JIM: Jurnal Ilmu Multidisiplin
E-ISSN: 2829-4580
P-ISSN: 2829-4599
GREENATION PUBLISHER
+62 812 1046 7572 http://greenpub.org greenation.info@gmail.com
DOI: https://doi.org/10.38035/jim.v5i2

The Danger of Traditional Abdominal Massage with Appendicitis; A Long-standing Misunderstanding in Ende, East Nusa Tenggara

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Abstract: *In Southeast Asia, Indonesia has the highest incidence of acute appendicitis, with approximately 5 cases per 1000 individuals. In rural areas, the burden got worse because of locals misconceptions. We noticed that as a part of their cultural beliefs, the patient had a traditional abdominal massage before going to the hospital. This study aims to understand the correlation between conventional abdominal massage with perforated appendicitis and other related complications. This is a retrospective analysis study which identified 47 patients who underwent surgery at Ende General Hospital from January 2020 – September 2023. Univariate and bivariate analysis was performed to describe and analyse the correlation between traditional abdominal massage and complications. This study showed there was a significant correlation between the patients who received traditional abdominal massage with bowel adhesion (OR: 0.071; 95%CI: 0.011 - 0.472; p=0.00), generalized peritonitis (OR: 6.25; 95%CI: 1.53 - 25.41; p= 0.009), perforated appendicitis (OR: 25.6; 95%CI: 4.17 - 156.99; p=0.00), and bowel adhesion (OR: 0.071; 95%CI: 0.011 - 0.472; p=0.00), but not with length of stay (LOS) (OR: 1.030; 95%CI: 0.972 – 1.092; p=0.72). This study found a correlation between traditional abdominal massage and appendicitis complications. Misconception that circulated in this area ended up backfiring on locals, worsening abdominal pain and causing complications. These findings imply that the local government should collaborate with health workers and tribal leaders to raise awareness and clarify inaccurate information.*

Keywords: *Traditional Abdominal Massage, Appendicitis, Alternative Therapy, Perforation, Bowel Adhesion*

INTRODUCTION

The number of patients with abdominal pain in Ende General Hospital's emergency room has increased during the past three years. We found the similarities that the patient did a traditional abdominal massage before coming to the hospital. One of the most common causes of lower abdominal pain which leads patients to the hospital is appendicitis. (Snyder et al., 2018) (Aguilar-Andino et al., 2021) (Di Saverio et al., 2020)

Luminal obstruction from various cause is assumed to be the origin of appendicitis. Proximal lumen obstruction can happen from lymphoid hyperplasia, mucosal inflammation, or a fecalith that accumulates mucosal secretions. These conditions increase intraluminal pressure, mucus production and bacterial overgrowth, collapse the venous system and circulation, induce suppurative transmural inflammation and cause wall tension, necrosis, and sometimes perforation. (Snyder et al., 2018) (Aguilar-Andino et al., 2021)

To diagnose acute appendicitis, a combination of a physical examination, a history taking, and test results is still considered essential. (Bom et al., 2021) Alvarado score is one of clinical scoring system used to stratify the risk of appendicitis in patients presenting with abdominal pain. (Shogilev et al., 2014) In order to effectively manage a patient with acute appendicitis, standardised imaging is also required to provide an accurate diagnosis. (Cole & Maldonado, 2011)

In Southeast Asia, Indonesia was placed on the first ranked with the highest prevalence of acute appendicitis around 24.9 cases per 10,000 population. (Di Saverio et al., 2020) Nevertheless, In Ende, East Nusa Tenggara, the prevalence of perforated appendicitis higher than other region due to sociocultural factors and misunderstanding going on in the community. One of the most commonly practiced cultural misperception to abdominal pain is to have traditional massage. The decision for having traditional abdominal massage was influenced by social beliefs and a lack of awareness about the disease.[j] Traditional abdominal massage, which involves stretching and rubbing the skin while applying pressure to the stomach, can delay diagnosis, change the clinical picture, all of which can lead to complications. The various techniques used by the therapist may have contributed to the appendix perforation because of the potential rise in intra-abdominal pressure, also affect vascular collapse and raise intracaecal pressure, which leads to perforated appendicitis. (Aguilar-Andino et al., 2021)

The aim of this study is to understand the correlation between conventional abdominal massage with perforated appendicitis and other related complications.

METHOD

This study was held in Ende General Hospital to understand the correlation of traditional abdominal massage with appendicitis. The design of this study is retrospective analysis with purposive sampling technique using medical records from January 2020 – September 2023. The population are all of the patients diagnosed with appendicitis and underwent surgery. In this study, we found 47 sample who matched inclusion and exclusion criteria.

