



TO STUDY THE MANAGEMENT OF ACUTE AND COMPLICATED APPENDICITIS: TRANS-ABDOMINAL DRAIN AFTER SURGERY CAN MINIMIZE THE POSTOPERATIVE COMPLICATION

Surgery

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ABSTRACT

Background: Acute appendicitis is common surgical condition and appendectomy is the treatment of choice in majority of cases. Ac. Appendicitis requires immediate diagnosis and definitive management if delayed may lead to perforation or gangrenous appendicitis that leads to develop post-operative complication. No standardized approach is available hence placed trans-abdominal drain post op to minimize complication.

Objectives: 1. To assess the mode of presentation of Ac & complicated appendicitis. 2. To assess the different treatment modality. 3. To assess the post-operative complication. **Methodology:** prospective study (cohort) carried out at tertiary care Centre, MUHS Nasik Maharashtra, India. Over 2 year period study from 1 January 2018 to 1 January 2020. 271 patients were enrolled. Results: Involved 5-45 years age group, Median age 25 years, maximum patients reported in 16-20 years, M:F ratio 1:1.39. Diagnosis based on symptoms, signs and laboratory, analyzed by Alvarado's score. Patients received preoperative, perioperative & post-operative antibiotics. Also USG, CT & X-ray abdomen, McBurney's muscle splitting incision preferred, in complication Rutherford Morison extension, Lanz, for females. Intraoperative findings were inflamed Appendix (33.50%), suppurated appendices (29.52%), perforated (10.33%), gangrenous (14.39%) & appendicolith, abscess, lump in few, it correlated with histopathology. In complication, peritoneal wash & trans-abdominal drain with primary wound closure. Post op complications like SSI, SAIO, wound gape, electrolyte imbalance, paralytic ileus, delayed were incisional hernia total (29.52%). Maximum patients discharged in 4-6 days (37.27%).

Conclusion: Young age group confirmed the open appendectomy remains the most effective treatment & trans-abdominal drain for complicated appendicitis associated with preoperative, perioperative and postoperative antimicrobial treatment can definitely minimize the postoperative complications and good outcome.

KEYWORDS

Appendicitis, Peritonitis, Perforation, Gangrenous, paralytic ileus, Trans-abdominal drain

INTRODUCTION

Acute appendicitis (AA) is common surgical disease with a lifetime risk of 7-8%¹, & common surgical abdominal emergency, with lifetime prevalence of 1 in 7². The incidence of acute appendicitis is about 76-227 patients per 100,000/year in different parts of the world³. AA requires immediate diagnosis and definitive management if delayed may lead to perforation or gangrene⁴. Clinical features are Right lower abdominal pain but there are many reasons & common cause is appendicitis, an infection/inflammation of the appendix⁵. Adults are able to give an accurate history of the prodrome of symptoms, while children's are less likely, that's the reasons younger children presented with more advanced appendicitis, perforation or abscess formation^{6,7,43}. Complicated appendicitis developed post op complications, like intra-peritoneal abscess, SSI⁸. To prevent such complications abdominal drains were used post operatively⁷. Diagnosis of AA based on symptoms, signs and laboratory data⁹. Several scoring systems described to diagnose AA, but commonly used Alvarado score and AIR (appendicitis inflammatory response Anderson score)^{10,11}. Have high Diagnostic accuracy, helpful for decision making, which decreases the expensive imaging study. Imaging study performed to diagnosis of AA, with clinical suspicious of AA it helps to reducing the rate of negative appendectomy by almost 15%, that's USG, CT, MRI¹². CT has high sensitivity (0.99), specificity (0.95)^{13,14,15}. However CT also does not differentiate between uncomplicated and complicated appendicitis^{16,17}. Presence of an appendicolith on imaging in younger age observed failure of medical management¹⁸. In children evidence of disease or contamination beyond RIF on imaging was a predictor for failure of conservative management¹⁹.

