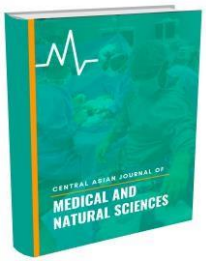

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Article

Current or Delayed Appendectomy? Effect of Time on 170 Patients with Acute Appendicitis: A Prospective Randomized Study

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Abstract: Surgeons throughout the world deal with acute appendicitis more than any other emergency medical illness. An estimated 6-7% of the population will experience acute appendicitis at some point in their lives. Acute appendicitis affects over 7% of the population at some point, with the highest prevalence seen in those aged 10–30. Because of the potential for acute appendicitis to proceed pathologically into perforation, gangrenous appendicitis, and abscess formation, it is normal practice to perform appendicectomy as soon as possible, if not immediately. Nevertheless, there have been authors who have questioned this approach and proposed that appendicectomies can be postponed in certain instances without causing any negative postoperative complications. One hundred and seventy individuals (94 men and 76 females) had appendicectomy in a hospital in the Diyala governorate between June 2021 and July 2022 as part of this prospective randomized trial. All of the patients who underwent appendectomy were divided into two groups for the purpose of performing the comparison: Patients who undergo surgery within eight hours after reaching the hospital are categorized as Group A, whereas patients who undergo surgery after eight hours are categorized as Group B. Results Group B had a lower mean white blood cell count on the first day after surgery compared to group A ($p = 0.0018$). This could be because both groups' patients took antibiotics, typically a combination of two drugs (one cephalosporin plus metronidazole) before the operation. The timing of commencing the liquid diet did not differ significantly between the two groups. Both groups began oral medication within the first 24 hours (p value 0.0715). Group B had a rate of 0.37% for acute and early postoperative complications, while group A had a rate of 0.02%. It is not statistically significant ($p = 0.4022$). Group A's postoperative hospital stay durations range from two days to less than one day, whereas group B's durations are similarly non-significant (p value 0.0826).Readmission for serious surgical site infection (severe cellulitis or wound abscess) or developing symptoms of adhesional intestinal obstruction occurred in 0.025% of patients in group B and 0.016% of patients in group A within 30 days (p value 0.9984). If the P-value is more than 0.05, then it is not statistically significant. Acute appendicitis is still a surgical emergency, although simple instances aren't always considered life-threatening enough to warrant an immediate operation (early appendicectomy) due to concerns about potential complications. Results showed that individuals with simple appendicitis might safely undergo delayed appendicectomy. A delayed appendicectomy has several potential benefits, including better patient care, more effective use of medical resources, and the ability to devote operating rooms to other potentially life-threatening emergencies.

Keywords: appendicitis, current appendectomy, complications

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1. Introduction

Significant morbidity and death are caused by appendicitis, making it the most prevalent general surgical emergency globally especially in underdeveloped regions. The way it is presented and handled could be complicated at times. Symptoms and signs tend to be non-specific and resemble other diseases, which might lead to an increase in because arriving to the right diagnosis is fraught with difficulty and complication. Imaging tools, grading systems, and a more comprehensive set of therapeutic choices, modern approaches to appendicitis care include reaching a higher level of complexity and accuracy. Here in this piece, we review the history, findings, and treatment alternatives and contentious issues surrounding the present treatment of acute the inflammation of the appendix.

An appendix that vermiformes has is a little, blind-ended protrusion starting in the cecum. It shares histological similarities with the nearby the colon, a peritoneal serosal layer on the outside, a layer of muscles, and an inner layer of mucosa with many mucin-secreting globular cells. On the other hand, a substantial proportion of lymphoid cells in the submucosa, which have the potential to sore as a result of an infection. Where the appendix is located base where the taenia coli meet is structurally uniform, however the remaining appendices can be found in any. Figure 1 shows the path from the pelvis to the area behind the ileum or caecum. The Appendix length typically ranges from 7 to 10 centimeters, but can go up to 26 centimeters. An artery called the appendicular artery supplies blood to the area within the mesoappendix, beginning at its free end and ending at its tip a branch of the ileocolic artery that ultimately leads to the appendix connects to the superior mesenteric artery throughout its course. The addition is This midgut structure becomes apparent beginning in the eighth week of gestation. The embryonic midgut spins in the opposite direction as the rest of the body as it develops, bringing the caecum and appendix to its ultimate resting place iliac fossa on the right side. Malrotation of the intestines can lead to the right upper appendix, which is supposed to be situated close to the gallbladder section, or perhaps at the upper left corner. Almost never occurs probably doesn't have an appendix from the start. The appendix was once considered a relic organ with has no practical utility, yet there's mounting proof that it could play a significant part in regulating the gut's immunological response. This is believed it may serve as a haven for good bacteria and facilitate colonization of the remaining intestines, for instance during a diarrheal disease for example, infection with clostridium difficile.

