“MINI LAPAROSCOPIC APPENDECTOMY VERSUS CONVENTIONAL LAPAROSCOPIC APPENDECTOMY: A ONE-YEAR RANDOMIZED CONTROL TRIAL AT KLE DR. PRABHAKAR KORE HOSPITAL AND MRC, BELGAUM.”

By

REG NO. BH0117002

Dissertation

Submitted to the
KLE Academy of Higher Education and Research,
Belagavi, Karnataka.

In partial fulfillment
of the requirements for the degree of

M.S.

in

GENERAL SURGERY

**DEPARTMENT OF GENERAL SURGERY,
JAWAHARLAL NEHRU MEDICAL COLLEGE,
BELAGAVI, KARNATAKA.**

APRIL - 2020

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH, BELAGAVI, KARNATAKA

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This is to certify that the dissertation entitled **"MINI LAPAROSCOPIC APPENDECTOMY VERSUS CONVENTIONAL LAPAROSCOPIC APPENDECTOMY: A ONE-YEAR RANDOMIZED CONTROL TRIAL AT KLE DR. PRABHAKAR KORE HOSPITAL AND MRC, BELGAUM."** is a bonafide research work done by **(REG NO. BH0117002).**

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LIST OF ABBREVIATIONS

OPD	:	Out patient Department
cm	:	Centimeter
TLC.	:	Total leucocyte count
CT Scan	:	Computed Tomography Scan
MDCT	:	Multidetector computed tomography
CXR	:	Chest X-ray
dl	:	Deciliter
ECG	:	Electrocardiogram
USG	:	Ultrasonography
g/gm	:	Gram
Kg	:	Kilogram
L	:	Liter
mg	:	Milligram
min	:	Minute
ml	:	Milliliter
mm	:	Millimeter
mmHg	:	Millimeter of mercury

mmol	:	Millimole
MRI	:	Magnetic resonance imaging
VAS	:	Visual analogue scale
POSAS	:	Patient observer scar assessment scale
POD	:	Post operative day
DOD	:	Day of Discharge
OSAS.	:	Observer scar assessment scale
PSAS	:	Patient scar assessment scale

ABSTRACT

“MINI LAPAROSCOPIC APPENDECTOMY VERSUS CONVENTIONAL LAPAROSCOPIC APPENDECTOMY: A ONE-YEAR RANDOMIZED CONTROL TRIAL AT KLE DR. PRABHAKAR KORE HOSPITAL AND MRC, BELGAUM.”

BACKGROUND AND OBJECTIVES --

Appendicitis being the commonest condition in surgical population, comes with an increasing mortality rate in untreated, misdiagnosed cases. With the latest advances in the field of laparoscopy, use of minilaparoscopy aids in diagnosis and treatment, thus reducing overall mortality and morbidity in such cases. The present study was taken up to compare better cosmetic and pain outcomes in patients undergoing minilaparoscopic appendectomy versus those undergoing conventional laparoscopic appendectomy.

MATERIALS AND METHODS –

A one year randomized control trial was done between January 2018 and December 2018. Patients who were diagnosed with chronic, recurrent appendicitis and chronic pain in abdomen were included in this study. Group 1 had 30 patients who underwent conventional laparoscopic appendectomy and Group 2 had 30 patients who underwent minilaparoscopic appendectomy. Pain scores in both groups was calculated with visual analogue scale at different time interval. Scar assessment in both groups was done using patient and observer scar assessment scale at different time interval. Statistical analysis was done to determine the cosmetic and pain outcome in both groups.

RESULTS –

In our study population it was found that patients with chronic appendicitis were maximum. Comparison of pain scores in both groups revealed significant results on POD 1 and DOD by Mann-Whitney U Test. The cosmetic outcome was found to be good in both groups. Group 2 showed consistently significant (0.0995) cosmetic outcomes throughout the study period when compared to group 1 by dependent t test. This study showed a positive correlation (0.0001) between both the groups for scar assessment by Kappa method.

INTERPRETATION AND CONCLUSION –

The study shows that minilaparoscopy appendectomy shows better cosmetic and pain outcomes in comparison to conventional laparoscopic appendectomy. The procedure of minilaparoscopic appendectomy comes with a few drawbacks in terms of difficult specimen retrieval and limitation of study subjects. Further studies on a larger population are required to evaluate and validate this correlation.

KEYWORDS: Appendicitis, Minilaparoscopic appendectomy

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INTRODUCTION

Appendicitis one of the commonest abdominal pathology requiring immediate surgical intervention, leaving a lifelong risk of morbidity. Appendicitis still remains 1 of the commonest cause of surgical abdomen in all population. Mortality has been brought down from 50% to less than 1/10,000 persons, with modern diagnostic facilities, surgery skills, fluids and antibiotic therapy. The morbidity is still more than 5-8%, mainly due to wound infection because of delayed diagnosis and treatment.[1]

The appendix was first described in 1521 and inflammation of the appendix has been known to be a clinical problem since 1759.[2] The term 'appendicitis', however, was not used until Reginald Fitz described this condition in 1886. He also reported the mortality rate of appendicitis to be not less than sixty seven percent without surgical intervention.

It has been shown that the delay in presenting to the hospital is the major factor for the development of complications rather than delay from the physician's end.[4] The effort of in time diagnosis and intervention has dropped the mortality rate for non-complicated appendicitis to 0.1%, gangrenous appendicitis to0.6% and 5% for perforated cases.[5]

Regardless of increasing incidence at which appendicitis occurs, it remains a puzzle – a disease that, despite best efforts, is still the most commonly misdiagnosed surgical emergency.

Until the year 1983 when Semm Kurt came up with Laparoscopic Appendectomy, McBurney's grid incision for open appendectomy remained the procedure of choice.

Mini-Laparoscopy couples the advantages of diagnosis and treatment in one procedure which further ensures less morbidity[2]. In comparison with the conventional laparoscopic appendectomy, patients have less postoperative pain, short hospital stay and can resume work sooner. Mini-Laparoscopy also decreases wound infection, provides better cosmetic outcome, allowsexploration of peritoneal cavity and toileting without the need for extending the incision or need for a larger port[2]. Laparoscopy also rules out gynecologic pathologies in females of child bearing age group.

However, in comparison to the conventional laparoscopic appendectomy (10mm ports) our technique of mini-laparoscopic appendectomy needs smaller 3mm trocars and fine instruments hence decreasing the financial burden. Handling a Fragile, inflamed and edematous appendix with fine 3mm instruments can become troublesome for the surgeon. Hence limiting the study in patients with chronic appendicitis.

The rampantly changing trend of minimal access surgery has inspired surgeons worldwide to convert maximum surgeries into laparoscopic procedures.

In this study we assess the cosmetic outcome along with post-operative pain of mini-laparoscopic appendectomy in comparison to conventional laparoscopic appendectomy.

AIM AND OBJECTIVE

AIM:

- To establish a better cosmetic outcome with mini-laparoscopic appendectomy.

OBJECTIVE:

Primary:

- To compare the cosmetic appearance of scar at regular intervals in mini-laparoscopic appendicectomy and conventional laparoscopic appendicectomy.

Secondary:

- Assessment of post-operative pain in mini-laparoscopic appendicectomy and conventional laparoscopic appendicectomy.

REVIEW OF LITERATURE

History

Berengario Da Carpi the first to describe appendix as an anatomical structure.

Normal appendix was illustrated in the 18th century "Defabrica Corporis HumaniFabrica" by ***Andres Versalius***.

Jean Fernel in 1554 reported a case of perforated appendicitis.

Lorenz Heister first studied the pathology of appendix. In the early 19th century caecum was considered to be the cause of the disease.

Reginald Heber Fitz was the first to recognise the pathology of the disease lied in the appendix.

First appendectomy was done on a 11 year old boy by ***Claudius Amyand***.

Frederick Treves operated King Edward VIII for appendectomy and was awarded *Knight hood for it*.

Murphy's triad of abdominal pain, vomiting and fever named after ***John Benjamin Murphy*** who introduced it[21].

At Keil university in Germany, ***Kurt Semm*** (gynaecologist) on 13th September 1983 performed the world's first laparoscopic appendectomy.

Alvarado A score used to diagnose acute appendicitis.

In 1894 the McBurney's muscle splitting incision became a standardized approach for surgical management of appendectomies. Ever since, with the vast improvement in the medical and surgical management mortality due to appendicitis reduced 0.1%.

Patients undergoing Laparoscopic appendectomy show significant advantages. Reduced rate of surgical site infection, decreased need for pain medication, early discharge, early normalcy of bowel habits, avoidance of a large laparotomy scar hence best cosmetic outcome. These results were quantified in a metanalysis by Sauerland et al., comparing laparoscopic appendectomy to Open Appendectomy[23].

Women, morbidly obese, paediatric and geriatric population are most benefited by the technique of laparoscopy. Over the years Laparoscopic Appendectomy was debated over Open Appendectomy. Since decades surgery has evolved from open appendectomies to minimally invasive appendectomies[22].

Pelosi, in 1992 pioneered single puncture laparoscopic appendectomy. It was known to be latest breakthrough in the appendectomy.

Invasion of mini laparoscopic appendectomy came with an effort to improve functional and cosmetic results. To further reduce the invasiveness.

Anatomy of Appendix

Caecum and appendix develop from the superior mesenteric arterial segment of the midgut loop. Visibility of the appendix is at the 8th week of intra uterine life as a protuberance of caecum.During rotation of gut the appendix moves to a more medial location, while the caecum gets fixed to the right lower quadrant[8]. Average length of

appendix in adults is 9cm, can also vary from 2-20cm. Along the inferior aspect of caecum, the base of appendix lies at the convergence of taeniae, facilitating identification during appendectomy[8]. Lumen of caecum and appendix communicate through an orifice which is guarded by semilunar valves, formed by mucosal membranes. The lumen is lined by crypts, at the base of these crypts lie the argentafin cells (Kulchitsky cells) which may give rise to carcinoid tumors. Commonest site of carcinoid syndrome is appendix. Appendiceal lumen being <0.1ml the intra luminal pressure increases to 60cm of water with a mere increase in luminal secretions of 0.5ml.

Positional variations

The vermiform appendix may lie in different anatomical positions. In one quarter of cases it may lie in the pelvic, subcaecal and paracaecal position as a result of non-rotation of appendix. It may occasionally be found close to the gall bladder, when caecum fails to rotate to its original position.

