ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES, SCHOOL OF MEDICINE, DEPARTMENT OF SURGERY

A 2 years retrospective, observational cohort study on Use of Drains and Post-Operative Complications in Complicated Acute Appendicitis at ZMH and MH

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APPROVAL SHEET

ADDS ABABA UNIVERSITY

COLLEGE HEALTH SCIENCE SCHOOL OF ALLIED SCIENCES DEPARTMENT OF SURGERY

I, the undersigned general surgery resident, declare that I have submitted my original work on **A 2 year' s retrospective, observational cohort study on Use of Drains and Post-Operative Complications in Complicated Acute Appendicitis at ZMH and MH** for the examination.

Submitted by:

Dr. Dereje Atnaw	Signature	Date

This thesis work has been submitted for examination with my approval as an advisor. Approved by:

Dr. Abebe Alemayehu	Signature	Date

Statement of the Author

I hereby declare that this thesis is my original work and has not been presented for a degree in any other university and all sources of material used for this thesis have been duly acknowledged.

Name: Dereje Atnaw (MD)

Signature: _____

Date:_____

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Abstract

Background: Complicated acute appendicitis is a significant surgical challenge, usually managed with prophylactic drains to reduce post -operative complications. However, the benefit of drain usage remains controversial.

Objective: This study aimed at evaluating the role of drains in managing complicated acute appendicitis by analyzing their impact on post – operative complications, recovery, and hospitalization time.

Methods: A two-year retrospective observational cohort study was conducted on 209 patients with complicated acute appendicitis at MH and ZMH. We categorized patients into two groups: patients with drains (n=104) and patients without drains (n=105). Then we analyzed Data' s on hospitalization time, post – operative fever, surgical site infection (SSI), residual collections, and reoperation rates.

Results: Patients in drain group had longer hospitalization times (mean of 6.44 days) compared to those in no drain group (mean of 4.31 days). Post -operative fever (56.8% vs. 44.8%), SSI (39 .4% vs. 30 .5%), residual collections (6.7% vs. 3.8%), and reoperation rates (5.8% vs. 2.9%) were all higher in the drain group. Despite these differences in drain vs no drain group, all patients were discharged improved.

Conclusion: Routine use of drains does not consistently reduce post-operative complications, in contrary it may increase certain complications. A case based drain placement, guided by intraoperative findings, is advised to optimize patient outcomes. And further research is needed to develop a clinical guidelines.

Acronyms and abbreviations

- CAA: Complicated Acute Appendicitis
- ZMH: Zewditu Memorial Hospital
- MH: Minilik Hospital
- EHR: Electronic Health Records
- RA: Research Assistant
- ICU: Intensive Care Unit
- EMR: Electronic Medical Records
- Sx: Surgery
- Pts: Patients
- Epi: Epidemiology
- Stats: Biostatistics

SPSS: Statistical package for the social sciences

Introduction

Acute appendicitis is one of the most common surgical emergencies worldwide, including Ethiopia, where it accounts for a significant proportion of acute abdominal conditions. Complicated acute appendicitis creates a unique challenges because of its association with serious complications like appendiceal abscess formation, surgical site infections, and prolonged hospitalization. These cases require immediate decision and surgical intervention, with application of intra-abdominal drains frequently employed to manage the post-operative complications and improve outcomes.

Despite their routine use, the benefit of routine prophylactic drains in reducing post – operative complications remains controversial. Some papers advocate for routine use to alleviate risks like post-operative residual collections and post-operative infections, other papers discourage their use, highlighting potential side effects, like increased surgical site infections, prolonged hospital stay, and reoperation rates.

This controversy emphasize the need for evidence-based guidelines to optimize the use of Drains in cases of complicated acute appendicitis.

This thesis evaluates the role of drains in managing complicated acute appendicitis with complications. It analyzes key parameters like post-operative complications, recovery time, and hospital stay, this study aims to clarify the efficiency of drain usage and tries to provide recommendations based on the findingd to guide clinical decision-making.

Literature review

The literature presents an array of findings on the use of drains in patients with complicated acute appendicitis.

A handful of studies suggests that the use of drains is associated with increased complications and longer hospitalization time. For example, patients with drains experienced higher rates of postoperative fever (Miranda-Rosales et al., 2019), increased risk of postoperative abscess and sepsis (Sridhar et al., 2019), and were identified as independent predictors for prolonged hospitalization (Martínez-Pérez et al., 2020). Additionally, no benefit in preventing postoperative intra peritoneal abscess was observed with drain placement (Alabbad et al., 2024), and patients without drains had less complications and shorter hospitalization time (Allemann et al., 2010).

Contrarily, other papers shows that laparoscopic appendectomy, which may include the utilization of drains, results in less postoperative complications and shorter hospitalization time compared to open appendectomy (Malkov et al., 2024). Furthermore, lap appendectomy is suggested to be a safe and feasible procedure for managing complicated acute appendicitis in available setup (Alsegaey et al., 2019).

However, some papers argue that drain placement may not have benefits and could prolong hospital stay (Schlottmann et al., 2016), while another study found no increase in surgical complications with laparoscopic appendectomy for complicated cases (Lin et al., 2012).

A wider study of surgical drain placement across different procedures suggests that drains may be associated with increased infectious complications and longer hospitalization (Talwar et al., 2023).