Different modes of treatment options described in literature, antibiotics plays an important role for treatment, described by several prospective trials and meta-analysis^{20,21,22,23}. USG report show visualization of non-compressible, tubular and blind-side aperistaltic structure, diameter of > 6 mm in RIF. Appendicolith, probe tenderness, increased echogenicity of the periappendiceal fat, free intra-peritoneal fluid particularly in RIF and circumferential color on Doppler ultrasound additional criteria for positivity of ac appendicitis or its complication²⁵. Such cases dealt with urgent surgery⁴³. Traditionally open appendectomy, the treatment of choice for acute and complicated appendicitis^{26,27}. Appendectomy first described by Mc Burney in 1894, after being introduced; was most common operations in abdominal surgery²⁸. In 1983 Kurt Semm, a German gynecologist performed first

laparoscopic appendectomy²⁹. Common practice to operate on doubtful cases rather than to wait and watch till the diagnosis is certain. This resulted negative appendectomy rate of 22-30%, considered acceptable¹. A longer wait results in a higher-perforation rate in children³⁴. Open appendectomy be considered gold standard technique³⁵. Postoperative SSI, adhesion Bowel obstruction occurring after the index surgery are described sequelae of appendectomies⁹.

Recently a new acute appendicitis grading system has been proposed by the world Society of emergency surgery (WSES), based on clinical presentation, imaging, and surgical findings. Aims are to provide a standardized classification system based on uniform patients stratification¹⁹.

Methodology

This is prospective observational cohort study carried out at surgery department, tertiary care Centre MUHS Nasik, Maharashtra, India. Over 2 year period study from 1 January 2018 to 1 January 2020.

Inclusion criteria: 1. Pain in the RIF suspected clinical diagnosis of Ac/complicated appendicitis confirmed by imaging. 2. Recurrent episodes of RIF pain. 3. Age 5-45 years. 4. Not responded to conservative treatment.

Exclusion criteria: 1. Age < 5, > 45 year. 2. Appendicular lump. 3. Severe comorbidity (Heart disease, DM, CRF)

Material: Study comprised 271 cases, presented with pain in RIF and associated other symptoms.

Evaluation: After hospitalization, patient kept NBM, IV fluid & antibiotics infused NSAID for pain control, if indicated placed ryles tube & Foley's catheter. Provisional diagnosis was made from detailed history, clinical findings, radiological and laboratory studies. Diagnosis of acute & complicated appendicitis was mainly based on symptoms, signs and laboratory data were analyzed by Alvarado's score it should be 7 or >7 indication for surgery. Written/informed consent for surgery & participation in study were obtained.

Procedure: Conventional muscle splitting right lower quadrant or Lanz cosmetically acceptable incision preferred, separate subcutaneous tissue, exposed an external oblique aponeurosis get

divide, splitting all abdominal wall muscles. Sometime get modified supero-lateral muscle-cutting wound extension for complicated appendicitis (Fig 1). Peritoneum opened (Fig 2). Appendix can be delivered out through the incision it may be wrapped in omentum which can either be gently freed or excised. Arterial supply clamped cut and ligated, appendicular base identified (Fig 3) clamped, cut and transfixed (Fig 4) with mersilk 2-0 suture material. Intra-peritoneal fluid or pus was obtained for culture in complicated cases like suppurated, perforated, gangrene and abscess. Whole Pus/fluid sucked out & peritoneal irrigation with warm normal saline, confirmed to clear off whole contamination. Then, intra-peritoneal drains were placed, brought out through separate incision made laterally on right side & fixed. Primary wound closure routinely practiced (Fig 5). Subcuticular in uncomplicated & interrupted permanent sutures was applied in complicated cases (Fig 6). Perioperative antibiotics were continued postoperatively non-standardized regimen exists, Inj.

Taxim/Xone (1gm BD), Inj. Gentamicin/ Amikacin (80/500mg BD) & Inj. Metronidazole/Ciprofloxacin (400/500mg TDS/BD). Modifying antibiotics as per culture sensitivity report, NBM break after 12 hour in uncomplicated cases. Precaution was required for complicated cases at least average 2 days of NBM, until the patient was afebrile, normal physical examination and WBC count. Early mobilization & oral intake observed then shift to oral antibiotics. In severe complication urgent surgery required, exploratory laparotomy without confirming diagnosis, midline/Rt paramedian incision was performed. Post op monitoring for any complication, maintain at least 50% of daily calorie intake, till the functional recovery of patients. Sometime post op complication were observed, can be treated conservatively, some of need secondary re-suturing & secondary outcome. Once the complication resolved, no signs of infection then surgeon decides to discharge the patient, independent analysis of quality of life of patient.

Study types: Clinical investigation,

Settings: Physical, Emergency ward, IPD

Design : Eligible for participation – Prospective study (cohort)- Post op findings – Follow up – Data collection - clinical outcome analysis

RESULTS

Our study involved 5-45 years of age group, Median age 25 years. Where maximum 67 patients (24.72%) reported in the range of 16-20 years, followed by 21-25 years 53 (19.55%) patients. Then 11-15 years age 48 patients (17.71%), 26-30 years 45 (16.60%), 31-35 age group 25 (9.22%). 36-40 years 14 patients (5.16%). 41-46 years 10 (3.69%). And few observed in 5-10 year 9 (3.32%).

