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Trans-umbilical laparoscopy assisted appendicectomy

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Abstract

Background: *Various approaches are used in the management of appendicitis. These include open technique, laparoscopy (conventional three ports, single incision laparoscopic surgery (SILS) and transumbilical laparoscopy assisted) and endoscopy. In this study we present the trans-umbilical laparoscopy assisted appendicectomy (TULAA). With this technique, a laparoscopy is performed to mobilize the appendix and the procedure is completed by exteriorization of the appendix at the umbilical port.*

Objective: *To highlight the role of the trans-umbilical laparoscopy assisted appendicectomy (TULAA) in the management of selected cases of appendicitis.*

Methods: *Retrospective review of data collected between November 2011 and October 2012 at Sebokeng Hospital. Parameters assessed included patient demographics, hospital stay, post operative complications, mortality, 30 days readmission, ICU admission, use of disposable items, use of gas (carbon dioxide) and histopathology. Inability to exteriorize the appendix to the umbilical port was an exclusion criteria.*

Results: *167 laparoscopic appendicectomy were performed of which 31 (18.5%)were completed trans-umbilically. Majority of patients were adult with a male to female ratio of 1.8:1, mean age of 22.4 years (6-66) and mean hospital stay of two days (1-8). There was one patient in the second trimester of pregnancy. Two patients had surgical site infection at umbilical port treated conservatively. One patient was readmitted for paralytic ileus that resolved spontaneously. One patient had appendicitis complicated with intra-abdominal abscess at presentation. There were no relook laparotomies, no ICU admissions and no mortality. On histology, markedly inflammed appendix represented 50% of cases.*

Conclusion: *In selected cases, trans-umbilical laparoscopy-assisted appendicectomy was possible. It combines the benefit of good visualization at laparoscopy with the more familiar technique of open appendicectomy*

I. Introduction

Various approaches are used in the management of appendicitis. The older operations were performed using an open technique through midline, paramedian, oblique or transverse incisions [1.] The new technique is laparoscopic that include conventional three ports, single incision laparoscopic surgery (SILS) and transumbilical laparoscopy assisted appendicectomies (TULAA)[2]. It has recently been shown that an appendicectomy can be done using a transgastric endoscopic approach [3].

Both laparoscopic and open appendicectomy are recognized methods for the surgical management of appendicitis. Neverthless, each approach has its own advantages and limitations. They both have good results in uncomplicated appendicitis[4-6]. Laparoscopic approach has the advantage of better visualization of the abdominal cavity to rule out differential diagnosis mimicking appendicitis but it requires expensive items that may not be readily available[6]. Open approach through a limited incision is minimally invasive but at the expense of adequate visualization. Combination of the two approaches may help to resolve the disadvantages of both.

Laparoscopic expertise poses a challenge in the developping world. In a national survey conducted in South African surgical academic centres in 2007 by C. Apostolou and E. Panieri, it was felt that laparoscopic training was not optimal [7]. In 2012, Kong VY et al reported that only 2% of appendicectomies were performed laparoscopically in an audit of 200 cases at Edendale Hospital in Pietermaritzburg [8].Similarly, in a review of the trainees' logbooks of the six consecutive final exams of the fellowship college of surgery (South Africa) from five different Universitiesby D. Kruger and M.Veller, there was no mention of laparoscopic appendicectomy[9.] All these three local studies underscore the lack of adequate exposure to laparoscopy in South Africa.

In this study we present the TULAA. With this technique, a laparoscopy is performed to mobilize the appendix and deliver it through the umbilical port. The procedure is then completed as open after exteriorization of the appendix. There are no local publications of this approach in South Africa. In this study we would like to present our results with TULAA as one of the viable options in the management of appendicitis

II. Objective

To highlight the beneficial role of the trans-umbilical laparoscopy assisted appendicectomy in the management of selected cases of appendicitis.

III. Patients and Methods

The patients were selected for TULAA based on surgeon's preference, early presentation, intraoperative findings of appendix that was easy to mobilize to the umbilicus,the degree of inflammed appendix. Friable appendix (gangrenous, sloughed) and generalized peritonitis were considered inappropriate for TULAA.

The steps in the techniques of TULAA are (fig.1): umbilical and suprapubic ports insertion. Identification of the appendix, if needed a third port is inserted in the left iliac fossa. Appendix is then delivered through the umbilical port incision and the procedure continue as in open surgery.