Most common variations:

i. Retrocaecal: lies behind the caecum
ii. Pelvic: lies in true pelvis
iii. Paracaecal: lies on either side of caecum
iv. Subcaecal: below the caecum
v. Preileal: anterior to the terminal part of the ileum
vi. Post-ileal: posterior to the terminal ileum

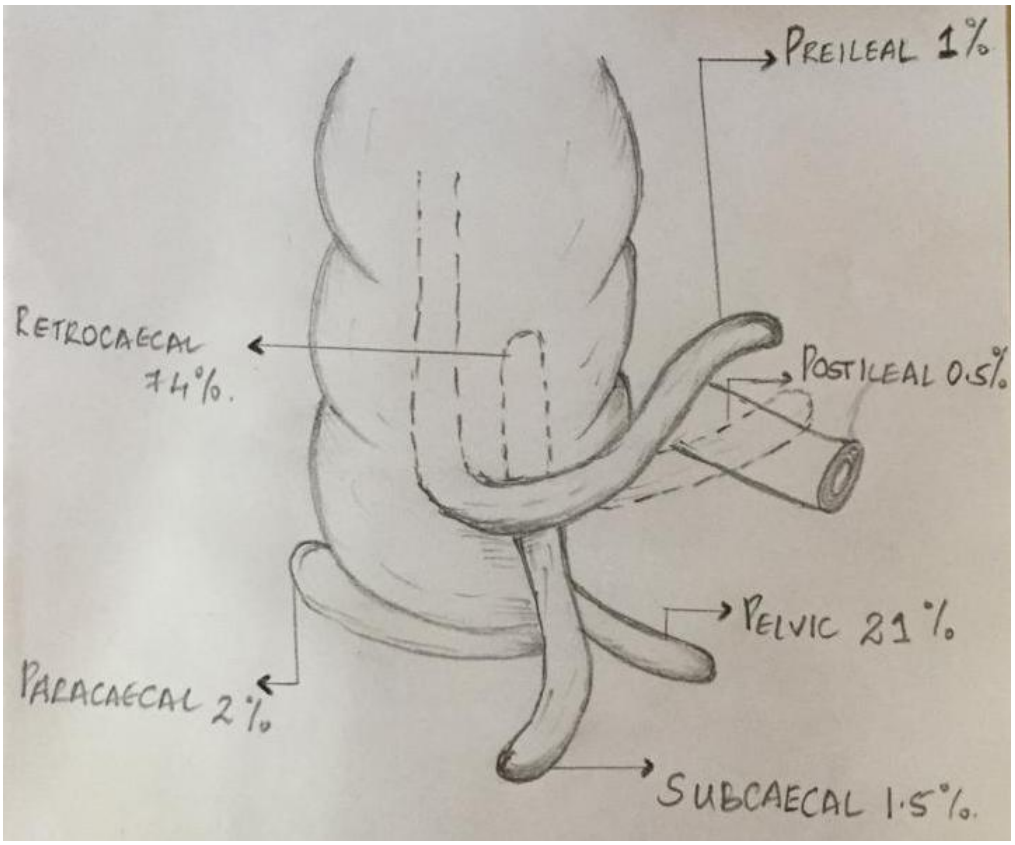


Figure 1: Positions Of Appendix.[9]

Mesentery of appendix

- A triangular fold of peritoneum, covering the whole of the viscus,extends from the appendix tip and attaches itself to the mesentery of small bowel. Blood vessels, nerves, lymphatics are enclosed.
- ***Ligament of Treves*** a bloodless plane. It is anileoceacal fold of peritoneum which adheres superiorly to ileum, inferiorly attaches to mesentery of appendix. It is of surgical importance during appendectomy.

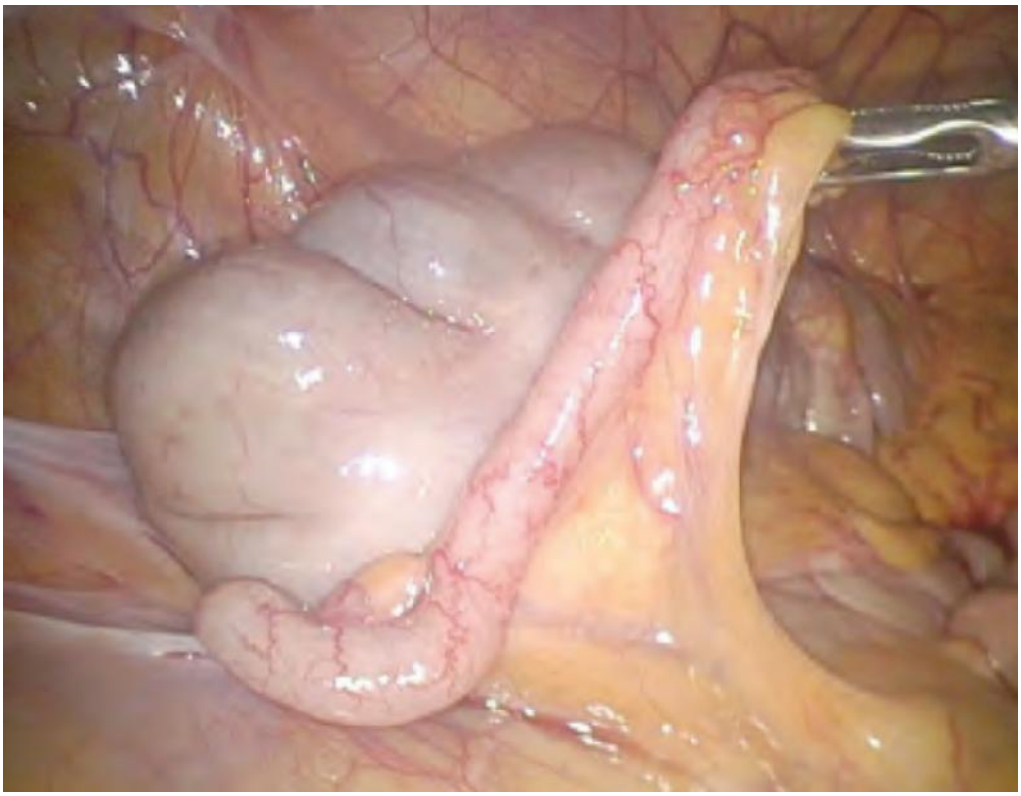


Figure 2: Laparoscopic View: Appendicular Artery[9].

Blood supply

- The appendicular artery, branch of ileocolic artery, enters the mesoappendix close to the base, just behind the terminal ileum.
- Accessory Artery of Sheshachalam is noted in few.
- In most of the population,appendicular artery appears to be the end artery.
- Gangrenous appendicitis/perforated appendix can be a result of thrombus of the appendicular artery.

Venous drainage

- Appendix drains into the ileocolic and posterior colic veins, that further drain in the superior mesenteric vein.

Lymphatic drainage

- Appendix drains into anterior ileocolic lymph nodes via multiple lymphatic channel that traverse mesoappendix.

Nerve innervations:

- Sympathetic and the parasympathetic nerves by superior mesenteric plexus innervate appendix.

Histology

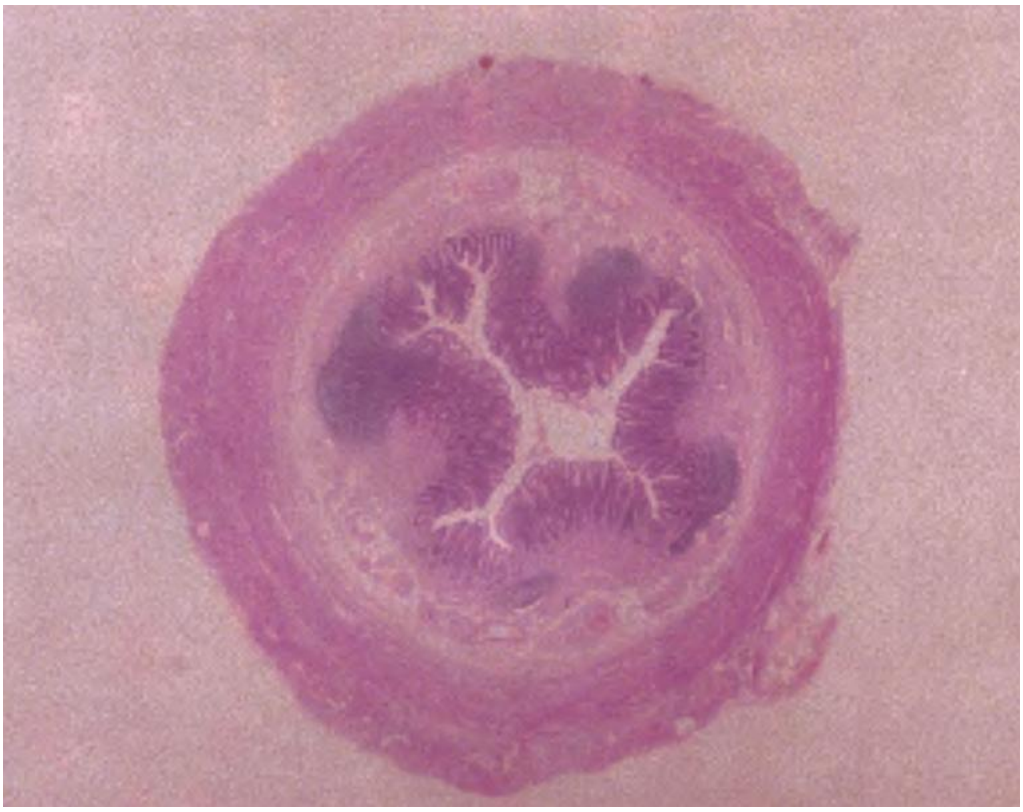


Figure 3: Normal Vermiform Appendix[9].

Vermiform appendix contains the following layers:

Serous, Muscular, Submucous, Mucosa.

Appendicular lumen is irregular, lined by multiple columnar cells. Serous layer completely invests in the tube, except along the line of mesentry. Goblet cells scattered throughout the longitudinal folds of mucosal layer, are responsible for mucus secretions.[8]Cells of Kulchitsky lie at the base of the crypts. Numerous lymphoid follicles lie in submucosal layer. Prominent in the young, hence one of the important etiological factor for acute appendicitis[9].

APPENDICITIS

Incidence

Appendicitis most commonly occurs during the 2^{nd} to 4^{th} decade of life. Reports suggestive of a high female predominance. Death due to perforated appendix is a leading cause in surgical cases. A major part of the population also suffers from Chronic abdominal pain, the incidence of chronic and recurrent appendicitis ranges between 7-10%. Such patients are reported to have higher chances of undergoing ischemic changes, perforations and septicemia.

Incidence of appendicitis is found to be higher in the western countries. Major factors being genetic, environmental and dietary cultures. Though lately, a downward trend of appendicitis has been noted in these countries due to the consumption of high fiber intake.

Etiopathogenesis:

Over half to three quarter of the population with an inflamed appendix have a secondary luminal obstruction. Presence of a fecolith, a gall stone, worm infestations leads to obstruction of the lumen. This further leads to the increase in luminal mucinous secretions. The obstruction leads to a constant and gradual increase in the intra luminal pressures which may even compromise the venous drainage. The resulting ischemic injury becomes a harbor for bacterial growth. Hence making luminal obstruction a major cause of appendicitis[10].

At the initial stages of appendicitis, a raise in neutrophils in all the layers of the appendix is noted. Inflammation which leads to dull, congested and granular looking appendix. With the worsening of inflammatory process there may be a neutrophilc, firbroplurulent exudate involving the serosa,leading to an abscess.

Recurrent appendicitis:

With the advent of antibiotics, appendicitis is beingtreated conservatively. Chronic appendicitis is said to be not just a clinical entity but also needs histological confirmation.Grossly the appendix appears thickened with narrowed and obliterated lumen. On histology, neutrophilic infiltration mainly localized to the submucosal layer along with large lymphoid follicles is seen. The picture is suggestive of chronic inflammation and fibrosis[11].