Appendicitis is characterized by the slow opening of the central Right Iliac Fossa (RIF)–localized abdominal discomfort after about a day. In the beginning, the agony is conveyed via internal nerves that go to the T10 dermatome, in the at the umbilicus level. When inflammation progresses, subacute peritoneal the RIF and the somatic sensory nerve fibers become inflamed may be aroused, resulting in the transmission of pain to the lower right quadrant third section. In contrast to the acute phase, this pain is more likely to be ongoing. Irregular, painful cramping in the middle of the belly. Having said that, multiple appendix anatomical sites indicate that the signs and symptoms could differ substantially. The appendix that is retro-caecal probably won't irritate the peritoneum directly, and people could express discomfort in the right loin area. Furthermore, a pelvic appendix might lead to haematuria and other urinary symptoms, such as discomfort in the groin not to mention dysuria. The diagnosis of a retro-ileal appendix is not always straightforward. considering the difficulty in localizing the discomfort and the possibility of diarrhea figure prominently. Health and Care Research at the National Institute National Institute for Health and Care Excellence (NICE) recommends that might be absent in half of all instances. Radiation, duration, and other aspects of the patient's pain history; variables that make things worse is crucial. Enhanced discomfort when moving over obstacles on the way to the hospital, most often caused by worsening to irritate the peritoneum locally, is highly sensitive, although not with pinpoint accuracy, in cases of appendicitis. Debilitating

foot pain or the same holds true with coughing. It is common for appendicitis to be accompanied with low-grade fever, although Indicators of possible perforation and extensive infection of the peritonitis.

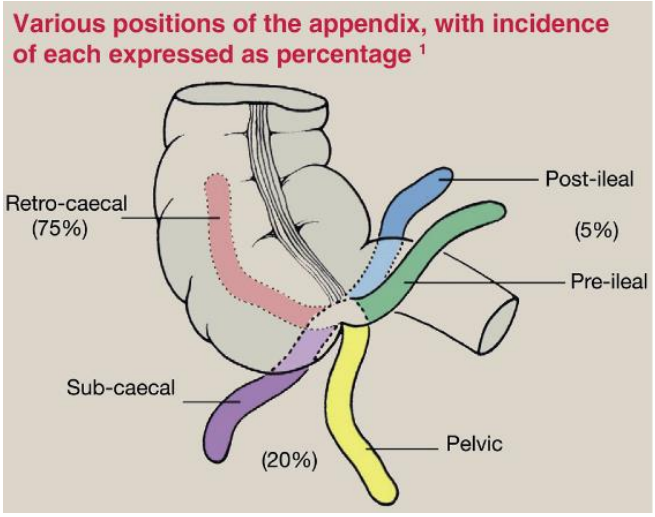

Figure 1. Various positions of the appendix

Upon assessment, you might notice reddened cheeks, a coated tongue, and a fever. Children included acute appendicitis patients often feel better while lying flat; it's normal for kids to lie with their hips bent. Young infants and toddlers might first require an examination while nestled in their mother's lap to establish a connection. There will be sensitivity to palpation at McBurney's point and protecting. To evoke rebound tenderness, one can gently stroking the region. Nevertheless, kids may find this upsetting, and techniques, like gently rocking the baby's belly, from turning them from side to side as they lie down or having them stretch and 'suck in' their belly or hop around on the bed during possible alternate methods for evaluating local peritonism. Results of an examination showing a rigid abdomen, i.e. widespread observing, within the framework of a conventional narrative, suggests dispersed appendix perforation causes peritonitis. We have perforated the appendix. when they first arrive, in around 20% of patients. Out of has the potential to cause septic shock. Other possible diagnoses include pathology related to the gynecology, pancreatitis, and perforated cancer ought to be taken into account in light of patient traits. Upon examination, a noticeable mass in the RIF may be felt, suggesting an either a mass in the appendix or cancer of the colon, both of which require additional inquiry. Additional nonstandard forms of appendiceal a perforation can lead to the formation of an abscess in the liver or the retroperitoneum. Risks associated with infection propagation via the portal-venous system, abscess fistulizing to the skin creates an enterocutaneous fistula. Small bowel blockage and pylephlebitis (septic portal) are also possible (deep vein thrombosis) that can cause symptoms similar to cholangitis. For appendicitis, there are a number of distinct tests that can be useful supplementary tools for a belly check: The palpation of Rovsing's sign in the left iliac fossa results in RIF discomfort caused by irritated peritoneum stretching Rotation within the joint and flexion of the obturator (Cope's sign). When the obturator muscle is irritated locally, it can lead to hip pain by a swollen appendix in the pelvis The Iliopsoas muscle contracts when the thigh is bent in opposition to a force produces discomfort as a result of psoas muscle inflammation. At all times, men should have a genital exam to disqualify hernias and testicular torsion, both of which can induce referred abdominal discomfort. At times, a digital rectal examination advised for adults in cases where a different diagnosis, like bowel It is believed that children do not have obstruction. Serious mesenteric adenitis should be considered as a possible cause of Children experiencing RIF pain and a different pathogen must never happen. In order to achieve this goal, the lymph nodes in the neck, lungs, check the respiratory

