**Original Research Paper** 



# COMPARATIVE STUDY IN MANAGEMENT OF HEPATIC ABSCESS DRAINAGE USING ULTRASOUND GUIDED NEEDLE ASPIRATIONS VERSUS PIGTAIL CATHETER PLACEMENT

Dr. Vijay Kulshrestha	Assistant Professor, Department of Radio diagnosis. G.S Medical College and Hospital, Hapur (U.P) India.			
Dr. Shabir Ahmed Dar*	Assistant Professor, Department of General Surgery. G.S Medical College and Hospital, Hapur (U.P) India. *Corresponding Author			
Dr. Mohd. Aslam Khan	Associate Professor, Department of General Surgery. G.S Medical College and Hospital, Hapur (U.P) India.			
Dr. Alok Maheshwari	Prof and Head, Department of Radio diagnosis. G.S Medical College and Hospital, Hapur (U.P) India.			
Dr. Mohammad Zakiuddin	Associate Professor, Department of Physiology. IQ city Medical College, Durgapur, West Bengal, India.			
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**Comparent Section Objective:** The aim of this study was to compare the effectiveness of percutaneous needle aspiration (PNA) and percutaneous catheter drainage (PCD) in the management of hepatic abscess.

**Methods:** The current study includes prospective randomized comparative study of 60 patients admitted in emergency and indoor department at tertiary health care centre, randomized into two groups- Percutaneous needle aspiration (PNA) & Pigtail catheter drainage (PCD). The effectiveness of hepatic abscess is based early recovery period, duration of hospital stay, and clinical improvement status. **Results:** The recovery rate was significantly improved in catheter drainage group. The analysis showed that outcomes in patients treated with PCD were superior to those in patients treated with PNA in terms of early recovery, clinical improvement and days to achieve a 50% reduction in abscess cavity size.

**Conclusion:** Both PNA and PCD are safe methods of draining hepatic abscesses. However, PCD is more effective than PNA because it facilitates a higher success rate, reduces the time required to achieve clinical relief and supports a 50% reduction in abscess cavity size. However, among successfully treated patients, the outcomes of PNA are comparable with those of PCD.

KEYWORDS : hepatic abscess, Pigtail catheter, Needle aspiration, amoebic hepatic abscess, Pyogenic Hepatic Abscess

# INTRODUCTION

Hepatic abscess is purulent collection depicted as cavity lesion in the liver parenchyma that results from parasitic, bacterial, fungal infection. Infection can spread to the liver through the biliary tree, hepatic vein, or portal vein by extension of an adjacent infection, or as a result of trauma. One or multiple abscesses can be present. The occurrence of amoebic hepatic abscess are worldwide, more in low and poor hygienic community while the Pyogenic abscess are caused by bacterial infection but reported less due to early use of affective antibiotics. Fungal infections are found in Immunocompromised patients. For amoebic hepatic abscesses (AHA's) the primary treatment is medical; however, 15% of amoebic abscesses may be refractory to medical therapy and 20% of AHA's may be complicated by secondary bacterial infection. Over the last two decades, outcomes in patients presenting with hepatic abscesses have improved as a result of advances in interventional radiological diagnosis and percutaneous treatment options. The frequent use of ultrasonography in diagnosis and guided procedures resulted in early detection and promptly treated with antibiotics and antiamoebic drugs. Currently, patients are treated with parental antibiotics along with percutaneous needle aspiration (PNA) or percutaneous catheter drainage (PCD), while surgical drainage is used only in patients who failed to respond to such treatment. The previous studies have shown both PNA and PCD to be effective and safe, although the optimal treatment remains unclear. The aim of this study was to perform a systematic review and comparing the effectiveness of PNA and PCD in management hepatic abscesses. The success rate of ultrasound guided percutaneous drainage has been rising high in management of hepatic abscess with reported success rate ranging from 80% to almost 100%. Although percutaneous placement of indwelling catheter (pigtail) is most widely used procedure to drain hepatic abscess. But recent comparative study reveals that needle aspiration found to be simple, less costly, effective, quick procedure with very short hospital stay and reliable method in liquefied hepatic abscess.

