LAPAROSCOPIC APPENDECTOMY IN OBESE. AN ATTRACTIVE OPTION

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ABSTRACT

Objective: To evaluate the outcomes of laparoscopic and open appendectomy in obese patients in Surgical departments of a tertiary care hospital.

***Study Design*:** Prospective observational study.

***Place and Duration of Study*:** Bahawal Victoria Hospital. Bahawalpur, from Jan 2013 to Dec 2016.

Methodology: A sample of 173 patients (aged ≥16 years, BMI >30) admitted to a surgical teaching service with a clinical diagnosis of acute appendicitis. This study was conducted on appendicitis patients, who underwent standard laparoscopic appendectomy (LA) and open Appendectomy (OA). Complicated appendicitis cases were disqualified. Variables analyzed includes age of patients, gender, operative time (OT), postoperative pain, return of bowel function, intra-abdominal abscesses, wound sepsis and length of Hospital stay.

Results: Laparoscopic appendectomy was performed on 83 patients & open appendectomy on 90. Statistical disparity in mean operative time between the laparoscopic (52 ± 8min) and open appendectomy (67 ± 13 min) groups was determined. Rate of intra-abdominal abscess was higher after open appendectomy (11%) than laparoscopic (3%) as well as the wound sepsis which was 9% in Open Appendectomy and 2% in Laparoscopic Appendectomy. Likewise, post-operative ileus was 12% in Laparoscopic Appendectomy and 20% in Open appendectomy. The span of stay in hospital was shorter in laparoscopic group (3 ± 1 day) as compared with open group (5 ± 1 days). Two cases needed re-exploration (0.5%) for appendicular stump leakage and pelvic collection respectively.

Conclusion: Laparoscopic approach is advantageous in comparison with open appendectomy in terms of less postoperative pain, shorter Hospital stay, reduced wound sepsis and operative time in obese patients.

Keywords: Ileus, Intraabdominal abscess, Laparoscopic appendectomy, Open appendectomy, Stump leakage, Wound sepsis.

INTRODUCTION

Appendectomy is the commonest surgical intervention. In literature comparing results of laparoscopic and open approaches, data is unconvincing and frequently conflicting. According to a Cochrane analysis in print by Sauerland *et al*[1]. Laparoscopy does not illustrate pertinent compensation compare to open appendectomy, subsequently indication should be limited to young women and obese patients. Evidence underneath this hypothesis was based on retrospective studies[2,3], organizational databases studies[4,5] and prospective trials with narrow populations[6,7]. Consequently it cannot be emphasized to set laparoscopy as the gold standard procedure for obese patients affected by acute appendicitis. As obesity represents a well-known condition in west and it's growing like an epidemic in our society as well so we designed this prospective study comparing open and laparoscopic appendectomy to present data pertinent to the issue in a tertiary care set up.

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METHODOLOGY

This prospective observational study included 173 patients of 16 to 58 years of age with BMI 30 or greater with preoperative diagnosis of appendicitis who have undergone laparoscopic and open appendectomy since January 2013 to December 2016 in Bahawal Victoria Hospital. All patients chosen by consecutive sampling completed the study, including post discharge follow-up. Patients with complicated appendicitis, pregnant women and patients with severe

medical disease (chronic medical or psychiatric illness, cirrhosis, coagulation disorders etc) requiring intensive care were excluded. Variables analyzed included patients age, gender, operative time, post-operative pain, return of bowel function, intra-abdominal abscesses and duration of hospital stay. They were compared between groups stratified by body mass index (BMI) and operative technique. Both groups of patients were given a prophylactic dose of third-generation cephalosporin and metronidazole at induction of the general anesthesia as part of the protocol. OA was performed through standard McBurney incision. A standard 3-port technique was used in laparoscopic group. All specimens were sent for histopathology. On return of bowel sounds and passage of flatus clear fluids were started. Patients were discharged once they were Temperature free, able to take regular diet and had good pain control. The operative time (minutes) for both the procedures was determined from the skin incision to the last skin stitch applied. The length of hospital stay was determined by number of nights spent at hospital post-operatively. Wound contamination was defined as redness or purulent or seropurulent discharge at incision site. Paralytic ileus was defined as absent bowel sound within 12 h postoperatively. The intra-abdominal abscesses were confirmed on ultrasound in both groups. Pain intensity was measured by visual analogue score. All patients were given NSAIDS in routine. Narcotic analgesics were used on demand and frequency was measured.