system, ears, nose, and throat. Given the existence of a diagnosis of appendicitis cannot be ruled out by pathology, but it may indicate a more careful method, like serial evaluation.

An appendicitis-like presentation in a young man are able to skip the pre-op and go straight to surgery. However, Diagnosis can be particularly challenging for a number of populations. and that more research is necessary. Urinalysis and pregnancy tests are commonplace at the doctor's office testing. The presence of white blood cells in a urine sample could mean pelvic appendix inflammation, another possible diagnosis for example, UTIs. In women who are able to have children, human chorionic gonadotrophin levels in the urine should verified to make sure there wasn't an ectopic pregnancy. A battery of diagnostic procedures, including blood testing for inflammatory markers and a battery of a screen capture is required. Common inflammatory markers typically exhibit a high negative predictive value, and the diagnostic utility of serial testing is enhanced sensitivity. Pancreatitis can be ruled out by blood amylase. One common first-line imaging modality for individuals in for whom there is no clear clinical presentation or another diagnosis of disease is thought to have. The fact that it is risk-free and won't cause any harm is a major plus.

In an environment free of ionizing radiation, the operator, though, dependent, and it's possible that the appendix won't be visible because abdominal gas, rendering the scan non-diagnostic. Most of the time children's smaller stature allows for better views, and often serves as a diagnostic tool. A positive result for appendicitis in the US comprise wall, peri-appendiceal fluid, and non-compressibility filling up. For diagnostic purposes, computed tomography (CT) is superior. Superior to the US, but requires a substantial amount of radiation exposure. According to one research, a single CT scan of the abdomen with contrast is the same as 234 chest X-rays, and a female patient aged 20 1 out of every 470 people who get a CT scan of their abdomen could risk of getting cancer associated with this scan. For those adults who are 40 and older years of RIF discomfort, a CT scan is necessary to exclude the possibility of a diverticulitis or obstructive cancer as an alternative diagnosis. In the US, many people routinely undergo CT scans, and countries across continental Europe, but the United Kingdom is not one of them. CT when considering dosing reduction for children, but saved for challenging situations and rarely made available. Good results CT findings of appendicitis may reveal an enlarged appendiceal diameter. increases in wall thickness (>2 mm), peri-appendiceal fat (>6 mm), deposition and hyperenhancement of murals. Not as many people have access to magnetic resonance imaging as CT scans especially outside of normal business hours, but the absence of ionizing radiation makes it a valuable imaging technique for pediatric and pregnant patients.

Differential diagnoses of right iliac fossa pain according to different patient groups

Child	Adult	Additional considerations in females
Gastroenteritis	Ureteric colic	Gynaecological
Mesenteric adenitis	Gastroenteritis	• Ectopic pregnancy
Meckel's diverticulitis	Testicular torsion	• Pelvic inflammatory disease
Intussusception	Visceral perforation, e.g. peptic ulcer	• Torsion/rupture of ovarian cyst
Testicular torsion	Pancreatitis	• Endometriosis
Diabetic ketoacidosis	Inflammatory bowel disease	• Mittelschmerz
Urinary tract infection	Caecal diverticulitis	Obstetric
Pneumonia	Torted epiploic appendage	• Round ligament syndrome
Sickle cell crisis	Rectus sheath haematoma	• Pyelonephritis
Henoch–Schönlein purpura	Non-specific abdominal pain	Older adults
	Pneumonia	Intestinal obstruction
		Colon cancer
		Diverticulitis
		Mesenteric infarction
		Leaking aortic aneurysm

Figure 2. Differential diagnose of right iliac fossa pain according to different patient group

Common problems that can arise during surgery:

