

Management of Acute Appendicitis in Covid Pandemic-A Prospective Study of 25 Cases

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Abstract

Acute Appendicitis is a surgical emergency. Patients present with pain in right lower abdomen, with other symptoms like nausea/vomiting, fever, diarrhoea, urinary symptoms. Diagnosis is based on a multimodality approach that includes, clinical, radiological and pathological findings. Alvarado Score helps determine the severity of infection, confirm diagnosis and guide further management. Management is either conservative with antibiotics or surgical depending on severity. However approach to surgical management has changed with the ongoing Covid-19 pandemic. It has necessitated categorisation of surgical procedures into essential and non essential to limit risk to both patient and surgical team and also for prioritization of resources to the rising, continued spread of Covid-19. We present a prospective study of 25 cases of appendicitis presenting during the Covid Pandemic between 15th March and 30th May to our hospital, with an intent to try conservative management for all patients except in the presentations with complications like perforation, abscess or the presence of fecolith or poor response to conservative management. Patients not amenable to conservative management were treated by Open appendicectomy.

Index terms— acute appendicitis, Covid-19, alvarado score, appendicectomy.

1 Introduction

Acute appendicitis is a surgical emergency. It is the most common cause of acute abdomen in North America, with approximately 1/3 rd presenting with perforation at presentation. Incidence is 84/100000 population. 1 CT is gold standard for imaging in acute appendicitis, however associated with increased radiation exposure. Alvarado Score is used to predict the severity of appendicitis, and uses clinical symptoms, signs and laboratory markers and negates the need for radiation exposure. 2 Management of appendicitis is either conservative or surgical. Conservative management can be tried for non complicated appendicitis, whereas presence of complications like perforation, fecolith, abscess dictate surgical management. 3,4 However, the Covid-19 pandemic changes routine surgical management. Operating theatres are high risk areas for transmission, additional strain on the team and resources due to increasing prevalence of Covid-19, risk to operating team has called for a change in protocols to determine essential vs non essential procedures. Proper education of surgical staff regarding use of PPE and decreased exposure of healthcare staff is the key to minimising risk of infection in the team. 5 Uncomplicated appendicitis can be managed with antibiotics and monitored for improvement in symptoms, signs and hemogram for leucocytosis. Complicated cases that cannot be otherwise conserved can be operated taking all the necessary precautions such as pre operative COVID-19 testing, including Personal Protective Equipment (PPE) for operating team, limiting the members of operating team, proper operating room ventilation and air purification, dedicated Covid-19 positive and Covid-19 suspect wards, clear path for transport with limited traffic are the need of the hour. Laproscopic surgeries carry higher risk over open surgeries due to the risk of aerosol transmission. ?? .

8 IN 33.33% PATIENTS. OUT OF 25 PATIENTS, 6 PATIENTS WHO UNDERWENT OPERATIVE MANAGEMENT HAD ADVERSE CLINICAL SIGNS ON PRESENTATION, WITH LEUCOCYTOSIS OR WORSENING AFTER ADMISSION OR APPENDICULAR PERFORATION AS PRESENTATION.

3 Material and Method

A Prospective study was done on all patients presenting to Dr. D.Y Patil Hospital, Navi Mumbai, India with clinical features of acute appendicitis during covid pandemic, from 15th March to 30 th May.

4 Inclusion Criteria

1. Patients presenting with clinical features of acute appendicitis, diagnosed clinically and confirmed on ultrasonography and evident as leucocytosis on hemogram were included in the study. 2. Patients willing to participate in the study. 3. Patients who followed up for 7 days after discharge.

5 Exclusion Criteria

1. Patients not willing to participate in the study. 2. Patients who did not follow up after discharge.

All patients presenting with right iliac fossa during the above stated period were evaluated. Following parameters were noted for all patients and compared.

Patients above 15 years of age were included in the study. Thorough history taking and examination was done for the patients. Presenting symptoms of pain in abdomen, nausea/vomiting, fever, loss of appetite, loose stools, urinary frequency were evaluated. History of recent travel, contact with covid positive or covid exposed patients was asked for. Any significant co I morbidities and past surgical histories were noted. Covid swab was sent for all patients on admission. Complete physical examination was done for the patients. Pulse rate, Blood Pressure examination, Per abdominal examination was done to look for tenderness and its site, presence of any guarding or rigidity. Chest Xray was done for all the patients to rule out features of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), including atypical or organising pneumonia, often with a bilateral, peripheral, and basal predominant distribution. A hemogram was done for all patients. Ultrasound examination was done for all patients, including diameter of appendix, periappendiceal fat stranding or collection with other features such as presence of appendiculoliths, gas within the lumen of appendix, loculated collection and appendicular phlegmon were noted. Based on ultrasound findings, patients were classified into Group A and B, Group A had cases of uncomplicated appendicitis that were conserved, whereas Group B had cases of Complicated appendicitis including, appendiculolith, appendicular perforation, appendicular abscess. Patients of group A who did not respond to conservative management within 24-48 hours were operated and included in group B.