Data

In this descriptive study, the data were retrospectivelly collected between November 2011 and October 2012 at Sebokeng Hospital in the Vaal, South Africa.Parameters assessed included patient demographics, hospital stay, post operative complications , mortality, 30 days re-admission, ICU admission, use of disposable items, use of gas (carbon dioxide) and histopathology. Inability to exteriorize the appendix through the umbilicus was an exclusion criteria.

Ethic approval was obtained from the Human Ethic Committee of the University of Witwatersrand.

Statistical analysis

Results are presented using mean for continuous variables and proportion by ratio or percentage for categorical variables.

IV. Results

167 laparoscopic appendicectomy were performed of which 32 were exteriorized at the umbilicus. One case was converted to full laparoscopy because the friable appendix was amputated at the base during exteriorization at the umbilical port. 31 appendicectomies (18.5%)were completed trans-umbilically of which 24 casesthrough two ports and 7cases by means of three ports.The patients' demographics,findings and outcome are depicted in table 1-3.Table 4 lists the disposable items that were not required in the TULAA.There were only one patient who presented with appendicitis complicated with intraabdominal abscess. Majority (50%) of patients had a markedly inflammed appendix (fig.2)

V. Discussion

TULAAenabled the identification of three cases of inflammation unrelated to the appendix that could have been easily missed through a limited incision for open surgery. TULAA enabled drainage of an IAA that may have required a midline laparotomy. For the surgical trainee, one advantage of TULAA is that the appendix is then removed by a familiar technique without the additional skills needed to use the endoloop, endostapler or endopouch. In a resource poor environment, this also means a considerable saving when expensive disposables are not required. The transumbilical approach was also applicable in markedly inflammed appendix but caution is required not to pull hard on the appendix (fig.2). The choice of two or three ports depended on how possible it was to mobilize the appendix and to deliver it through the umbilical port site.

laparoscopic surgery can be quite challenging especially during the learning curve as surgeons are relearning the same procedure with a different approach. Where resources are available, simulators are used to achieve proficiency in laparoscopic approach which is entirely different from open surgery in many aspectsand it revolves around moving from from three dimensions of open surgery to two dimensions of laparoscopy[10]. TULAA is not a substitute for poor laparoscopy skills but when indicated it is likely to be more user-friendly than the conventional laparoscopy because of the benefit of the well-known open phase.of the procedure.

It is preferable to mobilize the caecum adequately to ensurethat the transumbilical delivery of the appendix is atraumatic. Since the inflammed appendix is in direct contact with port site, there is concern about surgical site infection. There were two cases of wound sepsis that were treated conservatively with dressings. The cosmetic result was very rewarding both to the patient and the Surgeons (fig.3),especially for those patients who put great emphasis on their external image. For such patients the esthetic appearance needs special attention.

The operating time was not recorded, but we had the impression that TULAA was quicker presumably because of the selection of favorable cases and the use ofthe familiar technique of open surgery to complete the appendicectomy.

Since the presentation of appendicitis varies from the very early uncomplicated to the most advanced complicated case, it is preferable to tailor the surgical options to the clinical scenarios. Our cases of TULAA was selected on that basis taking also into consideration the surgeon preference.

VI. Conclusion

In selected cases, trans-umbilical laparoscopy-assisted appendicectomy was possible and effective. It combines the benefit of good visualization at laparoscopy with the more familiar technique of open appendicectomy and does not require disposable items that are costly and may not be readily available where resources are limited.

Acknowledgment

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Table 1. Patient demographics. (N =31)

Males, n (%)	20 (64.5)
Females , n (%)	11 (35.5)
Male: female ratio	1.8:1
Age (years), mean (range)	22 (6-66)
Paediatric patients (< 15), n (%)	10 (32.2)
Pregnant patient*, n (%)	1 (3.2)

* 14 weeks pregnancy

Table 2. Results

Hospital stay (day), mean (range)	2 (1-8)
30 days readmission, n (%) *	1 (3.2)
Relook, n (%)	0 (0)
ICU admission	0 (0)
Surgical site infection, n (%)	2 (6.4)
Intraabdominal abscess, n (%)	0 (0)
Mortality, n (%)	0 (0)

*One patient was readmitted for prolonged ileus that eventually resolved spontaneously

Table 3. Histopathology. (N =31)