- Discomfort. When compared to the agony of appendicitis, the pain of the operation will feel different, and for many patients, it will be much less severe. To alleviate this pain, your surgical team will administer medication. Make sure you take enough pain medication to be mobile after surgery.
- Hemorrhage. This may happen either before or after the surgical procedure. Very seldom does it necessitate additional surgical procedures. Blood transfusions are part of the treatment for severe hemorrhage. Tell your surgeon not to consider a blood transfusion when they are filling out the consent form with you if that is your wish.
- A virus. Infections can occur in many different places, including the abdominal cavity, the urinary tract, the lungs, and surgical wounds. It is important to be alert for any symptoms of infection when you are released from the hospital. These are detailed further down the brochure.
- Disc bulge. Occasionally, the deep abdominal muscles will not heal at the locations of surgical wounds. A hernia occurs when excess fat or bowel material pushes through the openings in these muscles. Having "Open" surgery instead of "Keyhole" surgery increases the likelihood of this. This might make your belly button look like a bulge or lump under the scar(s). Keyhole surgery carries a risk of 1 in 100 (1%). The risk is higher for "open" surgeries.
- Clots in the blood. Deep vein thrombosis ("DVT"), pulmonary embolism ("PE"), or both are possible causes of blood clots. A red, swollen, and painful calf muscle could be an indication of a deep vein thrombosis (DVT). The calf may appear reddened, and other veins in the area may appear larger than usual. Signs and symptoms of a pulmonary embolism (PE) include difficulty breathing, chest discomfort, and blood in the mucus. You may be prescribed anti-clot stockings to wear on your lower legs and given an injection of a gentle blood thinner to lessen the likelihood of blood clots. Following these guidelines significantly lowers the likelihood of deep vein thrombosis (DVT) and percutaneous embolism (PE).

Particular risks associated with appendicectomy:

- Potential harm to structures close to the appendix during abdominal instrument insertion. Among these are various nerves, arteries, and organs. The probability of this happening is one in three hundred (1.3%). Anyone with a history of abdominal surgeries is at a higher risk.
- There is an abscess. The probability of developing an abdominal abscess following the procedure is 7 out of 100, or 7%. After you've gone home, this usually happens. Fever and persistent or worsening stomach pain are warning signs to keep an eye out for. Antacids are frequently necessary for this. The pus will have to be surgically removed if antibiotics are ineffective.
- The risk of bowel resection is around 1 in 100. A tiny section of bowel may have to be removed with the appendix if the inflammation is so severe and affects the nearby bowel. Constantly, the goal is to reattach the bowel (anastomosis). Creating a stoma by bringing the bowel ends to the skin is an extremely rare procedure that is done to ensure your safety and the health of the bowel. This is just a stopgap measure that will be lifted soon.
- Ileus can cause bowel paralysis. It is possible for the bowel to go "on strike" after surgery and stop functioning normally. Bloating and vomiting are side effects of this. A nasogastric tube, which goes from your nose to your stomach, may be necessary until your bowels begin to function normally again. Depending on the severity of the appendicitis, this could take anywhere from three to five days. Having an episode of ileus does not cause any long-term complications.