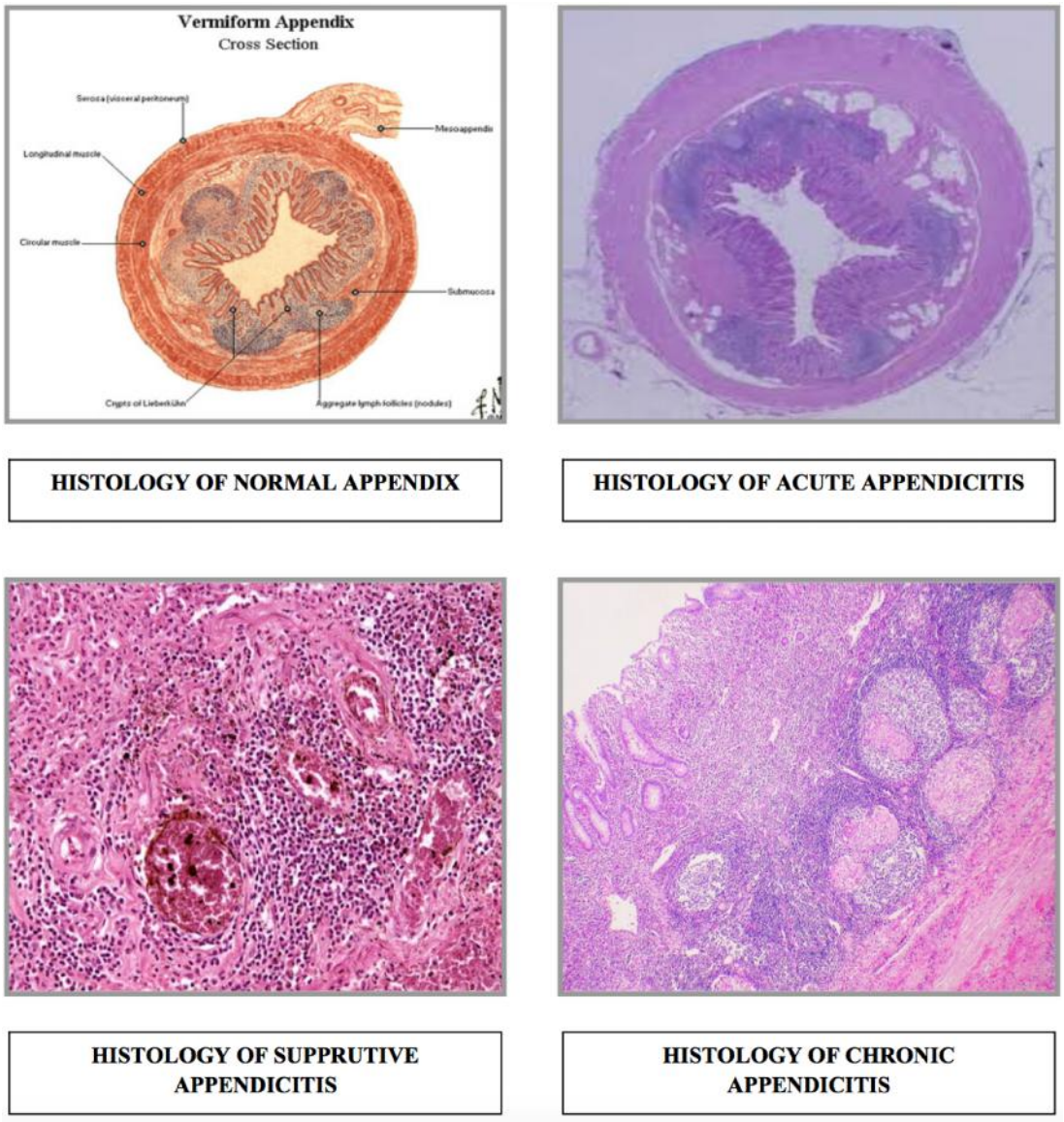


Figure 4: Histology

Clinical features

Pain in abdomen is an important symptom in diagnosing a case of appendicitis. In a case of acute appendicitis, the pain is localized in right lower abdomen and the peri-umbilical region. But in cases of chronic appendicitis the pain may appear vague, more diffuse, localized to the flanks (reterocolic undiagnosed appendicitis). In recurrent cases pain may be less severe and occur intermittently.

Nausea and vomiting are seen commonly in acute cases. May not be prominent in chronic cases.

Fever, bowel disturbances and urinary tract irritations are frequently associated in acute appendicitis. Although urinary tract infection is not an uncommon finding in cases of recurrent appendicitis.

Examination

Appendicitis is a clinical diagnosis, which is supported by radiological investigations.

These signs and symptoms may not be appreciated in a case of recurrent appendicitis.

Inspection:

In patients with pain as the major complaint. The patient is asked to point out the course of the pain, starting with the point of occurrence (pointing sign), is due to the irritation of the parietal peritoneum.

Palpation:

Mcburney's tenderness: classically seen in acute appendicitis.

Dunphy's sign: An act of coughing, sneezing can cause increased abdominal pain.

Blumberg's sign: Rebound tenderness in the right iliac fossa is a sign suggestive of peritoneal irritation.

Rovsing's sign: Due to shift of ileal coils to the right iliac fossa in presence of local peritonitis. Pain is experienced in right iliac fossa on deep palpation of left iliac fossa.

Psoas sign: In a retroceacal appendix due to the irritation of the inflamed appendix lying over the psoas muscle, extension of the right hip causes pain.

Cope's obturator test: Pain experienced in the hypogastrium secondary to the spasm of the obturator internus. It is elicited by internal rotation of the right hip.

Sherren's triangle of hyperesthesia: It's a triangle bound by the lines joining the umbilicus, anterior superior iliac spine and the symphysis pubis. By lifting the skin along with the subcutaneous tissue, a gentle stroke can elicit pain.

Investigations

Laboratoryinvestigation:

Total leucocyte count: >85% of the pateints with appendicitis will have counts over 10,000/cc mm.[12,13] A right shift in the neutrophils is seen among in 78% patients[14]. 10% patients may present with normal leucocyte and differential count[15]. TLC of 20,000/cc mm is suggestive of complicated appendix[8].

C- Reactive protein: An acute phase reactant, synthesized by liver in infections/ inflammations. The rise occurs between 6-12 hours of an acute attack. These values normalize within 12 hours. In appendicitis a normal level carries a negative predictive value of 97-100%[16].

Urine analysis: These are done to rule out other causes of pain in abdomen. Also,to check for associated urinary tract infection with appendicitis.

Imaging studies:

Plain X-ray abdomen:

These signs on a plain radiograph are not specific to appendicitis.

- Fluid levels in terminal ilium and caecum due to inflammation.
- Gaseous distention of appendix.
- Blurring of fat line between transverse abdominis and peritoneum.
- >10% patients, appearance of a calcified appendicolith may be seen[8].
- Blurring of psoas shadow.

Ultrasonography:

Ultrasonography carries a sensitivity and specificity of >85% and >90% respectively. Being a noninvasive modality, requiring no patient preparation is widely being used. USG are not ideal in suspected cases of perforation.

Computed tomography:

Most commonly used imaging technique. With or without contrast in high resolution (64 MDCT) the accuracy increases to 95% or more[17]. Diagnosis of appendicolith is reported most accurate with CT.

Diagnostic laparoscopy

Most patients are diagnosed based on history, clinical examination and investigation. But in a smaller population of patient in whom diagnosis remains elusive diagnostic laparoscopy is the best preferred intervention. It allows the

inspection of appendix and other abdominal organs. By this, negative laparotomies can be avoided in almost 1/4th to ½ of the patients.

Management

As quoted by J.B.Murphy- "The earlier the operation, the lower the mortality."

Early diagnosis followed by prompt surgical intervention is known to be the most important principle in treating appendicitis.

Several RCTs that compared laparoscopic vs open appendectomies showed minimal to negligible amount of differences. Laparoscopic appendectomies seem to progressively increase.[18] Reduced pain and shorter hospital stay has been noted in patients undergoing laparoscopic appendectomies.

Pre-operative workup:

Surgical intervention should not delay for more than 6 hours from presentation.

- Keep patient nil by mouth
- Intravenous fluids are kept on maintenance
- In uncomplicated appendicitis a single dose of antibiotic with aerobic and anaerobic cover is given.
- In acute cases enemas as contraindicated
- Prepare for conversion to open

LAPAROSCOPIC APPENDECTOMY[20]

Anesthesia: general

Procedure:

1. Patient in supine position. Parts from nipple to midthigh are painted and draped.
2. Pneumoperitoneum is created with either veress needle or by open method.
3. A 10mm umbilical port is inserted by open method. Following which a diagnostic scopy is done to look for port entry injuries, gross pathologies in the abdomen and the pelvis.
4. Under vision, second 10mm port is placed in the suprapubic region above symphysis pubis, followed by another 5mm port in the right lower quadrant.
5. Appendix is identified. It is inspected for signs of inflammation, fibrosis, turbidity.
6. With a non-traumatic grasper, the tip of the appendix is held in order to visualize the entire length (up to the base) of appendix.
7. Adhesiolyisis is done in presence of adhesions.
8. Mesoappendix is dissected and divided using clips, bipolar electric devices or ties.
9. Track the base of the appendix by tracing the convergence of the taenia. Secure the base with a rodders knot, clips or linear stapling device.
10. Specimen is retrieved from the 10mm umbilical port.
11. Peritoneal cavity is irrigated.
12. Trocars are removed. scope is removed in a gradual manner.
13. Port site is closed with 2-0 absorbable sutures.
14. Skin is closed with 2-0 nonabsorbable sutures

Recent advances in laparoscopic appendectomy

1. Single incision laparoscopic appendectomy
2. Video assisted transumbilical appendectomy
3. Video assisted extra corporeal appendectomy
4. Single port transumbilical laparoscopy or natural orifice transumbilical endoscopic surgery. (NOTES)

METHODOLOGY

A randomized control trial of 60 patients who presented with complaints of recurrent pain in abdomen in the Department of General surgery, KLE Hospital, Belgaum.

Study type: Randomized control trial

Study period: 1 year (January 2018 to December 2018)

Sample size: 60 (30 in each group)

Inclusion criteria:

Age 18years and above

All cases of chronic appendicitis

Patients with recurrent appendicitis

Recurrent lower abdominal pain

Patients who Gave written and informed consent

Patients who underwent diagnostic laparoscopy and appendectomy

Exclusion criteria:

Acute appendicitis

Patients < 18years of age

Complicated appendicitis (perforated or gangrenous appendix)

Suspected or proven malignancy

Previous history of abdominal surgeries

Appendicular mass

All patients who have been admitted under Department of General Surgery, KLES Prabhakar Kore Hospitaland MRC, Belgaum through OPD with diagnosis of appendicitis and who are undergoing elective laparoscopic appendectomy were studied.

After initial assessment, all the patients who meet the inclusion criteria, were subjected to a detailed history taking, thorough clinical evaluation, blood work-up hemoglobin, total leukocyte count, serum urea, serum creatine, viral markers and radiological imaging. The patients were randomized using computer graded numbers.

Group 1: Conventional laparoscopic appendectomy

Group 2: Minilaparoscopic appendectomy

MINILAPAROSCOPIC APPENDECTOMY

Anesthesia: General

Procedure:

1. A 10mm umbilical port was inserted by open technique. Pneumoperitoneum was created.
2. A quick diagnostic scopy was done to look for port site injuries, appendix and other gross pathology.

3. Under vision, a 3mm supra pubic port was inserted, followed by another 3mm right lower quadrant port.
4. Appendix was identified and retracted with the right lower quadrant port.
5. Mesoappendix was dissected and divided using bipolar electric device or ligatures.
6. Base of the appendix was traced to the convergence of the teania. It was ligated with rodders knot or ligature material.
7. The dissected specimen by the technique of ***rail-roading*** was retrieved through the umbilical port (10mm)
8. Abdomen was scanned for associated pathologies and checked for hemostasis.
9. Peritoneal wash was given
10. Port site was closed with absorbable 2-0 absorbable suture
11. Skin was closed with non-absorbable 3-0 suture.

CONVENTIONAL LAPAROSCOPIC APPENDECTOMY

Anesthesia: general

Port placement and dimension:

10mm umbilical port, 10mm suprapubic port, 5mm right/ left lower quadrant port.

Procedure:

General principles of laparoscopic appendectomy were followed. The detailed description is as mentioned in the methodology.