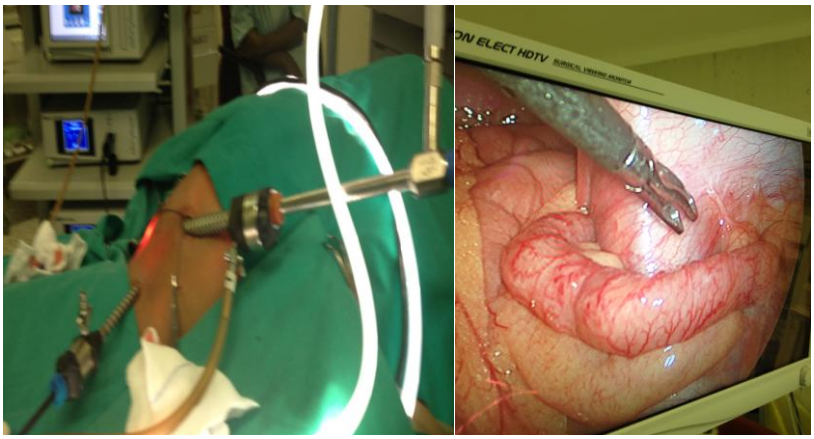
Acute suppurative appendicitis, n (%)	16 (51.6)
Early acute appendicitis, n (%)	9 (29)
Normal appendix, n (%)	3 (9.6)
Non appendiceal inflammation*, n (%)	3 (9.6)

* three patients had serositis (two pelvic inflammatory dfisease (PID), one unknown cause)

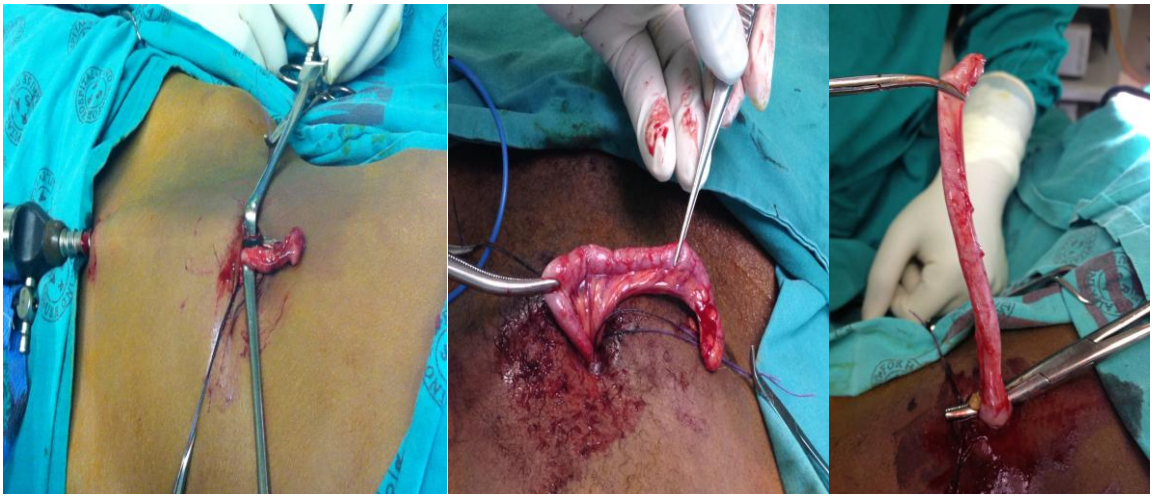
Table 4. Disposable items used in conventional laparoscopic appendicectomy that were avoided in TULAA

Items	TULAA	Conventional laparoscopy
Endopouch	N/R	R
Endoloop	N/R	R
Endostapler	N/R	R
Use of gas (Co_2)	Laparoscopic phase only	Throughout the procedure
Instruments (scissors, graspers, dissector)	R	R
Ports (10mm, 5mm)	Two or three	Three

N/R: not required R: required



1a 1b



1c 1d 1e

Fig.1 Trans-umbilical appendicectomy. 1a. port insertion,1b. appendix identified. 1c. Appendix delivered through the umbilicus. 1d,e. Procedure completed as open surgery

Fig.2. Markedly inflammed appendix delivered transumbilically.

3a 3b

Fig. 3. Good cosmetic result of transumbilical appendicectomy. 3a. Two ports (umbilical and suprapubic), 3b. three ports (umbilical,suprapubic and left iliac fossa).