# METHODS

The current study included retrospective randomized comparative study of 60 patients admitted in outdoor, emergency and indoor department at tertiary health care centre (G.S.M.C. & H), randomized into two groups- Percutaneous needle aspiration (PNA) & pigtail catheter drainage (PCD), studied from September 2017 to February 2019. The written informed consent was obtained from all patients. The diagnosis of Hepatic abscess is based on detailed history of anorexia, malaise, fever and pain abdomen and clinical findings of tenderness in right upper quadrant, lab investigations (CBC, LFT) and ultrasound evidence of hepatic abscess. A patient was randomized for aspiration and pigtail drainage if he or she has symptoms and signs of hepatic abscess and if hepatic abscess was confirmed at Sonographic or CT examination. Patients had begun intravenous antibiotic treatment with amikacin 10 mg /kg 12 hourly, ceftriaxone 10 mg/kg 12 hourly, and metronidazole 15 mg/kg 8 hourly.

# **INCLUSION CRITERIA**

The patients were selected from outpatient, emergency and indoor department at the hospital. The age of patients varied from 16 to 58 years. All the patients diagnosed to have hepatic abscess clinically and radio logically [on ultrasonography (USG) and/or CT scan] were included in the study.

# **Exclusion criteria**

All abscess cavities smaller than 5 cm in their greatest dimension; prior intervention; ruptured hepatic abscess; uncertain diagnosis; concomitant biliary tract diseases; and un-correctable coagulopathy. 68 patients were enrolled, and after assessment 5 patients were excluded due to prior PNA attempt, and 3 patients were excluded owing to ruptured abscess. The effectiveness of either treatment was measured in terms of early recovery period, duration of hospital stay & prompt clinical improvement, significant reduction in size of cavity (less than 50%) and partial/or complete resolution of abscess cavity.

# TECHNIQUE

### **Percutaneous Needle Aspiration (PNA)**

Pus was aspirated under Ultrasound guidance using a 16G disposable trocar needle and syringe and sent for culture and sensitivity and gram staining. Review US was done after one week and the size of the residual cavity was noted. Aspiration was repeated if the abscess cavity did not show a 50% reduction in size, irrespective of clinical response. Failure of abscess size to decline below 50% of the original or of clinical improvement after third aspiration was taken as failure of aspiration.

## Percutaneous Catheter drainage (PCD)

A trocar with a 14 F multi-side whole pig tail catheter was inserted into the abscess cavity under local anaesthesia and US guidance using Seldinger technique. The contents of abscess were aspirated and the catheter was fixed to the skin and connected to a collecting bag. The US was done every third day to monitor residual collection if any. Otherwise, the catheter was left until catheter drainage ceased.

#### **EVALUATION**

The temperature, TLC, LFT is recorded on daily basis, repeat ultrasound after 3 days for assessment of residual collection and cavity size. The aspiration is repeated if liquefied pus remaining and size of cavity is more than 5 cm. The failure of clinical improvement is assessed in terms of fever, abdominal pain, tenderness in RUQ, if daily output<10 ml in 24 hours catheter is removed. The patient is followed up weekly for a month and then once in a month for 3 months.

## **STATISTICAL ANALYSIS**

The effectiveness of both the methods were assessed on the basis of duration of hospital stay, days to achieve 50% reduction in size of abscess cavity, Days to achieve total/almost complete recovery from illness.(Table2)

#### RESULT

A total of 60 patients randomized into two groups of 30 for needle aspiration and 30 for catheterized drainage were included in the study. The following observations were made:

# Symptoms and sign

It was observed that pain in the right upper quadrant of the abdomen was the most common symptom, found in 93% of the cases. Weakness (90%) and fever (88%) were other frequently presenting symptoms. Approximately half of the patients had symptoms of anorexia, rigors and jaundice. Pain in the right shoulder region and nausea, vomiting were present in 22% and 27% of the patients respectively. In this study, hepatomegaly was found to be present in 48 of 60 patients (80%) whereas pleural effusion was found in 5 of 60 patients (8%) and ascites in 4 patients (6%). The types of abscesses are found to be 60% amoebic, 28% Pyogenic, 6% mixed and 4% indeterminate. The Involvement of liver lobe was right lobe in 81%, left lobe 11%, and both lobe in 8%. The number of abscess was solitary in 76% and multiple in 24%. The volume of abscess was ranging from 160ml to 550ml. The pigtail catheter drainage was found successful in 28 out of 30 cases, two cases were treated with surgical method due to incomplete drainage, while the success rate was 22 out of 30 cases in ultrasound guided needle aspirations, and Remaining 8 cases were cured by repeated aspirations.

The patient in PCD show earlier clinical improvement and 50% reduction in cavity as compared to patients treated with PNA which shows gradual reduction in abscess cavity and early clinical improvement and needs frequent aspirations. However no significant difference was found between duration of hospital stay or time required for almost complete recovery.

