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Overview and Characteristics of Laparotomy Appendectomy as a Treatment for Appendicitis in The Indonesian Christian University General Hospital, Jakarta

Efhata Surya Diapari Pohan[1], Meiranda Rose Pardede[2], Mulyadi Djojosaputro[3]

[1,2,3]Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

Corresponding Author: Efhata Surya Diapari Pohan

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ABSTRACT

Appendicitis is inflammation of the vermiform appendix and is one of the common causes of acute abdomen in developing countries. Appendicitis is caused by infection, obstruction or a combination of both. This research is motivated by WHO data (2021) which states that the incidence of appendicitis is quite high, namely in the world reaching 7%, Asia 2.6% and Indonesia 7% of the total population. The aim of this research is to determine the description and characteristics of Laparotomy Appendectomy as a treatment for appendicitis at RSU UKI in 2020-2022. The variables of interest were the duration of surgery, length of stay, pre- and post-operative antibiotics and painkillers, appendicitis classification, surgical technique approach and pre- and post-operative VAS. This research is observational analytic with a cross-sectional design with a retrospective approach. Sampling used a purposive sampling method with a total of 88 samples. The research instrument uses secondary data in the form of medical records and is processed using SPSS through univariate analysis. The results of the study showed that the majority of appendicitis patients who underwent appendectomy laparotomy were based on age in the range 25-45 years (44.3%), the majority gender was female (59.1%), the majority of operation duration was 60-90 minutes (63.6%) , the longest length of stay was 4-6 days (56%), pre-operative (97.7%) and post-operative antibiotics (98.9%) with the most common type being Ceftriaxone, pre-operative painkillers (62.5%) and post-operatively (96.9%) with the most common type being Ketorolac, the most frequent classification of appendicitis is acute appendicitis (45.5%0, the most surgical technical approach uses oblique incision (45.5%), Pre-operative VAS 7-9 (83%) and Post-operative VAS 1-3 (86.4%). Research conclusions were dominated by those aged 25-45 years, women, length of stay 4-6 days, duration of operation 60-90 minutes, almost all patients were given antibiotics pre- and post-operatively with the Ceftriaxone type, more than half of the patients were given pre-operative painkillers and almost all patients were given post-operative painkillers with the Ketorolac type, the most common classification of acute appendicitis, the most surgical technical approach was oblique incision, pre-operative VAS 7-9 and post-operative VAS 1-3.

Keywords: Appendicitis, Laparotomy Appendectomy

INTRODUCTION

Appendicitis is inflammation of the Vermiform Appendix which can cause abscesses, ileus, peritonitis, or death if left untreated. The vermiform appendix better known as the appendix is a small tube-shaped organ with a length of approximately 6 – 9 cm with a diameter of 0.3 – 0.7 cm and originates in the cecum. The appendix is a true diverticulum of the normal cecum. Like other diverticulums, the appendix is susceptible to acute and chronic inflammation [1]. Appendicitis is the most common abdominal surgical emergency. The current standard treatment for uncomplicated appendicitis is usually surgery. The typical symptom of appendicitis is acute abdominal pain that occurs suddenly and lasts less than 24 hours. This pain comes from visceral stimulation which is usually localized to the abdomen or right lower quadrant [2].