Both male and female were included for study 113 patients (41.67%) were Male and 158 patients (58.33%) were female hence M:F ratio 1:1.39.

Diagnosis of acute & complicated appendicitis was mainly based on symptoms, signs and laboratory data were analyzed by Alvarado's score where 10 points observed. Symptoms were pain in RIF seen in 268 patients (98.89%), anorexia in 203 (74.90%). & nausea/vomiting in 196 (72.32%), Signs were RIF tenderness 257 patients (94.83%), Rebound tenderness in 194 (71.58%), fever 187 (69.00%). Lab test Leukocytosis in 213 patients (78.59%) shift to left segmented neutrophils in 201 (74.16%). (Table 1)

Our study shows maximum patients 82 (30.26%) reported in 2-4 days followed by 63 patients (23.25%) in 1-2 days, 50 (18.46%) in 12-24 hours, 33 (12.17%) admitted in <12 hours. 24 (8.85%) in 4-6 days & 19 patients (7.02%) get admitted in > 6 days. We observed early admission within 4 days had more toxicity or complicated appendicitis.

Maximum patients 223 (82.28%) investigated with USG, 79 patients (29.15%) x-ray abdomen, CT in 35 patients (12.91%), While both USG and CT in 33 patients (12.17%). None of any imaging study done in 45 patients (16.60%).

McBurney's muscle splitting incision was commonly performed in 123 patients (45.38%) some of modified to Rutherford Morrison extension in 53 (19.55%). In females without complication preferred Lanz incision in 81 (29.88%). Some required right Para-median in 11

(4.05%), and midline incision in 3 (1.10%). **Chart 2.**

Intraoperative observation in present study were, inflamed Appendix in 91 patients (33.50%) (Fig 7), suppurative appendices in 80 (29.52%) (Fig 8), gangrenous appendix in 39 (14.39%) (Fig 9). Perforated appendix seen in 28 patients (10.33%), appendicolith in 11 (4.05%) (Fig 10) & abscess in 5 (1.84%). Appendicular lump in 3 patient (1.12%) and 14 patients (5.16%) observed normal appendix.

Table 2

Swab of peritoneal fluid or pus in 163 patients (60.14%), for culture & sensitivity examined in complicated appendicitis.

In 165 patients (60.88%) need intra-peritoneal irrigations with warm normal saline to wash out intra-peritoneal contamination in complicated cases to minimize post op septicemia.

Our study appendectomy done in 259 (95.57%), 5 (1.84%) had I&D. In 2 (0.73%) we performed caecostomy with appendicular base repair for perforation at base and surrounding edema. In 5 (1.84%) appendectomies were not possible due to dense adhesions. Primary closure of all wound & skin routinely practiced. (Table 4)

And in complicated appendicitis, in an attempt to improve results we have begun to placed trans-abdominal drain in 157 patients (57.93%) **Chart 1.** & patients showed mild to moderate intensity of pain post op. Sometimes severe pain observed because of post op complication.

In our study we began to start antibiotics respective to severity of complications, maximum patients 152 (56.08%) received 5 D IV + 5D oral antibiotics. 99 patients (36.53%) received 3D IV + 4D oral, and 20 patients (7.38%) 2D IV + 3D oral antibiotics. Modifying antibiotics as per culture sensitivity report, if patient shows improvement in vitals, count normalizes & patients tolerate orally, shifted them on oral antibiotics.

In this study complicated appendicitis shows a higher risk of post op complication observed in 80 patients (29.52%), were SSI in 47 patients (17.34%), wound gape and paralytic ileus in 9 (3.32%) each, electrolyte imbalance in 8 (2.95%), SAIO in 6 patients (2.21%) & late, incisional hernia in 1 patient (0.36%). Most of complication treated conservatively & some of treated with secondary re-suturing. (Table 3) Our study 245 specimens (90.40%) examined with histopathology & reported, inflamed appendix in 77 specimens (28.41%), suppurated in 79 (29.15%), Gangrenous in 38 (14.02%). Perforated in 28 (10.33%). Peri-appendicitis in 15 (5.53%) & 8 (2.95%) were normal.

