

Port Exteriorization Interval Appendectomy: An Experience with 25 Cases

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Abstract

Laparoscopic appendectomy is conventionally performed using three ports. However, we have adopted this modified two port exteriorization technique by using minimum number of ports as well as disposables and got an excellent result. Hence aiming to document.

Between May 2012 and Dec 2013, fifty laparoscopic appendectomies were performed of which 25 were operated using contemplated technique. Technical challenges, conversion, operative time, complications, post operative recovery and cosmeses were analyzed.

Twenty five (13 females and 12 males) patients with age of 07 years to 67 years underwent port exteriorization interval appendectomy. The operative time was from 10 to 45 minutes. Two cases needed conversion to open appendectomy due to dense adhesions. Post operative pain was less than 25 by visual response score. One (4%) patient developed surgical site infection. Post operative recovery and cosmeses were excellent.

Port exteriorization appendectomy appear simple, safe, economical, and effective if condition favors its performance. However, difficult appendices requires conversion to three port/open procedure.

Keywords: Laparoscopic appendectomy; Out technique; Port exteriorization appendectomy; Two port appendectomy.

Introduction

Laparoscopic appendectomy is a surgical procedure of common use. There are many techniques of surgery. It is broadly divided in to "in" and "out" types.[1,2,3] The "in" technique involves division of appendicular artery and base intracorporeally using endoloops/clips/staples/sutures, with delivery of appendix through one of the ports.[4,5] This necessitates 3 ports and either use of costly laparoscopic disposables or intracorporeal suturing. The "out" technique involves exteriorization of appendix through a port and performing appendectomy extracorporeally.[1,2,3] Although one port appendectomy appears very attractive, it entails the use of either operating telescope[6] or the use of instruments shoved in along with camera.[7] in both cases a mobile not so inflamed/fixed appendix is mandatory for success. The 3 port "in" technique is most desirable. Paucity of laparoscope, cautery (bipolar) and disposables crates difficulties during surgery. However, with availability of diagnostic laparoscope, a Maryland and a non toothed grasper two port surgery was possible successfully.

Materials and Methods

Between May 2012 and Dec 2013, 25 interval, two port, exteriorization appendectomies were performed after obtaining written informed consents from the

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patients and guardians in case of minors.

The operative technique is described in brief. Under GA/SA open umbilical 10 mm port was placed and pneumoperitoneum was achieved up to 8-12 mm of Hg intra abdominal pressure. Patients were placed in Trendelenburg position with 20 degree head down and right side up. Another 10 mm working port was placed at Mc Burney's point and instrument is introduced to keep the gut/omentum away to visualize appendix if not visualized properly earlier. The external view of ports placement is as in Fig 1. The appendix is isolated, the tip is held and is coaxed into the introducer while simultaneously pushing the introducer and the port right up to its base. Pneumoperitoneum is deflated while pulling out the appendix gently yet firmly. Once deflated, the introducer, along with the port, is slowly slipped away exposing the entire length of the appendix along with the mesoappendix, out side of the abdomen (Fig 2). The rest of the surgery is similar to open appendectomy. On completion of the appendectomy, the appendicular stump is repositioned back into the abdomen by inflating the peritoneum again. Appendix stump and the mesoappendix were visualized again for satisfactory completion of the procedure. Ports were closed after extraction of the instruments and deflation of the abdomen.