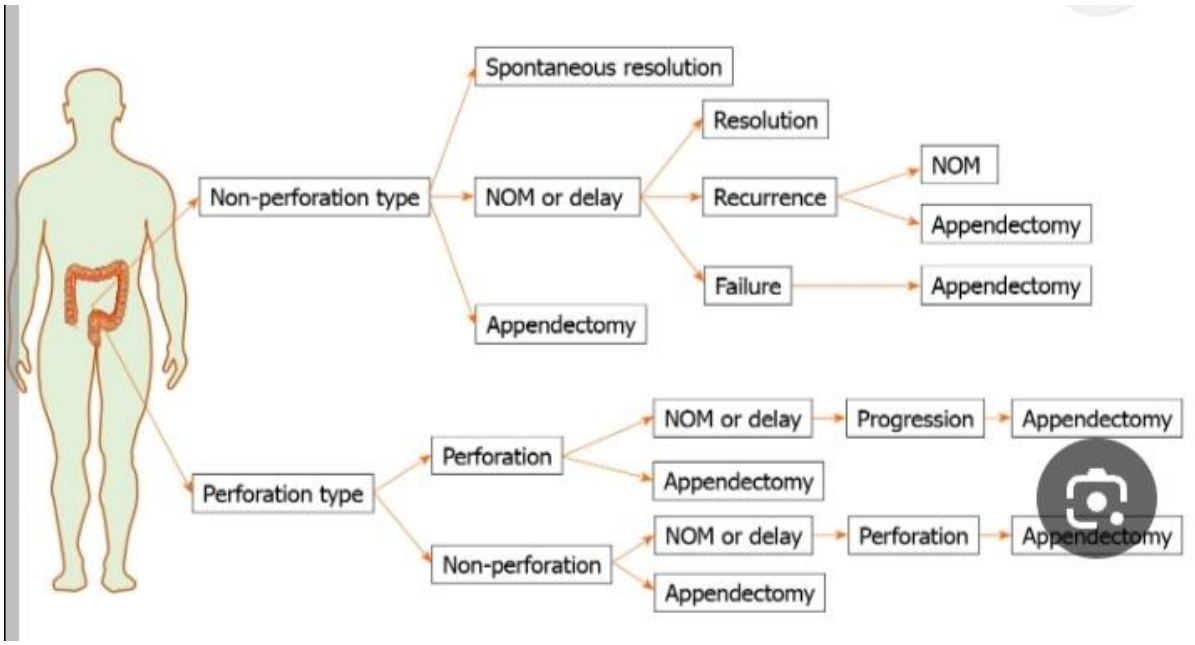

Figure 3. Appendicectomy type

After McBurney removed an appendix for the first time in Since its surgical excision in 1864, the appendix has been thought of as accepted treatment for severe appendicitis. First carried out by a laparotomy, laparoscopic appendectomy is currently the gold standard treatment norm in the West. The number of people who have been newly-emerging data demonstrates that NOM is an authentic substitute therapy choice, in some medical situations. Despite what There are still many unidentified fundamentals; appendicitis is more than that, and the sickness is evolving into something with many distinct parts that call for other treatment approaches.

There are two main methods for removing an appendix: open surgery and laparoscopic surgery. Both treatments are standard operating procedures with extremely low operational hazards, as well as the rates of illness and death, are mostly in relation to the degree of appendiceal illness. Though diminutive, contrasts between the two approaches are there, and laparoscopic appendectomy is become the standard practice in developed nations. From a technological standpoint, the laparoscopic method is considered to be more effective. reduced discomfort during and after surgery, and a decreased incidence of wound infections during the first day, and you'll spend less time in the hospital overall [1]. Maybe most significantly, it provides an opportunity to examine the whole intra- abdomen, helping to rule out other conditions that present similarly to appendicitis also resulting in a decrease in both the duration and intensity of adhesion the intestines [2], [3] cannot pass. On the other hand, open surgery is linked less intra-abdominal abscesses, a little less time spent in surgery savings in both time and money, however this might shift as more expanding the scope of laparoscopy and its subsequent advancements. There has been contentious disagreement over the timing of appendectomy. At during the era when it was believed that every case of appendicitis may eventually lead to perforation due to gangrene, surgery has to be done without delay. Advanced, simple laparoscopic appendectomy in the immediate aftermath of a diagnosis of appendicitis, a procedure should be carried out. In cases of simple appendicitis, there is now evidence indicating adding 12 to 24 hours to the time before surgery does not raise the risk of rupture if antibiotics are administered promptly, as proved in a review of eleven studies that did not use random assignment according to [4]. But, the risk of increases when the waiting period exceeds 48 hours infections at the surgery site and other problems. The timing of the procedure in individuals suffering from severe appendicitis is condition-specific, there are a variety of factors that the opening and, occasionally, the treatment approach used for extremely ill

patients exhibiting symptoms of free perforation, see references [5], [6]. An immediate appendectomy is necessary in cases of widespread peritonitis carry out. Patients with septic shock or unstable hemodynamics may require stabilization and preoperative resuscitation. When dealing with people in a stable condition who have individuals suffering from appendiceal abscesses or non-free perforation a phlegmon in the lower right quadrant, the first line of treatment is often non-invasive, and appendectomy is used just when conservative measures fail treatment is ineffective. The length of time that patients have been on symptoms and/or significant abscess development, prompt surgical intervention the risk of postoperative abscesses is increased when such as greater ileocecal resection and enterocutaneous fistulae prices [7], [8]. With regard to a subset of persons diagnosed with complex yet there is an alternative for appendicitis: urgent appendectomy. Therapy choice, particularly in cases when draining the abscess is not possible effectively [8], [9]. Once advised, interval appendectomy has the potential to be done as a last resort if the inflammation has subsided, however the usage of this is a topic of heated debate [10], [11]. It is important to notice that each and every action is with the administration of antibiotics prior to surgery. In order to lessen the likelihood of ulcer infection. Assuming complicated appendiceal illness antibiotics are administered for a minimum of 12 weeks after the procedure around three to five days [12].

