

Early post-operative pain in Laproscopic appendectomy versus open appendectomy

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Abstract:

Objective: To compare post-operative pain scores in open and laparoscopic appendectomy

Study design: Randomized Controlled trial (RCT)

Study settings and duration: Study was conducted at department of surgery Pakistan Ordinance Factory (POF) Hospital, Wah Cantt, for 6 months (January 2018- June 2018)

Material and methods: Sample size of 60 patients was calculated using WHO calculator. Non probability consecutive sampling was used. Patients were divided randomly into two groups using lottery method. Group-A underwent laparoscopic appendectomy while Group-B underwent open appendectomy. Ethical approval and consents form were taken patients were followed for measuring pain scores. Data was analyzed using SPSS version 23. T-Test and chi-square was applied. P value ≤ 0.05 was considered significant.

Results: Total 60 patients were included in study with 1:1 randomization (30 patients in each group). There were 38(63%) male and 22(37%) female. Mean age of patients was $35.8 \text{ years} \pm 11.9 \text{ SD}$. Mean pain scores in laparoscopic appendectomy group 30(50%) were $0.60 \pm 0.8 \text{ SD}$ while mean pain scores in open appendectomy 30(50%) were $4.9 \pm 1.2 \text{ SD}$ ($t = -15.392$, $df = 58$, $p = 0.000$). Laparoscopic and open appendectomy had significant association with age ($p = 0.05$), DM ($p = 0.001$), HTN ($p = 0.05$), Pain distress ($p = 0.000$) and Pain activity ($p = 0.03$).

Conclusion: Efficacy of laparoscopic appendectomy is better in terms of lower pain scores, pain distress and pain activity as compare to open appendectomy. Early diagnosis and treatment of appendicitis leads to better patient's related outcome.

Keywords: Laparoscopic appendectomy, open appendectomy, acute appendicitis

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Introduction:

Appendicitis is common gastrointestinal disease, worldwide.¹ Appendicitis incidence is 57/10,00,000 each year in United States.² Appendicitis prevalence is highest among children and adolescents. Most common risk factors for appendicitis include age, obesity, gender, ethnicity and season. Evidence exist that appendicitis is an irreversible disease that ultimately leads to perforation and removal of appendix (Gold Standard treatment).³

Appendicitis in 50% of patients presents with colicky abdominal (central) pain with vomiting, constipation and nausea.⁴ However, migration

of pain to right iliac fossa was also reported in some cases. Usually, appendicitis patients describe pain initially as peri-umbilical colicky leading towards intense and constant within 24 hours.⁵ However, later on the pains migrates towards right iliac fossa. Evidence exists that initial or referred pain is due to visceral innervations of midgut. However, localized pain is due to parital peritoneum involvement. Early diagnosis and surgery for appendicitis leads to improve quality of life.⁶

Appendectomy is most common surgical procedure for appendicitis. Moreover, appropriate resuscitation following appendectomy is treat-

Table-1: Comparison of pain scores using visual analogue scale

Appendectomy	N =60	Mean	Standard deviation	P value
Laparoscopic	30	0.60	0.8	0.000
Open	30	4.9	1.2	

Table-2: Comparison of age, DM, HTN, pain distress and pain activity in laparoscopic versus open appendectomy

Age	Appendectomy		Total	Chi-square value	P value
	Laparoscopic	Open			
18-35 years	23(38.3%)	16(26.7%)	39(65%)	3.59	0.05
>35 years	7(11.7%)	14(23.3%)	21(35%)		
Diabetes mellitus					
No	30(50%)	21(35%)	51(85%)	10.588	0.001
Yes	0(0%)	9(15%)	9(15%)		
Hypertension					
No	27(45%)	22(36.7%)	49(81.7%)	2.78	0.05
Yes	3(5%)	8(13.3%)	11(18.3%)		
Pain distress					
No pain	28(46.7%)	14(23.3%)	42(70%)	15.55	0.000
Severe pain	2(3.3%)	16(26.7%)	18(30%)		
Pain activity					
Rest	8(13.3%)	7(11.7%)	15(25%)	27.93	0.03
Normal daily activities	8(13.3%)	14(23.3%)	22(36.7%)		
Exercising or during strenuous work	14(23.3%)	9(15%)	23(38.3%)		

ment of choice. Appendectomy is classified as open and laparoscopic appendectomy.⁷ A systematic review reported that laparoscopic appendectomy is associated with reducing post operative pain, infection, hospital stay and time for work return. However, intra abdominal abscesses are found to be higher in laparoscopic process as compare to open approach.⁸ Antonio et al. reported that laparoscopic approach is associated with short duration of hospital stay($2.8 \pm 2.5SD$), less need for analgesia and faster return to daily activities. Total complication was lower in laparoscopic group as compare to open ($p < 0.001$).⁹

Limited data is available on open and laparoscopic post operative pain efficacy in Pakistan. So, present study aims to compare post opera-

tive pain scores in open and laparoscopic appendectomy.