The cause of appendicitis is suspected to be due to the anatomical shape of the appendix which is narrower at the proximal part and wider at the distal part. Its small size and location near the large intestine, especially the cecum, makes it easily blocked and infected. The colon contains a lot of bacteria and if too many become trapped in the appendix, they can grow too quickly and cause infection. Sometimes, appendicitis starts with an infection and sometimes a secondary infection. This infection will stimulate the lymphatic system which is part of the immune system to fight infection by producing and releasing white blood cells. This causes the lymphoid tissue in the appendix to swell. Swelling can reduce or close the lumen of the appendix and trap more bacteria inside. If not treated immediately the appendix will experience total obstruction and end in tissue death. Apart from swelling, other causes such as accumulation of fecaliths, tumors in the appendix, ascaris worms and erosion of the appendix mucosa due to the Entamoeba histolyca parasite can be the cause of appendicitis [3]. Appendicitis has two classifications based on onset, namely acute and chronic appendicitis. Acute appendicitis is inflammation of the appendix with typical symptoms in the form of vague and dull pain in the lower right abdomen, precisely at the Mc Burney point. The pain appears less than 24 hours. Meanwhile, in chronic appendicitis, the diagnosis can be made if we find three things. First, the patient had a history of pain in the lower right abdomen for at least three weeks without any other diagnosis. Second, after carrying out operative action in the form of an appendectomy, the patient experienced a decrease until the symptoms complained of disappeared. Finally, an anatomical pathology examination found that this was an active chronic inflammatory condition or fibrosis had occurred in the appendix tissue examined.

The highest number of appendicitis cases worldwide is in America and Europe. According to WHO, it most often occurs between the ages of 5 - 45 years, with an average age of 28 years. The incidence is around 233 cases/100,000 people. The incidence of acute appendicitis tends to be slightly higher in men than in women, with a lifetime incidence of 8.6% in men and 6.7% in women, respectively. However, research conducted between 1990 and 2019 shows that the incidence of appendicitis is increasing rapidly in developing countries. As more incidents occur, it is necessary to increase knowledge to be able to diagnose appendicitis as early as possible and determine the most appropriate management to reduce mortality and morbidity rates in appendicitis patients. A reduction in mortality rates of up to 46% has been achieved by developed countries through the development of good diagnosis and management [4]. According to the Ministry of Health in 2018, the incidence of appendicitis in Indonesia reached 7% of the total population. Statistics show an increase in cases of acute appendicitis every year. The peak of cases of acute appendicitis occurs in the 17-25 year age group. However, complications increase with age, with the most frequent cases occurring in patients aged 41-50 years. Sudden inflammation of

the appendix, accompanied or not by local peritoneal stimulation, is a typical symptom of appendicitis. Vague, dull visceral pain in the epigastric region around the umbilicus is a classic symptom of appendicitis. The pain will move to the lower right to Mc Burney's point within a few hours, becoming sharper and more pronounced. So in the end this pain becomes local visceral pain. Apart from pain, this disease is often accompanied by mild fever, nausea, vomiting, decreased appetite, and tenderness at the McBurney point.

Appendicitis rarely subsides spontaneously so the disease tends to progress to perforation. It is safe to observe during the first eight hours because during this time perforation rarely occurs. Signs that perforation has occurred include signs of localized peritonitis or abscess, ileus, fever, malaise and leukocytosis. Patients may also experience pain and muscle spasms in the right lower quadrant abdominal wall. The diagnosis can be made immediately if perforation with generalized peritonitis has occurred since the patient first arrived [5].

The most common treatment used for appendicitis patients is surgery. The part of the vermiform appendix that is experiencing problems is removed through a surgical procedure known as an appendectomy. Two surgical methods can be used to perform an appendectomy. The first is open or conventional surgery (laparotomy). This procedure is known as Laparotomy Appendectomy which involves an incision in the lower right side of the abdomen or Mc Burney area until it penetrates the peritoneum. The second method is known as Laparoscopic Appendectomy which is a minimally invasive surgical method. This procedure simply inserts a laparoscope into a trocar (small pipe) through the umbilicus and this action is monitored via a monitor screen. Laparotomy Appendectomy and Laparoscopic Appendectomy are the two most common procedures used to treat appendicitis.

Clinical treatment for appendicitis mostly uses Laparotomy Appendectomy surgery which has been practiced for more than 100 years as a classic therapy for treating appendicitis. However, patients and their family members are now gradually refusing this therapy due to problems such as incision wound infection, intestinal obstruction, intestinal adhesions, and slow recovery of the intestinal tract. With the development of medical technology and better medical equipment, clinical research on the treatment of appendicitis through Laparoscopic Appendectomy surgery is increasing.