Aiken et al. (2012), which focuses on sub-Saharan Africa, does not directly address the use of drains but spotlights the limited research from the region on interventions to reduce surgical site infections (SSI), with some evidence supporting the use of single-dose pre-operative antibiotic prophylaxis (Aiken et al., 2012).

Nonetheless, no specific studies from Ethiopia were identified in the given context.

In conclusion, the current literature shows that the use of drains in the context of complicated acute appendicitis may not provide significant benefits and could be associated with longer hospitalization and increased complications. While there is a

scarcity of research specifically from sub Saharan Africa and Ethiopia, the available evidence from sub-Saharan Africa indicates a need for standardized methodological approaches to study interventions for reducing complications in regard to using drains (Aiken et al., 2012). Further research from Ethiopia would be valuable to understand our local context and outcomes to develop guidelines.

Rationale of the Study

Acute appendicitis is one of the most common causes of acute abdomen, requiring surgical intervention, and when Complicated it presents a greater risk of post – operative complications. In such scenarios, prophylactic drain placement is often used to address complications like post-operative intra abscess formation, infection, and residual fluid collection. However, the Clinical benefits of routine drain use remain controversial, with studies showing mixed outcomes regarding their benefit in reducing post-operative complications and improving recovery.

In Ethiopia, the incidence of complicated appendicitis and the associated complications is high, but there is limited data on the role of drains in managing these cases. The decision to use or to avoid drains is often based on surgeon Preference, institutional practices, and the perceived severity of the disease, rather than standard, evidence-based guidelines. As a result, there is a need for a comprehensive study to assess the effect of drain usage on patient outcomes in our specific context.

This study aims to fill this gap by evaluating the effect of drain usage on post -operative complications like post operative fever, surgical site Infections, residual collections, and reoperation rates in patients with complicated acute appendicitis. Additionally, the study tries to explore the relationship between drain use and recovery parameters, including length of hospital stay and recovery. By generating evidence based results regarding the efficiency of drains, the study plans to guide surgical practices and improve patient management in settings like ZMH and MH, where complicated appendicitis is a significant clinical concern. In the long run, the findings of this study will contribute to the development of clinical guidelines regarding the use of drains in complicated appendicitis.

Objectives

General Objective: To evaluate the effectiveness and outcomes of drain usage in patients who undergo surgery for complicated acute appendicitis.

Specific Objectives:

1. To evaluate drains impacts on post-operative outcomes, including post op fever, surgical site infections (SSIs), and post op collections.
2. To analyze the outcome difference in hospital stay duration and reoperation rates between patients with and without drains.
3. To assess the demographic and clinical characteristics (e.g., age, sex, duration of illness) of the patients that influence the decision to use drains in complicated acute appendicitis cases.

Methodology

Study Setting:

Zewditu Memorial Hospital (ZMH) and Minilik Hospital (MH) are both referral centers located in Addis Ababa, Ethiopia. Which have affiliation to AAU, collage of Medicine. These hospitals are renowned for their comprehensive surgical services and management of complex surgical cases, like hepato-biliary, pancreatic and colorectal surgeries by general surgeons, fellows and specialists, including surgeries for complicated acute appendicitis. ZMH and MH are equipped with operating theaters, intensive care units (ICU), and electronic health record (EHR) systems, facilitating effective data collection and analysis for research purposes.

Study period:

The study was conducted on patients who were admitted and operated for complicated appendicitis over the past 2 years (Jan 1, 2022 to Dec 31, 2023).

Study design:

The research design for the use of drains and post-operative complications due to complicated acute appendicitis involved a retrospective observational cohort study with analytical approach. This design demands reviewing past medical records of patients who underwent surgery for complicated acute appendicitis with or without the use of drain.

Sampling Technique

Convenience sampling technique was applied, and all consecutive cases were selected until we meet the sample size.

Study population:

Record was obtained from patients admitted to ZMH hospital and Minilik II referral Hospital during the past 2 years (Jan 1, 2022 to Dec 31, 2023), with complicated appendicitis (localized peritonitis, abscess, and generalized peritonitis) who underwent emergency surgery with or without the use of drains. The match was made by date, age, sex and diagnosis in order to avoid bias.

Inclusion criteria:

Patients of both sexes, older than 14 years of age, diagnosed with complicated acute appendicitis who are admitted and operated with in the given specific period of time.

Exclusion criteria:

Patients younger than 14 years

Patients who have bleeding disorders

Pregnant patients

Immuno-compromised patients

Patients with incomplete clinical records.

Sample size

P= 12%(0.12) (prevalence of post op complications in appendicitis, from previous study done at dessie, ethiopia)
RR= 3.3(relative risk from previous study done in africa, asia)
Zα/2= 1.96 for 95% confidence
Zβ= 0.84 for 80% power
r= 1 (#drain use/#with out drain, from previous study done in africa, asia)
d= (p1-po) = 0.124 magnitude of difference we want to detect

Using the formula to calculate sample size for cohort studies

Sample Size Calculation for Cohort (binary outcome)

$$\eta_{exposed} = \frac{(z_{\alpha/2} + Z_{\beta})^2 \, p \, (1-p) \, (r+1)}{(d^*)^2 r}$$

$z_{\alpha/2}$ = 1.96 for 95% confidence

Z_{β} = 0.84 for 80% power

p = prevalence of the outcome

r = #unexposed/#exposed

d = magnitude of difference we want to detect

Sample size for exposed become 107, and with the ratio of 1(r=1) from previous study the unexposed will be 107.

