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Original Research Article

TO COMPARE THE EFFICACY BETWEEN LAPAROSCOPIC DRAINAGE AND PIGTAIL CATHETER DRAINAGE IN THE TREATMENT OF LIVER ABSCESS

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ABSTRACT

Background: Aim: The aim of the study is to compare the efficacy of two drainage methods, namely laparoscopic versus percutaneous catheter drainage, in achieving cure for liver abscess. **Materials and Methods:** This study was conducted in the Department of Surgery, Government Dharmapuri Medical College and Hospital among the liver abscess patients diagnosed in 25-82 years of age, Abscess size > 5 cm in diameter. **Result:** • The data indicates that liver abscess is predominantly a condition affecting middle-aged adults, particularly those between 40 to 69 years of age. • There is a stark gender disparity, with males being much more commonly affected than females. • The most prevalent symptoms are abdominal pain and fever among the patients• Right intercostal tenderness and hepatomegaly are the most prevalent signs in the patient population, • The most common abnormal investigation finding among the patients is an elevated total leukocyte count (43.34%), followed by elevated urea levels (30%). • The most common abnormal investigation finding among the patients is an elevated AST level (93.3%), followed by elevated ALT levels (80%). • A predominant involvement of the right lobe in the patient population, with a substantial majority (86.7%) of cases affecting the right lobe. • PCD has a higher mean value (7.07) compared to Laparoscopic Drainage (4.27). **Conclusion:** The findings reveal that PCD presents significant advantages over laparoscopy in specific clinical scenarios, notably through its minimally invasive nature, lower risk of infection, and shorter recovery time and requires only local anesthesia, cost Effectiveness PCD emerges as a safer alternative for high-risk patient populations, including the elderly and those with comorbidities. However, laparoscopy retains its critical role in cases that demand more extensive surgical intervention.

INTRODUCTION

Liver abscess is a rare occurrence with evolving etiology, diagnosis, and treatment.

Traditionally classified into pyogenic (caused by various bacteria) and amoebic (caused by Entamoeba histolytica) abscesses, recent trends indicate an increase in fungal and mycobacterial abscesses, likely due to the rise in patients with AIDS and other forms of immunosuppression.[1] Liver abscesses are the most common type of visceral abscess. In a study of 540 intra-abdominal abscess cases, pyogenic liver abscesses accounted for 48% of visceral abscesses and 13% of intra-abdominal abscesses. The annual incidence of liver abscess is estimated at 2.3 cases per 100,000, with a higher prevalence among men than women.[2]

An untreated hepatic abscess is nearly always fatal due to the ensuing complications. Effective management of a pyogenic liver abscess includes appropriate antibiotic therapy and abscess drainage, followed by identifying and treating the source of the infection.[3]

Most liver abscesses require some form of drainage, which can be performed via closed aspiration, percutaneous drainage, or surgical intervention.

Catheter Drainage

A randomized controlled trial by Rajak et al. in 1998 compared percutaneous aspiration with catheter drainage, showing a 60% success rate for percutaneous aspiration versus 100% for catheter drainage.[4] Indications and complications for catheter drainage are similar to those for percutaneous aspiration.

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Advantages

- It can serve both therapeutic and diagnostic purposes.
- It is relatively safe, economical, and informative.
- Follow-up on abscess resolution can be monitored via air cavitogram or dyes.[5]

Disadvantages

- Catheter blockage may require reinsertion.
- It is not suitable for abscesses with a risk of rupture.

Laparoscopic Surgical Drainage

Laparoscopic drainage offers the benefits of both open surgery and the minimal invasiveness of percutaneous drainage. However, laparoscopic localization of liver abscesses can be challenging due to the lack of tactile feedback, though this can be mitigated with aspiration using a long endoscopic or spinal needle and laparoscopic ultrasonography.

In 1938 a pivotal study of the liver abscess was done by Ochsner and Debakey. They stated that a significant reduction in mortality can be done through a surgical approach.[6] Localizing and diagnosing appropriately through proper method like radiological imaging developed over a period of time along with the development of pharmacotherapeutics and intensive care management. The treatment also showed developmental shift from the open surgical drainage to minimally invasive methods. The standard treatment of the liver abscess is still in debate. The aim of the study is to compare the efficacy of two drainage methods, namely laparoscopic versus percutaneous catheter drainage, in achieving cure for liver abscess.

Objectives

- To compare the response in patients with liver abscess in both the groups
- To compare the hospital stay, procedure, intraoperative resolution of abscess cavity, and post procedural pain in patients with liver abscess undergoing both the groups.

MATERIALS AND METHODS

This study was conducted in the Department of Surgery, Government Dharmapuri Medical College and Hospital among the liver abscess patients diagnosed.