However, due to various reasons, Laparoscopic Appendectomy surgery in children is not widely accepted. The choice of surgical method is debated by experts and academics in China and abroad. Some experts have the opposite opinion. For example, Ma GQ believes that Laparoscopic Appendectomy surgery cannot yet completely replace Laparotomy Appendectomy surgery. He has mentioned several conditions that are not suitable for Laparoscopic Appendectomy surgery, including patients who experience abdominal pain for more than 72 hours, abscesses around the appendix, the appendix is tightly attached to the surrounding organs, patients with obstructive factors such as a history of previous complicated abdominal surgery and patients complicated by pregnancy with appendicitis. The Laparoscopic Appendectomy procedure is also more expensive than the Laparotomy Appendectomy. However, according to most experts, safe and effective laparoscopic appendectomy has many advantages. Examples include smaller incisions, less risk of infection, less blood loss during surgery, faster recovery time, fewer post-operative complications, and better cosmetic results [6].

The development of knowledge regarding the management of appendicitis is still being carried out throughout the world to find which method is the best and most effective between Laparotomy Appendectomy and Laparoscopic Appendectomy. Until now there is no consensus regarding the superiority of Laparoscopic Appendectomy compared to Laparotomy Appendectomy so

Laparotomy Appendectomy is the most commonly performed operative treatment, especially in Indonesia. Therefore, researchers are very interested in finding out the description and characteristics of Laparotomy Appendectomy as a treatment for appendicitis at RSU UKI in 2020 – 2022.

MATERIALS & METHODS

Research design

This research is included in the type of combination research, namely research that combines descriptive research with a retrospective approach and observational analytical research with a cross-sectional design. This research data was collected using secondary data in the form of medical record data at the hospital. The research data obtained will be classified, described, and analyzed by researchers to determine the description and characteristics of Laparotomy Appendectomy as a treatment for appendicitis at RSU UKI in 2020 - 2022 in terms of length of the operation time, type of pre-and post-operative antibiotic use, pre- and post-operative type of anti-pain use. surgery, length of stay, classification of appendicitis, surgical technique approach, pre-and post-operative VAS, and outcomes of appendicitis patients who underwent laparotomy appendectomy at RSU UKI in 2020 – 2022.

Research sites

The data collection location for this research will be carried out at the Indonesian Christian University General Hospital (RSU UKI).

Research Time

The time required by researchers from submitting a proposal to the end is from June to December 2023.

Research Population and Sample

Population

All appendicitis patients at RSU UKI who underwent Laparotomy Appendectomy in 2020 – 2022.

Sample

This research uses the Purposive Sampling method, namely sampling is carried out in accordance with the required sample requirements. The samples taken have certain characteristics, features, criteria or traits.

Research Criteria

Inclusion Criteria

1. Appendicitis patients undergoing Laparotomy Appendectomy.
2. Registered in the RSU UKI medical record in 2020 – 2022.

Exclusion Criteria

Patients whose medical records contain inadequate information.

Research Instruments

This research uses secondary data as a research instrument. Secondary data was obtained from medical records at RSU UKI in 2020 – 2022.

Data analysis

Data analysis was carried out using univariate analysis assisted by SPSS 28. Univariate analysis, also known as descriptive analysis or descriptive statistics, is a method for analyzing data on one variable independently, where each variable is analyzed without being linked to other variables. The purpose of univariate analysis is to provide an overview of the conditions of the phenomenon being studied. The analysis results are presented as tables or graphs.