Post-operative:

All the patients in both the groups were managed similarly. They were evaluated for signs of pain and abdominal discomfort from post-operative day 1 till date of discharge according to ***visual analogue scale.***

Sutures were removed between post-operative days 7-10. Scars of all patients were assessed by ***patient and observer scar assessment scale*** after first week, second week, first month and third month of surgery.

RESULTS

The data of 30 patients who underwent conventional laparoscopic appendectomy and another 30 patients who underwent Minilaparoscopic appendectomy were analyzed. The results of the analysis are as follows.

Table 1: Age distribution in the two groups

Age groups	Group 1	%	Group 2	%	Total
<=20yrs	5	16.67	6	20.00	11
21-30yrs	11	36.67	14	46.67	25
31-40yrs	3	10.00	3	10.00	6
41-50yrs	4	13.33	4	13.33	8
>=51yrs	7	23.33	3	10.00	10
Total	30	100.00	30	100.00	60
Mean age	38.17		31.43		34.80
SD age	17.95		14.45		16.51
Chi-square= 2.0512 P = 0.7261					

From the above data it is clear that the maximum number of patients in both the groups were in the age group ranging 21-30 years.

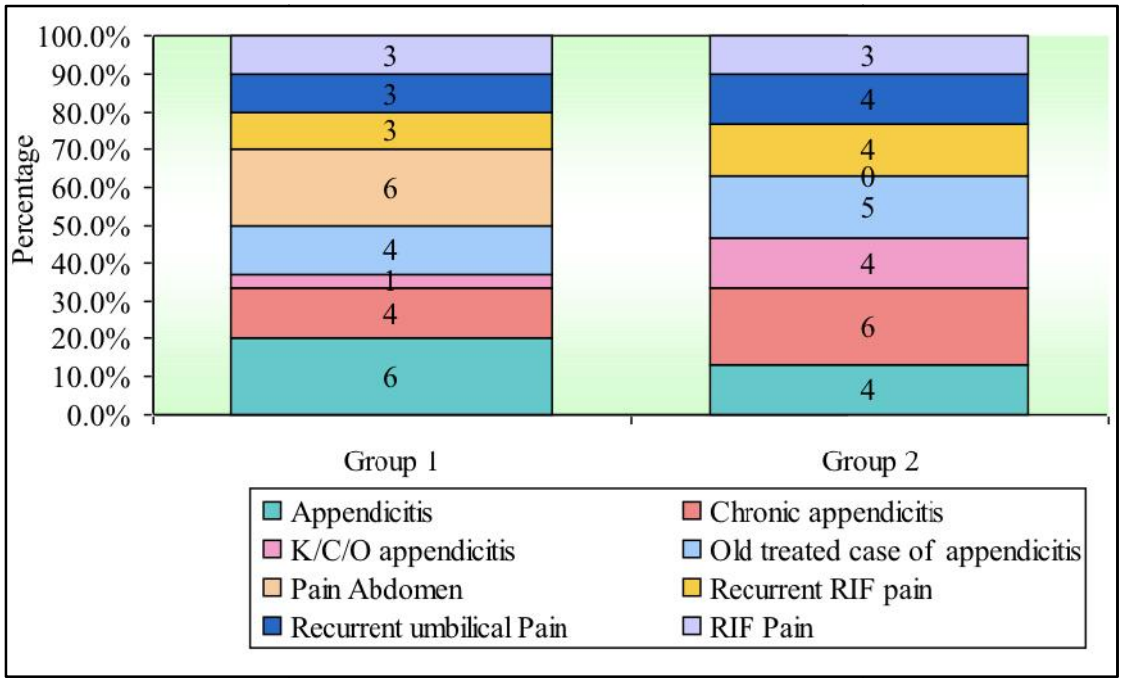
Table 2: Sex distribution between groups

Sex	Group 1	%	Group 2	%	Total
Male	15	50.00	10	33.33	25
Female	15	50.00	20	66.67	35
Total	30	100.00	30	100.00	60
Chi-square=1.7142 P = 0.1901					

In group 1 male: female ratio was equal,

In group 2 females outnumbered the males.

Figure 5: Comparison of two groups with diagnosis



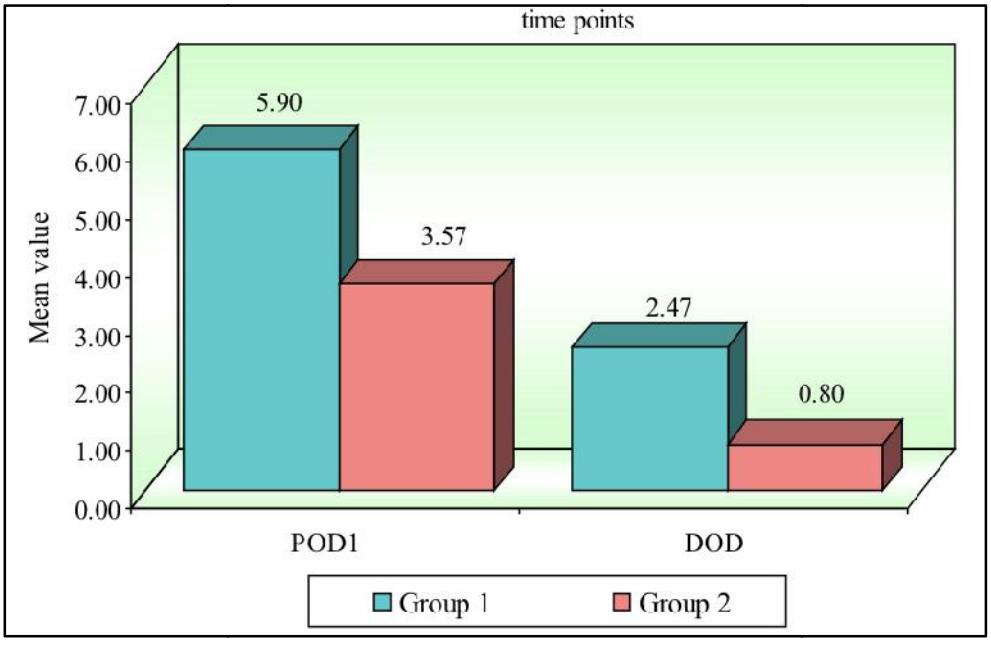
Patients with diagnosis of pain abdomen (20%) and appendicitis (20%) were maximum in group 1. In group 2 chronic appendicitis were maximum.

Table 3: Comparison of two groups with pain scores at different post-operative time points by "Mann-Whitney U test"

Variable	Groups	Mean	SD	Sum of ranks	U-value	Z-value	Signi.
POD1	Group 1	5.90	1.40	1263.00			
	Group 2	3.57	1.22	567.00	102.00	-5.1450	0.0001*
DOD	Group 1	2.47	1.17	1239.50			
	Group 2	0.80	0.89	590.50	125.50	-4.7975	0.0001*
Difference	Group 1	3.43	1.04	1116.00			
	Group 2	2.77	0.73	714.00	249.00	-2.9717	0.0030*

*p<0.05

Figure 6: Comparison of two groups with pain scores at different post-operative time points



In this study the pain scores of both the groups was assessed by visual analogue scale (VAS) on post-operative day 1(POD1) and date of discharge (DOD)

According to the above analysis the mean value in Group 2 on POD1 2.47 and 5.90 in group 2. On DOD 0.80 in group 2 and 3.57 in group 1, this gave a difference value of 0.73 in group 2 and 1.04 in group 1 which gave significant $p<0.05$.

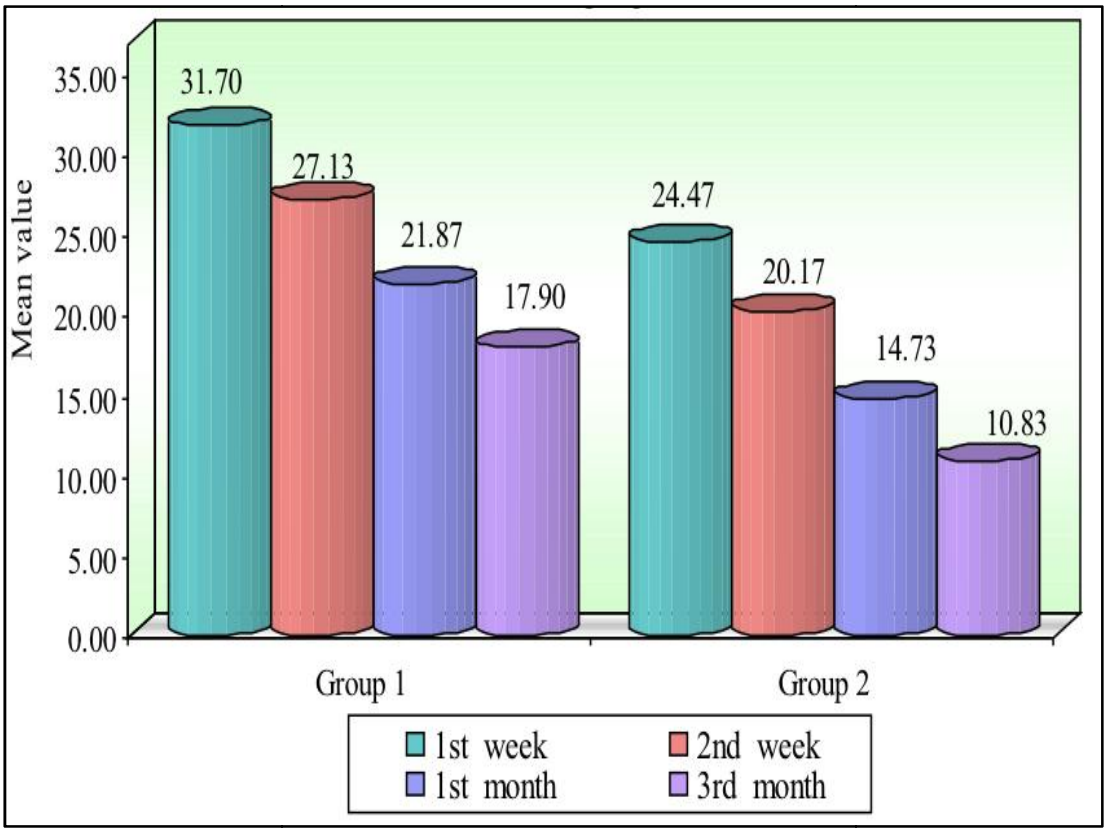
Hence this analysis reveals that in both groups pain has reduced, but is more significant in group 2.

Table 4: Comparison of two groups with scar scores by OSAS at different time points by independent t test

Time points	Group 1		Group 2		t-value	p-value
	Mean	Std.Dev.	Mean	Std.Dev.		
1st week	31.70	6.51	24.47	7.75	3.9150	0.0002*
2nd week	27.13	5.70	20.17	6.73	4.3247	0.0001*
1st month	21.87	5.58	14.73	4.97	5.2318	0.0001*
3rd month	17.90	4.94	10.83	3.78	6.2203	0.0001*
1W – 2W	4.57	2.82	4.30	2.20	0.4080	0.6848
1W – 1M	9.83	3.49	9.73	4.43	0.0970	0.9230
1W – 3W	13.80	4.86	13.63	5.39	0.1259	0.9003
2W – 1M	5.27	2.23	5.43	2.92	-0.2485	0.8046
2W – 3W	9.23	3.50	9.33	4.18	-0.1005	0.9203
1M – 3W	3.97	2.79	3.90	1.83	0.1096	0.9131

*$p<0.05$

Figure 7: Comparison of different time points with scar by OSAS in two groups



For both the groups Scar assessment was done based on patient and observer scar assessment scale.