Table 1 Patient characteristic, b	plood investigations and a	bscess
characteristics		

	Percutaneous	Pigtail Catheter	
	needle aspiration	Drainage	
Age(year)(Median[range]	38(16-88)	41(12-70)	
Male: Female	24:10	26:8	
Co-morbidity(n)			
Diabetes	5	3	
Gall Stones	10	8	
Cholangitis	5	3	
Colitis	8	6	
Clinical features(n)			
Fever	24	21	
Rigors, chills	12	10	
Right hypochondriac	32	31	
Anorexia/weakness	30	23	
Jaundice	7	4	
Nausea/vomiting	10	16	
Investigations(Median			
[range]			
Haemoglobin (g %)	9.6(6.2-12.5)	9.2(6.6-12.8)	
Total leukocyte count (/L)	12.6(3.8-22.2)	13.3(3.3-23.4)	
PT-INR	1.9(1.0-2.5)	1.75(0.9-2.4)	
Bilirubin (mg %)	1.6(0.6-2.4)	1.9(0.6-2.5)	
Aspartate	38(23-68)	46(18-72)	
aminotransferase (IU/L)			
Alanine	53(27-74)	49(22-69)	
aminotransferase(IU/L)			
Serum alkaline	198(72-266)	190.5(55-260)	
phosphatase(IU/L)			
Total protein (g %)	4.75	5.2	
Abscess (n) (Solitary	29:5	31:3	
multiple)			
Location (right: left: both)	27:5:2	30:1:3	
Nature(Amoebic:	24:10	28:06	
Pyogenic)			

### Interventional procedure and their result (Table 2) All Treatment Group

	Pigtail Catheter Drainage		Percutaneous Needle Aspiration	
	No. of Patients	Value Min-max Mean± SD	No. of Patients	Value Min- max Mean ±SD
Volume of the largest Cavity(c.c.)	30	102-770 358±122	30	98-552 320±121
Success	28	93.3%	22	73.3%
Hospital stay(days)	30	6-21 10.3±3.8	30	5-20 10.1±5.2
Clinical improvement (days)	30	2-9 4.2±1.55	23	3-11 5.1±1.9
Time for 50% reduction in cavity size(days)	30	3-9 4.9±1.6	30	4-10 7.1±2.3
Time for total or near total resolution of cavity (weeks)	30	8-22 10.9±4.1	30	8-25 10.1±4.2
Duration of drainage(days)	30	6-15 10.4±3.7	NA	NA

C.C. (Cubic Centimetres), SD (Standard Deviation), NA (Not Applicable)

#### DISCUSSION

Hepatic abscess is major tropical disease of liver and mainly amoebic and pyogenic. Both amoebic and pyogenic continue to be important cause of morbidity and patients usually present late when the liver abscess attains a large size. Males are more affected, M:F ration 9:1, the most commonly affected age group is from 2<sup>nd</sup> to 4<sup>th</sup> decade. Percutaneous drainage either needle aspiration and catheter drainage with systemic antibiotics has become the preferred treatment for the management of amoebic/ Pyogenic liver abscess. However for amoebic abscess the primary mode of treatment is medical 15% are refractory to medical treatment and require drainage. Our result found to be matching with khan et al series who reported 68% amoebic, 21% pyogenic, 8% indeterminate and 3% mixed. The mean duration of stay was 8 to 10 days. The Rajak et al reported 60% success rate while we observed 83.3% overall success rate in our study. The advantage of PNA over PCD are summarized as less expensive, minimally invasive, no care related to catheter displacement, easier to drain multiple cavities at same time, less complications, success rate is 81% and less cost effective too. The main causes of failure in both cases were found to be thick pus and its re-accumulations in the cavity. Previous investigations have shown that the combination of parenteral antibiotics and image guided percutaneous treatment is also successful. The objective of the present study was to give comparative study of both the procedures and their outcomes.

#### CONCLUSION

In conclusion, ultrasound guided percutaneous treatment of hepatic abscesses is a safe and effective alternative to surgery because it enables us to avoid perioperative complications, providing at the same time a better compliance, easier nursing care and reduced morbidity & mortality. We recommend PNA primarily in the treatment of liver abscesses in smaller cavity less than 80 mm while PCD should be applied for those larger than 80 mm in the longest diameter with complete liquefaction of pus. The results of the study, along with those from the previous ones, may contribute to finding a definitive answer whether a first-line treatment for hepatic abscess is percutaneous catheter drainage or intermittent needle aspiration.

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