RESULT

Based on the results of univariate analysis, the research results were presented in the form of descriptive data on patient characteristics and length of stay, as presented in Table 1 below:

Table 1. Patient Characteristics and Length of Hospitalization

Variable	n=88	%
Age (Years)		
< 25	36	40.9
25-45	39	44.3
> 45	13	14.8
Gender		
Male	36	40.9
Female	52	59.1
Length of Hospitalization (Days}		
1-3	27	30.7
4-6	56	63.6
> 6	5	5.7

From the data in Table 1, it can be seen that the characteristics of the patients sampled for this study based on age distribution are dominated by patients aged 25-45 years, namely 39 people from 88 samples (44.3%), which is then followed by patients aged 25-45 years with 36 people from 88 patients (40.9%).

Description of data based on pre-and post-operation administration of antibiotics and painkillers, as presented in Table 2 below:

Table 2. Pre- And Post-Operative Administration of Antibiotics and Painkillers

	Antibiotics				Painkiller			
	Pre-operation		Post-operation		Pre-operation		Post-operation	
	n	%	N	%	n	%	n	%
Yes	86	97.7	87	98.9	55	62.5	85	96.6
No	2	2.3	1	1.1	33	37.5	3	3.4
Total	88	100.0	88	100.0	88	100.0	88	100.0

The data in Table 2 shows that almost all patients (97.7%) received antibiotics pre-operation and 98.9% post-operation.

A description of the data based on the type of pre-and post-operation antibiotics is presented in Table 3 below:

Table 3. The Type of Pre-and Post-Operation Antibiotics

Type of Antibiotics	Pre-operation		Pasca-Operation	
	N	%	n	%
Monotherapy				
Ceftriaxone	56	65.1	47	54.0
Cefoperazone	10	11.6	5	5.7
Cefuroxime	1	1.2	2	2.3
Combination				
Ceftriaxone+Metronidazole	7	8.1	10	11.5
Cefoperazone+Metronidazole	2	2.3	2	2.3
others	10	11.6	21	24.1
Total	86	100.0	87	100,0

From the data in Table 3 above, it can be seen that the type of antibiotic most commonly used is monotherapy, namely Ceftriaxone, 65.1% for pre-operation and 54% for post-operation.

A description of the types of painkillers used pre- and post-operatively is presented in table 4 below:

Table 4. The Type of Pre-and Post-Operation Painkiller

Type of Painkiller	Pre-operation		Post-operation	
	N	%	n	%
Monotherapy				
Paracetamol	11	20.0	3	3.5
Ketorolac	25	45.5	46	54.1
Combination				
Paracetamol+Ketorolac	12	21.8	21	24.7
Others	7	12.7	15	17.6
Total	55	100.0	85	100.0

The description of data regarding Appendicitis Classification and Patient Outcomes is presented in table 5 below:

Table 5. Appendicitis Classification and Patient Outcomes

Patient Outcome									
Classification of Appendicitis					**H**	**C**		**D**	
	n	**%**	**% total**	**N**	**%**	**n**	**%**	**n**	**%**
1. Acute Appendicitis									
a. Simple Acute Appendicitis	40	45.5		40	45.5	0	0	0	0
b. Gangrenous Appendicitis	5	5.7		5	5.7	0	0	0	0
c. Infiltrating Appendicitis	4	4.5	78.4	4	4.5	0	0	0	0
d. Suppurative Appendicitis	1	1.1		1	1.1	0	0	0	0
e. Perforated Appendicitis	19	21.6		19	2.,6	0	0	0	0
2. Chronic Appendicitis									
a. Chronic Appendicitis	3	3.4		3	3.4	0	0	0	0
b. Acute Exacerbation of Chronic Appendicitis	16	18.2	21,6	16	100.0	0	0	0	0
Total	88	100.0	100,0	88	100.0	0	0	0	0

Notes: H: Healed; C: Complication; D: Die

A description of data based on the Appendicitis Classification and Surgical Technique Approach is presented in Table 6 below:

Table 6. The Appendicitis Classification and Surgical Technique Approach

Surgical Technique Approach					
		Oblique Incision (Grid Iron)	**Transverse Incision (Lanz)**	**Midline Infraumbilicus Incision**	**Midline Incision**
Classification of Appendicitis	Acute Appendicitis	29	7	3	1
	Gangrenous Appendicitis	2	3	0	0
	Infiltrating Appendicitis	1	0	3	0
	Gangrenous Appendicitis	2	3	0	0
	Suppurative Appendicitis	0	0	0	1
	Perforated Appendicitis	0	1	11	7
	Chronic Appendicitis	2	1	0	0
	Acute Exacerbation of Chronic Appendicitis	6	5	3	2

Table 7. Surgical Technique Approach and Operation Duration

Operation Duration (Minutes)						
		<60	**60-90**	**91-120**	**>120**	**Total**
Surgical Technique Approach	Midline Incision	1	4	3	3	11
	Midline Infraumbilicus Incision	2	13	4	1	20
	Oblique Incision (Grid Iron)	5	25	7	3	40
	Transverse Incision (Lanz)	1	14	2	0	17
Total		9	56	16	7	

Table 8. Pre- and Post-operative VAS

VAS-Scale	**Pre-operation**		**Post-operation**	
	n=88	**%**	**n=88**	**%**
0 (No Pain)	0	0	5	5,7
1-3 (Mild Pain)	1	1,1	76	86,4
4-6 (Moderate Pain)	14	15,9	7	8,0
7-9 (Severe Pain)	73	83,0	0	0
10 (Very Severe Pain))	0	0	0	0

DISCUSSION

Age

Appendicitis can occur at any age and is most often found in young adults and is very rare in toddlers and the elderly. This is because the shape of the adult appendix is narrow at the proximal part and wider at the distal part, thereby increasing the possibility of blockage or obstruction in the proximal part. Obstruction of the appendix lumen causes intraluminal pressure to increase and triggers the colonization of germs in the lumen which can result in appendicitis [32]

Appendiceal lumen obstruction is most often caused by fecaliths which occur due to accumulation and deposition of fecal material around the lumen. It is known that the age range of 25 – 45 years is a productive age where people do a lot of activities and pay less attention to healthy eating and living patterns. The healthy eating pattern that is meant to influence the incidence of appendicitis here is fiber consumption. Fiber has an important role in the digestive process, especially in the formation of feces. Feces will become larger and denser when you consume less fiber. This causes the feces to spend longer in the colon and makes it easier for bacteria to reproduce. This condition causes bacteria to invade the appendix mucosa, causing swelling of the veins and disruption of arterial flow. Ultimately, the worst condition that will occur is gangrene and perforation of the appendix and surrounding organs [33].

Gender

Previous studies found that the incidence of appendicitis occurs more often in men than women. The only reason found is that the proportion of lymphoid tissue in men is greater so when it swells for various reasons it is more likely to create lumen obstruction. However, if you are pre-menopausal, women tend to get appendicitis more easily due to hormonal changes which change drastically at that age. However, the data above is not in line with this theory where there are more women. In this study, women experienced appendicitis more often because the number of patients visiting was dominated by women. 34 In addition, researchers only took data on appendicitis patients who underwent laparotomy and appendectomy. So, patients who were diagnosed with appendicitis but did not undergo a laparotomy appendectomy were not included in the data.

Length of hospitalization

Length of stay is the number of days calculated from the difference between the patient's discharge date and the date the patient was admitted to the hospital. The average hospitalization for appendicitis patients in this study was 4 days, the highest was 4 days, the fastest was 2 days and the longest was 8 days. Another study found that

for patients with acute appendicitis without perforation, the length of stay was 2 days, and for acute patients with perforation around 4-5 days.