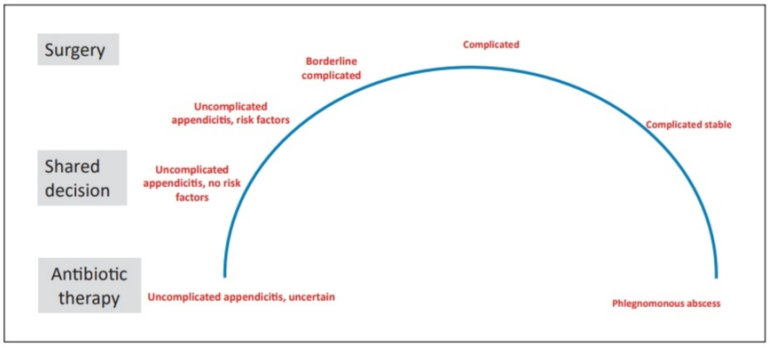

Figure 4. Acute appendicitis – the arc of therapy

Over the last two decades, many experiments conducted in Europe have shown that acute appendicitis in adults can be effectively managed with conservative measures. Antibiotics as a sole treatment for appendicitis is not novel. Ever since antibiotic treatment began, it has been demonstrated to be it was possible to conduct trials in the 1950s [13] or, alternatively, it was only want for instance in a naval or military context [14]. There was a publication by [15] 252 people who may have contracted appendicitis while traveling aboard ships at sea who were not immediately able to have surgery and, as a result, received antibiotic treatment, with a success rate of 84%. In cases of complex appendicitis, antibiotics therapy is commonly used as a first treatment and has a solid track record with the excision of substantial abscesses [5], [9].

The majority of treatment plans involve starting with an intravenous antibiotics for 1-3 days, then for 7 days, take them orally four to nine. The standard treatment consists of either tinidazole or a cephalosporin. The combination of a broad-spectrum penicillin and a beta-lactam a drug that blocks the enzyme. One study found that ertapenem used, resulting in justifiable criticism for insufficiently using reserve microbes [16]. As more and more people get expertise with non-invasive treatments, Antibiotic treatment durations are expected to decrease, along with the currently regimented timetable shifting to a course that focuses more on the patient The treatment should be stopped one or two days following the onset of symptoms. Typically, an inpatient environment is used during the initial days of therapy, in conjunction with careful observation of the patient's health and the possibility of should the patient's condition worsen, the surgeon may do a rescue appen-

dectomy. Patients are often released from the hospital once their clinical condition improves. I finished the antibiotic treatment at home. Assuming therapy after a colonoscopy and either an ultrasound or a It is commonly advised to get a CT scan within 6 months in order to exclude out malignant illness, among individuals who have a reasonable danger of it (often in those over the age of 40) [15], [17]. Since the start of treatment, the timing of antibiotic medication is crucial. at the earliest opportunity has proven to considerably improve success rates [14], [15]. During the initial admission, if antibiotic therapy fails, it is necessary to do a rescue appendectomy. With chronic illness, proper maintenance or removal of the appendix may be necessary. Appendectomy hazards and complications in both circumstances do not reach a high level [15], [16].

2. Patients and Methods

Prospective randomized study was to examine the outcomes of appendectomy for 170 patients (94 men and 76 females) who were treated at a hospital in the Diyala governorate between July 2021 and July 2022. There were a total of 200 individuals with acute appendicitis symptoms who participated in the research. Exclusion criteria included patients who underwent surgery within the first eight hours of diagnosis, which meant that thirty out of two hundred patients were not included in the research.

Patients who were not included in the study were those who were either under 12 years old (due to poor infection localization and peritonitis) or over 65 years old (due to high perforation rate), toxic, had advanced appendicitis with vital signs and abdominal swelling (characteristics of peritonitis), were diagnosed intraoperatively with an appendicular mass or abscess, were pregnant (due to high maternal and fetal mortality from potential perforation delays), had a negative appendectomie (due to gynecological issues, such as ovarian problems), had obvious mesenteric lymphadenitis, a grossly normal appendix, or had Meckel's diverticulitis, and so on. Another 170 patients were also a part of the research. All of the patients who underwent appendectomy were divided into two groups for the purpose of performing the comparison: Group A consists of 90 patients who undergo surgery within eight hours of reaching the hospital, and Eighty patients make up; Group B some of these patients arrived during the day but had their surgeries performed at night, while others arrived close to midnight but had their surgeries performed in the morning. Details such as name, age, sex, duration from first symptom to hospital visit, time from patient intake to diagnosis of acute appendicitis, time from diagnosis to operation, vital signs at presentation, laboratory findings at presentation, placement of tube drain status, postoperative laboratory findings, time to start oral intake, postoperative complications, length of hospital stay, and need for readmission within 30 days after surgery are all part of the study form. The following postoperative outcome measures were used to compare the two groups of patients:

1. Count of white blood cells (WBCs) on the first day after surgery.
2. Move on to the liquid diet.
3. Level of difficulty.
4. Duration of hospitalization.
5. A readmission within 30 days after surgery is necessary.

