52.6)	23 (40.3)
PMO	31 (54.3)	21 (36.8)
Trainee (registrar)	22 (38.5)	13 (22.8)
Trainers: Consultants+ PMO	48 (84.2)	44 (77.1)

PMO: Principal medical officer

V. Discussion

Intraabdominal abscess

Although one fifth of the patients developed IAA, only nearly a third (8.7%) of them required surgical intervention.

Had we defined complicated appendicitis on histological ground alone, we would have had a larger number probably with a lower incidence of IAA. We believe it is important to have a uniform definition of "complicated appendicitis" to enable accurate comparison. Asarias JR et al has shown that the incidence of IAA increased significantly in complicated versus non-complicated appendicitis irrespective of the surgical approach (whether laparoscopy or open)[2],

Wang Xin Paediatric surgery reported a lower incidence of IAA in laparoscopy versus open surgery (2.5% vs 14.6%)[4] and concluded:"Laparoscopic appendectomy should be the initial procedure of choice for most cases of complicated appendicitis in children"[4].

Timing and expertise

Appendicitis is a spectrum of a disease from the very simple early presentation to an advanced late presentation. Timing of presentation and delay in management can influence the outcome[17]. Besides, the expertise can play an important role to influence the incidence of IAA because even a difficult case can be managed efficiently, timeously by an experienced surgeon with an anticipated improved outcome. On the other hand, an early inflammed appendix is expected to do well regardless of the approach.

Different studies give conflicting reports. We need to consider the timing of the studies , the level of expertise, learning curve, the improvement in technology to account for these discrepancies. More studies started with higher number in open limb and ended up with overwhelming majority in laparoscopic limb. In the United states, more than 75% of appendicectomies are performed laparoscopically[18].

Most of our cases were done or supervised by trained surgeons. So the incidence of our IAA is likely to be more of a reflection of advanced disease as reported byAsarias JR et al[2].

Late complication.

Of notes, only one patient out of 57 cases had a laparotomy in our study. it means only one case is a potential candidate to develop incisional hernia. Incisional hernia is recognized as one of the most common late

complication of laparotomy(2-20%)[19]. The anticipated future benefit of laparoscopy would be to convert the high rate of incisional hernia (2-20%) to the low incidence of port site hernia (0-5.2%)[20]. Likewise we would expect less adhesive bowel obstruction in laparoscopic procedure.

Relook.

It is our policy not to do a mandatory relook in appendicitis complicated with IAA. Our relooks are rather done "on demand"when the patient's post operative clinical condition is suggestive. By so doing, we avoided unnecessary relooks in more than half of the patients with IAA (7/12). A negative relook has a potential risk of developing enterocutaneous fistula and open abdomen that may require challenging abdominal wall reconstruction.

In our practice, we commonly observe high incidence of post operative paralytic ileus on this group of patients with complicated appendicitis and a surgeon with a low threshold for relook is likely to have excessively high relook rate. We usually delay feed for few days to expect the paralytic ileus to resolve.

22.8% (13/57) had no appendicectomy performed either due to appendicular abscess (where the main focus is to drain the pus) or due to the fact that the appendix sloughed off completely. During the study period none of these patients was readmitted for interval appendicectomy.

The commonest site of IAA was the lower abdominal cavities presumably because they are also the most involved in the disease process owing to the anatomical location of the appendix.

Esthetic consideration

When considering midline laparotomy as the most likely equivalent of laparoscopy in complicated appendicitis, the cosmetic result of laparoscopy is very gratifying (fig.1).

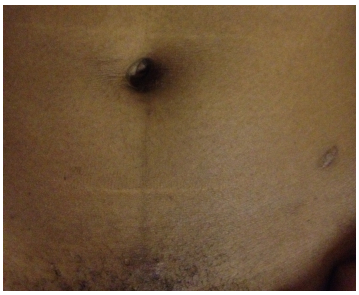

fig.1. Scar of laparoscopic appendicectomy

VI. Conclusion

Laparoscopic appendicectomy for complicated appendicitis was associated with a 21% incidence of IAA of which more than a third (8.7%) required relooks mostly via laparoscopy. There was no mortality and ICU admission was low (5.2%). Laparoscopic appendicectomy is applicable and safe even in the presence of appendicitis complicated with IAA. There is an added cosmetic benefit of a minimal access since the most likely equivalent to laparoscopy in complicated appendicitis is a midline laparotomy.

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