To obtain data, researchers used secondary data taken from the medical records of patients diagnosed with appendicitis who underwent surgery. This research data was processed using univariate analysis to describe the frequency distribution table of research subjects, then continued with bivariate analysis to determine the relationship between the dependent variable and the independent variable using SPSS 25 for windows.

Collected datas include patient characteristic (gender, age and education level), onset of the disease, history of getting traditional abdominal massage, Alvarado score, laboratory work (leukocytosis and shift to the left), abdominal x-ray and USG findings, intraoperative findings (perforated and non-perforated appendicitis) and duration of hospitalization. Three exclusion criteria were used to select cases that were admitted. The exclusion criteria was patient under 18 years old, had history of abdominal surgery, and had antibiotic.

The research was carried out after obtaining ethical approval No. KET-330/UN2.F1/ETIK/PPM.00.02/2024 from The Ethics Committee of the Faculty of Medicine, University of Indonesia.

Statistical analysis

All research data that has been collected then processed and presented in distribution tables based on variables. If the requirement for Chi-square was not match, Fisher's test was conducted to analyse intergroup differences, with a p-value of less than 0.05 being regarded as statistically significant. The probability of risk was indicated as odds ratio (OR) with a 95% confidence interval. A significant OR value is one that is greater than or equal to 1.00.

RESULT AND DISCUSSION

There were 47 people suffering from acute appendicitis who underwent surgery in Ende General Hospital from 2020-2023. According to Table 1, the overall incidence of appendicitis from 2020 to 2023 is approximately 1.35:1, with 58% of cases involving men and 42% involving women. The majority of cases occur in people between the ages of 18 until 25 (57.4%), followed by those between the ages of 31 until 40 and 41 until 50 (about 12.8%), 26 until 30 (about 10.6%), and those over 50 (about 6.4%). The majority of patients have completed junior high school (38%), then elementary and senior high school (30%), and a bachelor's degree (2%).

About 42.5% of patients visit hospital within 48 hours, whereas 8.5% within 12 hours, 21.3% between 12 until 24 hours, and 27.7% between 24 until 48 hours (Table 2). Approximately 72% of the patients had previously received a typical abdominal massage, while 28% had not. Alvarado Scores range from 7-8 for around 32% of patients, less than five for 28%, 9-10 for 21%, and 5-6 for 19%. Regarding bowel obstruction, 4.25% of patients had it while 95.7% did not; similarly, 38% of patients did not have generalised peritonitis while 69% did.

Table 3 displays imaging results and laboratory work. Two components of the Alvarado score were leukocytosis and shift to the left in about 76% of the patients, while 24% did not. In addition, imaging results revealed that 2.1% of patients had meteorism, 4.2% had colon and small intestinal distention, and 42.6% of patients had opacities in the right lower quadrant. According to USG, 2.1% of patients had small intestinal obstruction, 10.6% had fluid collection, 30% had appendicitis appearance, and 4.2% had periappendiceal abscess. According to Table 4, 22% patients did not have a perforated appendix and approximately 78% did. Additionally, 26% did not have intestinal adhesions, whereas 74% did. Table 1 presents the length of hospital stay, approximately 93.6% of patients were admitted within three to seven days, 4.2% for less than three days, and 2.2% for longer than seven days.

Table 1. Patient Characteristics

	Amount (n = 47)	Percentage (%)
Gender		
Male	20	42.6%
Female	27	57.4%
Age		
18-25	27	57.4%
26-30	5	10.6%
31-40	6	12.8%
41-50	6	12.8%
>50	3	6.4%
Education Level		

Elementary School	14	29.8%
Junior High School	18	38.3%
Senior High School	15	31.9%

Table 2. Clinical Profile

Onset of disease	**Amount (n = 47)**	**Percentage (%)**
<12 hours	6	12.8%
12-24 hours	10	21.3%
25-48 hours	13	27.7%
>48 hours	18	38.3%
History of Getting Traditional Abdominal Massage		
Yes	34	72.3%
No	13	27.7%
Alvarado Score		
<5	13	27.7%
5-6	9	19.1%
7-8	15	31.9%
9-10	10	21.3%
Generalised Peritonitis		
Yes	29	61.7%
No	18	38.3%
Leukocytosis	**Amount (n = 47)**	**Percentage (%)**
≤10.000	11	23.4%
>10.000	36	76.6%
Shift to the left		
Yes	36	76.6%
No	11	23.4%
Intraoperative Findings	**Amount (n = 47)**	**Percentage (%)**
Perforated Appendicitis	37	78.7%
Non-perforated Appendicitis	10	21.3%
Bowel Adhesion		
Yes	33	70.2%
No	14	29.8%
Duration of Hospitalization	**Amount (n = 47)**	**Percentage (%)**
≤ 7 days	46	97.9%
> 7 days	1	2.1%