Differences in length of stay between patients are influenced by many factors such as age, comorbidities, type of appendicitis suffered, and complications. Patients aged over 30 years begin to experience a decline in several physiological functions of the body, such as a decrease in vital respiratory capacity, cardiac efficiency, and immune system efficiency. All of these things support a slowdown in post-operative healing. In general, patients with acute appendicitis without complications can recover more quickly. However, delays in treatment or the presence of peritonitis can increase the hospitalization time. Comorbidities such as diabetes mellitus and hypertension must also be treated comprehensively at the same time as surgery, this also increases the patient's length of stay [35].

Pre- and Post-operative Antibiotics

Clean contaminated surgery is surgery performed on hollow organs (gastrointestinal tract) or surgery without obvious contamination. This type of surgery requires prophylactic antibiotics. Contaminated surgery is surgery on open wounds that lasts more than 4 hours (golden period), surgery on hollow organs contaminated by spilled contents of the gastrointestinal or urinary tract. This operation requires empirical antibiotics (not prophylaxis). Dirty surgery is surgery performed on open wounds after passing the golden period and operations on organs that are experiencing bacterial infections, for example in perforated appendicitis, abscesses, or empyema. This operation also requires empirical antibiotics (not prophylaxis). Therefore, patients who will undergo Laparotomy Appendectomy surgery should be given antibiotics first, whether antibiotics with prophylactic or empiric function.29

The type of antibiotic most commonly used was the third-generation cephalosporin group, namely ceftriaxone in 56 patients (65.1%) and cefoperazone in 10 patients (11.6%). The reason this antibiotic was chosen was because there was evidence from several studies that the percentage of infections in the surgical area was quite low, namely 5% if third-generation cephalosporins were used. Another advantage of ceftriaxone is that this antibiotic has the longest half-life of all cephalosporin antibiotics. Ceftriaxone also has good tissue penetration, low toxicity, no coagulase problems, and a good therapeutic index. As for the weakness, ceftriaxone is a broad-spectrum antibiotic, which means it can disrupt normal flora, thereby increasing the risk of antibiotic resistance [36].

The use of pre-operative antibiotics in this study did not comply with the guidelines for antibiotic use issued by the Ministry of Health. The recommended antibiotics for prophylactic purposes are generation I-II cephalosporins and generation III, and IV cephalosporins, quinolones, and carbapenems are not recommended. Metronidazole can be given if an anaerobic bacterial infection is suspected. The large use of ceftriaxone in this study certainly needs to be evaluated further because ceftriaxone is a cutting-edge antibiotic, has broad-spectrum properties, and functions as a therapeutic antibiotic. If ceftriaxone has been used as prophylaxis and then a post-operative infection occurs, then using antibiotics for therapy becomes difficult. Giving antibiotics to surgical patients should also follow the guidelines of the health service or hospital, according to the pattern of germs that are often found [37].

All appendicitis patients must be given broad-spectrum antibiotics to prevent the possibility of post-operative infection or intra-abdominal abscess [38]. The antibiotics that are widely used in hospitals for post-appendectomy patients are cephalosporins, especially in this study ceftriaxone. According to ASHP (American Society of Health-System Pharmacists) microorganisms that infect post-operative wound areas come from aerobic and anaerobic bacteria. So the use of ceftriaxone

is very appropriate because this antibiotic works actively against Gram-positive bacteria (Staphylococcus sp. and Streptococcus sp.) and Gram-negative anaerobes (Bacteroids fragilis) [39].

The second most frequently used antibiotic in this study was a combination of cephalosporin and metronidazole. This combination is synergistic because both antibiotics are bactericidal. Cephalosporins belong to the β-lactam class of antibiotics which work by inhibiting the final stage of peptidoglycan synthesis by alkylating transpeptidase or PBP (Penicillin Binding Protein) so that bacteria are lysed due to the action of autolysis enzymes in the cell wall. Meanwhile, metronidazole interacts with DNA after the diffusion process into the organism. This process results in DNA losing its helix structure and strand breakage. The action of these two antibiotics ultimately inhibits protein synthesis and death occurs in the target organism's cells [40].