Conservative management included, keeping the patient nil per oral for 48 hours with intravenous antibiotics for 3-5 days, shifted to oral antibiotics after that.

These patients were regularly examined for worsening of clinical signs including change in abdominal examination findings, with repeat leucocyte count being done at 48 hours. One patient in Group A did not improve after 48 hours and was taken up for surgery.

Patients operated were treated with all precautions and use of PPE and open appendectomy was done. Laproscopic appendectomy was not done due to increased risk of aerosol exposure to operating team. Patients were given intravenous antibiotics for 3 days in view of complicated appendicitis, then shifted to orals. Patients were kept nil per oral for two days after surgery, then shifted to orals. Suture removal was done on POD 10.

All patients were tested for Covid-19, and turned out to be negative.

All patients were followed up for 7 days after discharge, with plan to follow up if symptomatic in the future.

Patients with appendicular lump were asked to follow up after 4 weeks, and before that if symptomatic.

6 III.

7 Result and Discussion

Out of 25 patients, 15 were males and 10 were females. It was observed that 64% of patients were in the age group of 15-25 years. All 25 patients presented with pain in right iliac fossa, while 10 % had accompanying nausea/vomiting. 40% patients had a 24-48h history of pain in abdomen, 24% patients had a 48-72h history, 12 % had a history of >72h and 8% had <24h history of pain in abdomen. In Group A, 89% patients had an Alvarado Score of 7-10, 11% had a score of 5-6 and were conserved. Group B that underwent surgical management had an Alvarado score of 7-10 in 66.66% patients and a score of 5-6

8 in 33.33% patients. Out of 25 patients, 6 patients who underwent operative management had adverse clinical signs on presentation, with leucocytosis or worsening after admission or appendicular perforation as presentation.

The first historical description of appendix and its inflammation dates back to the 16 th century. The first appendectomy was described by Amyand in 1736, when he discovered inflamed appendix in a patient of hernia with enterocutaneous fistula. 7 Appendix is a blind muscular tube, with mucosa, submucosa, muscular and

serosal layers. It is short and broad at birth, then becomes tubular by 2 years of age. Appendix comes to lie in retrocaecal position as the caecum grows and appendix rotates. Failure of this rotation results in pelvic, subcaecal and paracaecal positions. The base of the appendix, however remains constant, at the confluence of the three tenia, and can help find the appendix intraoperatively by tracing anterior tenia. 8 Appendicitis is inflammation of appendix. Etiology of appendicitis includes decreased dietary fibre, increased consumption of refined carbohydrates and often luminal obstruction by fecolith or stricture. Pathology of appendicitis involves obstruction of lumen, lymphoid hyperplasia, increased intraluminal pressure, oedema and mucosal ulceration, venous obstruction and ischemia of appendix wall leading to gangrene and perforation. Infection may get contained by antibiotics or greater omentum and loops of small bowel become adherent to inflamed appendix and form a phlegmonous mass or paracaecal abscess. Risk 10 . Presentation as appendix mass is conserved with antibiotics. 11 Covid-19 is caused by SARS-COV-2, known commonly as coronavirus. It is responsible for an outbreak beginning in Wuhan in December 2019, then spreading to majority of the world. It causes asymptomatic infection to mild pneumonia like illness, spreading by person to person contact via droplets. Fulminant infection may develop leading to severe pneumonia, renal failure and even death. The existence of this pandemic makes surgical management a challenge as it risks exposing the surgical team to known, suspected or asymptomatic Covid-19 cases. Surgical management has to be limited to cases, that cannot be otherwise conserved or postponed, to limit unnecessary exposure of both the surgical team and the patient to Coronavirus. It also allows diversion of members of the team towards management of Covid-19 pandemic associated increased admissions. 12 . Laproscopic surgery involves creation of pneumoperitoneum which increases risk of aerosol exposure to the operating team. Electrical equipment and harmonic scalpels used in laproscopic surgery generate surgical smoke that cannot effectively deactivate cellular component of the virus. Level 3 protection is mandatory for the operating team. Closed smoke evacuation/ filtration systems with ULPA (Ultra Low Particulate Air Filtration) capacity should be used during MIS, minimal use of energy sources, separate cleaning of surgical equipment need to be exercised. 13 All patients to be considered as COVID-19 positive unless proven otherwise, and operated with proper precautions that need to be exercised for positive patients. Patients have to be explained the risk of acquiring covid-19 during procedure and hospitalisation.