Inclusion Criteria

- 25-82 years of age
- Abscess size > 5 cm in diameter.
- Patients who gave consent

Exclusion Criteria

- Patients 82 years of age.
- Abscess size < 5 cm in diameter.
- Ruptured Liver abscess.
- Liver abscess with ascites
- Patients who did not gave consent and willingness.

Patient Data Collection: The demographic details, clinical presentation and other histories were collected from study participants. Investigations were done and recorded. Intravenous Ciprofloxacin (200 mg BD) and Metronidazole (800 mg TDS) were given as initial treatment.

Patients were divided into two groups

- Group I: study participants who underwent ultrasound-guided pigtail catheter drainage.
- Group II: Study participants who underwent laparoscopic drainage.

Before interventions the patient's coagulation profile were normalised.

CATHETER PLACEMENT FOR ABSCESS DRAINAGE

Preparation and initial steps: Under sterile aseptic conditions the patient is prepared. The area is draped and anesthesia is given to the superficial tissue. To insert the catheter, skin incision is made.

Methods of catheter placement:

➢ **Trocar Method**

- Into the abscess using a sharp metal trocar and cannula the catheter is placed which gives stiffened support. From the trocar the catheter is advanced into the abscess from the trocar and stiffener. Ultrasound will confirm the position and through the flow of pus through the cannula.2.0 Silk is used for fixing the catheter and for ensuring the flow of pus.

➢ **Seldinger Technique**

- An Access needle is used to place the guide wire into the abcess. Until the catheter is advanced into the abscess the dilatations are done serially. Ultrasound and Fluoroscopy is used for checking the position of the catheter. To avoid the peritoneal contamination the contrast injection is not given before aspirating the cavity.[8]

A drainage bag will be connected to the catheter which will be either a gravity drain or suction. To facilitate the drain irrigation a three-way stopcock is used. Reconstitution of tissue plasminogen activator of 4-6 mg is done using 10-20 ml of saline in-order to reduce the pus viscosity by breaking the fibrin**.**

Follow-up and maintenance: With the help of ultrasound, the catheters of the patient is monitored daily to follow the progress. 5-10 ml of normal saline is used to flush the catheter three time a day in order to prevent clogging. The catheter occlusion was minimal in gravity drain.

The two main types of catheters include double Lumen and single lumen Sump Catheters.

- Catheters used for abscess drainage are available in sizes ranging from 8 to 16 French in diameter.

LAPAROSCOPIC DRAINAGE METHOD FOR LIVER ABSCESS OVERVIEW

Indications

- Liver abscess of size > 5 cm
- When ultrasound guided aspirations and percutaneous drainage failed
- Preference over open drainage procedures,[10]

Method

Under aseptic precautions the procedure is performed. Then the patient is administered general

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anesthesia. Supraumblically a 10 mm port is created after pneumoperitoneum is created using CO2.Visualisation is done using a telescope.5 mm additional port is created, one in midline and the other in right hypochondrium.

Percutaneously aspiration is done as a trial. Malecot's catheter with wide bore is placed inside the cavity through one working port. Non absorbable suture material is used to fix the catheter brought out to the skin. The pus is sent for culture and sensitivity. Due to the poor tactile sensation the loculated abscess will not be easily identified by the laparoscopic instruments. Once the hemostasis is secured the pneumoperitoneum is deflated and the ports are closed with vicryl an absorbable suture materials. Then antibiotics are given in the postoperative period.

The patients are monitored continuously for the symptoms. The quantity and the quality of the drainage was also noted. Infection at the port site is also checked. When the collection was found to be <10 ml the drain is removed. After three days a ultrasound is repeated in-order to monitor the size of the cavity with abscess.

This laparoscopic method provides a minimally invasive alternative for managing large liver abscesses, ensuring effective drainage while minimizing complications associated with open surgical procedures.[11]

POST-PROCEDURE FOLLOW-UP

Clinical improvement of the patients is monitored daily. If the fever, hepatomegaly and the fever reduced, WBC count decreased, no signs of relapse and if abscess cavity shows reduction by < 3 cm then the treatment is considered a successful.[12] The hospital stay was noted and the patients are followed for 3 months to check for complications and recurrent attacks.