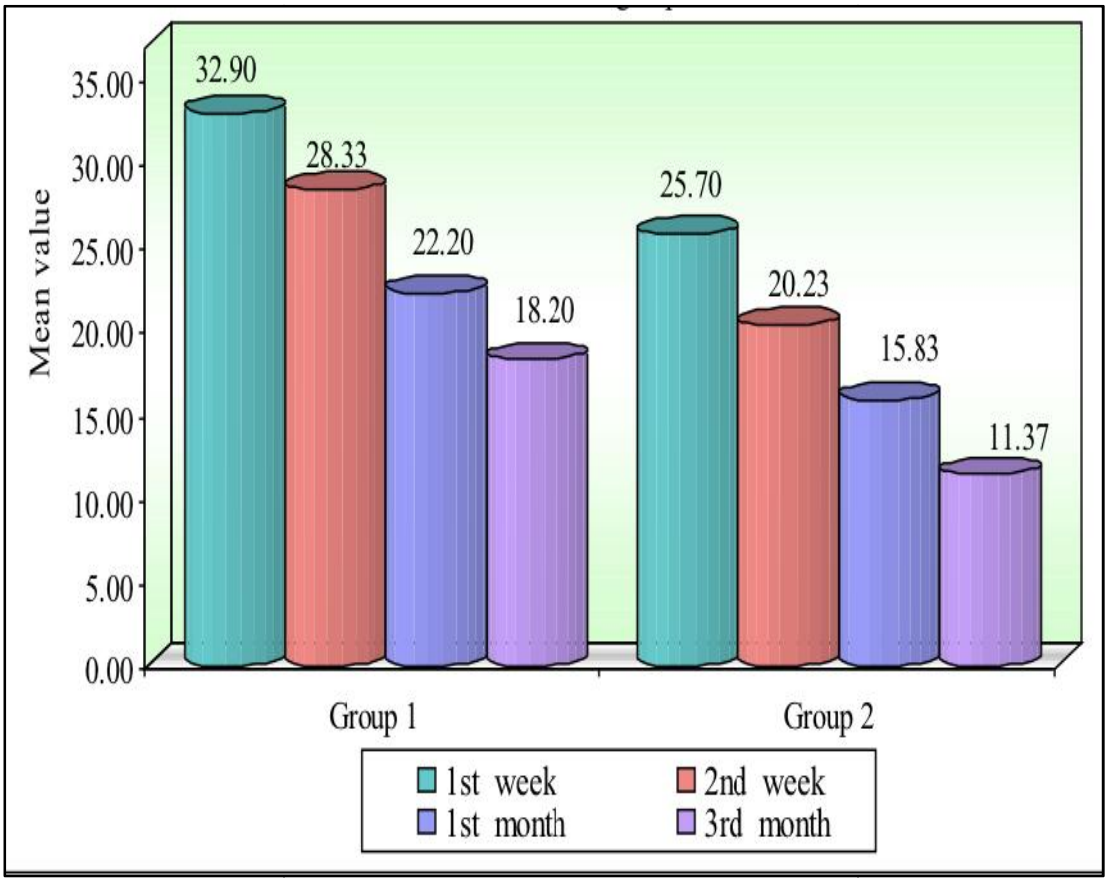
In table 4 between the comparison of the two groups by OSAS, all groups show good scar outcome. Group 2 shows a higher significance in comparison with group 1. Similarly, in figure 7 according to OSAS there is a significant improvement in scar score with time.

Table 5: Comparison of two groups with scar scores by PSAS at different time points by independent t test

Time points	Group 1		Group 2		t-value	p-value
	Mean	Std.Dev.	Mean	Std.Dev.		
1st week	32.90	6.59	25.70	7.39	3.9829	0.0002*
2nd week	28.33	6.05	20.23	6.18	5.1311	0.0001*
1st month	22.20	5.44	15.83	4.66	4.8666	0.0001*
3rd month	18.20	5.13	11.37	4.00	5.7569	0.0001*
1W – 2W	4.57	2.60	5.47	3.54	-1.1230	0.2661
1W – 1M	10.70	3.16	9.87	4.70	0.8061	0.4235
1W – 3W	14.70	4.90	14.33	5.45	0.2741	0.7850
2W – 1M	6.13	2.78	4.40	3.18	2.2492	0.0283*
2W – 3W	10.13	4.51	8.87	3.42	1.2258	0.2252
1M – 3W	4.00	3.22	4.47	2.08	-0.6673	0.5072

*$p<0.05$

Figure 8: Comparison of different time points with scar score by PSAS in two groups



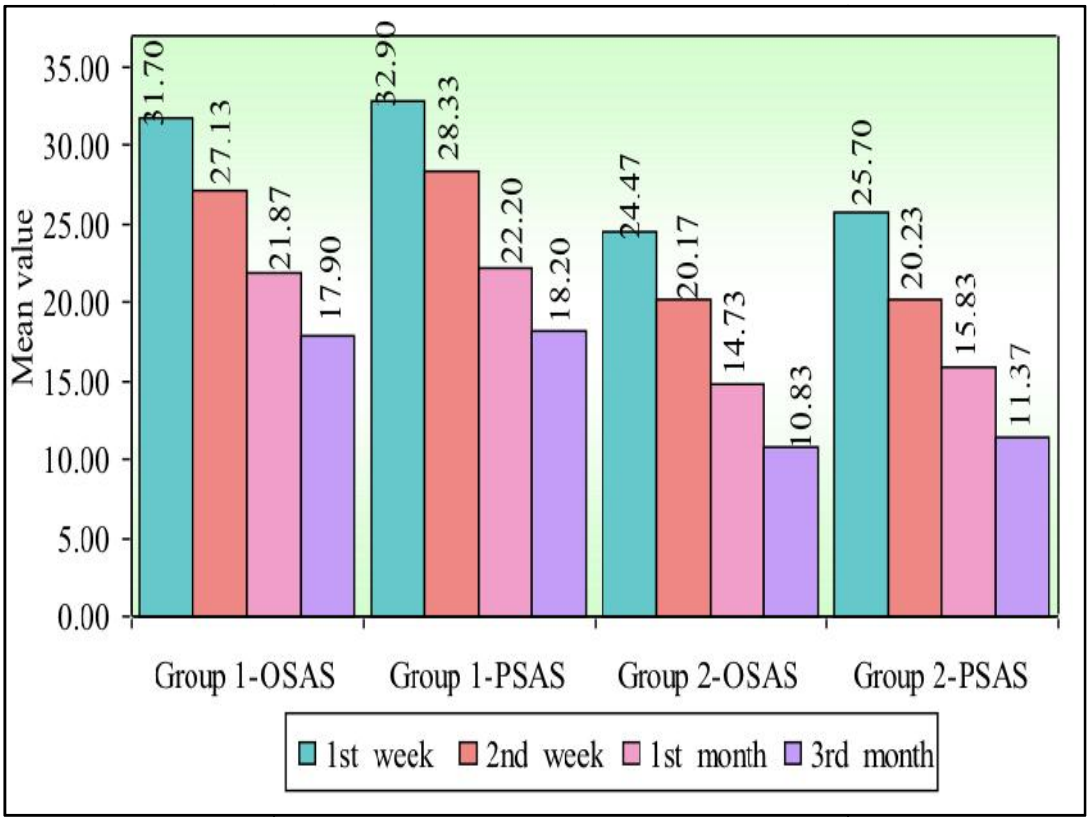
According to PSAS, table 5 shows scar score is significant in both groups. The result is consistently significant at different points in group 1.

Table 6: Comparison of scar scores between OSAS and PSAS methods in different time points in two groups by dependent t test

Groups	Time points	Methods	Mean	Std. Dv.	Mean Diff.	SD Diff.	% of change	Paired t	P-value
Group 1	1st week	OSAS	31.70	6.51					
		PSAS	32.90	6.59	-1.20	2.76	-3.79	-2.3820	0.0240*
	2nd week	OSAS	27.13	5.70					
		PSAS	28.33	6.05	-1.20	2.66	-4.42	-2.4733	0.0195*
	1st month	OSAS	21.87	5.58					
		PSAS	22.20	5.44	-0.33	1.94	-1.52	-0.9432	0.3534
	3rd month	OSAS	17.90	4.94					
		PSAS	18.20	5.13	-0.30	2.10	-1.68	-0.7812	0.4410
Group 2	1st week	OSAS	24.47	7.75					
		PSAS	25.70	7.39	-1.23	2.75	-5.04	-2.4561	0.0203*
	2nd week	OSAS	20.17	6.73					
		PSAS	20.23	6.18	-0.07	3.10	-0.33	-0.1180	0.9069
	1st month	OSAS	14.73	4.97					
		PSAS	15.83	4.66	-1.10	2.28	-7.47	-2.6430	0.0131*
	3rd month	OSAS	10.83	3.78					
		PSAS	11.37	4.00	-0.53	1.72	-4.92	-1.7016	0.0995

*$p<0.05$

Figure 9: Comparison of scar scores between OSAS and PSAS in different time points in two groups



According to the analysis in table 6 and figure 9 the results of the patients and observer scar assessment scale can be demonstrated.

In group 1 scar outcome shows significant value ($p<0.05$) at the end of postoperative 1st week (0.0240) and 2nd week(0.0195). Whereas scar scores in group 2 are significant at 1st week(0.0203) and 1st month (0.0131)

With this analysis the cosmetic outcome of the scar in both the groups is good. Group 2 having slightly better valuesat all time intervals and comparatively better scores at the end of 3rd month(0.0995).

Table 7: Agreement between scar scores assessed with OSAS and PSAS at different time points by Kappa method

Groups	Time points	Agreement	Expected Agreement	Kappa	Std. Err.	Z-value	p-value
Group 1	1st week	89.41%	70.99%	0.6350	0.1121	5.6700	0.0001*
	2nd week	89.38%	72.06%	0.6198	0.1025	6.0500	0.0001*
	1st month	91.90%	71.41%	0.7168	0.1109	6.4600	0.0001*
	3rd month	92.38%	73.51%	0.7124	0.1062	6.7100	0.0001*
Group 2	1st week	91.48%	70.46%	0.7117	0.1130	6.3000	0.0001*
	2nd week	88.33%	67.54%	0.6406	0.1136	5.6400	0.0001*
	1st month	89.74%	69.93%	0.6589	0.1144	5.7600	0.0001*
	3rd month	92.00%	72.84%	0.7054	0.1075	6.5600	0.0001*

*$p<0.05$

Based on the kappa method of analysis for scar assessment. There is significant correlation at different time intervals in group 1 and group 2.

DISCUSSION

The advent of laparoscopy into the field of surgery allowed the general surgeons to extend their hand of expertise into other subspecialties. Dating 30 years from now since the first laparoscopic appendectomy, laparotomies still occur at ahigh incidence of 90% in our country.[3,24,25]The existing controversies over the benefits of laparoscopic appendectomy over minimal access surgeries has motivated our study.

The NOTES surgery (assess through natural orifice) did not evolve as much due to the restrictions of high instalment cost, high cost for patients, need of specialized instruments, along with highly trained surgeons and nursing staff.[26] Single incision laparoscopic appendectomy was said to have better cosmetic outcomes in comparison to the multiple abdominal incision.[27,28,29,30,31] Regardless it was later reported that the incision required to negotiate the special trocar would be not less than 2.5cms.This yielded the patients to have a poor aesthetically acceptable scar or in cases a permanently deformed umbilicus. [26,32]Several comparative studies reported a higher intensity in pain in these patients.[32,33]

Over the last two decades the lesser invasive techniques in comparison to the conventional laparoscopic appendectomy became noteworthy. These techniques resulted in shorter recovery time, reduced hospital stay and lowered complications. Minilaparoscopy emerged in the 1990s, which gained popularization only in the recent years as they offered smaller portal diameters, lesser cost and complexity in comparison to the very complex and expensive NOTES and Single port surgeries.[35,36]

Avila et al.,[38] classified minilaparoscopy as conventional minilaparoscopy (diameter 4.9-3.5), modern minilaparoscopy (diameter of 3.4 mm to 2 mm), micro minilaparoscopy (1.9 to 0.5 mm) and ultramicrominilaparoscopy (diameter less than 0.5 mm). For other authors any technique which used materials less than or equal to 5mm in diameter were considered minilaparoscopic. The rest considered minilaproscopy a technique in which the sum of all incision did not exceed 20mm.[36] Minilaparoscopy gained tremendous success and advantages in cholecystectomies and appendectomies.