Material and Methods:

A randomized controlled trial (RCT) was conducted at department of surgery, Pakistan Ordinance Factory (POF) hospital Wah Cantt. Study duration was January 2018-June 2018. Sample size of 30 patients in each group was calculated with anticipated population P1 84.2% and P2 5.3%,¹⁰ significance level 5% and confidence level 95% using WHO calculator. Non-probability consecutive sampling was used. Ethical approval was taken from ethical review board. Consent forms were taken from all participants. Patients with age >18 years, both genders, diagnosed with appendicitis on the basis of history of right (lower) quadrant pain, periumbilical pain leading towards right (lower) quadrant, fever ($>38^{\circ}C$), nausea, vomiting, right (lower) quadrant guarding, leukocytosis $>10,000$ cells/ml and tenderness on physical evaluation were included in study. Exclusion criteria was based upon history of cirrhosis, shock on admission, coagulation disorders, generalized peritonitis, large ventral hernia, ascites with abdominal distension, severe cardiac and pulmonary diseases, pregnancy and mental disability. Patients were randomly divided into two groups. Group-A underwent Laparoscopic appendectomy while group-B underwent open appendectomy. Mean pain scores were measured using visual analogue scale. However, pain is also measure qualitatively using pain distress variable (assessed using visual linear score in which scale ranges from 0-100) and pain activity scale (categories as 3 activities 1-rest, 2-normal daily activities and 3- exercising or during strenuous work). Data was analyzed using SPSS version 23. Mean and standard deviation was calculated for continuous data while frequency and percentage was calculated for qualitative data. T-Test and chi-square was applied for comparing pain scores in both groups. P value ≤ 0.05 was considered significant.

Results:

Total 60 patients were included in study with

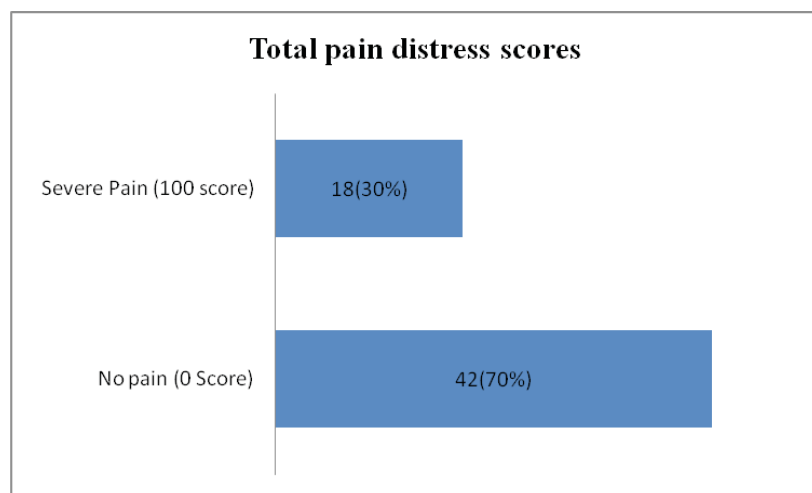


Figure-1: Total pain distress scores distribution

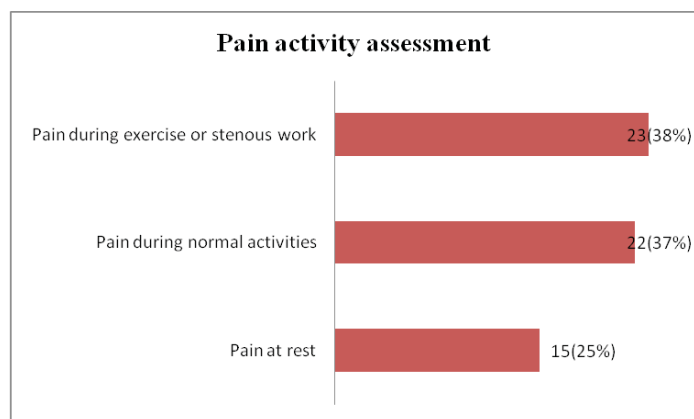


Figure-2: Pain activity assessment

1:1 randomization (30 patients in each group). There were 38(63%) male and 22(37%) female. Mean age of patients was 35.8 years \pm 11.9SD. There were 39(65%) patients in age group 18-35 years while 21(35%) in age group >35 years. Out of all, 9(15%) patients had history of diabetes mellitus while 51(85%) were not diagnosed with diabetes. Out of all, 11(18%) had history of hypertension while 49(82%) were not diagnosed with hypertension. Pain distress scores were shown in figure-1 and pain activity assessment is shown in figure-2.

