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Clinical evaluation and surgical outcome of appendix

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Abstract
Appendectomy is the most common surgical procedure done worldwide. 8 The management of simple appendicitis is straight forward. Its appendectomy, either open or through laparoscopy. Complicated appendicitis was traditionally managed with immediate surgery. But in 1980 conservative management was described. As per this approach, patients with complicated appendicitis were initially treated with intravenous antibiotics followed by interval appendectomy after a period of 4 to 16 weeks. Over the years this approach gained popularity. But in recent years this practice has been questioned with new data. The objective of the present study was to evaluate the surgical treatment of appendix.
The study was planned in the 20 cases in IGIMS, Patna from Jan 2008 July 2008. The patients were Clinically diagnosed case of Acute Appendicitis presenting within 48 hours of initiation of Abdominal pain. On all patients Open appendicectomy was done. Preoperative prophylactic antibiotics were given (cefotaxime 500 mg and metronidazole 250 mg intravenous) and continued post operatively for 3 days. Patients were discharged with oral Amoxcillin 250 mg 12 hourly and metronidazole 200 mg 8 hourly for 5 days.
The diagnosis and management of acute appendicitis have been described with a focus on some current issues. Appendicitis is the most common surgical condition. Complicated appendicitis is associated with high morbidity. High leucocyte count, delayed presentation and appendicolith are possible markers of complicated appendicitis. Controversy exists about the ideal time for surgery in complicated appendicitis. Early surgery in complicated appendicitis is safe, feasible.

Keywords: appendicitis, appendicectomy, surgery

1. Introduction
Appendicitis is an inflammation of the appendix, a small, closed, tube-like sac at the end of the first part of the colon (or large bowel). This small appendage can become irritated and sometimes infected when its opening into the colon is blocked with mucus, stool, or a swelling of the lymph tissue. The severely inflamed appendix may rupture, with the potential of spreading infection through the abdomen. Sometimes the body itself will contain the bacteria released by this rupture and heal the appendix, and the pain and infection will resolve naturally. Other times, a ruptured appendix (or even a case of suspected appendicitis itself) can be treated successfully with antibiotics alone.
Appendicitis is inflammation of the appendix. Symptoms commonly include right lower abdominal pain, nausea, vomiting, and decreased appetite. However, approximately 40% of people do not have these typical symptoms. Severe complications of a ruptured appendix include widespread, painful inflammation of the inner lining of the abdominal wall and sepsis [1].
Appendicitis is caused by a blockage of the hollow portion of the appendix. This is most commonly due to a calcified "stone" made of feces. Inflamed lymphoid tissue from a viral infection, parasites, gallstone, or tumors may also cause the blockage. This blockage leads to increased pressures in the appendix, decreased blood flow to the tissues of the appendix, and bacterial growth inside the appendix causing inflammation. The combination of inflammation, reduced blood flow to the appendix and distention of the appendix causes tissue injury and tissue death. If this process is left untreated, the appendix may burst, releasing bacteria into the abdominal cavity, leading to increased complications [2].
The diagnosis of appendicitis is largely based on the person's signs and symptoms. In cases where the diagnosis is unclear, close observation, medical imaging, and laboratory tests can be helpful. The two most common imaging tests used are an ultrasound and computed tomography (CT scan). CT scan has been shown to be more accurate than ultrasound in detecting acute appendicitis. However, ultrasound may be preferred as the first imaging test in children and pregnant women because of the risks associated with radiation exposure from CT scans [3].
For over a century, laparotomy (open appendectomy) was the standard treatment for acute appendicitis. This procedure consists of the removal of the infected appendix through a single large incision in the lower right area of the abdomen. The incision in a laparotomy is usually 2 to 3 inches (51 to 76 mm) long. During an open appendectomy, the person with suspected appendicitis is placed under general anesthesia to keep the muscles completely relaxed and to keep the person unconscious. The incision is two to three inches (76 mm) long and it is made in the right lower abdomen, several inches

above the hip bone. Once the incision opens the abdomen cavity and the appendix is identified, the surgeon removes the infected tissue and cuts the appendix from the surrounding tissue. After careful and close inspection of the infected area, and ensuring there are no signs that surrounding tissues are damaged or infected. In case of a complicated appendicitis managed by emergency open appendectomy, abdominal drainage (a temporary tube from the abdomen to the outside to avoid abscess formation) may be inserted but this may increase the hospital stay [4]. The surgeon will start closing the incision. This means sewing the muscles and using surgical staples or stitches to close the skin up. To prevent infections, the incision is covered with a sterile bandage or surgical adhesive.