Stata Enterprise ver. 5.1 was used for data analysis database management system (SAS, Inc., Cary, NC, USA). Statistical Information features, both clinical and otherwise, were presented as middle values for continuous variables and percentages for categorical-variables. A comparison was made using the chi-square test distinctions between multiple-category variables. A t-test for students in order to compare differences, the Wilcoxon rank sum test was employed considering variables that are continuous. Having a p-value lower than the significance level was set at 0.05.

3. Results

Between July 2021 and July 2022, a total of 170 patients (94 men and 76 females) were operated on in the Diyala Governorate Hospital for appendectomy. Each group's patients underwent a battery of tests before, during, and after surgery.

In order to accomplish the goals of this study, it is necessary to compare the two groups with respect to the ultimate postoperative result, with a focus on the postoperative measures listed in the Table 1 – 5.

Table 1. Distribution of patients according to the sex between the two groups

Gender	Group A (≤ 8 hours)	Group B (> 8 hours)		P value
Male	54	40	94	0.6781
Female	36	40	76	
Total	90	80	170	

Table 2. Demographics and clinical characteristics, according to body temperature, the initial white blood cell count at presentation and the mean age between the two groups

	Group A (≤ 8 hours)	Group B (> 8 hours)	P value
Body temperature centigrade	37.5 ± 0.7	37.7 ± 0.6	0.7612
Initial white blood cell count ($\times 10^3/mm^3$) at presentation	11.8 ± 3.5	12.5 ± 3.4	0.1231
Age (yrs)	38.6 ± 11.8	39.6 ± 12.3	0.2967

Table 3. Comparisons of preoperative and intra-operative characteristics between the two groups (Total number of cases 170)

Variables	**Group A (≤ 8 hours)**	**Group B (> 8 hours)**	**P value**
Presence of comorbidities	12 (13.3%)	10 (11.9%)	0.2014
Hours from onset of symptoms till hospital arrival	26.3 ± 18.4	24.1 ± 16.4	0.1943
Hours from arrival to making diagnosis	1.2 ± 0.9	2.3 ± 1.8	<0.0001
Hours from diagnosis to surgery	3.2 ± 1.1	9.7 ± 3.8	<0.0001
Hours from arrival to hospital to surgery	4.3 ± 2	13.2 ± 5.7	<0.0001

Operating time (minute)	44.3 ± 19.6	48.5 ± 19.8	0.2345
Complicated appendicitis (%)	12 (6.1%)	11 (8.1%)	0.3106
Drainage (%)	15 (10.5%)	23(13.1%)	0.2212

Table 4. Comparing the postoperative outcome measures between the two groups

Variables	**Group A (≤ 8 hours) Patients (90)**	**Group B (> 8 hours) Patients (80)**	**P value**
WBC, postoperative first day	9.7 ± 1.5	8.6 ± 1.1	0.0018
Time to liquid diet (day)	0.5±0.2	0.7 ± 0.2	0.0715
Length of postoperative hospital stay (day)	1.2 ± 0.8	1.5 ± 0.9	0.0826
The need for readmission within 30 days (%)	5 (0.016%)	7 (0.025%)	0.9984
Complication rate (%)	8 (0.02%)	9 (0.37%)	0.4022

Table 5. Appendectomies performed during the night shift

Variables	**Group A (≤ 8 hours) Patients (90)**	**Group B (> 8 hours) Patients (80)**
Overnight appendectomy (%)	52 (31.8 %)	65 (72 %)
Laparoscopic overnight appendectomy (%)	8 (10.3 %)	10 (20 %)
Open overnight appendectomy (%)	30 (89.7 %)	5 (8 %)

The patients and techniques section makes this point clear. Group B patients were either hospitalized in the late morning for nighttime surgeries or admitted close to mid-night for the following morning surgeries. This compares the two groups' postoperative outcomes metrics, as indicated in Table 5. On the first day following surgery, group B had a lower mean white blood cell count than group A ($p = 0.0018$). Patients in both groups began taking oral medication during the first twenty-four hours of treatment, and there were no statistically significant variations in when they began taking liquids ($p = 0.0715$). Group B had a rate of 0.37% for acute and early postoperative complications, while group A had a rate of 0.02%. The p-value is 0.4022, hence it is not statistically significant. Both

groups' postoperative hospital stays were non-significant, with a range of 2–1 days for group A and a similarly non-significant range of 2–1 days for group B (p = 0.0826). Regarding the necessity of readmission within 30 days, 0.016 percent of patients in group A and 0.025 percent of patients in group B were readmitted due to developing symptoms of adhesional intestinal blockage or severe cellulitis or wound abscess, respectively (p value 0.9984). If the P-value is more than 0.05, then it is not statistically significant.

