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ORIGINAL ARTICLE

Operative Intervention Vs Percutaneous Drainage in Treatment of Appendicular Abscess

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ABSTRACT

Background: One of the most common surgical diseases that require immediate care is acute appendicitis. An appendicular perforation or abscess has been observed in approximately 2–6% of hospital visits. A significant morbidity rate may result from this emergency, which develops in response to recurrent untreated perforated appendicitis. This study aims to assess the results of surgical and percutaneous drainage for appendicular abscesses.

Methods: Using a computed tomography (CT) scan, we identified an abscess as a collection of fluid adhering to the appendix. Patients with abscesses were divided into 3 grades: grade 1 (less than or equal to 3 cm), grade 2 (greater than 3 cm) and grade 3 (extended to the pelvic cavity), based on Jeffrey's scale. Surgical drainage (group I) and radiologic-guided (ultrasonography- or CT-guided) percutaneous drainage (group II) were the two therapeutic options offered to enrolled patients.

Results: Of the 67 instances, 23 patients (34.3%) had surgery and 44 (65.7%) had percutaneous drainage. 37 patients (55.2%) were males and 30 (44.8%) were females. The operational intervention group I had only one failure case (4.3%), while the radiologic-guided percutaneous drainage group II had 37 cases (84.1%) of successful outcomes and a failure rate of 15.9% (7 cases).

Conclusion: Appendicular abscesses smaller than 6 cm can be effectively treated with radiologic-guided percutaneous drainage.

Keywords: Aappendicular abscess; Operative drainage; Percutaneous drainage; Surgery.

INTRODUCTION

One of the most common illnesses that require immediate care is acute appendicitis. An appendicular perforation or abscess has been seen in approximately 2–6% of hospital visits. A high morbidity rate may result from this appendicular abscess, which develops in response to recurrent untreated perforated appendicitis [1]. According to reports, appendicular abscesses have developed in 20% of instances of acute appendicitis [2]. Ultrasonography and computed tomography (CT) are two imaging modalities that are unquestionably used to diagnose appendicular abscess. In addition to aiding in the assessment and evaluation of percutaneous drainage, improved CT also directs the drainage access path [3].

To reduce the morbidity and mortality rates, numerous conservative and non-conservative methods have been employed, either in conjunction with percutaneous drainage or as antibiotics alone [4]. The most effective conservative treatment for abscesses in the inflammatory stage is percutaneous drainage combined with intravenous antibiotics, but this approach has a high recurrence rate and a lengthy hospital stay, and postpones an urgent surgical appendectomy [5, 6]. It is still difficult to manage appendicular abscesses appropriately, particularly in unusual instances. According to studies, 15–40% of instances of appendicitis are misdiagnosed or mismanaged

in the early stages of inflammation, which results in emergency appendectomy [7].

Our study's objective is to assess the results of surgical and percutaneous drainage for appendicular abscesses.

METHODS

This study was carried out at Zagazig University Hospitals and was prospective in nature. Between April 2024 and October 2024, we recruited 67 patients for our study.

Inclusion criteria

Male or female patients over the age of 18 with a verified diagnosis of appendicular abscess based on CT results were eligible to apply .

Exclusion criteria

Patients transferred to another hospital, younger than 18 years, or who had an appendicular or cecal tumor identified by the final pathological analysis were not allowed to participate in our study.

Ethical considerations

This work has been carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans. Approval letter was obtained from the Ethical Committee for Research (Institutional Review Board 'IRB'), Faculty of Medicine, Zagazig University (753/3-Nov-2024). Every patient signed an informed written consent for acceptance of participation in the study.

Randomization

Following a radiological evaluation, enrolled patients were split into two groups and given one of two treatment options: surgical drainage (group I) or radiologic (CT-guided or ultrasound) percutaneous drainage (group II).

Group I: Following a CT evaluation, the surgeon performed the procedure.

Group II: The percutaneous drainage was carried out by interventional radiologists three days following the diagnosis.

All patients received antibiotic treatment both before and after the full course of drainage and surgery.

Enhanced Computed Tomography

To verify the diagnosis of the cases, we administered oral and intravenous contrast at a dose of 2 ml/kg at 3 ml/second using a 64-slice CT scanner. An abscess was defined as an accumulation of fluid next to the appendix with a CT scan attenuation ranging from 0 to 20 Hounsfield units (HU). Grade 1, 2, and 3 abscesses (less than or equal to 3 cm, greater than 3 cm, and bigger abscesses extending to the pelvic cavity, respectively) were distinguished according to the scale adopted by Jeffrey et al. [8].