In a study done by *Coletta et al.,*[37] with 21 patient who underwent minilaproscopic appendectomy, 9 patients complained of light pain, 1 complained of moderate pain. The aesthetic outcome was unsatisfactory in 1 patient. Laparoscopy converted to open was reported in 1 patient.

In our study, the results of pain appeared extremely significantin group 2 when compared to the conventional group. The aesthetic results were significant in both the groups. There was no conversion of Laparoscopy to Open in our study.

Several studies reported the increase in the surgical time in minilaparocipic appendectomies on and average between 35-130mins. *Sato et al.,*[39] demonstrated the use of a retractor loop for appendix manipulation with the mean operative time of 65 min. This was also reported by *Paquentin et al.,*[40]*Mostafa et al.,*[41] in minilaparoscopy used endostaplers, two optical systems reported time as 55 mins.

Instruments with smaller diameter provided lower friction and gripping. They hence promoted precise movements and delicate handlining of tissues causing lesser trauma to abdominal structures and wall.[36] Minimal tissue handling and peritoneal

trauma lead to lesser post-operative pain and promoted better healing.[36,42] The aesthetic results were also reported by *Noack et al.,*[42]

Croce E et al.,[43] performed minilaparoscopy with 10mm and two 2mm trocar, in 280 patients all with chronic, sub-acute appendicitis and 84 acute appendicitis.0.07% conversions were reported, 2.1% post-operative complication (intra-abdominal abscess, hemoperitoneum). 1.4% relaparoscopies were reported for management of complications.

Our study done in chronic, sub-acute appendicitis does not report conversion, post-operative complicationand relaparoscopies.

Nicola Di Lorenzo.,[44] in his study of 37 patients reported successful minilaparoscopic appendectomy in 31 patients. 2 Conversion to conventional laparoscopy were reported due to perforated appendix.

In our experience we have learnt that minilaparoscopy appendectomy provides better outcomes in terms of pain relief, less post-operative analgesic use, shorter hospital stay, faster recovery, quicker resumption of daily activities and work.

Scars stay for life, during growth they may alter, resulting in unpleasant outcomes. Our study reports best cosmetic results. It is proven to be additionally beneficial in females, women of childbearing age group and younger generation.

CONCLUSION

On analyzing the data, we found a univocal outcome between minilaparoscopic appendectomy and conventional laparoscopic appendectomy among randomly selected patients. Minilaparoscopy showed better outcomes in terms of minimal post-operative pain, lesser use of post-operative analgesics, early discharges, sooner recovery to normal life style and satisfactory cosmetic outcomes.

The drawback of minilaparoscopy was only limited to a few instances of difficult specimen retrieval. However, with the mentioned advantages, the drawbacks of the techniques can be outweighed.

To conclude minilaparoscopic appendectomy exceeds conventional laparoscopic appendectomy in selected patients with chronic and recurrent appendicitis.

SUMMARY

Appendicitis is the leading cause of surgical emergencies, making appendectomy the most commonly performed general surgical procedure. Although the trend of minilaparoscopy appendectomy is vibrant, the literature is not well established.

The present study from January 2018 to December 2018 was conducted on 60 (30 conventional and 30 minilaparoscopy) patients with chronic, recurrent appendicitis admitted in the Department of General Surgery, KLE Dr. Prabhakar Kore Hospital Belgaum. The patients were selected by randomized method. All patients underwent similar per-operative work-up and post-operative care. Following discharge, the patients were followed up for 3 months thereafter. The following parameters post-operative pain and scar assessment were recorded timely in the proformas.

As per the data analysis byMann-Whitney U test we noticed that among the two groups significant differences with respect to pain perception was SD 1.04 $p<0.05$. By dependent t test scar analysis was noted to be significant in both the groups with better values at different time points in group 2. The kappa analysis proved a significant correlation between the observer and the patient finding for scar assessment.

With the presence of few negligible drawbacks, through our study we report that Minilaparoscopic appendectomy in patients with chronic, recurrent appendicitis proves better than conventional laparoscopic appendectomy in terms of pain perspective, speedy recovery and satisfactory aesthetic outcome.

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ANNEXURE I – CONSENT FORM

CONSENT FOR PARTICIPATION IN RESEARCH STUDY

Mr/Mrs/Miss. we are requesting you to enroll yourself in study titled **"MINILAPAROSCOPIC VERSUS LAPAROSCOPIC .APPENDECTOMY: ONE YEAR RCT AT KLES DR. PRABHAKAR KORE HOSPITAL AND MEDICAL RESEARCH CENTER BELAGAVI."** conducted by _____, Post Graduate in M.S. General Surgery under the guidance _____ Professor And Head General Surgery Dept Dr. Prabhakar Hospital Belgaum under KLE university, Belagavi.

Respected Sir/Madam,

We request you to participate in our study as you are eligible for participating in the study. Your participation in the research is absolutely voluntary. Your decision to participate in the study or otherwise will not affect the relationship with KLE hospital. If you decide not to participate, you are free to to withdraw at any time. During the study your operative outcome will be accessed by some questions which will be answered by your operating surgeon.

Risks and Benefits:

There is no increased risk involved in becoming a part of this study and the complications are those which are normally anticipated. This study will help to estimate the incidence of postoperative pain in comparison with the two procedures involved. The results derived at the end of study will benefit all similar patients admitted in this hospital.

Withdrawing/removal from the study

The participant has freedom to withdraw from the study whenever he/she wishes and with any prior notice. Even if you decline to participate, there will not be any change in the line of your management or the relationship with your doctor. You will be told about all the new information that affects your decision to participate in the study. The investigator may also exclude a participant from the study at anytime.

Privacy and Confidentiality:

The only people to know that you are a research subject are members of the research team. No information about you or information provided by you during the research will be disclosed to other without your written permission except:

1. In emergency to protect your rights and welfare.
2. If required by law.

Institutional/sponsors policy:

If any unforeseen complications or injury occurs during the period of study the participant will be given treatment within the limitations of KLE's prabhakar kore hospital general ward.

Financial Incentives for participation:

The participant neither gets any financial incentives during the period of study nor will be asked to pay for the purpose of this study.

Authorization to Publish Results:

When the results of the research are published or discussed, in a cor.ference, no information will be displayed that would disclose your identity. Any information that is obtained in connection with this study and that can be identified with your identity remaining confidential.

CONSENT STATEMENT:

I, Mr/Ms/Mrs. voluntarily agree for the participation as a subject of study. By signing this consent form I am not giving up any of my legal rights, I may withdraw from the study anytime. I am signing the consent form after having read or been read for me in my vernacular language, including the risks and the

benefits and having all my questions answered.

Subject Name

Signature or the Left Thumb Print of Subject :

Witness Name: Signature:

Investigators Name: Signature:

Date:

Place:

ANNEXURE-II- ETHICAL CLEARANCE LETTER

K.L.E.UNIVERSITY'S
JAWAHARLAL NEHRU MEDICAL COLLEGE,
NEHRU NAGAR, BELAGAVI-590010 (KARNATAKA-INDIA)
(Accredited 'A' Grade by NAAC)

Website: http//www.jnmc.edu
E-Mail : dome@jnmc.edu

Phone: (+ 91-(0)831 Office : 2471350
Principal: 2471701
Fax No. +91 (0)831 – 2470759

Ref: MDC/DOME/ 15 · **Date: 22/11/2017**

To,

REG NO. BH0117002

Sub: Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled **"MINILAPAROSCOPIC APPENDECTOMY VERSUS CONVENTIONAL LAPAROSCOPIC APPENDECTOMY: ONE YEAR RCT AT KLES DR. PRABHAKAR KORE HOSPITAL AND MEDICAL RESEARCH CENTRE, BELAGAVI"**, is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee on Human Subjects Research.

(Dr. Arathi Darshan)
Member Secretary
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

(Dr. Roopa M Bellad)
Chairman,
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

ANNEXURE-III

PROFORMA

PROFORMA OF CLINICAL EXAMINATION OF INDIVIDUAL PATIENT

Name :

Age :

Address :

IP no.:

Sex :

Religion:

Education:

Date of admission:

Occupation:

Date of discharge:

HISTORY

Clinical history:

Other associated illnesses :

GENERAL PHYSICAL EXAMINATION:

Built and Nourishment:

Weight:

Pallor/Icterus/Cyanosis/Clubbing/Edema/Lymphadenopathy

Vitals Signs: PR: /min BP: mmhg RR: /min Temp:

SYSTEMIC EXAMINATION:

PER ABDOMEN:

CVS:

CNS:

RS:

PROCEDURE/OPERATION DETAILS:

POST-OPERATIVE FOLLOW-UP:

SCAR ASSESSMENT AS PER PATIENT AND OBSERVER SCAR ASSESSMENT SCALE:

Observer Scar Assessment Scale (OSAS)

	Normal skin 1 2 3 4 5 6 7 8 9 10	Worst scar imaginable
Vascularization	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Pigmentation	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Thickness	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Relief	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Pliability	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Observer scar rating	– – – – – – – – – – +	

OSAS summary score: _____ (minimum, 5; maximum, 50)

Patient Scar Assessment Scale (PSAS)

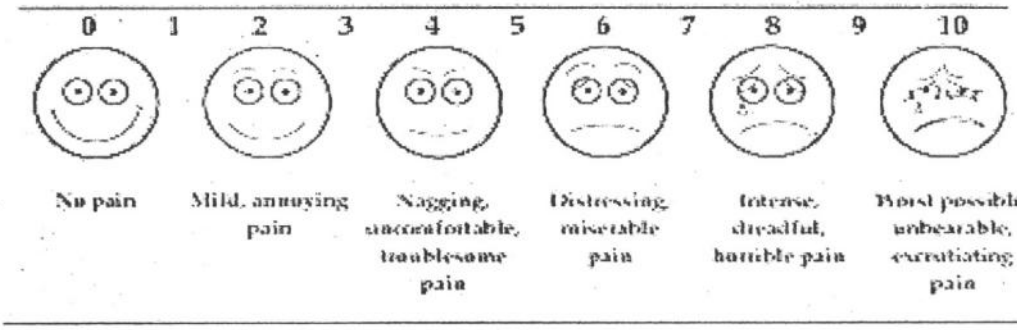
	No, no complaints 1 2 3 4 5 6 7 8 9 10	Yes, worst imaginable
Is the scar painful?	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Is the scar itching?	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
	No, as normal skin 1 2 3 4 5 6 7 8 9 10	**Yes, very different**
Is the color of the scar different?	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Is the scar more stiff?	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Is the thickness of the scar different?	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Is the scar irregular?	○ ○ ○ ○ ○ ○ ○ ○ ○ ○	
Overall patient scar satisfaction	– – – – – – – – – – +	

PSAS total score: _____ (minimum, 6; maximum, 60)