In our study maximum patients were discharged in 4-6 days seen in 101 patients (37.27%) followed by 67 (24.72%) discharged in 2-4 days. Then 56 (20.66%) in 6-8 days, 30 (11.08%) in 8-10 days, & 17 (6.27%) need long time for discharge > 10 days. **Table 5,** after discharge frequent F/U advised.

DISCUSSION

Our study involved 5-45 years of age group, Median age 25 years. Maximum 67 patients (24.72%) reported in 16-20 years. **Massimo Sartelli, et al** observed median age of 29 years in their study. **D. G. Addiss, N. Shaffer & et al** shows it affects who belong to 10-19 age group³⁰.

Both male/female were included, ratio was 1:1.39. **Massimo Sartelli, et al** observed 45% women and 55% men with a median age of 29 years⁹.

Diagnosis based on symptoms, signs and laboratory data were analyzed by Alvarado's score. Symptoms were pain in RIF, anorexia and nausea/vomiting. Signs were RIF tenderness, Rebound tenderness and fever. Lab reports, leukocytosis & shift to left segmented neutrophils, 7 or > 7 points indication for surgery. **Massimo Sartelli, et al** observed Clinical findings was Diffuse tenderness in 11.7%, Right lower quadrant pain in 91.2%, right lower quadrant tenderness 69.6%, Vomiting in 42%, Temperature > 38 in 24.7%, WBC > 10,000/ml 81.6%, also significant changes seen in CRP⁹.

Maximum reported to hospital in 2-4 days, then 1-2 days, then 12-24 hours (18.46%) & few after 6 days. Early admission within 4 days of pain had more toxicity or complication. **Jesse E, Thompson Jr, et al,**

observed hospitalization mean of 6.8 days of abdominal pain⁴¹. **Jonathan P. et al**, observed Duration of pain was < 72 hour were toxic-appearing & > 72 hour of symptoms was not toxic appearing³².

Our study practiced routinely to administer preoperative & perioperative antibiotics after hospitalization. **Maingots** described preoperative & perioperative antibiotic indicated³⁵.

Diagnostic study like USG, x-ray, CT abdomen carried out. **Massimo Sartelli, et al** observed that 21.2% patients underwent abdominal CT scan, 43.3% of patients had an ultrasonography and 6.7% had both CT scan and ultrasonography. And 28.8% of patients did not undergo any radiological investigation during hospitalization⁹.

We commonly preferred mcBurney's muscle splitting incision, in complicated cases modified to Rutherford Morrison extension. Lanz for female, few required right Para-median and midline for generalized peritonitis. **Farquharson's** described extension of wound, or separate midline laparotomy incision, is often necessary in complicated cases, gridiron & Lanz incision preferred⁴³. **Maingots** described right lower abdominal incisional for uncomplicated & modified muscle cutting in complicated cases while midline in generalized peritonitis³⁵.

Intraoperative observation was inflamed, suppurated, perforated, gangrenous appendicitis, abscess, appendicolith, Lump & normal in few. **Bradley EL 3rd**, & **Di Saverio S et al** reported 2- 7% of appendicitis present with Complex features, phlegmon or peripendicular abscess^{33,34}.

In our study, Intra-operative swab obtained for culture & sensitivity in complicated appendicitis. **Massimo Sartelli, et al** observed Intraoperative swab for culture in 19.6% patients. 34.2% were positive swab culture, Aerobic and anaerobic Bacteria identified⁹. **Mohammad Akbar Ali Mardan et al** observed peritoneal swab yielded growth of any bowel organism²⁹.

In our study 60.88% patients underwent intra-peritoneal irrigations with warm normal saline to wash out intra-peritoneal contamination to minimize post op septicemia. **St Peter SD, Holcomb GW 3rd et al** stated the role of irrigation, an abundance of data from several decades failed to demonstrate a clinical role for irrigation in the face of peritoneal contamination³⁸. **Harwich JE, et al & Moore CB, et al** observed To retrospective studies comparing irrigation to no irrigation during appendectomy, both demonstrated an increase in abscesses resulting from the use of irrigation, leading to recommended no irrigation^{39,40}. **Thomas J, et al** said irrigation of the peritoneal cavity with saline gives good result post operatively⁴¹. **James R et al** described saline peritoneal irrigation³⁷. **Farquharson's** described pus should be sucked, irrigated with saline or bactericidal solution in complicated appendicitis⁴³. **Maingots** described intra-peritoneal irrigation with warm saline in complicated appendicitis³⁵.