N total = 214

Study Variables

Dependent variable:

- Fever
- length of hospital stay
- Evisceration/dehiscence
- Intra-abdominal collection
- Re-operation
- Surgical site infection
- Patient outcome

Independent variables:

- Socio-demographic characters:

· - Age

· - Sex

- Use of drains during surgical intervention

Source of data:

Patients' medical record was main source of data. Basic demographic data (age, sex,) Post-operative complications, the presence of drains, and other relevant variables such as the length of hospital stay and operating time was collected.

Data collection:

Data collection was done using structured questionnaire and it was collected by the primary investigator.

Data analysis:

The patients were divided into two groups, patients with drain and without drain, and complications was studied. Chi-square and Student' s t-test statistical methods are used. All data analysis were be performed using IBM SPSS Statistics

Data quality control:

Data quality was ensured through patient cards, surgical registration books, cross-matching, training sessions, questionnaire checks, and supervisors' completion of data and code cleaning for improved reliability.

Ethical Consideration

Ethical clearance for the study was obtained from AAU, College of Health Science Institutional Review Board. Data collection was undertaken after permission is obtained from the administration. The identities of the study participants will not be disclosed and the collected questionnaires will not be transferred to third party.

Results

Demographic Characteristics

The study included a total of 209 patients with complicated acute appendicitis. Among these, 104 patients (49.8%) underwent surgery with prophylactic drain placement, while 105 patients (50 .2%) were treated without drains.

Age Distribution

The mean age was 28.70 years (with range of 15– 78 years). Patients with drains had a slightly higher age compared to those patients without drains. This may show surgeon's preference for using drains in older patients who may potentially have higher risk of complications because of factors like delayed presentation or more severe disease progression.

Sex Distribution

Male Patients account 57 .4% of the study population (120 patients). Among these, 52.5% of patients (63) had drains, while 4 7 .5% of patients (57) did not have drains.

Female Patients: Account for 42. 6% (89 patients)of the total population. A slightly lower number of females underwent surgery using drains, comprising 46.1 % of patients (41), while 53.9% of patients (48) did not have drains.

The higher number of males in the study aligns with global and regional epidemiological data which indicates that acute appendicitis is more prevalent in men population. However, the fractional difference in drain usage between the two sexes suggests that gender does not significantly influence the decision to use drains in this context.