Figure 1: External View of the Ports

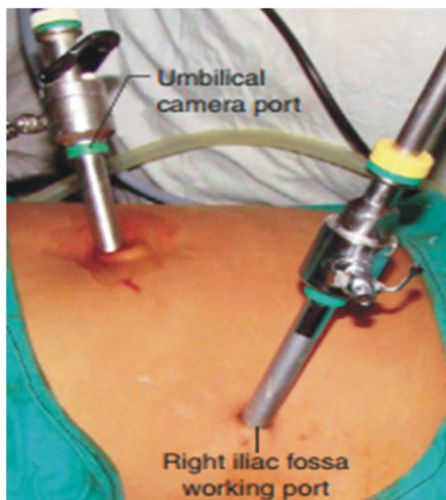


Figure 2: Appendix being Coaxed into the Port

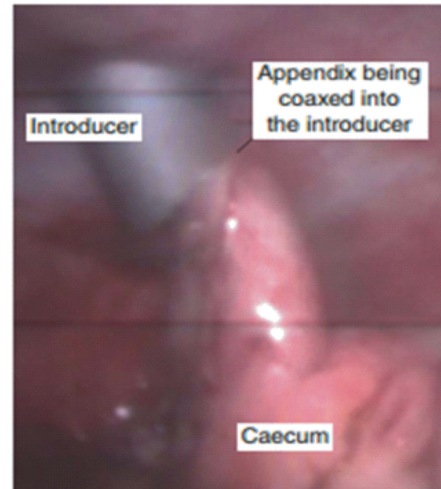


Figure 3. Appendix is Exteriorise



Results

Total ninety patients underwent appendectomy over one and half years. Out of these, 15 underwent open appendectomy, 50 three port laparoscopic and 25 two port exteriorization laparoscopic interval appendectomy.

Out of 25 port exteriorization technique, 13 were females and 12 were males. The age group involved were from 7 years to 67 years. Pediatric patients were three. There were 2 patients of age group 7 and seven & half years and one patient of 9 years old. All patients were operated under General Anesthesia. The operation time was between 10 minutes to 45

minutes.

Three cases needed conversion to open appendectomy which was performed by extending the right iliac fossa port site. This was due to adhesion and lump formation with terminal ileum, caecum and omentum.

One case was having turgid, thick and inflexible appendix. Ligation of the appendicular stump at caecal junction was little difficult. The same patient developed surgical site infection (SSI) subsequently due to E. coli infection. This case HPE report of appendix was in favor of acute appendicitis. In all other cases, chronic inflammatory findings were present on HPE of the appendix.

Post operative recovery in all patients was smooth. Post operative analgesia was required for 24 hrs only. Cosmese was excellent in all patients except the one who had SSI.

No patient had post operative port hernia during last 2 years of followup.

Discussion

Age

Although no age is exempt, appendicitis is, in general, a disease of late teens/young adults.[1,2,3] In our series, age group involved were from 7 to 67 years with 3 pediatric cases.

Gender

Appendicitis has a slight male predominance.[1,2,3,8] However, we had 13 females and 12 males in our study.

Diagnosis

Despite advances in diagnostic imaging, appendicitis remains a clinical diagnosis commonly using Alvarado's score. Score of more than 6 is credited with diagnosis accuracy of more than 70%.[8] In our series, all cases were interval appendectomy. Hence, there was no confusion. However, we landed up in an acute case resulting in SSI managed effectively by appropriate antibiotics.

Surgical Options

Open appendectomy is the standard time honored treatment for appendicitis and remains the most widely performed procedure, world wide.[3,8] Laparoscopic appendectomy has emerged as a viable treatment option not only because of patients demands for lesser pain and better cosmese but also because of surgeons diagnostic ambiguity and anatomical variability.[3] In our study, two port technique landed up in open method thrice due to dense adhesions and lump formation because of interval appendectomy.

Choice of Laparoscopic Technique

Although criticized for technical difficulty and cost [5] the three port "in" technique has been widely practiced and remains the gold standard, among techniques of laparoscopic appendectomy due to its significant advantages.[4]

However, less than optimum conditions specially in a busy OT with other team working with laparoscopic equipments, prompted us to look for alternative techniques which combined the best of open and laparoscopy which is in our opinion the port exteriorization technique. This technique performed predominantly using two ports gained popularity initially in pediatrics practice.[9,10]. Latter, this technique is going to be popularized in adult surgery in near future. In our study of total of 25 cases, we had three pediatric cases of appendicitis operated successfully by two port exteriorization technique. Others had good response to same two port exteriorization technique.

Technical Points

Pre Requisites

As with any other surgical technique, port exteriorization using two ports is ideally suited for favoring placed easy to grasp appendix which are either early stage of inflammation or not inflamed (interval appendectomy), without friability, mobile, in patients thin

abdominal wall. Hence, we selected all our patients for interval appendectomy by this innovative two port exteriorization technique. The distinct advantage of this technique is that it proves less invasive than both open and 3 port technique. Gentle yet firm handling of the appendix is all that is required. The other advantage of this technique is that the chance of SSI is definitely as well as significantly less as the selection of cases was for interval appendectomy only. This is new and unique study being interval appendectomy only. We agree that it needs further study for more comments/suggestion.

