ORIGINAL RESEARCH PAPER

Volume-8 | Issue-1 | January-2019 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

COMPARATIVE STUDY OF TWO PORT LAPAROSCOPE ASSISTED OPEN APPENDECTOMY VS THERE PORT LAPAROSCOPIC APPENDECTOMY

General Surgery

Dr Satyabrata Roy Medical Officer, Islampur Subdivision Hospital, Uttar Dinajpur, West Bengal, India,

Dr Debasis Dhar* Assistant Professor, Dept. of Surgery, College of Medicine and Sagore Dutta Hospital, Kamarhati, Kolkata 700058, West Bengal, India*Corresponding Author

ABSTRACT

We have done a randomised prospective observational study to compare the efficiency of two port laparoscope assisted open appendectomy versus three port laparoscopic appendectomy. Total 50 patients have been participated in the study (25 cases with two port and 25 cases with three ports). In this study two port laparoscope assisted appendectomy found simpler than three port laparoscopic appendectomy and requires less expertise and equipments, less operative time with shorter hospital stay. So it can be interpreted that the two port laparoscopic assisted open appendectomy is cost effective.

KEYWORDS

Two port, Three port, Laparoscope assisted open appendectomy, Laparoscopic appendectomy

INTRODUCTION:

Acute appendicitis is a common surgical condition that requires prompt diagnosis in order to minimise morbidity and to avoid serious complications. Conventional appendectomy was the gold standard for the treatment of acute appendicitis for more than a century. Although it is a simple operation, it is associated with a very low mortality rate. It may result significant post operative morbidity particularly post operative pain with overall post operative complications occurring in 10-20%. So the researchers were interested to evaluate laparoscopic appendectomy in respect to those factors.

Laparoscopic appendectomy is an intracorporeal operation and requires three or more ports, endoloop or staplers for appendicular vessels and appendicular base or the expertise of intracorporeal ligations. The aim of minimal access surgery is not only to minimise the number of ports but also the cost of surgery. Hence we adopted a laparoscopic assisted open appendicectomy approach using two nondispoable ports to save the cost and had no added morbidity.

METHOD: We have conducted a randomised, prospective, observational study on 50 patients. The aim of the study was to compare 1. Age and sex distribution 2. Operative time 3. Hospital stay 4. Port site pain, bleeding, infection, hernia 5. Post operation intra abdominal bleeding 6. Injury to viscera 7. Intra abdominal sepsis 8. Parietal wall infection 9. Leakage of appendicular pus or fecolith 10. Cosmetic value between the two groups. Study population represents the patients who attended in the OPD and in the emergency in a particular day of a week of a general surgery department of a tertiary teaching hospital in eastern India over a period of one year. All patients with history of pain abdomen were clinically assessed and investigated with routine blood test and urine analysis for establishing the diagnosis of appendicitis. Some patients were undergone some selective test like ultrasonography of abdomen, pregnancy test, blood urea and electrolyte and abdominal radiograph. Thus only patients with chronic and acute appendicitis were included with exclusion criteria of 1. Complicated appendicitis like appendicular lump and appendicular abscess 2. Pregnancy 3. Severe systemic disease or debilitated patients 4. Child below 10 years of age 5. Patients diagnosed with diffuse peritonitis. Out of 50 patients 25 cases undergone two port laparoscopic assisted open appendectomy and remaining 25 cases undergone three port laparoscopic appendectomy. All patients were followed at an interval of two weeks and six weeks and if required earlier. All patients were operated under general anaesthesia with decompression of urinary bladder by per urethral catheterization. All three port laparoscopic appendectomy as per standard protocol. In the second group of two port laparoscopic assisted open appendectomy two 10 mm port made one in the umbilicus and another in the right lower quadrant after assessing the position of the base of the vermiform appendix. If the vermiform appendix was not visible easily the port was inserted at the McBurney's point. Appendix was identified by standard techniques. Appendicular tip was grasped with either Babcock forceps or bowel grasper. Appendix was delivered through the right lower quadrant port. Pneumoperitoneum was deflated and the base of the vermiform appendix was identified (port stretching sometimes needed). Appendicular artery was ligated on the free border of the mesentery with 2-00 Polyglactin 910 and cut. Base of the vermiform appendix was ligated with 2-0 Polyglactin 910 thrice, two ligature proximally near the base and third one ligated distally keeping space to cut in between two ligature. Haemostasis was checked and secured at the end after reinflating the abdomen. Closure of umbilical and right lower quadrant port was done by 2-0 Vicryl. All appendicectomy specimens were sent for histopathology. All patients were followed up to one and half months.

