ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 10, pp.59848-59851, October, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

OUTCOME OF MINI APPENDECTOMY AND LAPAROSCOPIC APPENDECTOMY IN ACUTE APPENDICITIS

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ARTICLE INFO

Article History:
Received 10th July, 2017
Received in revised form
22nd August, 2017
Accepted 25th September, 2017
Published online 31st October, 2017

Key words:

Appendicitis,
Mini appendectomy,
Laparoscopic-appendectomy,
Rectus muscle.

ABSTRACT

Appendectomy remained standard treatment for acute appendicitis even after two centuries of chance appendectomy. Conventional appendectomy with standard Grid Iron incision in the era of minimally invasive surgery is loosening its essence. In low resource conditions when laparoscopic facilities are not available, mini appendectomy can be practiced as standard treatment to decrease morbidity of conventional appendectomy. Present study was conducted in Postgraduate Department of Surgery, Govt. Medical College; Jammu, over a period of 04 years from January 2013 to December 2016. 200 patients each were divided into two groups: Group I as mini appendectomy (MA), Group II as laparoscopic appendectomy (LA). Patients in Group I were operated under SA or GA. But all patients in Group II (LA) were operated under GA. Patients with clinically apparent appendicular lump, perforation peritonitis, marked obesity and doubtful diagnosis were not taken up for MA (Group I), but in Group II (LA) obese & patients with doubtful diagnosis were also considered. Our experience of mini appendectomy and laparoscopic appendectomy reveals that the two procedures are comparable in terms of analgesics use, hospital stay, return to routines and satisfaction with the scar, but laparoscopic appendectomy takes significantly more operating time than mini appendectomy. In low resource situations grid iron incision can be replaced with rectus muscle medial retracting mini appendectomy incision. However, patients with moderate to severe obesity and appendicular lump may not be fit for mini appendectomy. Furthermore, small incision of MA can be used as one of the ports for diagnostic laparoscopy if appendix is normal.

Citation: Dr. Sanjay Kumar Bhasin, Dr. Sunita Kumari, Dr. Mohd Riaz and Dr. Nasib Chand Digra. 2017. "Outcome of Mini Appendectomy & Laparoscopic Appendectomy in Acute Appendicitis", *International Journal of Current Research*, 9, (10), 59848-59851.

INTRODUCTION

Appendectomy has remained standard treatment for acute appendicitis even after two centuries of chance appendectomy performed by Cladius Amyand (1736) in a 11 year old boy with scrotal hernia wherein, he found a pin perforating appendix (Amyand C, 1736; Fitz, 1886). Kronlein (1886) published his experience of appendectomy (Douglas S *et al*., 2007). Although many incisions have been devised for appendectomy like Rocky Dave's, Rutherford Morison's, Battle's incision, Bikni incision and lately Lanz incision (Rintoul, 1995; Jelarko, 1973; Temple, 1990) yet Mc Burney Grid Iron incision (Mc Burney, 1894) for appendectomy have remained incision of choice even after more than one century since it was devised. Strong desire of patients especially females to avoid abdominal scar has encouraged many surgeons to use a variety of incisions for abdominal visceral surgery that are hidden from exposure (Schrieber, 1987). Laparoscopic surgery have enthused almost every member of the surgical fraternity due to less pain and better comfort to the patients. Although laparoscopic appendectomy is being performed in quite a large number of patients in both developed & developing countries yet there is still no final view on this procedure as Gold standard unlike laparoscopic cholecystectomy (Buckley, 1994; Esposito *et al*., 2007; Ali *et al*., 2010; Xiaohang *et al*., 2010; Sauerland *et al*., 2010; Nakhamiyayev *et al*., 2010; Varela, 2008). Conventional appendectomy with standard Grid Iron incision in the era of minimally invasive surgery is loosening its essence in view of lot of morbidity in terms of scar, pain, delayed return to routines and increased incidence of wound infection etc. The authors have already shared their experience of mini appendectomy (Sanjay Kumar Bhasin, 2005; Sanjay *et al*., 2007)**.** In order to weigh the benefits of mini-appendectomy and laparoscopic-appendectomy over each other keeping in view the needs of the developing countries and the state like ours where laparoscopic facilities still are not readily available in government hospitals, we are presenting here a comparative study of mini appendectomy (small rectus muscle retracting incision) and laparoscopic appendectomy, probably the first ever study of such nature related to the subject.