All the data was entered and analyzed by Statistical Package for Social Sciences (IBM SPSS Statistics version 16).Outcome analyzed by means of t test for quantitative variables and chi-square test for categorical variables. *p*- value <0.05 was considered as statistically significant.

RESULTS

One hundred seventy-three patients (98 females and 75 males) were operated for acute appendicitis having BMI over 30. Their age ranged from 16 years to 58 years. Highest number of patients comprised age group 20 years to 30 years with female's preponderance (table-I). Ninety-three patients (n=93) underwent LA, 2 requiring conversion to an OA. Eighty (n=80) patients underwent an OA. There were no significant differences with respect to age and associated co-morbidities. Post-operative complications are described in results (table-II) regarding the two techniques. Two patients required re-operation due to leakage and collection. No mortality was Observed in any group.

Table-I: Age wise distribution.

Age (years)	Male (n=75)	Female (n=98)
16-20	15 (20%)	24 (24.5%)
20-30	29 (39%)	31 (32%)
30-40	13 (17%)	17 (17%)
>40	18 (24%)	26 (26.5%)

Table-II: Comparison of demographics and complications of Laproscopic Appendectomy Vs Open Appendectomy groups.

Complications	Laproscopic Appendectomy (93)	Open Appendectomy (80)	*p*-value
Age (years)	38.1 ± 16.7	41.2 ± 15.5	0.210
Males	37 (40%)	38 (47.5%)	0.270
Females	56 (60%)	42 (52.5%)	0.322
Basal Mass Index	36.4 ± 3.1	35.9 ± 2.8	0.270
Wound Sepsis	2 (2%)	7 (9%)	0.08
Operation Time (minutes)	52 ± 8	67 ± 13	0.001
Hospital Stay	3 ± 1 days	5 ± 1 days	0.001
Residual Abscess	3 (3%)	9 (11%)	0.003
Ileus	12 (13%)	16 (20%)	0.21
Use of Parenteral Narcotic analgesia	27 (29%)	42 (53%)	<0.001

DISCUSSION

Acute appendicitis is the commonest cause of acute abdomen in teens requiring emergency intervention[8]. The possibility of appendicitis must be well thought-out in any patient presenting with lower abdominal pain but such diagnosis is still a challenge in obese patients[9,10]. Although more than 20 years beyond since beginning of laparoscopic appendectomy (performed in 1983 by Semm, a gynecologist), open appendectomy is still popular and widely adept method. Various authors believe emergency laparoscopy is a clear-cut tool of treatment for abdominal emergencies like appendicitis particularly in females of reproductive age groups[11,12]. Several studies[14,15] linked laparoscopic appendectomy with faster restoration towards normal activities with fewer wound Sequele. These findings have been disagreed by many researchers who demonstrate no major disparity into the conclusion among two methods rather additional operating expenses with laparoscopic appendectomy. Recent meta-analyses of randomized controlled trials comparing laparoscopic versus conventional appendectomy depicted that acute appendicitis can be dealt by open and laparoscopic approach safely[13-16].

Obesity is a well-established medical concern in western societies and also affects a huge proportion of general community in our social setups. Popular myth with intention of laparoscopic appendectomy supposed to be "Gold Standard" in overweight patients stand as assumption that augmented abdominal wall thickness is a procedural challenge during open appendectomy due to restricted accurate hand actions and visibility. Further dissection is often warranted which ends up by prolong recovery time. Recent data consider laparoscopic approach as a better option in obese. Our study focused on over-weight patients, comparing open and laparoscopic techniques for appendectomy. Most of patients in our study were having BMI >30 with a female preponderance in age group of 20-30 years.

Time to be taken for surgery is measured as an important predictor for procedural outcome. Various researchers mentioned long operative time with laparoscopic approach. Probable justification for this finding may be learning curve of surgeons spending added moment in time than conventional appendectomy. Prolong operative time in laparoscopic appendectomy may be due to additional steps like setup of instruments, insufflations, ports positioning under vision and a phase of diagnostic laparoscopy. By contrast, in our series the impact of learning curve was almost negligible as all operations were performed by senior consultants. Clarke *et al*[6] noticeably have a high value for laparoscopic appendectomy group. Our study interpretation is in contradiction to a meta-analysis by Markar *et al*[18], who investigated time taken for surgery, based on records available in literature[3,19] and detected no noteworthy disparity among laparoscopic and open appen-dectomy in routine patients. However, in our study of obese patients, this verdict is different[20] which verified a major decline of time to be taken for surgery in laparoscopic appendectomy group (p<0.001).