Routine preoperative investigations

Prior to the procedure, several investigations were performed, including preoperative screening, coagulation profile, liver and kidney function tests, CBC, abdominal ultrasound, and CT abdomen.

Percutaneous radiological drainage

Depending on the viscosity of the aspirated fluid, interventional radiologists utilized catheter sizes ranging from 8 to 12 Fr. One patient got transgluteal drainage, whereas almost all patients were handled by transabdominal channel drainage. Successful outcomes of percutaneous drainage were defined as patients who were relieved after the initial drainage with a fluid drained less than 10 ml/day in the next three days without requiring surgery [9]. However, we considered drainage failure if the patient required an urgent appendectomy or the clinical examination was getting worse. On the other hand, a patient's recovery and hospital discharge following a single drainage intervention were the basis for satisfactory operation outcomes. Nonetheless, situations that needed percutaneous drainage or another surgical procedure were taken into consideration as surgical failure.

Questionnaire

A questionnaire was provided for every patient to record the clinical history, including length of sickness, abscess criteria, time between drainage and procedure, and type of operation.

Statistical Analysis

SPSS version 23 was used to analyze the gathered data. The mean ± standard deviation (SD) was used to express numerical data. The Chi-square test and Pearson coefficient correlation were used to analyze the qualitative

variables. The Mann-Whitney test was used to analyze quantitative variables. A significant P-value was less than 0.05.

RESULTS

Baseline Data

Regarding the interference type, of the 67 instances, 44 (65.7%) underwent percutaneous draining, and 23 (34.3%) underwent surgical removal. Regarding gender, men made up nearly half of the patients (37, 55.2%), while women made up the other half (30, 44.8%) (Table 1). The average onset of symptoms was reported to be 5 days, with a range of 1 to 30 days

Outcomes of abscess drainage

Regarding abscess drainage, we found that percutaneous drainage was more effective than surgery for grade I abscesses (65.9% vs. 13%, respectively). Both methods have near results in grade 2. While the majority of individuals with grade 3 abscesses were in need for surgery. A 15-day hospital stay was required for a patient with recurrent appendicitis undergoing percutaneous drainage (Table 2).

In 26 cases (59.1%), we used 10 Fr catheters, 8 Fr catheters in 12 cases (27.3%), and 12 Fr catheters (13.6%) in 6 cases with 7 cases (15.9%) of failed percutaneous drainage (Tables 3 & 4).

Only one instance (4.3%) of unsuccessful surgery was reported, while the percutaneous drainage group had a success rate of 84.1% (37 cases) and a failure rate of 15.9% (7 cases) (Table 5, Figure 1).

Table (1): Demographic data of the studied patients

Variables	Patients (N = 67)	
Age (in years) **Mean ± SD**	46.7 ±6.65	
	N	**%**
Gender **Male** **Female**	 37 30	 55.2% 44.8%
Type of intervention **Percutaneous drainage** **Operative interference**	 44 23	 65.7% 34.3%

Table (2): Intra-operative parameters among the studied patients

Variables		Operative interference (N= 23)	Percutaneous drainage (N= 44)	P-value
Size of abscess	**Median (IQR)**	3.6 (0.9-11.0)	6.0 (2.5-12.3)	<0.001
Length of hospital stay	**Median (IQR)**	3 (2 - 6)	15 (3-67)	<0.001
		N (%)	**N (%)**	
Abscess grading	**Grade 1**	3 (13%)	29 (65.9%)	<0.001
	Grade 2	6 (26.1%)	13 (29.5%)	<0.05
	Grade 3	14 (60.9%)	2 (4.5%)	<0.001
Total number of abscesses	**Multiple**	5 (21.7%)	9 (20.5%)	0.432
	Single	18 (78.3%)	35 (79.5%)	0.106
Location of abscess	**Extend to distant site**	5 (21.7%)	12 (27.3%)	<0.05
	Right lower quadrant	18 (78.3%)	32 (72.7%)	<0.05
Recurrent appendicitis		0 (0.0%)	1 (2.3%)	0.438

Table (3): Outcomes of the percutaneous drainage among the studied cases

Variables		Frequency (N=44)	Percent
Successful drainage		37	84.1%
Failed drainage		7	15.9%
Image technique	**CT with US guided**	25	56.8%
	US	11	25%
	CT	8	18.2%
Size of Catheter (Fr)	12 **Fr**	6	13.6%
	10 **Fr**	26	59.1%
	8 **Fr**	12	27.3%
Approach	**Transgluteal**	1	2.3%
	Transabdominal	43	97.7%

Table (4): Outcomes of surgical interference among patients underwent initial percutaneous drainage