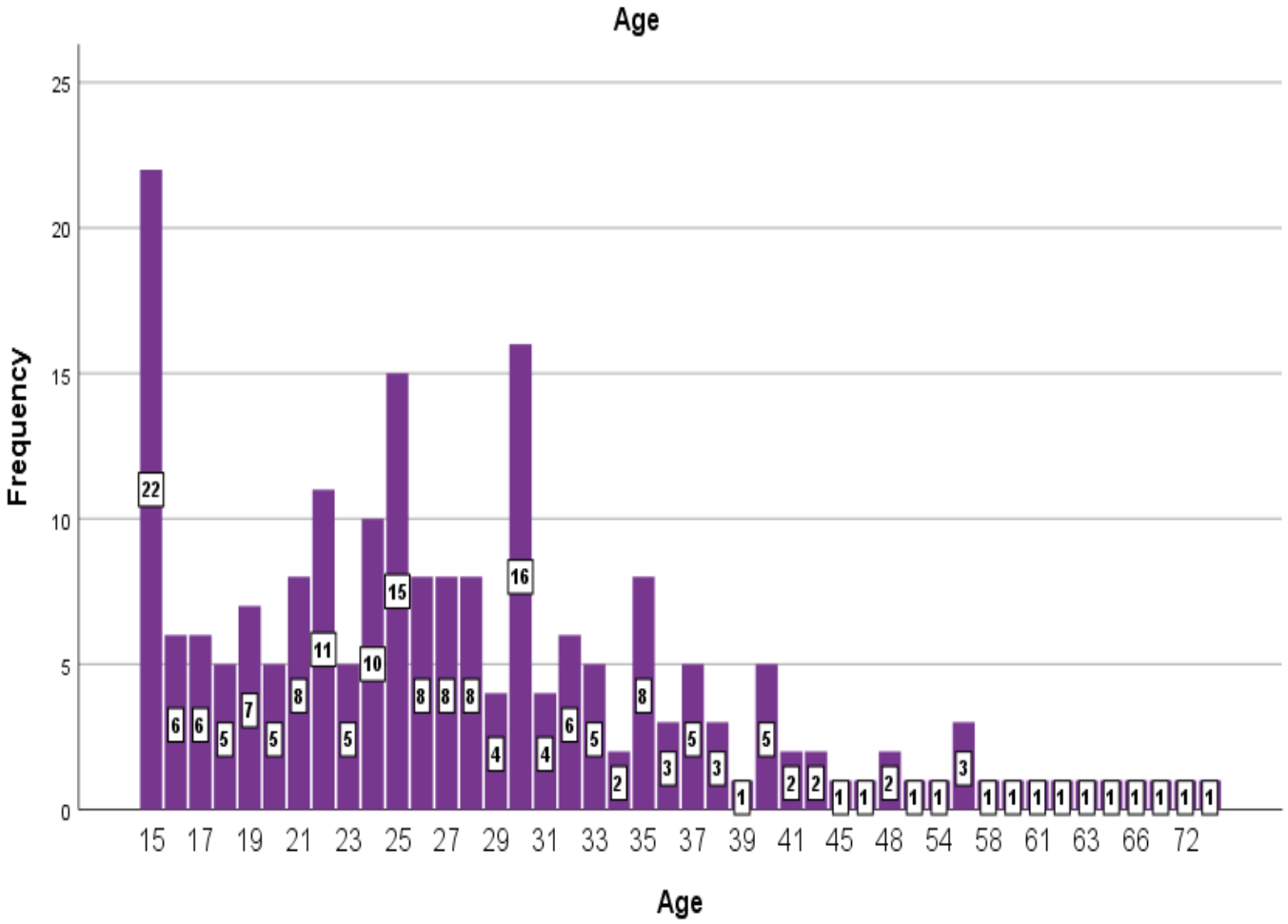
Implications

The demographic analysis reveals no major difference in the assignment of drain usage concerning age or sex. However, the slightly more utilization of drains in older patients and males may indicate a cautious approach by surgeons when managing patients assumed to have a higher risk of complications. These findings emphasize the importance of individualized decision-making in the management of complicated acute appendicitis.

Table-1, Age distribution

Age

N	Valid	209
	Missing	0
Mean		28.70
Median		26.00
Minimum		15
Maximum		78



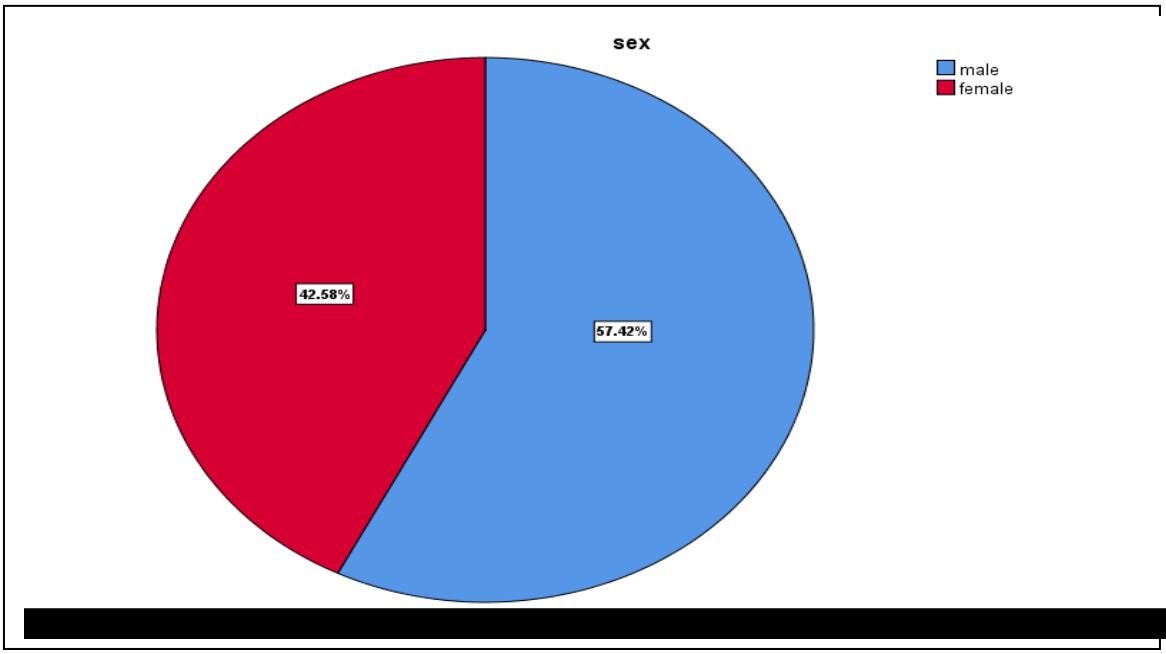


Table-2, Sex distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	120	57.4	57.4	57.4
	female	89	42.6	42.6	100.0
	Total	209	100.0	100.0	

Discussion on Pre-Operative Presentations

The pre-operative presentations of patients in the study emphasize significant clinical variations, particularly in duration of illness, symptoms, temperature, blood count, and ultrasound findings.

These pre operative factors provide valuable insights into the decision-making process for drain utilization and the magnitude of disease in patients with complicated acute appendicitis.

