

## A Comparative Study Between; Conservative Management of Appendicular Abscess by Percutaneous Drainage and Emergency Operation

Fady M. Habib<sup>1\*</sup>, Ahmed M. Sallam<sup>1</sup>, Loay M. Gertallah<sup>1</sup> and Samar A. Amer<sup>2</sup>

<sup>1</sup>Department of General surgery, Faculty of Medicine, Zagazig University

<sup>2</sup>Public health and community medicine, faculty of medicine Zagazig University

\*Corresponding Author: Fady M. Habib, Department of General surgery, Faculty of Medicine, Zagazig University, Egypt.

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### Abstract

**Background:** Appendicular abscess was found to be managed conservatively with good success rates and low incidence of complications. As emergency surgery is not always preferred, as it carries out risk of spread of inflammation within the abdominal cavity, adhesion of the intestines, sepsis after surgery, and delayed healing of surgical wounds. So, antibiotic treatments and ultrasound-guided percutaneous drainage have been proven to be effective and safe.

**Aim:** We conducted this study to compare the outcomes; morbidity and hospital stay in patients who underwent emergency surgery, and those who underwent percutaneous drainage for management of appendicular abscess.

**Patients and Methods:** We have included 30 patients with appendicular abscess, divided them into 2 groups each group contain 15 patients; group (A) are managed by classical extra-peritoneal drainage with or without appendectomy, while group (B) are managed by conservative measures and ultrasound guided drainage of appendicular abscess.

**Results:** We found that the period of functional recovery and mean hospital stay in group A is longer than in group B. In group A technical success rate was 12/15 patients and clinical success was 11/15 patients while in group B technical and clinical success were 15/15 (100%). In group a five patients had complication in the form of wound infection, dehiscence, seroma and ugly scar but there is no complications in group B.

**Conclusion:** Appendicular abscesses may be treated by safe and effective manner by US-guided percutaneous drainage with high technical and clinical success rates, low incidence of complications and shorter hospital stay. Appendectomy might be reserved for recurrent cases or patients with a possibility of underlying malignancy.

**Keywords:** Appendicular abscess; Percutaneous drainage; Conservative management; Appendectomy

### Introduction

Appendicitis is the commonest cause of pain which is usually requiring surgery. Appendicitis might be complicated with an abscess or mass in 2–7% of the patients [1]. It was found that

appendicular abscess could be managed conservatively with a high success rates ranging from 76% to 97%, with few complications [2]. So, antibiotic treatments and ultrasound-guided percutaneous drainage have been found to be effective and safe [3]. Emergency Appendectomy is not preferred on such cases as it

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carries out risk of, spread of inflammation in a wide area within the abdominal cavity, adhesion of the intestines, and delayed healing of surgical wounds [4& 5]. However, treatment failure and recurrent acute appendicitis happened in 7%-10% of patients who are managed conservatively. Furthermore, it was found that the presence of a fecalith in the abscess, which has been demonstrated to be a major predicting factor for recurrence of acute appendicitis or abscess, so, further operation would be required for drainage of recurrent abscess or for removal of the retained fecalith [6].

American authors have recommended primary surgical treatment, while European authors have recommended performing initial conservative non-surgical management by using intravenous antibiotics with or without percutaneous drainage. More recent studies question interval appendectomy and recommend selective interval appendectomy in patients over 40 years of age, so as not to miss a malignancy [7]. Due to conflicting results regarding the best method of management of appendicular abscess, we have conducted this study aiming at comparing the outcomes; morbidity and hospital stay in patients who underwent emergency surgery, and those who underwent percutaneous drainage for management of appendicular abscess.

## Patients and Methods

This is a prospective randomized cohort study which was carried out throughout the period from April 2016 to October 2018 at Department of General Surgery and Department of Radiology, Faculty of Medicine, Zagazig University. We included 30 patients with appendicular abscess. The study was approved by the local ethical committee of the Faculty of Medicine, Zagazig University and an informed consent was taken from all patients.

- Personal, present and past history was taken from all patients at admission.
- Plain x ray pelvi-abdominal ultrasound was done to diagnose appendicular abscess.
- Diagnostic aspiration was done to confirm the diagnosis.
- C.T to confirm diagnosis in suspicious cases.
- C.B.C, bleeding profile, liver and kidney function tests were done.
- All patients were given intravenous fluids, antibiotics and analgesics during the period of hospital stay till the result of culture and sensitivity was obtained.
- On discharge, we shift to oral antibiotics for two weeks.
- We divide the patients into two groups:

Group (A) Fifteen patients are underwent emergency surgery and were managed by classical extra-peritoneal drainage with or without appendectomy.

### Surgical steps of Management of patients in group A:

Appendectomy, evacuation of all gross pus and exudates, thorough lavage with warm saline until the effluent was clear of contamination and the operation bed was clean.