RESULTS:

The mean age of two port procedure was 25.04 years with standard deviations of 6.64 and three port procedure was 28.88 with standard deviations of 8.05.

Table1

Age distribution					
	GROUPS				
Age	2 Port n (%)	3 Port n (%)	Total n (%)	p value	Significance
<=20	9(36)	1(4)	10(20)	0.025	Significant
21-30	12(48)	16(64)	28(56)		
31-40	4(16)	6(24)	10(20)		
41-50	0(0)	2(8)	2(4)		
Total	25(100)	25(100)	50(100)		

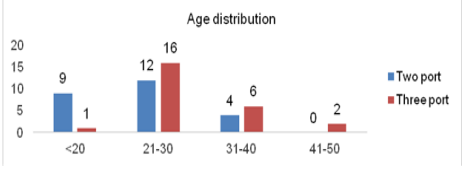

Figure 1

Out of 50 patients 64% was female (n-32) and 36% (n-18) was male.

Table 2

Sex distribution		
	Two port	There port
Male	07	11
Female	18	14

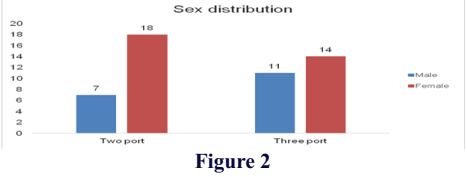

Figure 2

Port placement according to pathology: 16 patients of chronic Appendicitis were operated with two-port and 6 patients with inflamed appendix were operated with two-port procedure. 4 obese patients, 8 patients with inflamed appendix with adhesion, 5 patients with short appendix with fixed caecum and 8 patients with inflamed appendix were operated with three port procedure.

Table 3

Port distribution according to pathology		
	Two port	Three port
Chronic Appendix	16	00
Inflamed Appendix	06	08
Short Appendix with fixed caecum	00	05
Adhesion & inflamed	00	08
Obesity	00	04

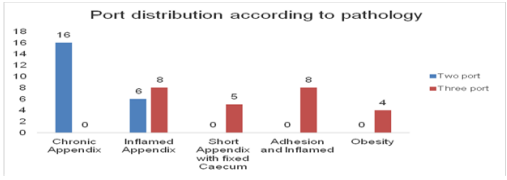

Figure 3

The mean operative time in two port procedure was 27.68 minutes with standard deviations of 7.5, wherein in the three port procedure it was 43.96 minutes with standard deviations of 5.13.

Table 4

Operative time and Hospital stay				
	GROUPS			
	Two port Mean + SD	Three port Mean + SD	p value	Significance
Operative time	27.68+7.5	43.96+5.13	<0.001	Significant
Hospital stay	2.2+0.82	3.04+1.67	0..28	Significant

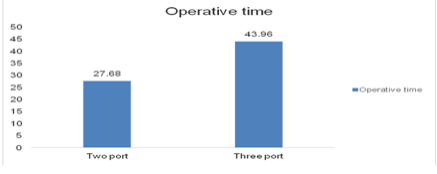

Figure 4

The mean hospital stay in the study of two port method was 2.2 days with standard deviations of 0.82 and in the three port method was 3.04 days and standard deviations of 1.67.

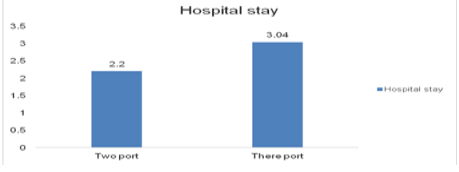

Figure 5

Port site infection in two port method was 4.54 %(1 patient) compared to three port method was 8.33 (2 patients).

Table 5

Port site infection					
	GROUPS				
	Two port n (%)	Three port n (%)	Total n (%)	p value	Significance
Without port site infection	24(96)	23(92)	47(94)	0.552	Not significant
With port site infection	1(4)	2(8)	3(6)		
Total	25(100)	25(100)	50(100)		

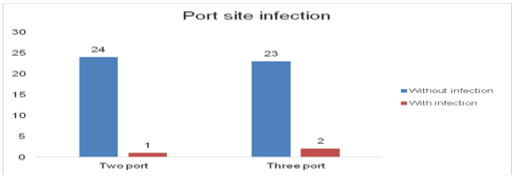

Figure 6

7 patients (28%) complained immediate surgical site pain in two port procedure, 19 patients (76%) complained of immediate surgical site pain in three port laparoscopic procedure.

