

## Role of Ultrasonography in Evaluation and Management of Intra Abdominal Abscess

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### Abstract

**Background:** Intra-abdominal abscesses continue to present therapeutic challenge to the surgeon. They are common complication of inflammatory bowel disease, malignancy and trauma. The objective of the present study is to manage the intra-abdominal abscesses by percutaneous aspiration under ultrasound guidance and placement of continuous catheter drainage wherever deemed necessary and to assess the efficiency, limitations and complications, if any of this method.

**Aim and Objective:** 1. To evaluate and management of the intra-abdominal abscess by ultrasonography guided aspiration and pig tail catheter drainage.

2. To assess efficiency, limitations and complications associated with these methods.

**Patients and Methods:** A total of 68 cases of intra-abdominal abscesses admitted to surgical unit of MKCG MCH Berhampur, Odisha from November 2020 to June 2022 were selected. The diagnosis of intra-abdominal abscess was confirmed by USG and/or CT. Patients were then subjected to ultrasound guided drainage/aspiration as a therapeutic measure. Post procedure patients were watched for signs of peritonitis. Systemic antibiotics were given, and analgesics were given on SOS basis. Follow up ultrasound after three days was done. Follow up was kept in all cases.

**Results:** Out of 68 patients of intra-abdominal abscess, there were 51 males (75%) and 17 females (25%). Maximum number of patients present in fifth decade (20 patients) and sixth decade (25). Minimum number of patients were up to the age of 30year and above 70year. Most common intra-abdominal abscess was liver abscess (60.29%) followed by sub-phrenic abscess (11.76%). Total 59 patients were cured by ultrasonography guided aspiration (29 patients) and pig tail catheter drainage (30 patients). In 5 patients, laparotomy was done and 4 patients were treated conservatively. Out of 68 patients, the aetiology was not known in 32 patients (47.5%). 15 patients were having amoebiasis and 8 patients were having postsurgical intraabdominal abscess. Less number patients got intraabdominal abscess due to trauma (4.41%), enteric (4.41%) and tubercular (5.88%). The above table shows out of 41 cases of liver abscesses, 15 cases were amoebic liver abscess and 26 cases were pyogenic liver abscess as confirmed pus culture and cytology. Overall complication rate is 8.82%, among which bleeding (2.94%) is most common, followed by renal failure, respiratory failure and recollection as 1.47%. Out of

68 patients, 59 patients were undergone ultrasonography guided aspiration and pig tail catheter drainage. 5 patients were undergone laparotomy & surgical drainage and 4 patients were conservatively managed. There was no mortality due to this method.

**Conclusion:** The method is associated with good success rate, low morbidity and mortality, better patient compliance, low cost, can be performed under local anaesthesia and should be used as an initial procedure in the treatment of intra-abdominal abscesses.

**Keywords:** Intra-abdominal abscess, Minimally Invasive drainage of intra-abdominal abscess, USG guided aspirations, pig tail catheterisation

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## Introduction

Intra-abdominal abscesses are the accumulation of purulent exudate in the abdominal cavity that develop postoperatively or after spontaneous intra-abdominal infections. Intra-abdominal abscesses can be intraperitoneal and retroperitoneal. In past their localization and management used to be difficult. Despite advances in modern medicine, evaluation and management of intraabdominal abscess are very difficult without any radiological guidance. Early localization and adequate drainage are two important factors for management of intra-abdominal abscess.

Surgery was the only option available for their treatment till 1953. In 1954, Mc Fadzean was the first to successfully aspirate the liver abscess [1]. But it was not done under any radiological guidance. Then after 1974, ultrasound guided aspiration of liver abscess was done [2]. In some cases, placement of indwelling pig tail catheter through ultrasound guidance was done for continuous drainage of pus. Percutaneous drainage of intra-abdominal abscesses gives advantages like less complications, lower cost, reduced hospital stay. Later visualization of abscess cavity was improved further by the help of ultrasound and computed tomography.

### Aim And Objective of The Study:

1. To evaluate and management of the intra-abdominal abscess by ultrasonography

guided aspiration and pig tail catheter drainage.

2. To assess efficiency, limitations and complications associated with these methods.

### Materials:

A total of 68 cases of intra-abdominal abscesses, presented with varied sign and symptoms, admitted to surgical ward of M.K.C.G Medical college, Berhampur were included in the study from November 2020 to July 2022.

### Inclusion criteria:

All the confirmed cases of intra-abdominal abscess attended to surgery OPD and emergency

### Exclusion criteria:

All the cases below 14 years of age

All the pregnant with intra-abdominal abscess.

Patients with comorbid conditions like chronic liver diseases, diabetes, chronic kidney disease etc.

Patients not willing to give informed consent.

On admission, a detailed history and clinical examination was carried out. The diagnosis of intra-abdominal abscess was carried out by history and clinical examination and then diagnosis was confirmed by ultrasonography and / or CT scan.