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MATERIALS AND METHODS

The study was conducted in Postgraduate Department of Surgery, Govt. Medical College Jammu over a period of 04 years from January 2013 to December 2016. 200 patients each were divided into two groups: Group I as mini appendectomy (MA), Group II as laparoscopic appendectomy (LA). In Group I there were 120 males and 80 females in the age group of 03-68 years whereas; in Group II there were 110 males and 90 females in the age group of 7 to 65 years. Patients in Group I were operated in either SA or GA. But all patients in Group II (LA) were operated under GA. Patients with clinically apparent appendicular lump, perforation peritonitis, marked obesity and doubtful diagnosis were not taken up for mini-appendectomy (Group I), but in Group II (LA) we considered obese & doubtful diagnosis patients also. Patients in both the Groups were subjected to detailed examination and relevant investigations.

Operative Technique

Mini appendectomy: After marking Mc Burney's point and lateral boarder of the right rectus muscle we start the incision on lateral border of rectus muscle and extended transversally 2 to 2.5 cm towards Mc Burney's point. Anterior sheath is cut in line of the skin incision and rectus muscle retracted with the help of long pronged Skin/Czerny's/Langenbuch's retractors. Peritoneum is cut in the line of skin incision. Once we reach abdominal cavity, retractors are removed and subsequently it requires little effort and manipulation to trace the appendix. Rest of the procedure of appendectomy is done as per the standard protocol. We neither bury appendix stump nor close peritoneum. Retracted muscle comes to its place once the anterior sheath is sutured back. Skin is closed either with interrupted silk or subcuticular prolene or skin staplers. No special retractors are required for the procedure.

Laparoscopic appendectomy: was done using standard three port technique.

RESULTS

In Group I, Mini-appendectomy was successfully completed in 194 patients and 06 patients requiring extension of incision maximum up to 5cms.Whereas, in Group II, laparoscopic-appendectomy was completed successfully in 192 patients, 08 patients requiring conversion to conventional cholecystectomy. In Group I (MA) there were 120 males and 80 females in the age group of 03-68 years (23.5 years) whereas; in Group II (LA) there were 110 males and 90 females in the age group of 7 to 65 years (22.5 years). Average weight of pts in Group I was 45.7 Kgs (20 kgs to 64 kgs) and 55.4 Kgs (24 kgs to 70 kgs) in Group II. Average time taken to complete surgery in Group I and Group II was 11.5 mt (11-45 mt) and 27.5 mt (25-55 mt) respectively. Higher operating time was observed in conversion cases in both groups. Average dose of analgesic used in Group I and II were 2.2 doses (2-5 doses) and 1.92 doses (2-4 doses) respectively. Post operative hospital stay in Group I was 2.14 days (2-5 days) and 2.04 days (2-4 days) in Group II. Time to return to work in Group I was 8.2 days (8-12 days) and 8.1 days (8-10 days) in Group II. There was no mortality and negligible morbidity in both the study groups. In Group I operation time was much less then Group II. Analgesics use, hospital stay, time to return to work were comparable. The minor complications observed were 4% (n=8) in Group I in comparison to 5% (n=10) in Group II. No long term complications were observed in either group. Details of the results are given in Table I-IV.

Table 1. Peri-operative Parameters in Mini appendectomy & Laparoscopic appendectomy

Parameter	MA	LA
Length of incision	2-2.5 cms (2.44 cm)	03 port method
Operation time	11 to 45 mts (11.5mts)	25 to 55 mts (27.5 mts)
Incision extension/conversion	06	08cases
Analgesics used	2 to 5 doses (2.14 doses)	1 to 5 doses (1.92 doses)
Hospital stay	2 to 5 days (2.14 days)	1-8 days (2.04 days)
Return to routines	8 to 10 days (8.2 days)	8 to 10 days (8.1 days)
Satisfaction with scar	97% (n=194)	96 % (n=192)
Minor Complications	4% (n=8)	5% (n= 10)

Table 2. Per-operative Findings

Operative findings	MA	LA
Acute inflammation	170	168
Gangrene of the tip	07	05
Appendicular lump	04	06
Asoociated Meckle's diverticulum	04	05
Meckle's diverticulitis	02	02
Appendicular perforation(including tip)	04	02
Normal	08	10
Other	01*	02**

Note: * Acute mesenteric lymphadenitis;
**Right sided Ovarian cyst, **TO Mass.

Table 3. Reasons for extending Incision

Reason	MA	LA
Apendicular lump	02	03
Subserosal retrocaecal	02	01
Meckle's diverticulitis	01	02
Others	01	01
Difficult Dissection	00	01

Table 4. Post-operative Complications

Complication	MA	LA
Post-operative Fever	03	05
Ant. Abdominal wall hematoma	01	00
Ant. Abdominal wall abscess	01	00
Wound infection*	03	03
Paralytic Ileus	00	02

Note: * Both in conversion groups.