Our study performed (95.57%) appendectomy, few had I & D, caecostomy with appendicular base repair for perforation at base and surrounding edema. **Massimo Sartelli, et al** observed, 95.7% of patients underwent surgery, 0.6% had lavage and drainage, 0.8% had an open ileocaecal resection, and 0.2% underwent percutaneous drainage⁹. **Chen C, Botelho C. et al** observed in survey (APSA) in 2005 found that 86% of the responders perform interval appendectomy after conservative management of perforated appendicitis⁴². **Jesse E et al** stated 10 patients had abscessed was encountered & Intra-op surgery modified, it includes part of right colon and 5-7 cm terminal ileum resected. In which 14 patients had a primary anastomosis, while 3 had the creation of an ileostomy³¹. **Maingots** described in phlegmon, appendectomy is difficult due to dense adhesions and inflammation. Ileocectomy may be necessary if the inflammation extend to the wall of caecum³⁵.

Primary closure of wound & skin routinely carried out in our study. **Thomas J, et al** stated for complicated cases often managed with primary closure and literature supports it⁴¹. **James R et al** stated, Skin and subcutaneous tissues were left open for delayed closure³⁷. **Maingots** described Primary closure of skin, with interrupted permanent suture or stapler every 2 cm with loose wound packing in between it, removal of packing in 48 Hour³⁵. **Marion C W, Henry et al** stated primary closure is a safe and practical treatment option³⁶.

In complicated appendicitis in an attempt to improve results we have

begun to placed trans-abdominal drain (57.93%). **Thomas J, et al** stated Studies dealing with complicated appendicitis and use of postoperative intra-abdominal drain, through the lateral aspect of the wound with skin closure⁴¹. **James R et al** stated, Trans peritoneal drainage was not used in complicated cases also³⁷.

Farquharson's stated when localized pus is encountered a peritoneal drain is placed it should be brought out through separate incision⁴³. In our study, pain had mild to moderate in early postop phase, comparatively severe in some of complicated appendicitis.

We continue antibiotics postoperatively respective of complications, (56.08%) received 5D IV + 5D oral antibiotics. (36.53%) 3D IV + 4Doral, (7.38%) received 2D IV + 3D oral antibiotics. **Massimo Sartelli, et al** observed 80.9% patients received antibiotics, mono-therapy in 38.6% patients; median duration was 4 days⁹. **WSES** recommended the use of broad spectrum antibiotics in complicated AA for a minimum duration of 3-5 days and no antibiotics for uncomplicated appendicitis⁴⁴. **Styrud J, et al** said Median duration of the antimicrobial therapy was 4 days⁴⁵. **AnneLoes et al** described comparative study, 48 hour & standard 5 days IV antibiotic infusion for complicated cases, all received cefuroxime/metronidazole, 1500/500 TDS. Or ceftriaxone/metronidazole (once a day, 2000 mg/three time a day). Next group extended 3 more days' to reduce post op complication⁴⁶. **Jonathan P. et al** observed all received broad spectrum antibiotics for 5-7 days³². **Maingots** described IV broad spectrum antibiotic significantly reduced post of wound infection and intra-abdominal abscess formation, gram -ve and anaerobic antimicrobial agent single dose for uncomplicated & 4 days for complicated appendicitis³⁵.

Our study observed complicated appendicitis have a higher risk of post op complication. Like SSI, wound gape, paralytic ileus, electrolyte imbalance, SAIO & incisional hernia. **Thomas J, et al** observed Complication rate was 8% with intra-abdominal abscess 3%, bowel obstruction 5%, minor like prolonged ileus, fever⁴¹. **Jesse E, et al** observed Caecal leak or disruption after appendectomy for complicated appendicitis is a consequence of severity of disease and residual abscess cavity, inflammation, phlegmon, and non-viable intestine. Minimal Complication like 1 wound infection, 1 pulmonary embolism³¹. **Ming, Poon Chi et al** said Infection occurred in 40 patients (23.1%) 32 had wound infections and 10 had intra-abdominal abscess⁵⁰. **James R et al** observed 49% total complication, 11% gangrene, 33% perforation, 4% bowel perforation with well-developed abscess³⁷.

Our study histopathology analyzes 245 (90.40%) specimens, reported inflamed, suppurate, Gangrenous, perforated & periappendicitis. **Massimo Sartelli, et al** said 88.6% appendix were analyzed with 4% normal, 6.5% periappendicitis, 31.6% inflammation, 32.4% suppurated, 7% perforated and 18.5% were gangrenous appendix⁹. **Gahukamble DB, Mazziotti MV & Knott EM et al** noted a high rate of pathologic findings in interval appendectomy specimens^{47,48,49}.