Patients diagnosed with intra-abdominal abscess were included in the study and subjected to ultrasound guided aspiration or ultrasound guided pig tail catheter drainage. Written consent from the patient and patient's attendant were obtained. Routine investigation like hemogram, Coagulation profile of the patient were assessed. If required correction of coagulation profile was done by giving fresh frozen plasma and clotting factors. The patients are kept without oral intake overnight or at least are not allowed to eat any fat containing food for approximately 12 to 18 hours before the procedure. This permits better visualisation of intra-abdominal abscesses, distended gall bladder and reduces the gastro intestinal air content. Premedication like antibiotics prophylaxis should be given for high-risk patients and for anxious patients, anxiolytics like oral diazepam or alprazolam was given. IV-line, emergency medications were kept in hand. The patient was given appropriate position. Vitals of the patient were monitored throughout the procedure. The abdomen was painted with betadine solution and properly draped. Ultrasound guided aspiration was done if the lesion is clearly seen and path is safe. Scanning at right angle to the needle path was sufficient to produce a good result. The choice of specific thin needle (20-22 gauge)

was done to reduce post procedural complications. After getting the safe path to the lesion by sonography, the point of puncture was selected and then the needle was attached to the syringe and gently pushed into the mass usually right angle to the plane of transducer in a vertical manner. The movement of needle from the skin, through the intermediate tissues and within the target was continuously visualized in the monitor. Presence of needle in abscess cavity was confirmed by a sensation of give away. Pus was aspirated and collected in a sterile container to be sent to culture and sensitivity study. The pus was aspirated till the abscess cavity was collapsed or no more pus was aspirated. Pigtail catheter was placed in large collection or thick pus and in communicating abscesses. In this case drains were removed when there was no drain for at least 24 hours or no residual collection seen repeat ultrasonography. After the procedure patients were kept nil per oral for 8 hours and empirical systemic antibiotics along with analgesics were also given to the patient. Follow up ultrasonography was done after 3 to 4 days.

#### Data Analysis and Results:

Out of 68 patients of intra-abdominal abscess, there were 51 males (75%) and 17 females (25%). (Chart1)

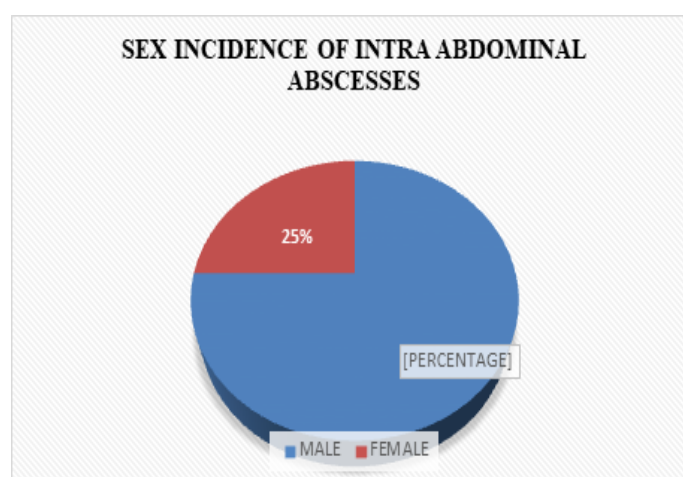
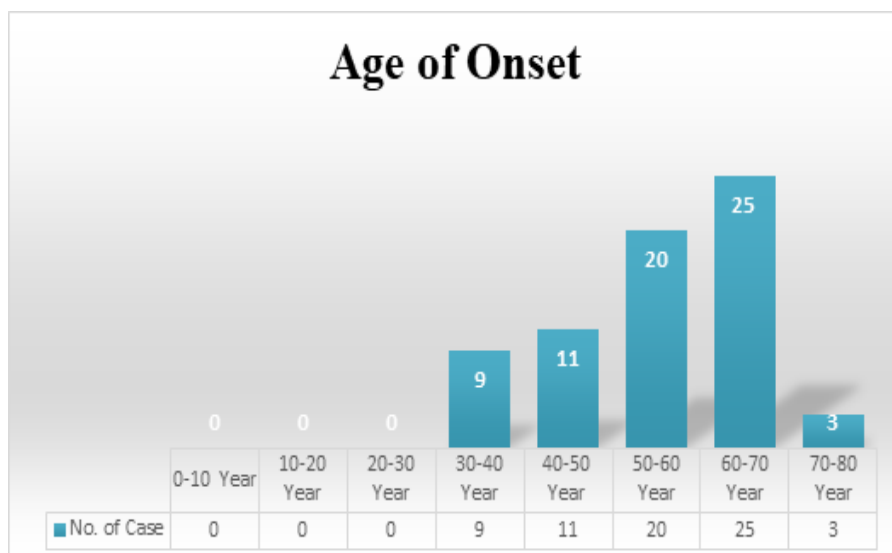


Figure 1: Sex incidence of Intra-abdominal abscesses

Maximum number of patients present in fifth decade (20 patients) and sixth decade (25). Minimum number of patients were up to the age of 30year and above 70year. (Chart 2)