IV.

9 Conclusion

Acute appendicitis, with prevalent Covid-19 and its associated morbidity to the patient undergoing surgical procedures and risk to the operating team can be managed conservatively, even with a higher Alvarado Score on presentation, unless complicated with fecolith, appendicular perforation or abscess or failure to resolve after conservative management. Conservative management decreases the burden on the already overwhelmed hospital resources, medical team due to Covid-19 and limits unnecessary exposure for both patient and the operating team. ^{1 2}

9 CONCLUSION

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Out of the six operated patients, indications for surgery were as follows

GROUP A (Conservative Management)-19 patients Patient (Serial number)

Alvarado Score 1 1-4 2 5-6 7-10 3

GROUP B (Operative Management)-6 patients 4

Alvarado Score 1-4 5 5-6 6 7-10

8 Antibiotics given: Antibiotics were given depending on Leucocyte count of the patients were compared

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Global Age distribution (in years) 15-25 26-35 36-45 46-55 >55 Comorbidities-One patient was diabetic and

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[Ann Surg ()] , 10.1097/SLA.0000. *Ann Surg* 2020.

[Ann Surg ()] , 10.1097/SLA.0000000000003924. doi:10.1097/SLA.0000000000003924. *Ann Surg* 2020.

[Alvarado ()] ‘A practical score for the early diagnosis of acute appendicitis’. A Alvarado . 10.1016/S0196-0644(86)80993-3. *Ann Emerg Med* 1986. 15 p. .

[Wilms ()] ‘Appendectomy versus antibiotic treatment for acute appendicitis’. Ingrid Mha Wilms . *Cochrane database of systematic reviews* 2011. 11.

[Styrud ()] ‘Appendectomy versus antibiotic treatment in acute appendicitis. a prospective multicenter randomized controlled trial’. Johan Styrud . *World journal of surgery* 2006. 30 (6) p. 1033.

[Thomas ()] ‘Conservative management of the appendix mass’. D R Thomas . *Surgery* 1973. 73 p. .

[Wojciechowicz et al. ()] ‘Conservative treatment of acute appendicitis: an overview’. K H Wojciechowicz , H J Hoffkamp , R A Van Hulst . *International maritime health* 2010. 62 p. .

[Spinelli and Pellino ()] ‘COVID-19 pandemic: perspectives on an unfolding crisis’. A Spinelli , G Pellino . *The British Journal of Surgery* 2020.

[Shogilev et al. ()] ‘Diagnosing appendicitis: evidence-based review of the diagnostic approach in 2014’. D J Shogilev , N Duus , S R Odom , N I Shapiro . 10.5811/westjem.2014.9.21568. *West J Emerg Med* 2014. 15 (7) p. .

[Coward et al. (2016)] ‘Incidence of Appendicitis over Time: A Comparative Analysis of an Administrative Healthcare Database and a Pathology-Proven Appendicitis Registry’. S Coward , H Kareemi , F Clement . 10.1371/journal.pone.0165161. *PLoS One* 2016. 2016 Nov 7. 11 (11) p. e0165161. (Published)

[Brindle and Gawande (2020)] *Managing COVID-19 in Surgical Systems*, M E Brindle , A Gawande . 2020 May 21. (published online ahead of print)

[Zheng et al. (2020)] *Minimally Invasive Surgery and the Novel Coronavirus Outbreak: Lessons Learned in China and Italy*, M H Zheng , L Boni , A Fingerhut . 2020 Mar 26. (published online ahead of print)

[Amyand ()] ‘Of an inguinal rupture, with a pin in the appendix caeci incrusted with stone, and some observations on wound in the guts’. C Amyand . *Phil Trans R Soc Lond* 1736. 39 p. .

[Bailey] *s short practice of surgery, 26e*, Love Bailey . p. 1199.

[Francis ()] ‘SAGES and EAES recommendations for minimally invasive surgery during COVID-19 pandemic’. Nader Francis . *Surgical Endoscopy* 2020. p. .