Short hospital stay observed in favor of those patients treated by laparoscopic approach. It is not clinically important, but it has impact on bed availability and hospital funds. Nonetheless, faster return to the normal activities cannot be credited to short stay in hospital only, since this may depends on personal attitude and job nature.

Masoomi *et al*[4,21] emphasized benefits of laparoscopic appendectomy by reporting a lesser intra-abdominal abscess formation in laparoscopic appendectomy group. We observed that residual abscess formation in obese was lesser in Laproscopic Appendectomy as compared to open appendectomies but it was not statistically significant (p=0.08). These findings are contradictory to many studies those showed an enhanced hazard of residual abscesses in laparoscopic appendectomy compared with open surgery[22]. Several hypotheses have been postulated to find possible justifications, mechanical spread of bacteria in the peritoneal cavity promoted by carbon dioxide insufflations, especially in perforated appendix, inadequate learning curve[22], the

extensive washouts instead of simple suction of the infected area in case of perforation, which results in soiling of entire abdominal cavity.

Likewise, the wound sepsis was encountered more in open appendectomy group. Wound contamination could have been a cause for financial burden on patient as well as on hospital as it prolongs hospital stay. Wound dehiscence was more frequent in open group especially in problematic appendicitis regardless of receiving same antibiotics within pre and postoperative phase. Second reason may be the use of endobag for retrieval of appendix in Laproscopic Appendectomy group. According to Mason *et al*[23] core benefit of laparoscopic surgery in obese patients with acute appendicitis is reduced wound related sequele.

We compared pain intensity in postoperative period through assistance of visual analogue score and analgesia requirement on charts to try to find out the dissimilarity. In accordance to various studies[14,24]. Parenteral Narcotic analgesia requirement was less in Laproscopic Appendectomy group. Present outcome is similar in laparoscopic surgery performed in obese as well as in normal BMI patients but has considerably reduced (p<0.001) requirement as compare with conventional open appendectomy.

Postoperative ileus was prolonged in case of open appendectomy group due to additional handling. The frequency of ileus was lower in Laproscopic Appendectomy group but this difference was not statistically significant (p=0.21). Primarily, advantage of less ileus is not only due to laparoscopic approach only but also related to less use of narcotic analgesia in postoperative phase.

Mortality rate was negligible in our series. In general appendectomy performed whether through laparoscopic or open route is a safe procedure as revealed by many studies[25].

CONCLUSION

Laparoscopic approach is advantageous in comparison to open appendectomy in terms of less postoperative pain, shorter hospital stay, reduced wound sepsis and operative time in obese patients, but a large prospective trial is essential to establish superior surgical outcomes of laparoscopic appendectomy.

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CONFLICT OF INTEREST

This study has no confict of interest to be declared by any authors.

REFERENCES

1. Sauerland S, Jaschinski T, Neugebauer EA. Laparoscopic versus open surgery for suspected appendicitis. Cochrane Database Syst Rev 2010; 10(1): CD001546-1655.
2. Towfigh S, Chen F, Katkhouda N, Kelso R, Sohn H, Berne TV, et al. Obesity should not influence the management of appendicitis. Surg Endosc 2008; 22(12): 2601-05.
3. Corneille MG, Steigelman MB, Myers JG, Jundt J, Dent DL, Lopez PP, et al. Laparoscopic appendectomy is superior to open appendectomy in obese patients. Am J Surg 2007; 194(6): 877–80.
4. Masoomi H, Nguyen NT, Dolich MO, Wikholm L, Naderi N, Mills S, et al. Comparison of laparoscopic versus open appendectomy for acute nonperforated and perforated appendicitis in the obese population. Am J Surg 2011; 202(6): 733-38.
5. Varela JE, Hinojosa MW, Nguyen NT. Laparoscopy should be the approach of choice for acute appendicitis in the morbidly obese. Am J Surg 2008; 196(2): 218-22.
6. Clarke T, Katkhouda N, Mason RJ, Cheng BC, Olasky J, Sohn HJ, et al. Laparoscopic versus open appendectomy for the obese patient: A subset analysis from a prospective, randomized, double-blind study. Surg Endosc 2011; 25(4): 1276-80.
7. Enochsson L, Hellberg A, Rudberg C, Fenyö G, Gudbjartson T, Kullman E, et al. Laparoscopic vs open appendectomy in overweight patients. Surg Endosc 2001; 15(4): 387-92.
8. Chung RS, Rowland DY, Li P, Diaz J. A meta-analysis of randomized controlled trials of laparoscopic versus conventional appendectomy. Am J Surg 1999; 177(3): 250-56.
9. Bhangu A, Søreide K, Di Saverio S, Assarsson JH, Drake FT. Acute appendicitis: modern understanding of pathogenesis, diagnosis, and management. Lancet 2015; 386(10000): 1278-87.
10. Rio S, Birindelli A, Kelly MD, Catena F, Weber DG, Sartelli M, et al. WSES Jerusalem guidelines for diagnosis and treatment of acute appendicitis. World J Emerg Surg 2016; 11(1): 34-58.
11. Di Saverio S, Mandrioli M, Birindelli A, Biscardi A, Di Donato L, Gomes CA, et al. Single-incision laparoscopic appendectomy with a low-cost technique and surgical-glove port: "How to do it" with comparison of the outcomes and costs in a consecutive single-operator series of 45 cases. J Am Coll Surg 2016; 222(3): 15-e30.
12. Di Saverio S. Emergency laparoscopy: a new emerging discipline for treating abdominal emergencies attempting to minimize costs and invasiveness and maximize outcomes and patients' comfort. J Trauma Acute Care Surg 2014; 77(2): 338-50.