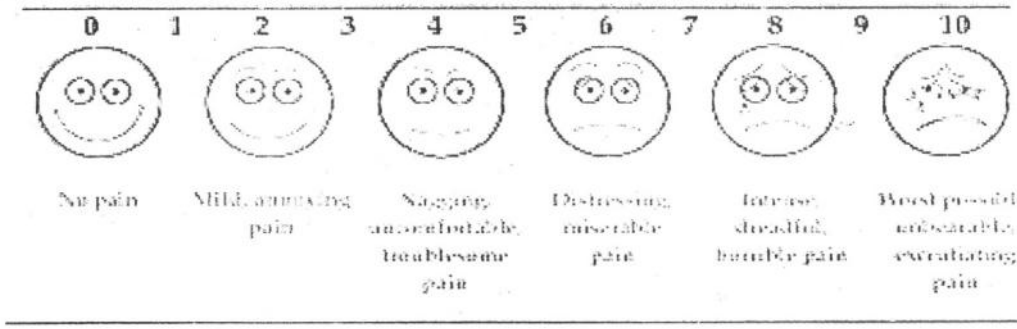
POD 3: *OSAS SCORE:* *PSAS SCORE:*	POD 11: *OSAS SCORE:* *PSAS SCORE:*
1st MONTH POST OP: *OSAS SCORE:* *PSAS SCORE:*	3rd MONTH POST OP: *OSAS SCORE:* *PSAS SCORE:*

ASSESMENT OF PAIN AA PER VISUAL ANALOGUE SCALE:

POD 1:



POD 3:



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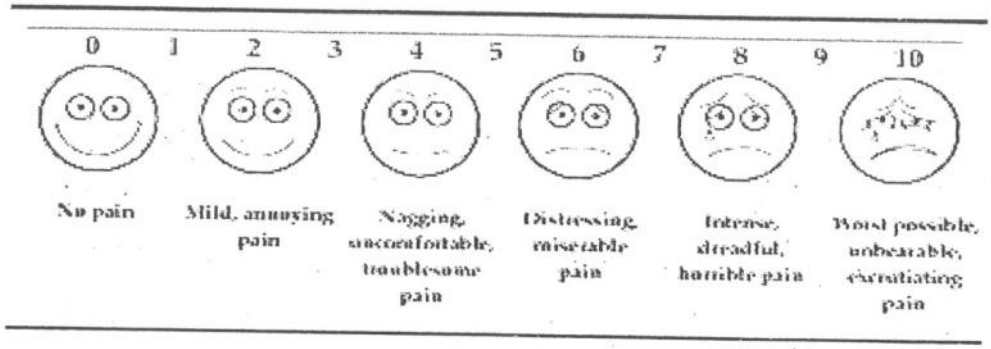
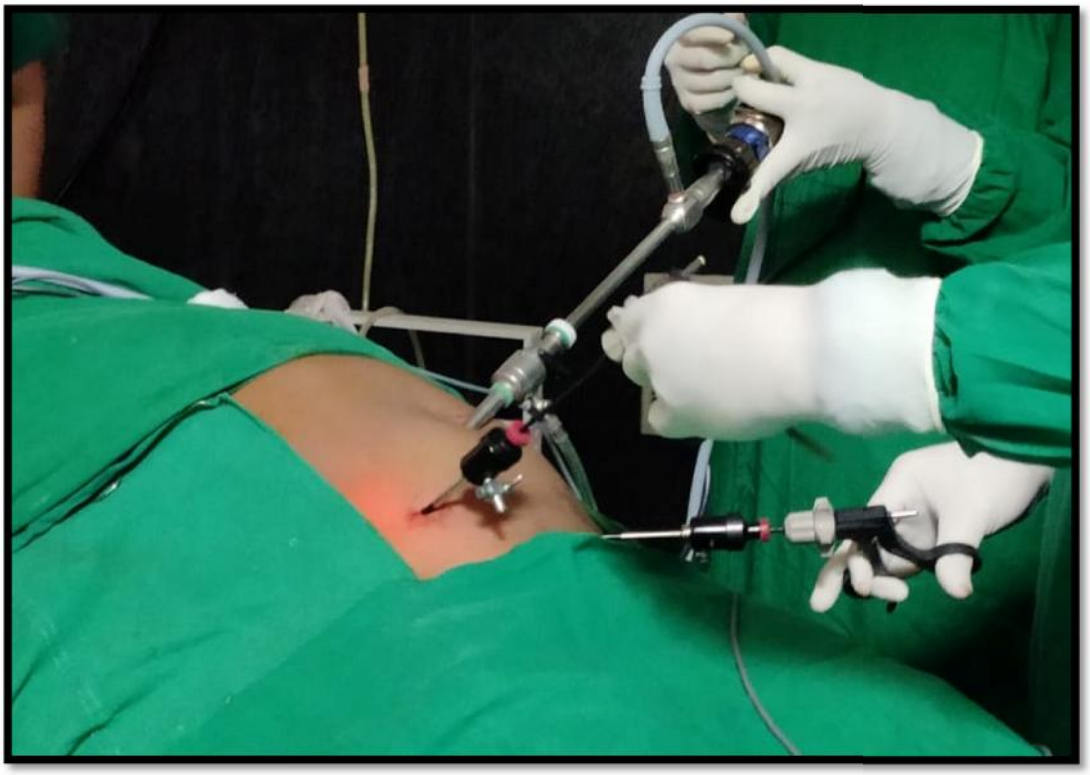
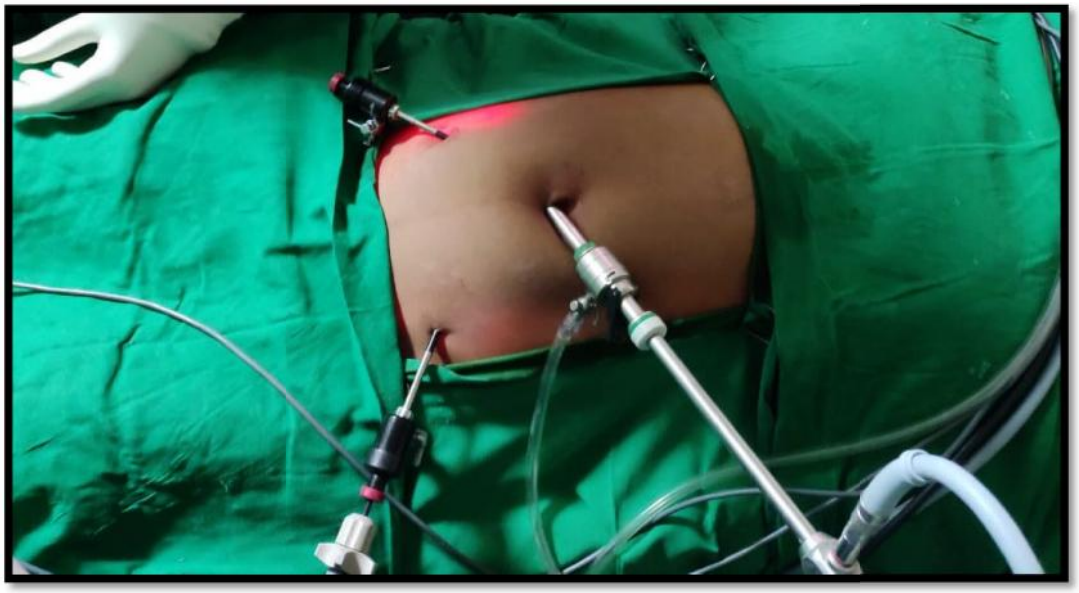