Mean pain scores in laparoscopic appendectomy group 30(50%) were 0.60 \pm 0.8 SD while mean pain scores in open appendectomy 30(50%) were 4.9 \pm 1.2 SD ($t = -15.392$, $df = 58$, $p = 0.000$) as shown in table-1

In laparoscopic group 30(50%), 23(38.3%) patients were in age group 18-35 years while

7(11.7%) were in age group >35 years. Similarly in open appendectomy group 30(50%), 16(26.7%) were in age group 18-35 years while 14(23.3%) were in age group >35 years ($p = 0.05$). In laparoscopic group 30(50%), no patients was diagnosed with diabetes while in open appendectomy 30(50%), 9(15%) were diagnosed with DM ($p = 0.001$). In laparoscopic group 30(50%), 3(5%) patients had hypertension while in open appendectomy 8(13.3%) had hypertension ($p = 0.05$). In laparoscopic group 30(50%), 28(46.7%) patients had no pain and 2(3.3%) had severe pain on pain distress scale. In open appendectomy group 30(50%), 14(23.3%) had no pain while 16(26.7%) had severe pain on pain distress scales ($p = 0.000$). In laparoscopic group 30(50%), 8(13.3%) patients had pain at rest 8(13.3%) had during normal activities and 14(23.3%) had during exercise or during strenuous work. In open appendectomy group 30(50%), 7(11.7%) had pain at rest, 14(23.3%) had during normal activities and 9(15%) had during exercise and strenuous work ($p = 0.03$) as shown in table-2.

Discussion:

In present study, total 60 patients were included with 1:1 randomization (30 patients in each group). Mean pain scores in laparoscopic appendectomy group 30(50%) were 0.60 \pm 0.8 SD while mean pain scores in open appendectomy 30(50%) were 4.9 \pm 1.2 SD ($t = -15.392$, $df = 58$, $p = 0.000$). Iganecio et al reported that mean pain scores were significantly lower in laparoscopic group as compare to open appendectomy (1.2 \pm 0.3SD versus 6.5 \pm 2.1SD).¹¹ However, Kazemier et al reported no difference in pain scores of open versus laparoscopic appendectomy.¹²

Present study found out that age is strongly associated with appendectomy ($P = 0.05$). A similar study reported that patients with age < 30 years are more prone to have appendicitis ultimately leading towards appendectomy as compare to older age group ($p < 0.01$).¹³ Kum et also reported a positive correlation between age and type of appendectomy ($r = 0.8$).¹⁴

Present study reported that in laparoscopic

group 30(50%), 28(46.7%) patients had no pain and 2(3.3%) had severe pain on pain distress scale. In open appendectomy group 30(50%), 14(23.3%) had no pain while 16(26.7%) had severe pain on pain distress scales ($p=0.000$). Laine et al. reported significant association of pain distress with type of appendectomy. They reported zero pain scores in laparoscopic group as compare to open approach.¹⁵

Present study found out that in laparoscopic group 30(50%), 8(13.3%) patients had pain at rest 8(13.3%) had during normal activities and 14(23.3%) had during exercise or during strenuous work. In open appendectomy group 30(50%), 7(11.7%) had pain at rest, 14(23.3%) had during normal activities and 9(15%) had during exercise and strenuous work ($p=0.03$). Larsson et al reported that majority of patients after open appendectomy had severe pain during exercise or at work site as compare to laparoscopic approach (75% vs 24%).¹⁶

Limitation: small sample size and conduction of study at single center limits generalizability of study

Conclusion:

Efficacy of laparoscopic appendectomy is better in terms of lower pain scores, pain distress and pain activity as compare to open appendectomy. Early diagnosis and treatment of appendicitis leads to better patient's related outcome.

Conflict of interest: None

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Role and contribution of authors:

Dr Gohar Latif Kalas, study designing and acquisition

Dr Naeem Akhtar, Data collection and analysis

Dr Abdul Hameed Khan, study write ups and interpretation

Dr Anam Altaf, final review and analysis

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