Table 3. Univariate and bivariate analysis

	History of Traditional Abdominal Massage		No History		OR	95% CI	P value
	n	percentage	n	percentage			
Perforated Appendicitis	32	68.1%	5	10.6%	25.6	4.174 - 156.996	0.000
Non-perforated Appendicitis	2	4.3%	8	17%			
Generalized Peritonitis	25	53.2%	4	8.5%	6.25	1.537 - 25.415	0.009
No Peritonitis	9	19.1%	9	19.1%			
Bowel Adhesion	33	70.2%	0	0	0.071	0.011 - 0.472	0.000
No Adhesion	1	2.1 %	13	27.7%			
LOS ≤ 7 days	33	70.2%	13	27.7%	1.030	0.972 – 1.092	0.723
LOS > 7 days	1	2.1%	0	0			

We discovered a corelation between traditional abdominal massage and the following outcomes:

Perforated appendicitis (p value = 0.000, OR = 25.6), generalized peritonitis (p value = 0.009, OR = 6.25) and incidence of bowel adhesion (p value = 0.000, OR = 0.07) but not with hospitalisation duration (p value = 0.723, OR 1.030)

Incidence of appendicitis in Ende General Hospital is around 1.35:1, with 57.4% of cases occurring in female and 42.6% in male. This contrast with another study that found male to female ratio at 1.4:1. (Cole & Maldonado, 2011) Men are slightly more likely have acute appendicitis than women, with a lifetime incidence of 8.6% compared to 6.7% for women. (Jones, 2023) (Noudeh et al., 2007) We assume that based on habit, men tend to endure their pain so that more cases go unrecorded. In this study, the highest prevalence of acute appendicitis found in the 18-25 years old age group. Another study found that appendicitis mostly happen around 20-30 years old, and relatively uncommon under 5 years old or above 50 years old with the highest incidence occurring in 10-14 years old males and 15-19 year old females. (Cole & Maldonado, 2011) (Wijaya et al., 2020)

The majority of patients at Ende General Hospital had an overall Alvarado score of 7-8, indicating a probable case. (Wijaya et al., 2020) (Cole & Maldonado, 2011) To diagnose appendicitis, laboratory work is needed to support clinical findings. About 76% of patients came with leukocytosis and PMN count found as shift to the left. Another study found that a leukocyte count of 10,000 cells/mm^3 is predictable with acute appendicitis. Complex appendicitis, such as perforated and gangrenous appendicitis, is related to a WBC level equal to or above 15,000 or 17.000 cells/mm^3 and higher PMN count. (Wijaya et al., 2020) (Cole & Maldonado, 2011) (Wijaya et al., 2020) This occurs because when the appendix is ruptured and perforated, pus from the appendix's lumen spreads to other organs and the appendix's vermiform fossa, which can lead to peritonitis and encourage the growth of bacteria that worsen infection. As a defence against infectious organisms, this condition will increase the immune system's production of the leukocytes. (Wijaya et al., 2020)

Bowel obstruction on plain radiographs may be the result of a perforated appendix. Peritoneal inflammation from a perforated appendix may result in an ileus with resultant

bowel obstruction pattern found on imaging. (Snyder et al., 2018) Patients with suspected acute appendicitis can be evaluated using ultrasound, computed tomography (CT), or magnetic resonance imaging. (Snyder et al., 2018) In our limited resourcing area, we often did ultrasound to evaluate the appendix.

Although the specific onset of symptoms is unknown, appendicitis usually occurs in stages, beginning with early appendicitis at 12 to 24 hours and leading to perforation at more than 48 hours. Within a day, 75% of people show symptoms. Although it differs, the chance of rupture is roughly 2% at 36 hours and increases about 5% every 12 hours in the hours after. (Jones, 2023) Within this study, most of the patients come to hospital after more than 48 hours of onset. This is also supported by their mid-education level which also contributes to their action and shows a lack of awareness of the disease. The majority of the population level of education is junior high school and classified as a mid-level which also contribute to their misperception and lack of awareness about the disease.