In our study maximum patients were discharged in 4-6 days (37.27%) & (6.27%) need > 10 days. **Massimo Sartelli, et al** observed median length of stay was 3 days, 4% had a 1 day stay⁷. **Thomas J, et al** observed Average hospital stay was 8.7 days⁴¹. **Jesse E, et al** observed all patients discharged on the average of 9.9 days postoperatively³¹. **Maingots** described Non-complicated cases require 24-48 hours Hospitalization and complicated cases hospitalized till becomes afebrile³⁵.

CONCLUSION

Young age group confirmed the open appendectomy remains the most effective and backbone of treatment in complicated appendicitis. Trans-abdominal drain post operatively, after peritoneal irrigation in complicated cases. Preoperative, peri-operative & post-operatively use of antimicrobial treatment, modified after culture sensitivity report of peritoneal fluid/pus. It definitely minimized the postoperative complications. The whole procedure was ideal for surgeons as well as patients especially in complicated cases; it is effective procedure with good clinical outcomes.

OBSERVATION

Table 1: Symptoms (Alvarado score)

Score	Symptoms	No of pt.	%
1	Pain in RIF	268	98.89%

1	Anorexia	203	74.90%
1	Nausea/Vomiting	196	72.32%
Sign			
2	TendernessRIF	257	94.83%
1	Reboundtenderness	194	71.58%
1	Fever	187	69.00%
Lab			
2	Leukocytosis	213	78.59%
1	Shift to left(segmented neutrophils)	201	74.16%

Table 2: Intra op findings

no	Findings	pt.	%
1	Inflamed Appendix	91	33.59
2	Suppurated Appendices	80	29.52
3	Gangrenous Appendix	39	14.39
4	PerforatedAppendix	28	10.33
5	Normal Appendix	14	05.16
6	Appendicolith with in flamedA	11	04.05
7	Only Abscess	05	01.84
8	Lump / Denseadhesion	03	01.12

Table 3: Post Op Complication

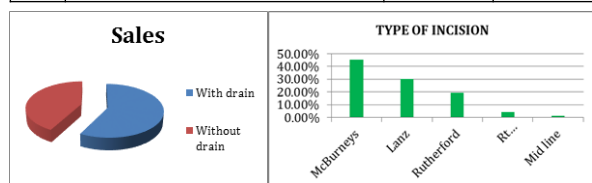
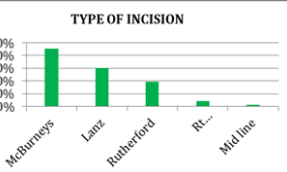
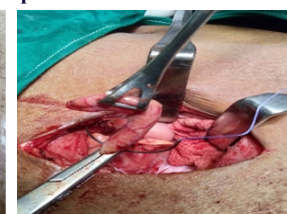
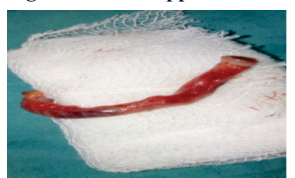
no	Complication	Pt.	%
1	SSI	47	17.34%
2	Woundgape	09	3.32%
3	Paralyticileus	09	3.32%
4	Electrolyteimbalance	08	2.95%
5	Subacuteintestinalobstruction	06	2.21
5	Incisionalhernia	01	0.36%

Table 4: Type of surgery

no	Type of surgery	Pt.	%
1	Append ectomy	259	95.57%
2	Incision & Drainage	05	1.84%
3	Caecostomy with base repair	02	0.73%
4	Appendicular lump surgery abandoned	05	1.84%

Table 5: Hospital stay

Sr.no	Hospitalstay	Pt.	%
1	2-4	67	24.72%
2	4-6	101	37.27%
3	6-8	56	20.66%
4	8-10	30	11.08%
5	>10	17	6.27%

**Chart 1: Post op drain****Fig 1: McBurneys incision with Ruthford extension.****Chart 2: Type of incision****Fig 2: Peritoneum exposed & opened****Fig 3: Appendix & Appendicular Base****Fig 4: Appendicular Basetransfixation****Fig 5: Incision primary closed****Fig 6: Subcuticular skin closure****Fig 7: Inflamed Appendix****Fig 8: Suppurated Appendix****Fig 9: Pregangrenous changes****Fig 10: Appendiculolith****REFERENCES**

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