1. A tube drain was fixed into the appendectomy site through a separate incision, anchored with a stitch and connected to a sterile bag.
2. Another drain was inserted and exited separately from the main incision.
3. The main incision wound was closed in layers with interrupted stitches up to the fascia and the skin.
4. We finally cover the wound with dressing soaked in povidone 10% solution.

### Follow up

1. The amount of fluid in the drain reservoir were estimated and recorded daily during the follow-up period.
2. The wounds were inspected and their status was noted with daily dressing by povidone iodine.
3. Abdominal ultra-sonographic examination was performed every other day or on demand.
4. The drains were extracted after stoppage of pus discharge and US revealed no residual collection.
5. All patients were discharged when fever subsided, white blood cell count normalized and oral feeding started.

### Steps of conservative management of patients in group B:

Group (B) includes fifteen patient which remains on conservative measures in addition to US-guided drainage of appendicular abscess.

1. The procedure was done under local anesthesia (lignocaine hydrochloride).
2. A spinal needle 22G was used for injection of local anesthetics.
3. The needle was placed in the abscess capsule under US guidance
4. Local anesthetics were injected while the needle was withdrawn up to the subcutaneous tissues and also intradermal.

5. A puncture needle 18G was introduced under US-guidance into the abscess cavity, followed by aspiration of 10 cc of the abscess contents for culture and sensitivity.
6. The contents of the abscess were manually evacuated then the catheter was fixed to skin using - 0- silk suture, and was connected to an evacuation bag.
7. The catheter was left and daily washout with sodium chloride 10 ml was performed.
8. The catheter was removed when the clinical manifestations subsided, the bag stopped drainage of pus or drained <5 cc serous fluid for 3 days, and ultrasound examinations must show that there is no residual fluid in the abscess cavity.
9. The follow-up observation period was from the day of the first visit to the most recent visit to outpatient clinic.

#### The clinical characteristics

We have recorded patients' data, duration of pain before admission, body temperature at the time of admission, leukocytic counts, heart rate, size of abscess; the hospital stay, and the postoperative complications were analyzed.

#### Success rate is calculated as follows:

##### For group A:

1. The ability for complete evacuation of the abscess
2. Performing appendectomy.
3. All symptoms are subsided.
4. Absence of complications or the need for new surgery.

##### For group B

1. The ability to insert a drainage catheter into the abscess cavity.
2. Complete evacuation of the abscess cavity.
3. Subsidence of all symptoms.
4. Absence of major complication or the need for surgical evacuation.

The follow-up observation was analyzed based on electronic medical records.

Statistical analysis of data was done at department of public health and community medicine, faculty of medicine Zagazig University, using SPSS ver. 20 program. For statistical validation, the Student's t-test, Pearson's chisquare test, and Fisher's exact test were used. P < 0.05 was determined to be statistically significant.

## Results

Patients of group A included 13 male and 2 female with median age of 20 year with 2 patients had co-morbidity. Group B 9 male 6 female with median age 22 years and 4 patients had co-morbidity table 1.

The period of functional recovery in group group A is 2 -4 days but 1- 2 days in group B, the mean hospital stay in group A is 3 -7 days while in group B is 1-3 days, these results are statistically significant (p=0.00)

In group A technical success was 12 patients and clinical success was 11 patients while in group B technical and clinical success were 100% and there is recurrence of symptoms in 3 patients. These results are statistically significant (p=0.00). Table 3

In group a five patients had complication in the form of wound infection, dehiscence, seroma and ugly scar but there is no complications in group B. These results are statistically significant (p= 0.04). Table 4

	Group A	Group B	Test	P
Sex			2.73	0.09
-male	13 (86.7)	9 (60.0)		
-female	2 (13.3)	6 (40.0)		
Age (y)			Mann = 105.0	0.78
median	20	22		
Mean±SD	28.9±19.1	27.1± 15.1		
Range	13-67	13-65		
Comorbidity			0.833	0.361
-no	13 (86.7)	11 (73.3)		
-yes	2 (13.3)	4 (26.7)		

**Table 1:** Shows the sociodemographic data among the studied cases.

	Group A	Group B		P
Symptoms mduration (d)			T=1.184	0.25
Mean+_SD	6.4+_1.6	7.1+_1.5		
Range	4-9	5-9		
Rt abdominal pain	15(100.0)	15(100.0)	00	1.00
Anorexia	13(86.7)	9(60.0)	2.73	0.09
N-v	10(66.7)	6(40.0)	X2=2.14	0.14

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Abdominal mass-	2(13.3)	2(13.3)	00	1.00
Fever	15	15		
Rt iliac tenderness	15(100.0)	15(100.0)	00	1.00
Leukocytosis	12(80.0)	13(86.7)		
Tachycardia	9(60.0)	11(73.3)		
Us finding			00	1.00
-abscess	12(80.0)	12(80.0)		
-mass with liquification	3(20.0)	3(20.0)		