Laparoscopic appendectomy has become an increasingly prevalent intervention for acute appendicitis since its introduction in 1983. This surgical procedure consists of making three to four incisions in the abdomen, each 0.25 to 0.5 inches (6.4 to 12.7 mm) long. This type of appendectomy is made by inserting a special surgical tool called a laparoscope into one of the incisions. The laparoscope is connected to a monitor outside the person's body and it is designed to help the surgeon to inspect the infected area in the abdomen. The other two incisions are made for the specific removal of the appendix by using surgical instruments. Laparoscopic surgery requires general anesthesia, and it can last up to two hours. Laparoscopic appendectomy has several advantages over open appendectomy, including a shorter post-operative recovery, less post-operative pain, and lower superficial surgical site infection rate. However, the occurrence of intra-abdominal abscess is almost three times more prevalent in laparoscopic appendectomy than open appendectomy [5].

However, the diagnosis of appendicitis is almost always treated as a medical emergency. Patients usually undergo surgical treatment promptly because of the potential complications of a ruptured appendix. Frequently, the site of perforation of the appendix becomes abscessed. Or, the bacteria released by the burst appendix will cause peritonitis, an infection of the lining of the abdomen and pelvis that can become very serious. Less commonly, the inflammation can cause a disruption of colon function that results in a blockage of the bowel. These complications are indications for immediate surgery targeted both at the ruptured appendix and any infectious process caused by it.

Appendectomy is the surgical procedure used to treat appendicitis, and it is the most common form of urgent gastrointestinal surgery. In this operation, the surgeon removes the appendix and closes its connection to the colon. The surgeon can perform an appendectomy either laparoscopically or through an open surgical procedure. The laparoscopic approach also permits the team to fully confirm the diagnosis of appendicitis, through visualization of the appendix, without the patient incurring the large incision necessary for an open surgical appendectomy.

An appendectomy may also involve draining any abscesses that are present. Furthermore, even in cases where symptoms of the ruptured appendix have been limited and have resolved on their own, surgeons often perform an appendectomy after several weeks to prevent a future attack of appendicitis. An open appendectomy requires one incision that is two or three inches in length. A laparoscopic appendectomy requires three much smaller puncture wounds. Since less abdominal healing is required after a laparoscopy, this approach means less pain and faster recovery. If the appendix has not yet ruptured by the time of its surgical removal, patients often need stay only one night in the hospital. If the appendix has ruptured, patients will typically need to stay in the hospital for several days, as the medical team treats any abdominal infection (or risk of it) with antibiotics.

The appendix has no known function, and its removal does not appear to have any negative effects. Full recovery from appendectomy requires several weeks, during which time patients need to limit physical activity. Recovery may take longer if the appendix ruptured, or if there were complications such as abscess or peritonitis [6].

Appendectomy is the most common surgical procedure done worldwide. 8 The management of simple appendicitis is straight forward. Its appendectomy, either open or through laparoscopy. Complicated appendicitis was traditionally managed with immediate surgery. But in 1980 conservative management was described. As per this approach, patients with complicated appendicitis were initially treated with intravenous antibiotics followed by interval appendectomy after a period of 4 to 16 weeks. Over the years this approach gained popularity. But in recent years this practice has been questioned with new data. The objective of the present study was to evaluate the surgical treatment of appendix.

2. Methodology

The study was planned in the 20 cases in IGIMS, Patna from Jan 2008 to July 2008. The patients were Clinically diagnosed case of Acute Appendicitis presenting within 48 hours of initiation of Abdominal pain. On all patients Open appendicectomy was done. Preoperative prophylactic antibiotics were given (cefotaxime 500 mg and metronidazole 250 mg intravenous) and continued post operatively for 3 days. Patients were discharged with oral Amoxcillin 250 mg 12 hourly and metronidazole 200 mg 8 hourly for 5 days.

All the patients were informed consents. The aim and the objective of the present study were conveyed to them. Approval of the institutional ethical committee was taken prior to conduct of this study.

Following was the inclusion and exclusion criteria for the present study.

Inclusion Criteria: Patients with right lower abdominal pain diagnosed as acute uncomplicated appendicitis.

Exclusion Criteria: Patients with suspected complicated acute appendicitis; Patients with immunodeficiency status or on immunosuppressive therapy; Pregnancy; Allergy to antibiotics established in the study protocol.