Duration of Illness

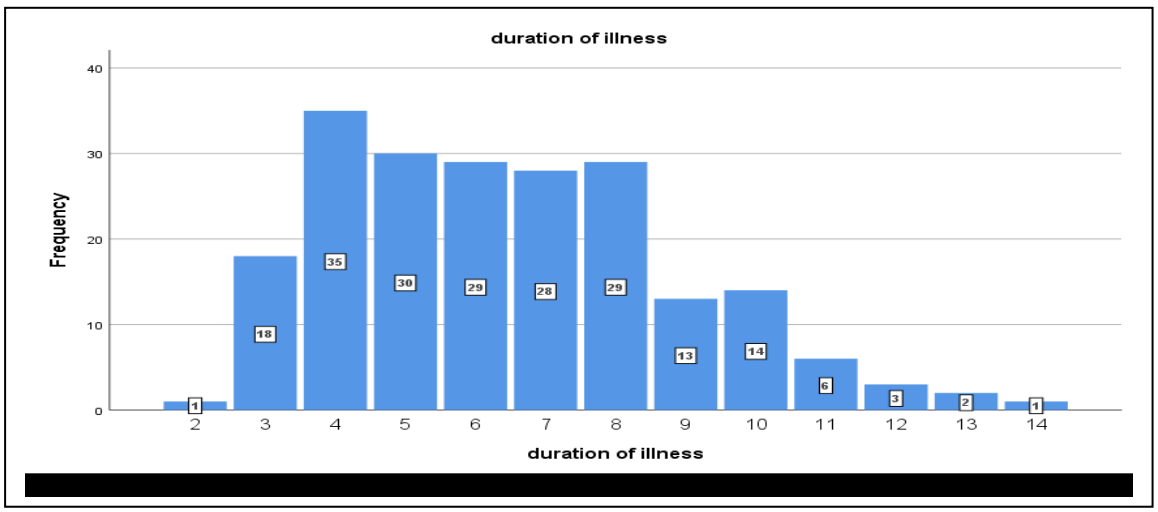
The average duration of illness for all patients was 6.44 days (ranging 2– 14 days). Patients with drains generally had a longer duration of illness prior to surgical intervention compared to those without drains. This shows that prolonged pre-operative symptoms may be associated with severe disease, such as abscess formation or secondary peritonitis, leading to the use of drains.

Delayed presentation in the drain group shows the need for careful pre-operative assessment and individualized intervention in patients with prolondes symptom duration.

Table-3, Pre-operative duration of illness

duration of illness

N	Valid	209
	Missing	0
Mean		6.44
Median		6.00
Minimum		2
Maximum		14



Presenting Symptoms

Common Symptoms: The majority of patients (accounting 74. 6%) presented with a

combination of tenderness, vomiting, and intra-abdominal collection.
Among patients with drains, the prevalence of more complicated symptom combinations (Tenderness + vomiting + collection) was higher compared to those without drains.

This finding shows that patients with drains often have a more severe clinical presentation preoperatively, affecting the decision to use drains during surgery.

Temperature

Deranged Temperature: Observed in 67 .5% of all study population.
Patients with drains had a higher proportion of deranged temperatures compared to those without drains. This indicates that patients with fever, a potential marker of systemic inflammation, may prompt surgeons to use drains more frequently.
Normal Temperature: More common in the patients with no-drain, shows a less severe inflammatory response.

Blood Count

Deranged Blood Count: Accounting for 92.3% of patients had abnormal blood counts, a marker of systemic inflammation.
Patients with drains shows a slightly higher frequency of deranged blood counts compared to those without drains.
This shows that deranged white blood cell counts are important indicators of disease severity and influence the decision regarding drain placement.

Ultrasound Findings

Abnormal Findings: Accounting for 59 .8% of all patients shows abnormalities on ultrasound.
Abnormal findings such as intra-abdominal collections were more prevalent among patients with drains.
No Abnormal Findings: More common in patients with no-drain, suggesting that the absence of significant intra-abdominal findings affects the likelihood of drain usage.
Ultrasound serves as a critical pre-operative diagnostic tool, helping to identify

complications

Implications

The pre-operative characteristics of patients with drains indicate more severe disease process, including prolonged illness, complicated Symptoms, fever, deranged white blood counts, and abnormal ultrasound findings.

These factors shows the role of pre-operative assessment in guiding surgical management decisions, particularly the use of drains.

Table-4, presenting symptoms

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tenderness	2	1.0	1.0	1.0
	tenderness, vomiting	18	8.6	8.6	9.6
	tenderness,collection	21	10.0	10.0	19.6
	vomiting,collection	12	5.7	5.7	25.4
	tenderness,vomiting,collection	156	74.6	74.6	100.0
	Total	209	100.0	100.0	

Table-5, Drain vs. pre-operative Symptoms Cross tabulation

		Symptoms					
		Tenderness	tenderness, vomiting	tenderness,collection	vomiting,collection	tenderness,vomiting,collection	Total
drain	Yes	2	6	12	4	80	104
	No	0	12	9	8	76	105
Total		2	18	21	12	156	209

Table-6, Drain vs. pattern of pre-operative Temperature Cross tabulation

		Temperature		
		normal	Deranged	Total
drain	yes	40	64	104
	no	28	77	105
Total		68	141	209

Table-7, Drain vs. pattern of pre-operative white Blood cell count Cross tabulation

		blood count		
		Normal	deranged	Total
drain	Yes	12	92	104
	No	4	101	105
Total		16	193	209

Table-8, Drain vs. pattern of pre-operative Ultrasound finding Cross tabulation

Count

		ultrasound		
		no, no finding	abnormal finding	Total
drain	Yes	25	79	104
	No	59	46	105
Total		84	125	209

Discussion on Intraoperative Diagnosis and Length of Surgery

The intraoperative findings and surgical durations provide insights into the disease severity and surgical complexity among patients with complicated acute appendicitis. These factors also shows trends in the decision to use drains and their potential implications for patient outcomes.

Intraoperative Diagnosis and length of surgery

The study identified three main intraoperative findings: abscess formation, localized peritonitis, and generalized peritonitis.

These findings significantly influenced the use of drains:

Abscess Formation (57.9%): The majority of patients with abscesses (77.7%, 94 patients out of 121) underwent surgery with drain utilization.

Drains are routinely used in these cases to evacuate pus and prevent collections, reflecting their role in managing localized infectious processes.