Pre and Post-operative Pain Relief

The use of pre-operative painkillers is still controversial today. Several meta-analysis studies suggest that administering analgesics to patients with appendicitis is unnecessary. 38 Administering them to patients with acute, undifferentiated pain has historically been discouraged and has been criticized because of concerns that they will make physical findings less reliable. However, at least 8 randomized controlled trials have shown that administering opioid analgesics to adult and pediatric patients with acute undifferentiated abdominal pain is safe. To date, no studies are shown that analgesics have a detrimental effect on the accuracy of physical examination.

The conclusion that can be drawn from these two opinions is that patients with acute abdominal pain suspected of having appendicitis can be given painkillers for the patient's comfort. But the important thing to remember is that the doctor must be sure or have made a diagnosis that the patient may have appendicitis. So, giving painkillers here is to provide patient comfort while waiting for surgery.41

The recommended pain management for post-operative laparotomy appendectomy patients is acetaminophen or also known as paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs). Both analgesics should be considered, especially in patients with contraindications to opioids.

One of the most common post-operative patient complaints is pain in the surgical incision area. Pain is a complex health complaint that requires appropriate treatment. One of the pain management interventions uses a pharmacological approach. The pharmacology used is the opioid class of painkillers (analgesics) for severe pain and the NSAID class for mild to moderate pain. The most common type of painkiller used in this study was ketorolac which is classified as an NSAID. Paracetamol and the combination of ketorolac and paracetamol are also one of the most common choices used as post-operative painkillers in this study, where paracetamol is also classified as an NSAID. This group was chosen because other groups of analgesics, namely opioids, have quite serious side effects, namely sedation, dizziness, nausea and vomiting, constipation, and respiratory depression.

The use of NSAIDs also certainly has side effects that need to be taken into account, for example, dyspepsia, erosion, and gastric ulcers, and the worst case can be perforation of the upper gastrointestinal tract, especially the stomach. This can occur because NSAIDs inhibit the synthesis of prostaglandins which are protective components of the gastric mucosa from gastric acidity. So, the use of NSAIDs as analgesics needs to be given together with PPIs (Proton Pump Inhibitors) to reduce side effects [42].

Classification of Appendicitis

Acute appendicitis occurs more often than other types of appendicitis because the symptoms of appendicitis include abdominal discomfort and anorexia is pathognomic.

Initially, the pain is felt in the periumbilical area and then moves to the lower quadrants and almost 66% of patients experience this classic series of symptoms. In general, viscera pain is mild, often like cramps, lasts 4-6 hours, and may not be felt too much in people who can tolerate it. As the inflammation spreads to the parietal peritoneal surface, the pain becomes somatic, persistent more severe, and aggravated by coughing or movement. In this condition, the patient will usually come to the hospital. The diagnosis of appendicitis is also assisted by a scoring system, namely the Alvarado Score or Appendicitis Inflammatory Response Score. This scoring assessment looks at signs and symptoms, and physical and laboratory examination results. Patients often come with pathognomic symptoms, plus there is a scoring system that makes it easier and faster to make this diagnosis, which makes acute appendicitis easy to find and treat [19]

Perforated appendicitis occurs more often in the age range of children and the elderly. In children it is found that the omentum is shorter, the vermiform appendix is longer, the appendix wall is thinner and the body's immune system is not yet perfect which makes it easier for perforated appendicitis to occur. In older people, perforated appendicitis easily occurs due to disorders of the blood vessels. Early or acute appendicitis is at risk of developing into perforated appendicitis approximately 48 hours after the initial onset of symptoms. When the appendix perforates it can cause local abscesses and even peritonitis.

Several studies show that uncomplicated and complicated appendicitis are different conditions that require different treatments. This may explain why up to 20% of acute appendicitis resolves spontaneously, as observed 125 years ago by Fitz. Some cases of uncomplicated acute appendicitis can be treated with antibiotics. This treatment is considered safe and effective in some cases, but patients should be aware that the risk of recurrence is said to be 39% within the next 5 years. Treatment decisions like this are usually made because of the consideration that there is no need for surgery either because of the condition of the disease, consideration of lower morbidity or cheaper costs than surgery [43].