3. Results & Discussion

Appendicitis is most common surgical condition. In the present study the incidence of complicated appendicitis was 26%. In literature the perforation rates vary from 5 and 62% respectively [7]. Various risk factors have been studied for the increased risk of perforation. These include extremes of age, male sex, rural locality, delayed presentation, delay in diagnosis, presence of appendicolith, elevated blood

parameters namely neutrophils [8].

Table 1: Various causes of pain in right iliac fossa

Various causes of pain in right iliac fossa	Number of Cases
Appendicitis	16
Renal calculus	2
Typhlitis/Colitis	2
Total	20

Table 2: Symptoms and sign distribution

Presenting features	Observed in Number of Cases
Pain right iliac fossa	20
History of migratory pain	4
Anorexia	3
Nausea/vomiting	3
Right lower quadrant abdominal guarding	3
Tenderness	20
Rebound tenderness	4
Pyrexia ≥37.5°C	3
Leucocytosis >10x109 /L	4
Albuminuria	3
Ultrasonography Confirming Appendicitis	3

Table 3: Summary of outcomes

Parameters	No. of Cases
No. of Patients	20
Mean age in years	28 - 63
Treatment efficacy	70%
Mean length of stay	3 – 4 days
Recurrence	0
Post-operative complications	
No. of patients	20
Wound infection	4
Residual abscess	1
Chest infection	1
Adhesive bowel obstruction	2

Appendectomy can be performed as open surgery or laparoscopically. Both procedures are routine operations with very low operational risks, and morbidity and mortality are mainly determined by the severity of appendiceal disease itself. Although small, differences between both methods exist, with laparoscopic appendectomy emerging as the preferred method in Western countries. In technical terms, the laparoscopic approach is thought to be superior in terms of a lower rate of wound infections, less pain on postoperative day 1, and a shorter duration of hospital stay [9]. Maybe more importantly, it offers the possibility of inspecting the whole intra-abdominal cavity, therefore detecting other causes mimicking appendicitis as well as leading to fewer short- and long-term adhesive bowel obstructions [10-11]. Open surgery, meanwhile, is associated with a lower rate of intra-abdominal abscesses, a slightly shorter operative time, and lower costs, although this might change with more widespread use and further developments of laparoscopy. Timing of appendectomy has been debated controversially. At the time when every appendicitis was thought to progress to perforation and gangrene, surgery was to be performed as soon as possible. Laparoscopic appendectomy for advanced uncomplicated appendicitis should be performed during the first 24 h after diagnosis. Today, there is evidence that in uncomplicated appendicitis, a delay of 12–24 h prior to surgery does not increase the rate of perforation if a course of antibiotics is immediately started, as demonstrated in a meta-analysis of 11 non-randomized studies [12]. Waiting for more than 48 h, though, leads to a higher rate of surgical site infections and other complications.

In patients with complicated appendicitis, the timing of the operation depends on the clinical status of the patient, the nature of the perforation, and, in some cases, the therapeutic strategy preferred [13-14]. In severely sick patients with signs of free perforation or generalized peritonitis, emergency appendectomy should be performed. Septic, hemodynamically instable patients may need preoperative resuscitation and stabilization. In stable patients with non-free perforation and in patients with an appendiceal abscess or a phlegmon of the right lower quadrant, initial therapy usually is non-operative, and appendectomy is only performed if conservative therapy fails. Especially in patients with a long duration of symptoms and/or extensive abscess formation, immediate surgery has shown to be associated with higher rates of postoperative abscesses or enterocutaneous fistulae, as well as higher ileocecal resection rates [15-16].

There is no doubt that appendectomy is the most efficient way of treating appendicitis, with success rates of >95% as well as low overall morbidity and mortality. However, it is a way more invasive treatment than a course of antibiotics. When comparing antibiotic therapy with surgery, we should be aware that we are comparing two treatment strategies of different nature and not two different surgical techniques. Therefore, we should take a broader look and not focus on success rates alone. To undergo surgery, although considered low-risk, is no small feat and represents a burden for many patients. Many patients would consider 'surgery' a complication by itself. Therefore, many patients would surely prefer a non-operative approach. For example, when debating Non-Operative Management of acute appendicitis in children, one study found that most parents prefer Non-Operative Management for their children.

4. Conclusion

The diagnosis and management of acute appendicitis have been described with a focus on some current issues. Appendicitis is the most common surgical condition. Complicated appendicitis is associated with high morbidity. High leucocyte count, delayed presentation and appendicolith are possible markers of complicated appendicitis. Controversy exists about the ideal time for surgery in complicated appendicitis. Early surgery in complicated appendicitis is safe, feasible.

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