Table 6

Immediate pain					
	GROUPS				
	Two port n (%)	Three port n (%)	Total n (%)	p value	Significance
Without immediate pain	18(72)	6(24)	24(48)	0.001	Significant
With immediate pain	7(28)	19(76)	26(52)		Significant
Total	25(100)	25(100)	50(100)		

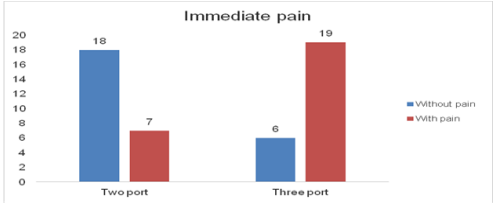

Figure 7

No patients complained for delayed pain in two port procedure. 6 patients (24%) complained for delayed pain in three port procedure.

Table 7

Delayed pain					
	GROUPS				
	Two port n (%)	Three port n (%)	Total n (%)	p value	Significance
Without delayed pain	25(100)	19(76)	44(88)	0.009	Significant
With delayed pain	0(0)	6(24)	6(12)		Significant
Total	25(100)	25(100)	50(100)		

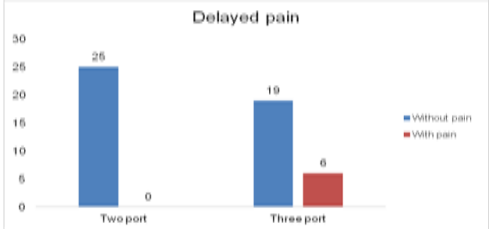

Figure 8

Port site bleeding was found in one patient in each group.

Table 8

Port site bleeding					
	GROUPS				
	Two port n (%)	Three port n (%)	Tota n (%)l	p value	Significance
Without port site bleeding	24(96)	24(96)	48(96)	1.000	Not significan
With port site bleeding	1(4)	1(4)	2(4)		
Total	25(100)	25(100)	50(100)		

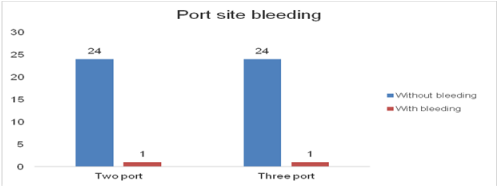

Figure 9

There was no case of injury to any viscera during the procedure in both the groups.

Table 9

Injury to viscera					
	GROUPS				
	Two port n (%)	Three port n (%)	Total n (%)	p value	Significance
Without injury to viscera	25(100)	25(100)	50(100)	NA	NA
With injury to viscera	0(0)	0(0)	0(0)		
Total	25(100)	25(100)	50(100)		

There was no case of intraabdominal bleeding in any group.

Table 10

Intra abdominal bleeding					
	GROUPS				
	Two port n (%)	Three port n (%)	Total n (%)	p value	Significance
Without intraabdominal bleeding	25(100)	25(100(	50(100)	NA	NA
With intraabdominal bleeding	0(0)	0(0)	0(0)		
Total	25(100)	25(100)	50(100)		

There was also no case of leakage of pus or fecolith in the two groups.

Table 11

Leakage of pus or fecolith					
	GROUPS				
	Two port n (%)	Three port n (%)	Total n (%)	p value	Significance
Without leakage	25(100)	25(100)	50(100)	NA	NA
With leakage	0(0)	0(0)	0(0)		
Total	25(100)	25(100)	50(100)		

There was not a single case of postoperative parietal wall infection.

Table 12

Parietal wall infection					
	GROUPS				
	Two port n (%)	Three port n (%)	Total	p value	Significance
Without parietal wall infection	25(100)	25(100)	50(100)	NA	NA
With parietal wall infection	0(0)	0(0)	0(0)		
Total	25(100)	25(100)	50(100)		

There was no case of port site hernia in both the groups.

Table 13

Port site hernia					
	GROUPS				
	Two port n (%)	Three port n (%)	Total	p value	Significance
Without port site hernia	25(100)	25(100)	50(100)	NA	NA
With port site hernia	0(0)	0(0)	0(0)		
Total	25(100)	25(100)	50(100)		

There was no case of intraabdominal sepsis has been diagnosed after operation in both the groups.