In contrast, only 22.3% of patients (27) with abscesses were managed without the use of drains, possibly due to smaller volume or fully evacuated collection.

Localized Peritonitis (Account for 30.6% of cases): Patients with localized peritonitis were less likely to have drains placed, with only 15.6% (10 patients out of 64) receiving drains. This suggests that surgeons may avoid drain placement in less severe cases where localized infection is adequately controlled during operation.

Generalized Peritonitis (Accounts for 1 1.5% of cases): none of the patients with generalized peritonitis had drains placed.

This could show a surgical approach where adequate peritoneal lavage is assumed sufficient, or where drains are avoided to minimize additional post-operative risks.

Implications:

The decision to use drains is closely tied to the type and extent of intraoperative findings.

Abscess formation strongly correlates with drain placement, emphasizing the importance of

Individualized treatment strategies based on intraoperative assessments.

Table-9, Drain vs Intra op diagnosis Crosstabulation

Count

		Intra op diagnosis			
		abscess	localized peritonitis	generalized peritonitis	Total
Drain	yes	94	10	0	104
	no	27	54	24	105
Total		121	64	24	209

Table-10, Drain vs. duration of surgery(means)

duration of surgery

Drain	Mean	N	Std. Deviation
Yes	1.98	104	.418
No	2.03	105	.379
Total	2.00	209	.398

Discussion on Post-Operative Course

The post-operative course is a important indicator of the success of surgical interventions, and complications arising during this period can significantly affect patient outcomes. The study data revealed difference in post-operative complications, hospitalization time, and overall recovery between patients who with drains placed and those who did not. Post-operative course, focusing on hospitalization time, fever, infections, dehiscence, residual collections, enter cutaneous fistulas, reoperation rates, and patient outcomes, with particular attention on the presence or absence of drains.

Hospitalization Time

Overall Duration: The average hospital stay for all patients was 5.37 days, with patients who had drains stay longer (with mean of 6.44 days) compared to those without drains (with mean of 4.31 days).

Patients with Drains: The prolonged hospitalization time in the drain group likely shows the complexity of their post-operative recovery.

Patients without Drains: These patients experienced shorter stays, which could be reflect fewer complications and quicker recoveries, possibly due to less aggressive surgery or more localized infections that resolved without the need for drain usage.

Implications:

Longer hospital stay in patients with drains shows the association between more severe pre operative conditions (e.g., abscess formation, generalized peritonitis) and a complicated recovery. This suggests that drain usage may be linked to increased post-operative follow up and recovery time.

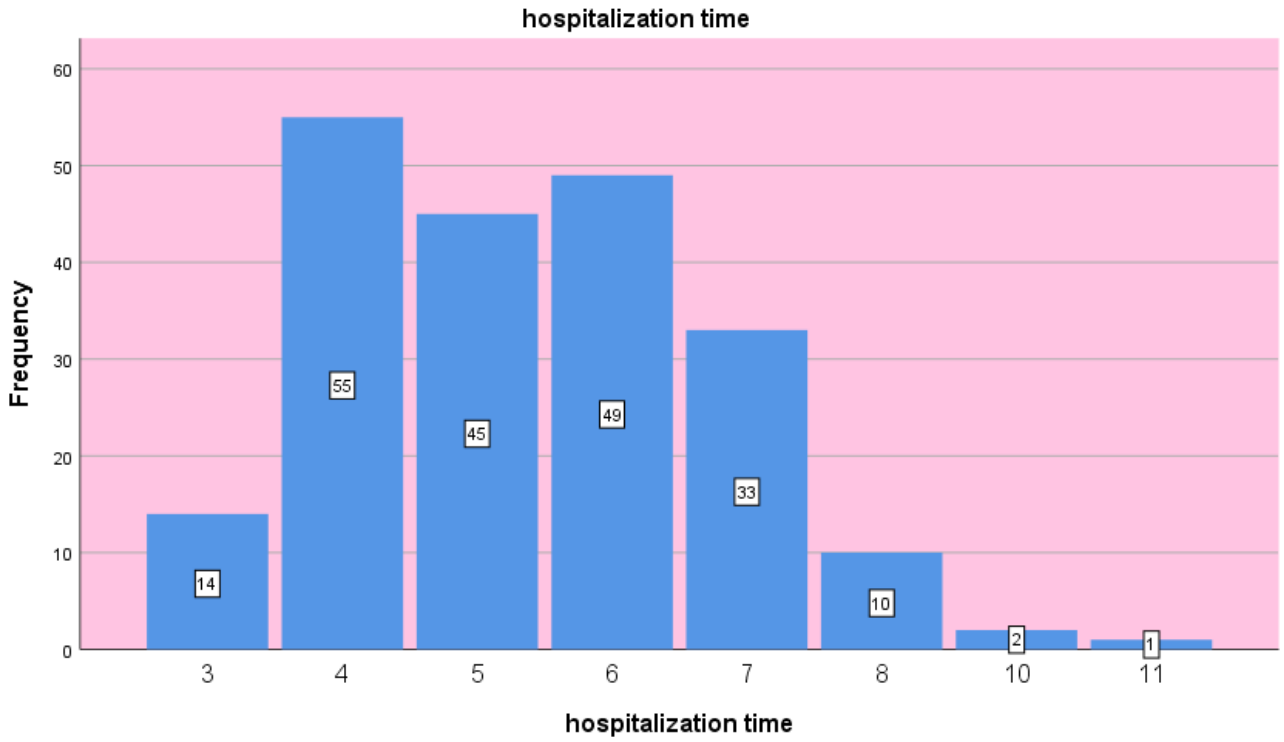


Table-11, Drain vs. hospitalization time(means)

hospitalization time

Drain	Mean	N	Std. Deviation
Yes	6.44	104	1.122
No	4.31	105	.836
Total	5.37	209	1.453

Post-Operative Fever

Prevalence: Post-operative fever was recorded in 49.3% of all patients, with 56.8% of patients with drains developing fever, compared to 44.8% of patients without drains.