Surgical Technique Approach

The vermiform appendix has such wide anatomical variations that it may be present in almost any part of the peritoneal cavity, so no single incision will be satisfactory in all cases. Neonates to children aged 14 years, the appendix is a subhepatic organ so an incision above the umbilicus is required.

The most commonly used incision is the oblique or Grid Iron incision also called the McBurney incision. In theory, this incision follows the direction of the muscle fibers in each layer. The aponeurosis of the internal obliquus and transversus abdominis is cut according to the fiber lines. The McBurney incision is currently the most common surgical approach technique, especially in acute appendicitis, because this incision prevents injury to the viscera under the muscle layer and has been proven to provide faster recovery. Therefore, the data above shows that the McBurney incision is most commonly used because the most common classification of appendicitis is acute appendicitis. However, this incision is often not large enough for adequate exploration and exposure, making removal of the appendix technically difficult.

In cases other than acute appendicitis, the incision preferred by surgeons is the midline infra umbilicus or midline incision. This incision allows a larger field of view for exploration and is usually needed in cases of perforated appendicitis without or with peritonitis.44

Operation Duration

In this study, the duration of the operation was calculated from the time the first incision was made until the patient was moved to the recovery room. 22 Other studies have a different definition, the duration of the operation is defined as the time from the start of the anesthesia process until the patient is moved to the recovery room. 45 The duration

of the operation, specifically Laparotomy Appendectomy, does not exist.

a standard range, but according to the Ministry of Health this operation is included in the moderate type of operation. Medium surgery is expected to take 1-2 hours. Research by Bauwens K et al found that the average operating time was 108 minutes and Yu G et al 59.8 minutes. So, it can be concluded that the operating time is in the range of 60 minutes to 120 minutes. The duration of each patient undergoing surgery can be different due to various factors, for example age, gender, BMI and type of appendicitis.46

From the results of data processing, 88 patients who underwent surgery had an average operation duration of 84.33 minutes, the highest duration was 60 minutes, the fastest duration was 30 minutes and the longest duration was 180 minutes.

Pre- and Post-operative VAS

The Visual Analog Scale (VAS) is a subjective pain assessment scale consisting of the numbers 0 (no pain) to 10 (very severe pain). Pain is an unpleasant sensory and emotional experience associated with tissue damage. Pre-operative pain can be acute or chronic. Appendicitis patients generally come to health services if the pain is interfering with activities on a scale of >6. This is caused by an infection in the appendix causing the lymphoid follicles to swell and mucus secretions to continue to be released. This condition causes intraluminal pressure to increase and ultimately pain occurs.

Meanwhile, post-operative pain is common and is categorized as acute pain caused by inflammation and activation of afferent neurons resulting from surgical trauma. The post-operative pain felt by the patient will decrease over time with the help of non-pharmacological and pharmacological therapy in the form of analgesics. In this study, it was found that the highest pre-operative VAS was in the range 7-9 (severe pain) and decreased after becoming more in the range 1-3 (mild pain) post-surgery [47].

CONCLUSION

Description and characteristics of Laparotomy Appendectomy as a treatment for Appendicitis at RSU UKI in 2020-2022 dominated by ages 25-45 years, women, length of stay 4-6 days, duration of operation 60-90 minutes, almost all patients were given pre- and post-operative antibiotics with the Ceftriaxone type, more than half of the patients were given pre-operative painkillers and almost all patients were given post-operative painkillers with the ketorolac type, the most common classification was acute appendicitis, the most surgical technical approach was oblique incision, pre-operative VAS 7-9, post-operative VAS 1-3 and the outcome of all patients was cured

Declaration by Authors

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