Table 14

Intraabdominal sepsis		
	Two port	Three port
	Nil	Nil

Conversion from two port procedure to three port procedure has been done in 3 patients (12%). Conversion from three port procedure to open procedure has been done in one patient (4%). All continuous variables have been reported as mean and standard deviations compared across groups using unpaired't' test and 'n' has been reported compared across groups using chi- square test for independent attributes. SPSS version 16 software has been used for analysis. 5% level of confidence of alpha level has been taken and hence any p value less than 0.05 has been considered as significant.

DISCUSSION: The present study has been conducted at a tertiary teaching hospital in eastern part of India in the department of general surgery on 50 patients diagnosed with Appendicitis. It was a randomised, prospective, observational study for a period of one year and has been done after obtaining proper consent. The observation was based on the following parameters likely age, sex, mean operative time, hospital stay, port site bleeding, injury to viscera, post operative abdominal bleeding, leakage of pus or fecolith, port site pain, port site infection, parietal wall infection, port site hernia, intraabdominal sepsis, conversion rate to three port or open procedure. There was no mortality in this study. In this study age ranges from 14 years to 50 years. Mean age of two port appendectomy was 25.04 with standard deviations of 6.64 and the mean age of three port procedure was 28.88 and standard deviations of 8.05. Highest incidence of appendicitis was found in the age group of 21 to 30 (total no of 28 cases). In extreme age group 2 cases in each group were found. Appendicitis is generally a disease of the young. The mean age of 25.04 and 28.88 years was in conformity with that sited by Al Omran et. al.(45) Out of 50 patients 64% was female (n-32) and 36% was male (n-18). Most authors reported a higher incidence in young female having a preference for a highly refined diet which prolonge the colonic transit time. This has been found to increase the possibility of developing appendicitis, diverticular diseases, and even colonic malignancy in South Africa.(46,47) The two port procedure was successfully done in 88% and conversion rate to three port procedure was 12%. The three port laparoscopic appendicectomy was successfully done in 96% and conversion rate to open procedure was 4% which is significantly lower as compared to two port procedure. The mean operative time of the two methods were 27.68 minutes with standard deviations of 7.5 and 43.96 minutes with standard deviations of 5.13. There was statistically significant (p value less than 0.001) reduction in operating time in two port method as compared to three port method.(41,43) The mean hospital stay in the study of two port procedure was 2.2 days with standard deviations of 0.82 and for three port procedure was 3.04 days with standard deviations of 1.67. In this study hospital stay significantly reduced in two port procedure (p value 0.028) compared

to three port procedure. Port site infection of two port procedure was 4.54% (1 patient) compared to three port procedure was 8.33 (2 patients) with a p value 0.552 which was statistically insignificant. So in our study we could not found any statistically significant difference in relation to port site infection.(43) Pain following laparoscopic appendectomy had multifactorial visceral and parietal components. In the initial 24 hours usually visceral component predominates while parietal component usually acts later on. Fixed dose schedule of NSAID is enough to alleviate the pain.7 patients (28%) complained of immediate pain but none complained of delayed pain in two port procedure. 19 patients (76%) complained of delayed pain in there port procedure. There was significant reduction of surgical site pain both in immediate pain (p value 0.001) and delayed pain (p value 0.009) in two port procedure compared to three port procedure.(41) Port site bleeding found in one patient in each group (p value 1). There was no incidence of intraabdominal bleeding, visceral injury, leakage of pus or fecolith, parietal wall infection, port site hernia and intraabdominal sepsis in both the groups. From the study we found that the two port laparoscopy assisted open appendectomy which was a minimal access surgery was a simple, required less expertise and equipments where visualisation was good with less operative time and with less hospital stay and it could be easily converted to an open or intracorporeal approach. Two port procedure had similar cosmetic value as compared to three port procedure. Laparoscopic appendectomy especially two port laparoscopy assisted open appendectomy was found cost effective.