Patients with Drains: The higher incidence of fever in the drain group could be associated with complex surgeries and increased likelihood of intra-abdominal infection that necessitated drain usage. Drains themselves can contribute to infection if not properly

managed or if contaminated.

Patients without Drains: Fever in patients with no-drain was less frequent, which may suggest a less complicated post-operative Course, potentially showing less extensive surgery and fewer intra-abdominal infections.

Implications: post-operative fever is common in both groups, its higher frequency in patients with drains shows that these patients might have more severe infections or residual collections. It may also indicate that drains, assumed to reduce complications, could sometimes be a source of complications.

Table-12, Drain vs. post op fever Cross tabulation

Count

		post op fever		
		yes	no	Total
Drain	Yes	56	48	104
	No	47	58	105
Total		103	106	209

Surgical Site Infection (SSI)

Prevalence: Surgical site infections occurred in 34.9% of all patients, with a slightly higher incidence in patients with drain (39.4%) compared to those without drains (30.5%).

Patients with Drains: The increased rate of SSIs in the drain group may be associated with extended duration of surgery, increased tissue manipulation, and potential contamination during maintenance of the drain. Prolonged exposure of surgical sites to drains may also increase infection risk.

Patients without Drains: The lower rate of SSIs in this group suggests that avoiding drains

might reduce certain risks, possibly Due to simpler and less invasive surgery.

Implications: The slightly higher incidence of SSIs in the drain group shows the potential risks of using drains, Including contamination and the need for more meticulous post-operative care.

Table-13, Drain vs. surgical site infection Cross tabulation

Count

		surgical site infection		
		yes	no	Total
Drain	yes	41	63	104
	no	32	73	105
Total		73	136	209

Dehiscence/Evisceration

Prevalence: Dehiscence or evisceration occurred in a total of 7.7% of patients, with similar rates of 7.7% for both patients with drain and no-drain.

Implications:

The occurrence of dehiscence or evisceration was not significantly different between the two groups, showing that factors unrelated to drain placement—like as surgical procedure, wound closure, and patient comorbidities—may play a more important role in these complications.

Table-14, Drain vs. dehiscense/evisceration Crosstabulation

Count

		dehiscense/evisceration		
		yes	no	Total
drain	Yes	8	96	104
	No	8	97	105
Total		16	193	209

Residual Collection

Prevalence: Residual collection, an important complication following complicated appendicitis, was observed in a total of 5.3% of patients. The rate of residual collections was 6.7% in patients with drain compared to 3.8% in patients with no-drain.

Patients with Drains: Despite the use of drains, the rate of residual collections remained high, indicating that drains are not always efficient in fully evacuating abscesses or collections. This suggests that factors such as the size and location of the collection, as well as the technique, might affects outcomes.

Patients without Drains: The lower incidence of residual collections in the no-drain group may reflect smaller or less complicated collections that did not need drainage.

Implications:

The occurrence of residual collections in both groups shows the challenges in managing abscesses and fluid collections post-operatively. Drains, though widely used to address this complication, do not guarantee cure.

Table-15, Drain vs. residual collection Cross tabulation

Count

		residual collection		
		yes	no	Total
Drain	yes	7	97	104
	no	4	101	105
Total		11	198	209

Enterocutaneous Fistula

Prevalence: No cases of enterocutaneous fistula were observed in both group.

Implications: The absence of enterocutaneous fistulas may suggest that neither drain placement nor surgical technique in this study contributed to this severe complication, or that the sample size was small to detect rare occurrences.

Table-16, Drain vs. enterocutaneous fistula Cross tabulation

Count

		enterocutaneous fistula	
		No	Total
Drain	yes	104	104
	no	105	105
Total		209	209

Reoperation

Prevalence: Reoperation was required ina total of 4.3% of patients, with a higher incidence of 5.8% in patients with drain Compared to 2.9% in patients with no-drain.

Patients with Drains: The higher reoperation rate in the drain group could show the severity of the underlying disease, where complications like residual infections, abscesses, or wound dehiscence necessitate further intervention.

Patients without Drains: A lower reoperation rate in this group shows fewer complications or the effectiveness of other Management strategies.

Implications: While the overall reoperation rate was low, the increased need for reoperation in the drain group raises concerns about the efficiency of drains in preventing complications.

Table-17, Drain vs. reoperation Cross tabulation

Count

		reoperation		
		yes	no	Total
Drain	yes	6	98	104
	no	3	102	105
Total		9	200	209

Patient Outcome

Overall Outcome: All patients were discharged improved, indicating that despite the complications and prolonged hospitalizations, the overall prognosis for both groups was favorable.