Variables	Frequency (N=44)	Percent
Cases that were not treated with surgery	31	70.5%
Exploratory laparotomy with drainage (Failed percutaneous drainage)	3	6.8%
Delayed appendectomy	6	13.6%
Hemicolectomy (Failed surgical drainage)	4	9.1%

Table (5): Outcome comparison of the studied groups

Outcomes	Operative interference (N=23)	Percutaneous drainage (N=44)
Successful outcomes	22 (95.7%)	37 (84.1%)
Failure outcomes	1 (4.3%)	7 (15.9%)

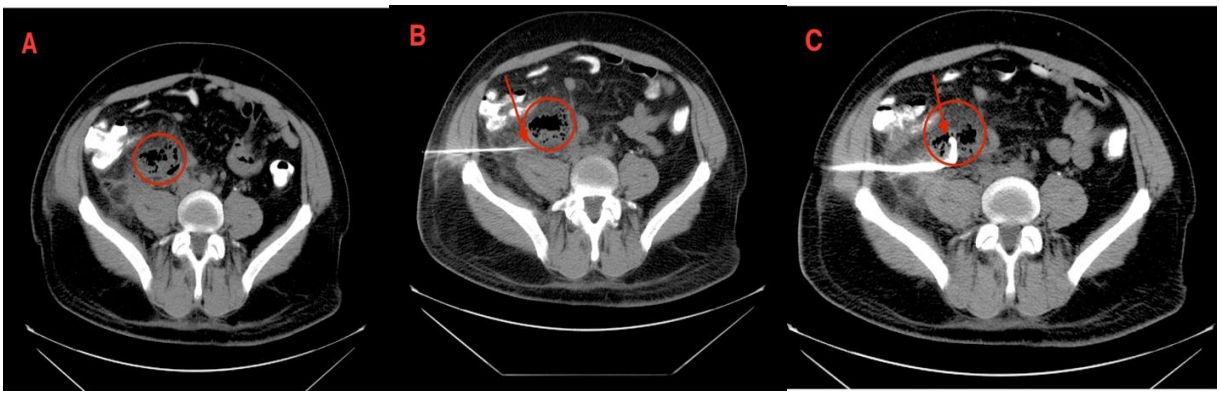

Figure (1): (A) Right lower quadrant abscess**. (B)** Drain placement for abscess. **(C)** Drain placement with resolution of abscess.

DISCUSSION

Misdiagnosed and mistreated acute appendicitis with perforation can lead to periappendiceal abscesses. In our study, we found that 84.1% of patients in group II had successful percutaneous draining results. These findings are consistent with those of Marin et al. [5], who reported 90% successful and problem-free percutaneous draining outcomes. According to three other earlier studies, the response to percutaneous drainage ranged from 78.6% to 100% [10-12]. Contrary to our findings, a meta-analysis found that only 20% of patients required percutaneous drainage and that 93% of appendicular abscesses could be treated with a conservative antibacterial strategy alone [10].

But according to Miftaroski et al. [13], recurrent appendicitis occurred in 7% of individuals that had first responded to medications and improved CT-guided drainage. After drainage, recurrent appendicitis occurred in 2.3% of cases (1 case) in our study.

Kim et al. [4] contrasted emergency surgical removal and percutaneous drainage with antibiotics. Conservative treatment was more effective than surgical intervention in 91.7% of cases. Zerem et al. [14] contrasted antibiotics and percutaneous drainage. Because there was a lower chance of appendectomy, their findings showed that percutaneous drainage produced better results than antibiotic treatment.

Percutaneous drainage had a success rate of 84.1% in our study, and the difference between surgery and percutaneous drainage was not statistically significant. At a 95% confidence interval, the odd ratio between the two groups was 4.529, with a range of 0.521 to 39.386. Additionally, we noted that 95.7% of surgeries were successful.

In our investigation, we found that the abscess varied statistically significantly between the two groups ($p < 0.001$). According to our findings, doctors should treat grade 1 abscesses with percutaneous drainage instead of surgery. The percutaneous drainage is a viable treatment option for minor abscesses. Our findings also showed that the doctor's decision regarding drainage or surgery is what determines how to treat grade 2 and 3 abscesses. Our findings contradict research by Zerem et al. [14] that claimed shorter hospital stays for individuals undergoing percutaneous drainage. Until the abscess was fully healed and confirmed by imaging, our patients remained in the hospital.

CONCLUSION

Percutaneous drainage is an effective treatment method for appendicular abscesses, especially grade 1, with a reduced chance of recurrence, according to our findings. However, this method prolongs hospitalization until the abscess is fully healed.

Conflict of interest: None.

Financial disclosures: None.

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