Image 1. Mini appendectomy with 2.5cm incision single stitch

Image 2. Mini appendectomy scar after stitch removal

Image 3. Laparoscopic appendectomy with three ports

DISCUSSION

Kronlein has been credit for first published appendectomy in 1886, but 17 year old patient died two days after the surgery (Douglas *et al*., 2007; Harold, 1997). The credit to pioneer early diagnosis and early operative intervention devising muscle splitting incision for appendectomy goes to Charles Mc Burney (1889). Over a period of time it has been learnt that the standard incision has its own disadvantages big scar, ventral hernias, post-operative pain etc. With advancing civilization, a strong desire of patients to remain pain free and to get small scar especially the females, encouraged many surgeons to use a variety of cosmetically better incisions in visceral surgery. For appendectomy few surgeons have worked on the subject that too without following their work, hence this area of one of the most common emergency visceral surgery remained without an established minimally invasive incision. Since the first published laparoscopic cholecystectomy in 1987 by Phillipe Mouret, there had been a real revolution in the field of visceral surgery (Mouret, 1991). Kurt Semm did first laparoscopic appendectomy in 1983 (Semm, 1983) but first published laparoscopic appendectomy was reported in 1987 (Schrieber, 1987). Unfortunately like various incision for open surgery, laparoscopic appendectomy too have failed to establish itself as surgical technique of choice for acute appendicitis, laparoscopic equipment being expensive and takes longer operating time (Soon Youn Seong, 2009; Cariati *et al*., 2001; Little *et al*., 2002; Padankatti *et al*., 2009). Suh tried small incision 1.5 to 2.5 cm (microceliotomy) combined with laparoscopic instruments to diagnose and do subsequent appendectomy that too failed to establish, as it loses its essence where concomitant facilities of laparoscopic instruments are not available. According to a Cochrane review published by Sauerland *et al*. (2010), laparoscopy does not show relevant advantages compared to open appendectomy; therefore, indication should be limited to young women and obese patients. Nakhamiyayev *et al*. (2010) and Varela *et al*. (2008) while comparing laparoscopic appendectomy and small incision appendectomy reported that the total hospital costs were comparable between the two procedures or were even lower for the laparoscopic group when the subgroup of obese patients was analyzed. They are in contrast to the other studies that have reported much more cost of laparoscopic procedures (Buckley, 1994; Ali *et al*., 2010; Little *et al*., 2002).

Enthused by minimally invasive surgery and successful outcome of our initial experiences of mini appendectomy (Sanjay Kumar Bhasin, 2005; Sanjay, 2007; Sanjay, 2012), we have successfully compared two techniques i.e MA (Group I) versus LA (Group II) in acute appendicitis. We have observed from the present study that average operation time of MA is 11.5 mts against 27.5 mts in LA. Similarly analgesic used in mini appendectomy was 2.14 doses against 2.04 doses in laparoscopic appendectomy; hospital stay was 2.04 days in Group I and 1.92 days in Group II. Patients took 8.2 days in Group I to return to routine work against 8.1 days in Group II. Minor complication observed in Group I were fever (n=03), abdominal wall hematoma (n=01), abdominal wall abscess (n=01) and wound infection in 03 patients. In Group II fever was observed in 03 pts, wound infection in 03 pts and paralytic ileus in 02 patients. 06 patients in Group I required incision extension maximum up to 5cms, whereas, 08 patients had to be converted to conventional appendectomy in Group II. No long term complications were observed in either group. K Ashok *et al*., (2016) and Faisal, (2016) have recently reported their experience of buttonhole appendectomy. Furthermore, Esmail Özsan (2014) and Çiftçi, (2015) have reported their experience of laparoscopic appendectomy and mini incision appendectomy using grid iron type incisions, whereas in present study we did mini appendectomy by rectus muscle retracting incision.

Conclusion

Our experience of mini appendectomy and laparoscopic appendectomy reveals that the two procedures are comparable in terms of analgesics use, hospital stay, return to routines and satisfaction with the scar, but laparoscopic appendectomy takes significantly more operating time than mini appendectomy. We suggest that in low resource situations grid iron incision can be replaced by mini appendectomy. Patients with moderate to severe obesity and appendicular lump may not be fit for mini appendectomy, but definitely we can use mini-appendectomy incision site as one of the ports and can proceed with diagnostic laparoscopy if appendix is normal.

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