13. Garbutt JM, Soper NJ, Shannon W, Botero A. Meta-analysis of randomized controlled trials comparing laparo-scopic and open appendectomy. Surg Laparosc Endosc 1999; 9(1): 17-26.
14. Towfigh S, Chen F, Mason R, Katkhouda N, Chan L, Berne T. Laparoscopic appendectomy significantly reduces length of stay for perforated appendicitis. Surg Endosc 2006; 20(3): 495-99.
15. Di Saverio S, Mandrioli M, Sibilio A, Smerieri N, Lombardi R, Catena F. A cost-effective technique for laparoscopic appendectomy: outcomes and costs of a case–control prospective single-operator study of 112 unselected consecutive cases of complicated acute appendicitis. J Am Coll Surg 2014; 218(2): 51–65.
16. Kehagias I, Karamanakos SN, Panagiotopoulos S, Panagopoulos K, Kalfarentzos F. Laparoscopic versus open appendectomy: which way to go? World J Gastroenterol 2008; 14(31): 4909–14.
17. Stroup DF, Berlin JA, Morton SC, Olkin I, Williamson GD, Rennie D, et al. Meta-analysis of observational studies in epidemiology: a proposal for reporting. meta-analysis of observational studies in epidemiology (MOOSE) group. J Am Med Assoc 2000; 283(15): 2008–12.
18. Markar SR, Venkat-Raman V, Ho A, Karthikesalingam A, Kinross J, Evans J, et al. Laparoscopic versus open appendicectomy in obese patients. Int J Surg 2011; 9(2011): 451–55.
19. American Obesity Association. AOA Fact sheets 2005; 1-3. Available on http://www.fitwize4kids.com/fp/marketing/1_Research/Statistics_Trends/AOA_FactSheets.pdf
20. Tan-Tam C, Yorke E, Wasdell M, Barcan C, Konkin D, Blair P. The benefits of laparoscopic appendectomies in obese patients. Am J Surg 2012; 203(5): 609–12.
21. Ricca R, Schneider JJ, Brar H, Lucha PA. Laparoscopic appendectomy in patients with a body mass index of 25 or greater: Results of a double blind, prospective, randomized trial. J Soc Laparoend Surg 2007; 11(1): 54–58.
22. Shaikh AR, Sangrasi AK, Shaikh GA. Clinical Outcomes of laparoscopic versus open Appendectomy. J Soc Laparoend Surg 2009; 13(4): 574–80.
23. Mason RJ, Moazzez A, Moroney JR, Katkhouda N. Laparoscopic vs open appendectomy in obese patients: outcomes using the american college of surgeons national surgical quality improvement program database. J Am Coll Surg 2012; 215(1): 88–99.
24. Moore DE, Speroff T, Grogan E, Poulose B, Holzman MD. Cost perspectives of laparoscopic and open appendectomy. Surg Endosc 2005; 19(1): 374–78.
25. Agresta F, De Simone P, Leone L, Arezzo A, Biondi A, Bottero L, et al. Italian society of young surgeons (SPIGC). Laparoscopic appendectomy in Italy: an appraisal of 26, 863 cases. J Laparoendosc Adv Surg Tech A 2004; 14(1): 1–8.