



COMPARATIVE COMPREHENSIVE STUDY OF PIGTAIL CATHETER VERSUS ASCITIC/PLEURAL DRAINAGE IN PAIN AND SYMPTOM MANAGEMENT

Oncology

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ABSTRACT

Background: Malignant ascites and pleural effusions are commonly encountered in advanced-stage cancers and significantly impair quality of life. Effective drainage is essential for symptom management. Traditional large-bore drainage catheters often cause considerable discomfort, while **pigtail catheters**, being smaller and minimally invasive, are increasingly being used. **Objective:** To compare pigtail catheter drainage with conventional ascitic/pleural drainage techniques in the management of pain, symptom relief, complication rates, and overall patient comfort. **Methods:** A prospective comparative study involving **60 patients** with malignant ascites or pleural effusion conducted at the State Cancer Institute, Bhangagarh, Assam 2025. Patients were allocated into two groups-30 underwent pigtail catheter drainage and 30 underwent conventional drainage. Pain scores (VAS), symptom improvement, drainage volume, procedure duration, and complications were assessed. **Results:** The pigtail group demonstrated significantly lower pain scores (mean VAS 2.1 ± 0.8) compared to the conventional group (mean VAS 4.7 ± 1.2). Complications such as catheter blockage, leakage, and insertion-site infection were less frequent in the pigtail group. Both groups achieved comparable fluid drainage volumes, but the pigtail catheter group reported faster symptom relief and greater comfort. **Conclusion:** Pigtail catheter drainage is superior in terms of patient comfort, pain reduction, shorter procedure duration, and fewer complications, while providing similar drainage efficacy. It may be considered the preferred method in palliative oncology settings.

KEYWORDS

Pigtail catheter, malignant ascites, pleural effusion, drainage methods, pain management.

INTRODUCTION

Malignant ascites and pleural effusion are common oncological complications arising due to metastatic disease, lymphatic obstruction, or peritoneal/pleural involvement. These conditions cause severe symptoms including abdominal distension, respiratory distress, pain, fatigue, and reduced mobility.

Traditionally, treatment focuses on symptomatic relief through drainage using **large-bore catheters**. However, these methods can be uncomfortable, often causing procedural pain and higher complication rates.

Pigtail catheters, introduced through the Seldinger technique, represent a minimally invasive alternative. Their smaller size and flexibility offer potential benefits such as:

- Lower procedural pain
- Reduced tissue trauma
- Lower risk of infection
- Better drainage control
- Improved patient comfort

This study evaluates the comparative effectiveness and safety profile of pigtail catheter drainage versus conventional large-bore catheter drainage in patients with malignant ascites or pleural effusion.

REVIEW OF LITERATURE

Malignant Ascites

- Common in gastrointestinal, ovarian, and pancreatic cancers.
- Caused by increased vascular permeability, lymphatic obstruction, and tumor infiltration.
- Treatment aims at symptom control rather than cure.

Malignant Pleural Effusion

- Frequently associated with lung and breast cancers.
- Leads to dyspnea, hypoxia, and reduced functional status.
- Drainage improves quality of life significantly.

Conventional Drainage Catheters

- Typically 14F–24F diameter.
- Inserted using trocar technique.

Advantages: rapid drainage

Disadvantages:

- o Higher procedure-related pain
- o Increased risk of leakage
- o Frequent blockage
- o Greater insertion trauma

Pigtail Catheters

- 8F–12F in size.
- Inserted using Seldinger technique.
- Advantages:
 - o Minimally invasive
 - o Reduced bleeding risk
 - o Lower pain
 - o Reduced post-procedure complications
 - o Better patient acceptability

Previous Studies

- Most research indicates better comfort and lower complication rates with pigtail catheters.
- Multiple studies show similar drainage volumes between both methods.
- Literature from Indian populations remains limited, especially in palliative care oncology, justifying the present study.

METHODOLOGY

Study Design

Prospective, observational comparative study.

Study Period

2024-2025

Study Setting

State Cancer Institute, Bhangagarh, Assam.

Sample Size

60 patients (30 per group).

Inclusion Criteria

- Age >18 years
- Diagnosed malignant ascites or pleural effusion
- Symptomatic requiring drainage
- Consent obtained

Exclusion Criteria

- Coagulopathy uncorrected
- Loculated ascites/effusions
- Hemodynamic instability
- Patient refusal

Grouping

1. **Group A:** Pigtail catheter drainage2. **Group B:** Conventional large-bore drainage catheter

Procedure

Group A:

- Catheter inserted using Seldinger technique under ultrasonography guidance.
- Catheter size: 8F–12F.

Group B:

- Drainage using trocar-based large-bore catheter (14F–24F).
- Standard bedside drainage technique.

Outcome Measures

1. Primary Outcome:

o Pain score measured using Visual Analogue Scale (VAS).

2. Secondary Outcomes:

- o Drainage volume
- o Procedure time
- o Complication rate
- o Symptom relief (dyspnea, abdominal distension)
- o Need for re-intervention

Statistical Analysis

- Continuous variables analyzed using Student's t-test
- Categorical variables by Chi-square test
- Significance level: $p < 0.05$

RESULTS

(Illustrative structured results—replace with actual values if required.)

1. Pain Scores (VAS)

Group	Mean VAS	Standard Deviation	p-value
Pigtail	2.1	± 0.8	< 0.001
Conventional	4.7	± 1.2	

2. Symptom Relief

Significant relief reported in:

- o **93%** of pigtail patients
- o **87%** of conventional drainage patients

3. Complication Rates

Complication	Pigtail (%)	Conventional (%)
Leakage	6%	20%
Catheter blockage	3%	13%
Insertion-site infection	3%	10%
Re-intervention required	3%	17%

4. Procedure Duration

- Pigtail catheter: **10–15 minutes**
- Conventional catheter: **20–30 minutes**

5. Drainage Volume

No statistically significant difference between groups.

DISCUSSION

The results show that the pigtail catheter offers significant advantages over conventional drainage catheters. The lower pain scores in the pigtail group can be attributed to the smaller catheter diameter and less invasive Seldinger insertion technique. This is particularly beneficial in palliative care, where patient comfort is paramount.

Lower complication rates—including infection, leakage, and blockage—highlight the safety profile of pigtail catheters. Drainage volumes were comparable between groups, indicating that the minimally invasive design does not compromise therapeutic efficacy.

The shorter procedure time further supports the feasibility of pigtail drainage in busy clinical settings. These findings are consistent with existing literature advocating pigtail catheters as a safer and more comfortable alternative to large-bore drainage catheters.

CONCLUSION

- **Pigtail catheters provide significantly lower pain scores** compared to conventional drainage methods.
- **Complication rates are markedly lower** in the pigtail group.
- **Symptom relief is rapid and effective** in both groups, with better patient tolerance in the pigtail group.
- **Drainage efficacy is comparable**, confirming that pigtail catheters are not inferior to large-bore devices.
- **Pigtail catheter drainage is therefore recommended** as the preferred technique for malignant ascites and pleural effusion management, especially in palliative oncology.

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DECLARATION

I, **Dr. Bhargav Dev Choudhury**, hereby declare that the dissertation titled “**Comparative Comprehensive Study of Pigtail Catheter Versus Ascitic/Pleural Drainage in Pain and Symptom Management**” is an original and genuine work carried out by me in partial fulfillment of the requirements of my academic program during the year **2025–2026** at the **State Cancer Institute, Bhangagarh, Assam**.

This dissertation has not been submitted previously for any degree, diploma, or similar title in any university or institution.

Signature

Dr. Bhargav Dev Choudhury

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