Turgid Inflamed Appendix

On account of friability, thickness and edema coaxing to trocar is difficult. Enlarging the port site has also been described for the same difficulty.[3] Hence we avoided all cases of acute appendicitis. The attempted procedure was adopted only in cases of interval appendectomy.

Adhesions

Adhesions can be broken (divided/cauterized) by using Maryland, introduced through the working port. Once the appendix is freed, the remainder of the procedure is carried out as described. However, if the adhesions are thick or the appendix is coiled around due to recurrent inflammation or in appendicular lump formation (as in our cases) it becomes difficult for dissection in 2 port method to deliver appendix, resulting in conversion to open appendectomy. We agree our difficulties while mobilizing appendix in interval appendectomy. In this series, it was not possible to dissect out the appendix free in three occasions resulting in conversion to open appendectomy.

Limitations

This technique is less optimally suited for very short fibrosed appendix, especially in obese patients, as it is difficult to pull it up

enough to achieve optimal exposure of the base.[1] This may leave a long stump with subsequent risk of stump infection.[1] Gangrenous appendix with friable bases are unsuitable as they rupture during extrication.[2,3] In this series we have excluded all acute appendicitis cases. In our present series, two cases were difficult due to multiple factors mentioned above resulting in open appendectomy. However, three port "in" technique would have a definite advantage over the contemplated technique in such situations.[3] Should one encounter an appendicular mass it is best left alone for a later date interval appendectomy (as our cases) as true dissection such a friable mass needs either an out standing experience in laparoscopic surgery or the tactile feed back provided by finger, as in open surgery.[3] That is the reason, we have not done the contemplated procedure in acute appendicitis as well as in appendicular lumps.

Time

Our operation time ranged between 10 and 45 minutes depending upon the difficulties encountered during surgery. This compares well with the timings both of open procedures as well as that of laparoscopic appendectomy performed using port exteriorization technique by other centers.[2,3,9,11] It is worth to mention here that the time consumed is less than that of standard three port appendectomy.[1,2,4] The result is similar to series by Bharati *et al.*

Economy

A definite economically good procedure as nothing else (no other disposables) are required except a free silk suture.

Conversion

Out of 25 cases attempted by two port technique, 22(88%) could be completed without conversion to other techniques like three port/open appendectomy. This

compares well with the literature of this technique where rate of success ranged from 73% to 100%. [1,2,3,9,11] In a series of 26 cases attempted by two port technique, 22 (84.61%) could be completed without conversion by Bharati *et al* which is similar to our result. It is worth mentioning that conversion and addition of working instruments should be considered good judgment, if required to prevent failure/complications.

Complications

Surgical site infection is a known complication of open appendectomy, which occurs in 5 to 10% of cases. [8] Although a similar incision, the site of exteriorization carries the same risk, but our experience showed one case of SSI out of 25 (4%) who had an inflamed turgid appendix. This series is comparable to many series. [1,2,3,9,11] However, we feel less chance of infection as all cases in our series were Interval appendectomies only. Further work is required to comment on infection in this method of port exteriorization appendectomy.

Caecal perforation, bleeding, pelvic abscess and port site hernias have also been reported following laparoscopic appendectomy, but fortunately none were observed in our patients. [1,2,3,9,11]

Post Operative Pain

Pain following laparoscopic cholecystectomy is multifactorial like visceral and parietal components. [1,2,3] The visceral component predominates following surgery for 24 hrs and parietal component takes over latter. [1,2,3] That is what has happened in our study. However, use of non steroidal anti inflammatory drugs was enough to alleviate pain.

Post Operative Recovery

Commencing orals after 8 hrs of surgery had no complications. [12] We have started oral fluid following 12 hrs after surgery and have

good post operative response. The hospital stay was from 3 to 7 days depending on relief of post operative pain and requests of patients to stay in the hospital till removal of stitches. Otherwise most of the patients were discharged on third post operative day.

Cosmoses

Cosmoses is an important criterion especially for young females undergoing surgery. All our patients were cosmetically satisfied and had never any complains following surgery.

Conclusion

In conclusion, port exteriorization interval appendectomy proves simple, safe, economical and effective, when condition favors its performance. However, difficult appendectomies warrant conversion either to three port or open procedure.

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