RESULTS

Table 1: Age and Sex Distribution of the Studied Population

AGE GROUP	MALE	FEMALE	TOTAL	PERCENTAGE
20-29	1	0	1	03.33%
30-39	3	1	4	13.33%
40-49	8	0	8	26.67%
50-59	6	0	6	20.00%
60-69	5	2	7	23.33%
70-79	1	0	1	03.33%
80-89	2	1	3	10.00%
TOTAL	26	4	30	100%

Table 2: Symptoms and Signs Associated with Liver Abscess in the Studied Population

		Number	Percentage
Symptoms	Abdominal pain	28	93.30
	Fever	23	76.60
	Jaundice	03	10.00
	Diarrhea	03	10.00
Signs	Tachycardia>100/min	12	40.00%
	Hepatomegaly	13	43.34%
	Rt Intercostal tenderness	18	60.00%

Table 3: Patients with abnormal results

Investigations	Number	Percentage
Hb <9g/dl	5	16.66%
TC>11000/mm3	23	76.66%
Urea>40mg/dl	10	33.33%
Creatinine >1.0mg/dl	5	16.66%

Table 4: Number of patients exhibiting abnormal liver function test results in Studied Population

Investigations	Number	Percentage
Total Bilirubin >3	2	06.66%
AST>40	28	93.30%
ALT>40	24	80.00%
SAP>115	9	30.00%
Albumin <3g /dl	3	10.00%
PT>20s	1	03.33%
INR >1.3	2	06.66%

Table 5: Distribution of Patients Based on the Involved Lobe in the Studied Population

LOBE	NUMBER	PERCENTAGE
Right	26	86.70%
Left	4	13.33%
Total	30	100%

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Table 6: Comparison of Average Length of Hospital Stay Between Patients Undergoing Percutaneous Catheter Drainage and Laparoscopic Drainage

	PCD	Laproscopic Drainage
Mean	7.07	4.27
Std.Dev	0.77	1.34

DISCUSSION

The study shows high Prevalence in Middle-aged Adults, particularly those between 40 to 69 years of age. There is a stark gender disparity, with males being much more commonly affected than females. Health interventions and awareness campaigns should particularly target middle-aged males to effectively address and reduce the incidence of liver abscess. Further research might be needed to understand the underlying reasons for the high prevalence in middle-aged males and develop targeted prevention and treatment strategies.

The most prevalent symptoms are abdominal pain and fever among the patients, while jaundice and diarrhea are much less common. This information can guide healthcare providers in diagnosing and prioritizing treatment for patients presenting with these symptoms.

Right intercostal tenderness and hepatomegaly are the most prevalent signs in the patient population, indicating their potential importance in diagnosing and understanding the condition. Tachycardia is less common but still relevant.

The most common abnormal investigation finding among the patients is an elevated total leukocyte count (43.34%), followed by elevated urea levels (30%). Anemia and elevated creatinine levels are less common in the patient population. The most common abnormal investigation finding among the patients is an elevated AST level (93.3%), followed by elevated ALT levels (80%). Elevated SAP levels are also fairly common (30%). Less frequent abnormalities include elevated T Bilirubin (6.66%), low Albumin (10%), prolonged PT (3.33%), and increased INR (6.66%). These findings highlight that liver enzyme abnormalities are the most prevalent issues in this patient population, with other biochemical anomalies occurring less frequently.

The data clearly demonstrates a predominant involvement of the right lobe in the patient population, with a substantial majority (86.7%) of cases affecting the right lobe. This finding may be significant for clinical considerations and future research, indicating that the right lobe may be more susceptible or more frequently involved in the conditions affecting these patients.

The data compares the mean values of PCD (Percutaneous Catheter Drainage) and Laparoscopic Drainage.

- PCD has a higher mean value (7.07) compared to Laparoscopic Drainage (4.27).
- There is statistically significant difference observed between the two groups. This may be unlikely due to random chance.
- This suggests that PCD tends to result in higher outcomes or differences in terms of the measured variable (depending on the specific study parameter, e.g., recovery time, treatment effectiveness, etc.).

CONCLUSION

This study has examined the comparative effectiveness of Percutaneous Drainage (PCD) versus Laparoscopic Surgery, particularly in the context of abscess drainage and fluid collection management. The findings reveal that PCD presents significant advantages over laparoscopy in specific clinical scenarios, notably through its minimally invasive nature, lower risk of infection, and shorter recovery time. As a procedure that requires only local anesthesia, PCD emerges as a safer alternative for high-risk patient populations, including the elderly and those with comorbidities. Additionally, the cost-effectiveness of PCD offers a substantial benefit, particularly in resource limited healthcare settings. Laparoscopy remains the gold standard for complex cases where thorough exploration and drainage are required, underscoring the importance of careful case selection for optimal treatment outcomes.

In conclusion, this comparative analysis emphasizes the value of PCD as a preferable first-line option in suitable cases, combining lower procedural risks with shorter recovery periods. However, laparoscopy retains its critical role in cases that demand more extensive surgical intervention. New researches are recommended to choose the parameters which helps in guiding and deciding the surgical techniques thereby improving the patients outcome.

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