**Table 2:** Shows the symptoms and signs (clinical finding) among the studied cases.

	Group A	Group B		P
Period of functional recovery (d)			T=6.15	0.00*
Mean ± SD	2.9 ± 0.8	1.33±0.5		
Range	4-2	1-2		
Period of hospital stay (d)			T=8.39	0.00*
Mean ± SD	5.2±1.1	2.2±0.7		
Range	3-7	1-3		
IV ab administration	15(100.0)	15(100.0)	--	---
Oral ab administration	15(100.0)	15(100.0)	---	----
Technical success	12(80.0)	15(100.0)		0.02
Clinical success	11(73.3)	15(100.0)		0.05
Recurrence of symptoms	3(20.0)	0(0.0)		0.02

**Table 3:** Shows the post-operative data among the studied cases.

	Group A	Group B	X2	
Complications				0.04*
-no	10(66.7)	15(100.0)		
-yes	5(33.3)	0(100.0)		
Classification of compl			19.1	0.00*
-no	10(66.7)	15(100.0)		
-early	3(20.0)	0(0.0)		
-late	1(6.7)	0(0.0)		
-late-early	1(6.7)	0(0.0)		
Early complication	4(26.7)	0(00.0)		0.05

Wound infection	2(13.3)	0(00.0)		0.48
Wound dehiscence	2(13.3)	0(00.0)		0.48
Serous discharge	2(13.3)	0(00.0)		0.48
Superficial ischemia	2(13.3)	0(00.0)		0.48
Late complication	2(13.3)	0(00.0)		0.48
Painful ugly scar	2(13.3)	0(00.0)		0.48

**Table 4:** Shows the complications among the studied cases.

## Discussion

It was found that when emergency surgery is performed during appendicitis, the inflammation has spread to adjacent areas over a wide area, additionally, due to edema and vulnerability of the adjacent small and large intestine, secondary fistulas may occur. So the incidence of reported complications of emergency appendectomy was up to 26% [8,9]. Furthermore, in emergency appendectomies, surgery may be technically difficult due to deformation of anatomical structures. For those cases, instead of completing surgery after performing appendectomy, many cases may require ileocectomy or right colectomy simultaneously [3,8].

The advantages of performing emergency surgery are frequent patient follow-ups and re-hospitalization after a certain time for the planned surgery are not required in comparison with conservative managements [10,11].

It was previously stated that appendicitis which is associated with abscess could be managed conservatively with high success rates and with low incidence of complications.

Thus, nonsurgical treatments, like antibiotics and US-guided percutaneous drainage have been proven to be effective and safe [3, 12,13].

In the current study we have found that the conservative management is better than emergency appendectomy, regarding short period of functional recovery, mean hospital stay, technical success rate, clinical success rate and fewer incidence of complication in the form of wound infection, dehiscence, seroma and ugly scar but there is no complications in group B. our results were similar to results of Olsen et al., in 2014 that studied 67 patients (35 were treated by emergency surgery and 32 were treated by conservative percutaneous drainage), they proved that the incidence of complications was high in the emergency group in the form of

wound infections, fecal fistula and burst abdomen while they have reported no complications in the conservative group and this results matches our study [14].

Moreover the need for interval surgery after the improvement of symptoms after initial conservative management for appendicitis which was associated with an abscess is still controversial. Moreover, recurrences after conservative treatment usually occur within 2 years of the development of initial symptoms, after which recurrence rate decreases [15]. In this research no recurrence of symptoms was found in patients that were managed conservatively.

In studies which are showing a high recurrence rate, interval surgery to remove the risk of recurrence was recommended [16].

On the other side, in the study that was conducted by Kumar and Jain [17], the recurrence rate of appendicitis in the group that were managed conservatively without surgery after conservative management was 10%.

Recently, the need for surgery after conservative treatment is controversial. The reasons for this controversy are the data indicating the low rate of recurrence of acute appendicitis, if the conservative treatment of appendiceal abscess is not followed by interval surgery [18]. Also, the incidence of complications has been found to be high in patients who underwent interval surgery performed after inflammation [3,19].

In our study both the technical and clinical success rates were 100% in group B, while in group 1 the technical success rate was 80% and the clinical success rate was 73%. The differences between the results of both groups were statistically significant and in favor of percutaneous drainage. These results agree with those of Brown *et al.* [20], who reported that technical and clinical success rates for percutaneous drainage of the appendicular abscess range from 85% to 90% and 81% to 100%, respectively.

## Conclusion

Appendicular abscesses may be treated by safe and effective manner through US-guided percutaneous drainage with high technical and clinical success rates, low incidence of complications and shorter hospital stay. Moreover, interval appendectomy could be reserved for recurrent cases or for patients with high possibility of underlying malignancy.

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