REFERENCES

1. Semm, K.(1983). Endoscopic Appendectomy. Endoscopy, 15,59-64.
2. Schreiber, J. H. (1987) Early experience with laparoscopic Appendectomy in women. Surgeon Endoscopy. 1.211-216.
3. Parks, R. W., Garden, O. J, Carter, D. J., Bradbury, A.W., Forsythe, J. L. R. Principles and practice of Surgery (5th ed.). Edinburgh: Churchill Livingstone. ISBN 0-443-10157-4.
4. Dutta, A. K. (2000). The vermiform appendix. In Essentials of Human Anatomy. 5th ed; Current International, Calcutta: 228-230.
5. Zahid, A. (2004, April). The vermiform appendix not a useless organ. Journal of the College of Physicians and Surgeon Pakistan. 14 (4): 256-8. DOI: 04.2004/JCPSP. 256-258. PMID 15228837.
6. Kumar, V., Robbins, S. L., Cotran, R. S. (1989). Robbins' pathologic basis of disease (4th ed.). Philadelphia: Saunders. 902-3. ISBN 0-7216-2302-6.
7. Bollinger, R. R., Barbas, A. S., Bush, E. L., Lin, S. S., Parker, W. (2007). Biofilms in the large bowel suggest an apparent function of the human vermiform appendix. Journal of the Theoretical Biology. 249(4):826-831. DOI: 10.1016/j.jtbi.2007.08.032. ISSN 0022-5193.PMID 17936308.
8. Sonnenburg, J. L., Angenent, L. T., Gordon, J. I. (2004). Getting a grip on things: How do communities of bacterial symbionts become established in our intestine? Nature Immunology. 5 (6): 569-73. DOI: 10.1038/ni1079. PMID 15164016.
9. Everett, M. L., Palestrant, D., Miller, S. E., Bollinger, R. R., Parker, W. (2004). Immune exclusion and immune inclusion: a new model of Host-Bacterial interactions in the gut. Clinical and Applied Immunology Reviews. 5: 321-32.
10. Miller, K. R., Levine, J. S. (2002). Biology. Prentice Hall. 92-98. ISBN 0-13-050730-X.
11. Williams, N. S., Bullstrode. C. J. K. , O'Connell, P. R. Bailey & Love's Short Practice of Surgery. 25th edition. ISBN: 9780340939321. 1206.
12. Townsend, C. M., Beauchamp, R. D., Evers, B. M. (2007). Sabiston-Textbook of Surgery. 18th Ed. Philadelphia : WB Saunders. ISBN 978141603673. 1334.
13. Cuschiery, A. (Ed), Steele, R. J. C. , Moosa, A. R., Essential Surgical Practice, Higher Surgical Training in General Surgery. Fourth edition. Hodder Arnold. 563.
14. Cotran, R. S., Kumar, V., Collins, T. Robbins Pathologic Basis of Disease. Sixth Edition. 839
15. Brooks, D. W. Jr., Killen, D. A., (1965). Roentgenographic findings in acute appendicitis. Surgery. 57:377-384.
16. Miranda, R., Johnston, A. D., O'Leary, J. P. (1980). Incidental Appendectomy: Frequency of Pathologic Abnormalities. The American Surgeon. 46(6):355.
17. Kumar, V., Abbas, A. K., Fausto, N.(Ed). (2004). Robbins's & Cotran Pathologic basis of diseases. 7th ed. Elsevier. 870.
18. Rosai, J. (Ed). (1996). Appendix; In Ackerman's surgical pathology. 8th ed. Mosby. 711-15.
19. Mann, C.V. The Vermiform Appendix. In Bailey and Love's Short Practice of Surgery. Mann, C.V., Russell, R. C. G., William, N. S. (ed). (1995). Chapman and Hall, London, 22nd ed. 828-841.
20. Berry, J. Jr., Malt, R. A. (1984). Appendicitis near its centenary. Ann Surg. 200: 567-575.
21. Bowers, W. F. (1939). Appendicitis with special reference to pathogenesis, bacteriology and healing. Ann Surg . 39: 362-422.
22. Hui, T. T., Major, K. M., Avital, I., et. al. (2002). Outcome of elderly patients with appendicitis. Ann Surg. 137: 995-8.
23.. Brunicardi, F. C.(ed). (2005).The appendix. In Schwartz principles of Surgery. 8th ed. McGraw Hill. 1119-1135
24. Gearhart, S. L., Silen, W. Acute Appendicitis and peritonitis. In Harrison's Principles of Internal Medicine; Fauci AS, Braunwald E(ed). 17th ed. McGraw Hill. 2008: 1914-1917.
25. Gurleyik, E., Gurleyik, G., Unalmiser, S. (1995, December). Accuracy of serum of C-reactive protein measurements in diagnosis of acute appendicitis compared with Surgeon's clinical impression. Dis Colon Rectum. 38(12): 1270-4.