Delay in seeking health professional care is found to be the most important risk factor for perforation. (Cole & Maldonado, 2011) In another study, the average time for experiencing abdominal pain is 46 hours for gangrenous appendicitis and 71 hours for perforations. According to other research, if appendicitis is not diagnosed for more than 48 hours after the pain first appears, there is a higher than 80% chance of perforation. (Cole & Maldonado, 2011) Cultural beliefs also played a major role in the delay of healthcare seeking behaviour in this study. One of the most common circulating cultural belief in East Nusa Tenggara is to have a traditional massage upon abdominal pain as a cure for abdominal ailments. This cultural belief similar in Honduras, Central America which also have “sobada”, an abdominal massage which patient’s abdomen get rubbed, stretched and pressed to cure indigestion syndrome with oils or butter, and after that a spoonful of olive oil, purgatives, and/or tea is administered. (Aguilar-Andino et al., 2021) Traditional or alternative therapies were also favoured by cultural beliefs. Since these traditions have been carried down through the centuries, it is hard to ignore the established culture. (Widayanti et al., 2020) Due to the country's multiculturalism, ethnic diversity, and wide range of healthcare options, people's behaviour connected to their health is more complex in Indonesia. (Widayanti et al., 2020) We found correlation between traditional abdominal massage with incidence of perforation in Ende, East Nusa Tenggara.

Due to the implications, as reported in the 2021, intestinal perforation, appendiceal adhesions, intra-abdominal abscess, and gangrenous appendicitis were the most common complications among patients who had previously undergone abdominal manipulation. This topic requires the attention of multiple parties. One potential contributor to the appendix perforation might involve different therapist manoeuvres that can raise intra-abdominal pressure, affect vascular collapse and raise intracaecal pressure, then lead to appendix perforation. After abdominal manipulation, patient also reported an increased pain intensity, with a generalization of abdominal pain in the four quadrants, diarrhoea, and constipation. (Aguilar-Andino et al., 2021)

Sepsis, abscesses, peritonitis, intestinal blockage, and problems with reproduction may arise from perforation. Perforation rates among adults vary from 17% to 32%, which can result in longer duration of operation, longer antibiotic prescription regimens, and more serious postoperative consequences. (Snyder et al., 2018)

Adhesions can develop in the body as a result of any healing process, including surgery, physical trauma, infection, and/or inflammation. Surgery is not the only reason of adhesion formation. (Rice et al., 2013) In this study, traditional abdominal massage is defined as physical trauma in abdomen that would make the clinical condition worsen, such as perforated appendicitis and bowel adhesions.

Adhesions during surgery can cause more intraoperative difficulties, such as haemorrhage, damage to the ureter, bladder, and intestine, as well as lengthen operating hours.

Additionally, pelvic adhesion can occur which can result in pelvic pain, bowel obstruction and infertility in women. (Stovall et al., 1989) (diZerega, 1997)The incidence of anterior abdominal wall adhesions has risen significantly following prior laparotomy using a midline vertical incision. Approximately 5% of individuals who have laparotomies suffer adhesive obstruction; 10–30% of these patients will experience further episodes. (Liakakos et al., 2001) Since laparoscopy is not available in our area, this must be a concern as laparotomy is known to induce more adhesion than laparoscopy. (Cheong, 2001)

Research on adhesion prevention appears to be most promising when it comes to developing techniques to separate injured peritoneal surfaces and promote an optimal degree of fibrinolysis. (diZerega, 1997) The current standard procedure for small intestinal obstruction caused by adhesions that cannot be relieved by bowel rest or stomach decompression is surgery called adhesiolysis, which lysis the adhesions to release the obstruction. Through the micro failure of each individual crosslink's, the manual soft tissue physical therapy procedure efficiently lysis the adhesions, restoring normal anatomical structure and promoting the formation of more normal tissue structures. (Rice et al., 2013) Because the risk of adhesion formation is highest during the postoperative period, multiple studies recommend visceral manipulation. (Seffinger & Martin, 2013)

The severity of adhesions can be decreased by a multidisciplinary approach that includes biochemical agents with or without biomechanical barriers, a careful surgical technique to minimise tissue harm, and adequate prophylactic antibiotic use to lower infectious morbidity. (Liakakos et al., 2001)

CONCLUSION

This study found a correlation between traditional abdominal massage and appendicitis complications. Misconception that circulated in this area ended up backfiring on locals, worsening abdominal pain and causing complications. These findings imply that the local government should collaborate with health workers and tribal leaders to raise awareness and clarify inaccurate information.

It is recommended that a more comprehensive and rigorous study be conducted on a bigger patient group to determine whether there is a causal association between history of traditional abdominal massage and risk of perforated appendicitis and other complications in Ende, East Nusa Tenggara.

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