Patients with Drains: While these patients experienced a more complicated post-operative course, including higher rates of Fever, infection, and residual collection, they ultimately had a good outcome. The longer hospital stays and additional interventions reflect a more involved recovery process.

Patients without Drains: These patients also had positive outcomes, with fewer complications and shorter hospital stays.
However, they may have had a less severe form of complicated appendicitis, or the absence of drains may have been associated with a less complicated recovery.

Implications:
While both groups had good outcomes, the differences in post-operative recovery suggest that the use of drains is linked to a more complicated course.

Table-18, Drain vs. outcome of the patient Crosstabulation

Count

		outcome of the patient	
		discharged improved	Total
Drain	yes	104	104
	no	105	105
Total		209	209

Conclusion

The post-operative recovery for patients with and without drains shows important differences in complication and recovery times. Patients with drains were more likely to have longer hospital stays, higher post-operative fever and infections, and a higher need for another surgery.

However, both groups had good outcomes, showing that drain does not necessarily lead to better outcomes and may , in some cases, affect the recovery process. These findings suggest that the decision to use drains should be individual based, assuming the severity of the disease, intraoperative findings, and potential post-operative complications.

Recommendations

1. Selective use of Drains:

Based on the findings that patients with drains experienced longer hospital stay and higher post-operative complications such as surgical site infections and residual collections, it is advised that drains be used selectively. Surgeons should consider factors such as localized abscess formation, the extent of peritonitis, and overall patient condition before deciding on drain usage.

For patients with peritonitis or less severe complications, drains may not be important.

2. Improved Post-Operative Care:

Given the higher post-operative complications in patients with drains, it is important to develop post-operative care protocols. Including careful monitoring for signs of infection, drain care, and timely removal to decrease the risk of complications.

3. Tailored Surgical Approaches:

A more case based approach to the use of drains, guided by intraoperative findings and clinical presentation, can reduce unnecessary drain placements while addressing the potential for complications. Surgeons should base their decisions on a comprehensive assessment of disease severity, with a focusing on minimizing post-operative compilations.

4. Future Research:

The findings on this study shows the need for more large-scale, and prospective research on the role of drains in complicated appendicitis, especially in setups like Ethiopia.

Future studies could study whether alternative methods, such as minimally invasive drainage techniques, could improve outcomes.

Additionally, studying the long-term effects of drain usage on quality of life and disease recurrence rates would be important.

Limitations

1. Retrospective Design:

The study' s retrospective design is one of its limitations. Retrospective studies are prone to biases, such as incomplete or inconsistent data collection, and may not fully show all variables that could influence the outcomes. A prospective cohort study would provide stronger evidence and help establish clearer relationships.

2. Sample Size and Generalizability:

Although the study included 209 patients, the sample size may still be small to detect all complications, especially rare complications like enter cutaneous fistulas. Furthermore, the findings may not be directly applicable to all setups, as the study was conducted in two hospitals in Addis Ababa, which may differ in resources, patient population, and surgical practices compared to other hospitals.

3. Lack of Randomization:

The absence of randomization in the assignment of drains means that the results may be influenced by confounding factors. For example, patients with more severe forms of appendicitis or those presenting late might have been more likely to have drains, affecting the results. Randomized controlled trials would provide stronger evidence regarding the role of drains in post-operative outcome.

4. Limited Data on Long-Term Outcomes:

The study focused on short-term post-operative complications and outcomes. But, it did not study long-term follow-up data such as recurrence or long-term quality of life, which would be valuable in understanding the full impact of drain usage.

By addressing these limitations in our research, a more robust understanding of the role of drains in managing complicated appendicitis can be achieved.

Dissemination and utilization of results

The findings of the study primarily will be presented to the surgical department, College of Medicine, AAU as part of requirement for finishing postgraduate surgical program of AAU. The findings will be disseminated to different organizations, including the involved hospitals through different means such using Ethiopia Medical journal or any global ones if possible.

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Annex

Questionnaire

This questionnaire is prepared to identify Disease characteristics. Use of drains and post-operative complications in secondary peritonitis for complicated acute appendicitis in two affiliated referral hospital of AAU, College of Health Science, School of Medicine, Addis Ababa

Socio-demographic data

Card Number _____

Telephone No _____

1. Age _____ 2. Sex _____ 3. Date of admission _____

4. Date surgery _____ 6. Date of discharge_____

Pre operative factors		
Duration of presenting illness		-hrs
Symptoms	Tenderness	1. Yes 2. No
	Vomiting	1. Yes 2. No
	Collection	1. Yes 2. No
Temperature		1. Normal Range 2. Deranged
Blood count(Leukocytes)		1. Normal Range 2. Deranged
Ultrasound findings		1. Normal/No U/S 2. Deranged

Intra operative		
Intraop diagnosis	Appendicular Abscess	1. Yes 2. No
	Localized peritonitis	1. Yes 2. No
	G. peritonitis	1. Yes 2. No
Was drain left insitu		1. Yes 2. No
Duration of Surgery		Hrs

Post operative complications	
Hospitalization time	-Days
Post-operative fever	1. Yes 2. No
Surgical site infection	1. Yes 2. No
Evisceration/dehiscence	1. Yes 2. No
Residual collection	1. Yes 2. No
Enterocutaneous fistula	1. Yes 2. No
Reoperation	1. Yes 2. No
Outcome of the patient	1. Discharged improved 2. Dead

Thank you!!