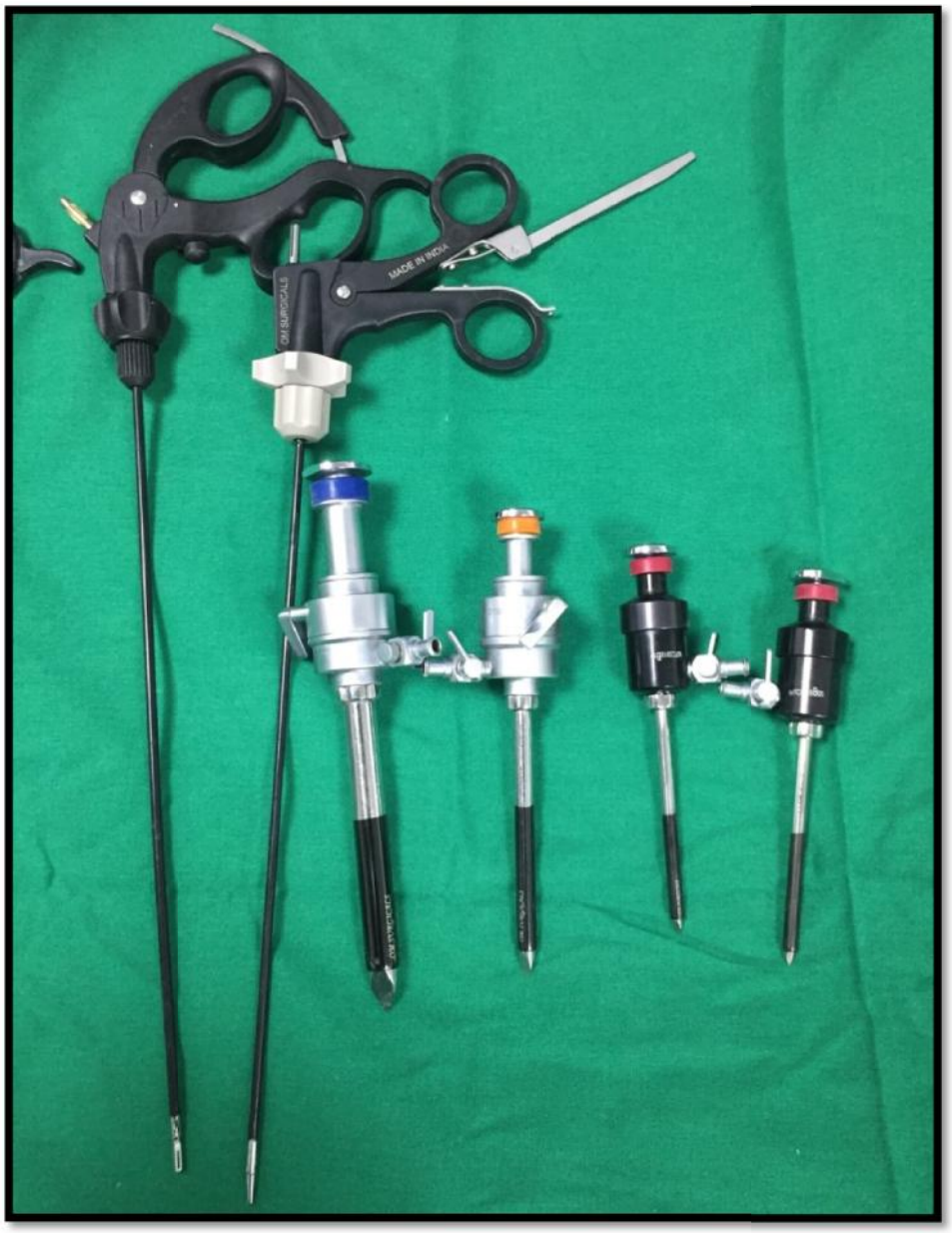
ANNEXURE IV – PHOTOGRAPHS



Photograph 1: Mini laparoscopic appendectomy



Photograph 2: Example of port Placement



Photograoh 3: Mini laparoscopic instruments

ANNEXURES V - MASTER CHART

Master Chart															
Sr. No	**IP Number**	**Name**	**Age/sex**	**Daignosis**	**Name of procedure**	**Pain as per VAS**		**Scar assessmet as per POSAS**							
								1st week		**2nd week**		**1st month**		**3rd month**	
						POD 1	**DOD**	**OSAS**	**PSAS**	**OSAS**	**PSAS**	**OSAS**	**PSAS**	**OSAS**	**PSAS**
1	821881	kalpana	39/F	K/C/O Recurrent appendicitis	Mini laparoscopic appendectomy	3	0	10	18	10	16	8	12	6	10
2	860972	prema	33/F	Chornic appendicits	Mini laparoscopic appendectomy	2	0	15	18	10	16	10	12	8	8
3	894460	Suman	50/F	RIF Pain	Daignostic laproscopy	4	0	12	15	10	12	8	8	6	6
4	817327	Shobha	65/F	old treated case of appendicitis	Mini laparoscopic appendectomy	3	1	20	18	16	16	12	10	10	10
5	855542	Pranay	18/M	K/C/O appendicitis	Mini laparoscopic appendectomy	3	0	16	16	12	10	10	10	8	6
6	870908	Gangubai	50/F	RIF Pain	Daignostic laproscopy + appendectomy	5	2	18	22	16	18	12	12	8	8
7	839132	Pravati	21/F	Appendicitis since 6months	Mini laparoscopic appendectomy	2	0	18	20	15	15	10	12	8	8
8	817327	Shobha	65/F	Recurrent umbilical Pain	Daignostic laproscopy	4	2	20	20	16	18	12	12	8	8
9	839412	Pallavi	18/F	Chornic appendicits	Mini laparoscopic appendectomy	2	0	12	12	10	10	8	10	5	6
10	854216	Laxmi	27/F	RIF pain since 2 years	Daignostic laproscopy + appendectomy	3	1	26	30	22	26	15	20	10	15
11	884432	Rushikesh	19/M	2months history of appendicitis	Mini laparoscopic appendectomy	5	2	16	16	12	16	10	12	10	10
12	823457	Basavraj	25/M	Recurrent RIF pain	Mini laparoscopic appendectomy	3	0	22	20	18	16	12	12	8	6
13	860970	Heena	24/F	appendicitis since 3 months	Conventional laparoscopic appenectomy	6	3	30	34	28	30	22	26	20	20
14	854312	Sachin	21/F	K/C/O appendicitis	Mini laparoscopic appendectomy	5	1	28	30	22	20	15	15	10	8
15	861970	Ashwini	27/F	RIF Pain	Conventional laparoscopic appenectomy	5	3	35	38	32	30	28	28	25	28
16	871230	Jabeen	20/F	Recurrent umbilical Pain	Mini laparoscopic appendectomy	3	0	22	25	18	18	15	12	10	10
17	863146	Kavita	29/F	Chornic appendicits	Mini laparoscopic appendectomy	2	1	30	26	25	18	13	19	9	10
18	864368	Anil	25/M	Chornic appendicits	Mini laparoscopic appendectomy	6	3	18	16	15	12	10	12	8	10
19	868144	Neelkanth	68/M	Appendicitis	Conventional laparoscopic appenectomy	8	5	20	25	22	23	19	18	23	25
20	867123	Laxman	75/M	Recurrent RIF pain	Conventional laparoscopic appenectomy	4	1	36	30	28	26	20	24	18	20
21	886063	Bhima	36/M	Recurrent RIF pain	Mini laparoscopic appendectomy	4	2	30	28	28	26	22	22	16	18
22	873045	Shankar	30/M	K/C/O appendicitis	Mini laparoscopic appendectomy	3	1	28	28	23	20	16	18	10	12
23	882471	Jyoti	29/F	old treated case of appendicitis	Mini laparoscopic appendectomy	2	0	19	20	16	16	10	10	5	8
24	909293	Doddawwa	48/F	K/C/O appendicitis	Conventional laparoscopic appenectomy	5	2	32	26	25	26	20	18	20	15
25	909387	Yallappa	28/M	Chornic appendicits	Conventional laparoscopic appenectomy	8	4	41	42	28	38	25	25	18	20
26	909403	Priyanka	21/F	old treated case of appendicitis	Mini laparoscopic appendectomy	4	1	30	32	22	20	15	18	12	14
27	909460	Gayatri	18/F	Recurrent RIF pain	Daignostic laproscopy+ appendectomy	5	2	30	35	25	22	15	12	10	10
28	909637	Rudrappa	29/M	old treated case of appendicitis	Conventional laparoscopic appenectomy	7	4	38	40	36	38	30	28	25	26
29	909693	Bharti	44/F	Recurrent umbilical Pain	Daignostic laproscopy + appendectomy	5	1	18	20	16	19	12	14	10	10
30	910259	Anita	27/F	Appendicitis since 2months	Mini laparoscopic appendectomy	3	0	22	25	18	20	15	18	12	12
31	910505	Aarti	20/F	Pain Abdomen	Daignostic laproscopy	6	2	34	36	28	25	18	20	15	18
32	910772	Padmaja	65/F	Recurrent umbilical Pain	Daignostic laproscopy+ appendectomy	4	1	40	38	35	36	25	22	18	18

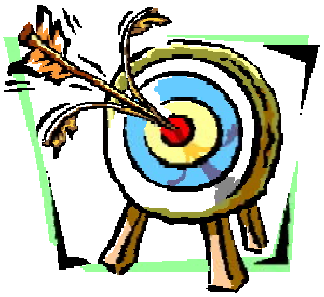
33	911769	Arif	21/M	Chornic appendicits	Mini laparoscopic appendectomy	6	2	38	40	36	35	30	28	22	22
34	912127	Shankar	50/M	Recurrent umbilical Pain	Conventional laparoscopic appenectomy	8	4	40	42	36	35	32	32	28	25
35	912976	Shubham	22/M	Old treated case of appendicitis	Conventional laparoscopic appenectomy	6	3	29	30	22	25	18	19	14	12
36	913735	Basavraj	43/M	Pain Abdomen	Daignostic laproscopy	7	3	30	32	28	25	18	18	12	12
37	914001	Malikarjun	68/M	Pain Abdomen	Daignostic laproscopy	8	2	26	28	22	24	14	16	10	10
38	913900	Rajalaxmi	20/F	Chornic appendicits	Conventional laparoscopic appenectomy	4	1	25	24	22	18	18	18	16	18
39	914185	Sampada	26/F	Old treated case of appendicitis	Mini laparoscopic appendectomy	5	2	33	35	26	25	18	18	12	10
40	914408	Kirankumar	24/F	Appendicitis since 6months	Mini laparoscopic appendectomy	3	0	28	30	22	25	18	19	14	15
41	913403	Tukkappa	68/M	Pain Abdomen	Daignostic laproscopy	7	3	30	35	29	28	22	20	18	18
42	915599	Lakappa	24/M	Recurrent RIF pain	Conventional laparoscopic appenectomy	5	1	38	40	32	30	25	28	20	20
43	915842	Gajanan	24/M	Chornic appendicits	Conventional laparoscopic appenectomy	6	2	28	30	22	25	18	20	16	16
44	910098	Vinayak	29/M	Old treated case of appendicitis	Conventional laparoscopic appenectomy	6	3	30	28	26	28	25	22	20	16
45	915685	Ratansing	66/M	RIF Pain	Mini laparoscopic appendectomy	4	0	28	32	25	28	20	22	16	18
46	916320	Mahadevi	28/F	Appendicitis since 2months	Conventional laparoscopic appenectomy	6	2	35	38	32	35	28	29	20	20
47	916518	Shreya	18/F	Recurrent RIF pain	Mini laparoscopic appendectomy	3	0	28	28	20	20	16	20	14	15
48	916252	Yashodha	28/F	Pain Abdomen	Daignostic laproscopy	6	1	30	33	28	30	22	20	16	16
49	916440	Kavita	45/F	Recurrent umbilical Pain	Mini laparoscopic appendectomy	3	0	28	30	24	26	18	20	14	14
50	917291	Shalan	38/F	Pain Abdomen	Daignostic laproscopy	6	3	36	38	30	32	25	22	18	18
51	917337	Jayashree	39/F	appendicitis since 3 months	Conventional laparoscopic appenectomy	6	2	38	40	33	35	30	28	19	20
52	917353	Mahesh	22/M	Old treated case of appendicitis	Mini laparoscopic appendectomy	4	1	39	35	28	22	16	16	12	10
53	917436	Gangawwa	55/F	RIF Pain	Conventional laparoscopic appenectomy	3	3	28	30	22	25	16	18	16	18
54	918599	Ravsab	41/M	Chornic appendicits	Mini laparoscopic appendectomy	2	0	24	28	20	20	16	18	10	10
55	899111	Radhika	18/F	Appendicitis since 2months	Conventional laparoscopic appenectomy	5	1	30	32	25	26	18	20	12	16
56	900508	Lalitha	25/F	Recurrent umbilical Pain	Daignostic laproscopy	6	3	38	35	30	33	25	26	20	20
57	901344	Gangaram	58/M	Old treated case of appendicitis	Conventional laparoscopic appenectomy	4	1	35	36	28	30	22	22	20	18
58	919001	Nagraj	18/M	Chornic appendicits	Conventional laparoscopic appenectomy	6	3	36	38	33	35	26	28	22	25
59	883050	Pradhnya	18/F	Recurrent RIF pain	Conventional laparoscopic appenectomy	7	3	36	40	33	35	26	28	22	20
60	882887	Mouneshwar	38/M	appendicitis since 3 months	Conventional laparoscopic appenectomy	8	4	35	32	28	30	26	25	20	22

ANNEXURE-VI

KEY TO MASTER CHART

Sr. No.	:	Serial number
IP Number	:	In patient Number
VAS	:	Visual analogue scale
POD 1	:	Post operative day 1
DOD	:	Date of discharge
POSAS	:	Patient observer scar assessment scale
OSAS	:	Observer scar assessment score
PSAS	:	Patient scare assessment score
K/C/O	:	Known case of
RIF	:	Right iliac fossa
Diagnostic laparoscopy	:	Conventinal laparoscopic appendectomy
Diagnostic laparoscopy + appendectomy	:	Mini laparoscopic appendectomy

Introduction



Objectives

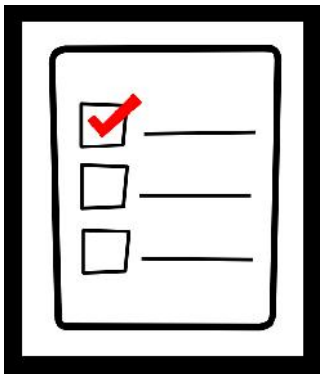
Review of Literature

Methodology

Results

Discussion

Conclusion

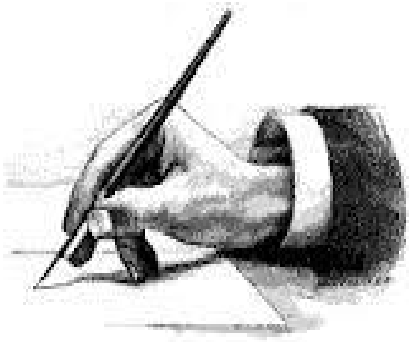


Limitations

Recommendations

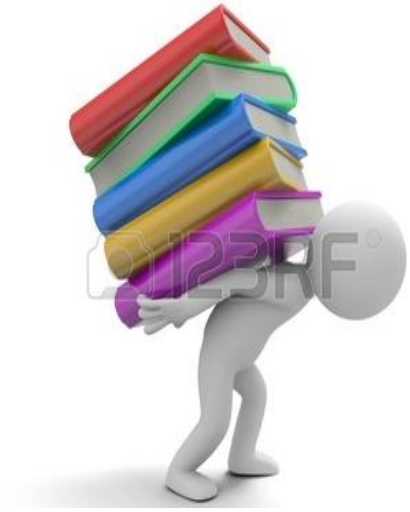
Summary

Bibliography



Annexure-I

Annexure-II



Annexure-III

Annexure-IV

Annexure-V