26. Eriksson, S., Granstrom. L., Carlstrom. A. (1994). The diagnostic value of repetitive preoperative analysis of C-reactive protein and total leukocyte count in patients with suspected acute appendicitis. Scandinavian J Gastroenterol. 29(2): 1145-49
27. Smith, D. E., Kirchmer, N. A., (1999). Stewart D R. Use of the barium enema in the diagnosis of acute appendicitis and its complications. Am J Surg. 138: 829-34.
28. Kessler, N., Cyteval, C., Gallix, B., et al. (2004). Appendicitis: evaluation of sensitivity, specificity, and predictive value of US, Doppler US, and laboratory findings. Radiology. 230: 472-478.
29. Borushok, K. F., Jeffrey, R. B. Jr., Laing, F. C., Townsend, R. R. (1990). Sonographic diagnosis of perforation in patients with acute appendicitis. AJR. 154: 275-278.
30. Weyant, M. J., Eachempati, S. R., Maluccio, M. A., et. al. (2000). Interpretation of computed tomography does not correlate with laboratory or pathological findings in surgically confirmed acute appendicitis. Surg. 128: 145-8.
31. Fuchs, J. R., Schlamberg, J. S., Shortsleeve, M. J., et al. (2002). Impact of abdominal CT imaging on the management of Appendicitis. An update. J Sure Res. 106(1): 131-2.
32. Moberg, A. C., Ahlberg, G., Leijonmarck, C. E., et al. (2003). Diagnostic laparoscopy in 1043 patients with suspected Appendicitis. Euro J Surg. 164(11): 833-840.
33. Alvarado, A. (1986). A practical score for the early diagnosis of acute appendicitis. Ann Emarg Med. 15(5): 557-564.
34. Yagnik, V. D., Rathod, J. B., Pathak, A. J. (2010). A prospective study of two port appendicectomy and its comparison with open and three port appendicectomy. Saudi J Gastroenterol. 16: 268-271.
35. Amyand, C. (1736). Of an inguinal rupture, with a pin in the appendix caeci, incrusted with stone; and some observations on wounds in the guts. Philos Trans R Soc. Lond: 39: 329-342.
36. Jaffe, B. M., Berger, D. H. The Appendix. In Schwartz principles of Surgery; Brunicardi F C (ed); 8th. McGraw Hill. 2005; 1119-1135.
37. Fitz, R. H. (1886). Perforating inflammation of the vermiform appendix with special reference to its early diagnosis and treatment. Am J Med Sci. 92:32-46.
38. McBurney, C.(1893). The incision made in the abdominal wall in cases of Appendicitis. Ann Surg. 1: 835-837.
39. Treves, F. (1893). A series of cases of relapsing Typhilytis treated by operation. BMJ. 1: 835-837.
40. Saunderland, S, Neugebauer, E. A. M., Fingerhut A.,Millat B. et. al. (2006). EAES guideline for endoscopic surgery. Heidelberg: Springer. 387-9.
41. Khan, A. R., Al-Bassam, A. R., (2004). Two-port Versus three- port Laparoscopic Appendectomy in Children with uncomplicated Appendicitis. Paediatric Endosurgery and Innovative Techniques. 6(4), 255-260.
42. Vershanay, S., Sekwani, A., Naik, S., Sharma, S., Kapoor, S. (2006). Scarless, Two-port Laparoscopic Assisted Appendectomy. JCD. 21(1) 16-18.
43. Yagnik, V. D., Rathod, J. B. G., Pathak, A. G. (2010). A Retrospective Study of Two-port Appendectomy and Three-port Appendectomy. Saudi J Gastroenterol. 16(4): 268-271.
44. Ahmed, K., Magadhi, L., Ahmed, A., K, Mustafa, T. (2010). Two-port Versus Three-port Laparoscopic Appendectomy in Children, Annals of Paediatric Surgery. Vol. 6, No 3, 4:140-143.
45. Al Omran, M., Mandani, M., McLeod, R. S. (2003). Epidemiologic features of acute appendicitis in Ontario, Canada. Can J Surg. 46: 263-8.
46. Ahmed, I., Asgeirsson, K. S., Beckingham, I. J., Lobo, D. N. (2007). The position of the vermiform appendix at laparoscopy. Surg Radiol Anat. 29(2): 165-8.
47. Bakheit, M. A., Warille, A. A. (1999). Anomalies of vermiform appendix and prevalence of acute appendicitis in Khartoum. East Afr Med J. 76(6): 338-40.