4. Discussion

Neither the early nor the delayed appendectomy groups differed significantly from one another on the preoperative outcome variables. In cases of simple appendicitis, for example, the time of operation was unaffected by factors like white blood cell count or temperature.

This aligns with the findings of the APPAC Randomized Clinical Trial, which assessed the effectiveness of antibiotic therapy vs appendectomy in treating uncomplicated acute appendicitis. The researchers found no significant impact of white blood cell count or temperature on the timing of surgery. Time to soft liquid diet, duration of hospital stay, and rate of postoperative complications were not significantly different between the two groups in the current study. A study conducted by John C. Kubasiak et al. and Brett A. Fair, M.D., found that the timing of the operation had an effect on the outcome of appendicitis cases. The findings were published in the National Surgical Quality Improvement Project. The results of the subsequent study showed that patients whose appendectomy was postponed for more than 48 hours had a twofold increased risk of complications, but those whose appendectomy was postponed for less than 24 hours had essentially identical outcomes. Results from appendectomy for acute appendicitis showed no difference between earlier and later procedures, according to a different study (Population-level outcomes of early versus delayed appendectomy for acute appendicitis using the American College of Surgeons National Surgical Quality Improvement Program [13]. On the other hand, appendectomies that are postponed until the third day in the hospital have far poorer results. The higher complication risk in this group (patients who had surgery on the third day of hospital stay) was unexpectedly linked to lower baseline health condition and the kind of treatment, rather than the day of surgery itself [13]. There was no statistically significant difference in mortality rates or complications between appendectomy performed during the day and night, according to a different study (Short-term outcome after appendectomy is related to preoperative delay but not to the time of the procedure: A nationwide retrospective cohort study of 9224 patients) conducted by Canal et al. The risk of complications and death is greatly increased with a prolonged preoperative hospital stay of more than 24 hours. Regarding the necessity of readmission within 30 days, the present investigation did not show a statistically significant difference between the two groups. Many investigations, including one (Delayed vs urgent surgery in acute appendicitis: do we need to operate throughout the night?) by Yardeni et al. (2004), corroborated these and other characteristics. Researchers found no significant effect on operating time duration, rate of perforation, or complications when patients with acute appendicitis had their procedures postponed to the daylight. Delaying treatment instead permits more efficient use of medical facility and doctor resources, such as less engagement of residents in late-night procedures. Thus, compared to early appendectomy, delayed appendicectomy is safer. Is acute appendicitis a surgical emergency? is an intriguing research question posed by Stahlfeld et al (2007). Several factors were considered by Stahlfeld K. et al. (2007) when comparing delayed and early appendicectomy [18]. This study tested the hypothesis that postponing appendicectomy to normal day hours, with the use of parenteral antibiotics and proper hydration, reduces patient morbidity and death. All 81 individuals who were evaluated at that one facility had appendectomy. There were two groups of patients: those who had appendectomies performed within 10 hours of a CT diagnosis (group A) and those who had appendicectomy performed within 10 hours of the diagnosis (group

B). The two groups were compared with respect to the following: antibiotic usage, total analgesia required, duration of surgery, length of stay in the hospital, and surgical site infection. Group A and B did not vary significantly with respect to the following: average time to surgery (3.18 vs 15.85 hours), duration of operation (54.1 vs 55.7 minutes), length of hospital stay (2.65 vs 2.09 days), infections at the surgical site (4 vs 0), and antibiotic use at discharge (19 vs 3). The results of this study do not appear to indicate that there is a substantial danger to the patient when surgeons choose to delay surgical intervention for acute appendicitis in order to maximize hospital efficiency or to satisfy their own preferences [18]. In addition, compared to group A, group B had a decreased mean white blood cell count on the first postoperative day. Possible explanations for these results include the fact that group B had many doses of intravenous antibiotics before surgery, but group A only received one, and that these doses were efficient enough to cover both aerobic and anaerobic colonic flora.

5. Conclusion

Acute appendicitis is still considered a surgical condition, but simple instances aren't always deemed an emergency that needs surgery right away (early appendicectomy) because of the risk of complications. It was determined that patients with simple appendicitis might safely have delayed appendicectomy according to this study. Delaying appendicectomy has several benefits, including better patient care, more effective use of medical resources, and the ability to avoid overcrowding in operating rooms, which can improve the quality of care that trainees and surgeons deliver.

6. Recommendations

We propose that surgeons can determine the optimal appendicectomy time by taking into account specific operating room and hospital circumstances, including available resources.

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