**Figure 2: Age wise incidence of Intra-abdominal abscesses**

**Table-1 Socio-economic status**

Socio-economic status	Total	Percentage
Low	45	66.17%
Middle	15	22.5
High	8	12.30

Out of 68 patients, 45 patients are from low socioeconomic status and only 8 patients are from high socioeconomic status. (Table 1)

**Intra-Abdominal Abscess in Relation to Anatomical Site:**

Most common intra-abdominal abscess were liver abscess (60.29%) followed by sub-phrenic abscess (11.76%). (Table 2)

**Table 2: Anatomical location of Intra-abdominal abscesses**

Site	Number	Percentages (%)
Liver	41	60.29%
Pelvic	4	5.88%
Appendicular	3	4.41%
Sub Phrenic	8	11.76%
Perinephric	4	5.88%
Splenic	3	4.41%
Pancreatic	1	1.47%
Psoas	4	5.88%
Total	68	100

**Different Management Procedures:**

**Table 3: Different type of management if Intra-abdominal abscesses**

Abscesses	No. of cases	Conservative	U.S.G guided aspiration	U.S.G guided Pigtail catheterization	Laparotomy
Liver	41	2	16	21	2
Pelvic	4	0	2	2	0
Appendicular	3	0	2	1	0
Sub Phrenic	8	0	4	3	1
Perinephric	4	0	2	1	1
Splenic	3	1	1	1	0
Pancreatic	1	1	0	0	0
Psoas	4	0	2	1	1
Total	68	4	29	30	5
Percentages	100	5.88%	42.64%	44.11%	7.35%

Total 59 patients were cured by ultrasonography guided aspiration (29 patients) and pig tail catheter drainage (30 patients). In 5 patients, laparotomy was done and 4 patients were treated conservatively.

**Table 4: Aetiology of Intra-Abdominal Abscess**

Etiology	No. of cases	Percentages
Idiopathic	32	47.05%
Postsurgical	8	11.76%
Amoebiasis	15	22.05%
Traumatic	3	4.41%
Enteric	3	4.41%
Tubercular	4	5.88%
Pancreatic	1	1.47%
Other	2	2.94%
Total	68	100%

Out of 68 patients, the aetiology was not known in 32 patients (47.5%). 15 patients were having amoebiasis and 8 patients were having postsurgical intraabdominal abscess. Less number patients got intraabdominal abscess due to trauma (4.41%), enteric (4.41%) and tubercular (5.88%). (Table 3-4)

**Table 5: Aetiology wise of liver abscess**

	No of cases	Percentage (%)
Liver abscesses	41	100%
Amoebic liver abscess	15	36.58%
Pyogenic liver abscess	26	63.41%

The above table shows out of 41 cases of liver abscesses, 15 cases were amoebic liver abscess and 26 cases were pyogenic liver abscess as confirmed pus culture and cytology. (Table 5)

**Table 6: Complication of Intra-abdominal abscesses**

Complication	No. of Cases	Percent (%)
Bleeding	2	2.94%
Recollection	1	1.47%

Damage to Viscera	0	0
Septicaemia	1	1.47%
Chest Complication	0	0
Respiratory Failure	1	1.47%
Empyema	0	0
Renal Failure	1	1.47%
Total	6	8.82%

Overall complication rate is 8.82%, among which bleeding (2.94%) is most common, followed by renal failure, respiratory failure and recollection as 1.47%. (Table 6)

Final outcome:

**Table 7: Outcome of the Intra-abdominal abscesses**

Outcome	No of patients	Percentage (%)
Full recovery by aspiration & catheter drainage	59	86.76%
Laparotomy and surgical drainage	5	7.35%
Conservative	4	5.88%
Lost to follow up & death	0	0

Out of 68 patients, 59 patients were undergone ultrasonography guided aspiration and pig tail catheter drainage. 5 patients were undergone laparotomy & surgical drainage and 4 patients were conservatively managed. There was no mortality due to this method. (Table 7)

### Discussion:

Diagnosis and treatment of intra-abdominal abscesses pose considerable difficulties for surgeons. Often it is difficult to arrive at an approximate diagnosis without the help any screening procedure. Ultrasound is valuable and often considered as an extension of the physical examination of intra-abdominal abscesses. It is safe, non-invasive, easily affordable and available in most of the centres. Fine needle aspiration of intra-abdominal abscess under ultrasonography guidance has achieved wide spread recognition, because of its low morbidity, directness in achieving a diagnosis. Though it can be performed in palpable mass blindly, but it could be inaccurate. It was Lundquist in 1971, who first popularised the method of guided aspiration by showing that it has higher accuracy rate [3]. With the help of ultrasound information regarding the parent tissue of origin and nature of the swelling

as to solid or cystic was obtained in all the cases. In the present study, we could categorize the abscesses arising from liver, spleen, pancreas, subphrenic, perinephric, pelvis and appendicular area. In the present study, intra-abdominal abscess in males is 75% and in females is 25%. Intra-abdominal abscess in males is 3 times that of in females. In the study by Kapoor et al, shows that male has approximately double the incidence of the female [4]. The present study shows 95.58% intra-abdominal abscess are in the age group of 30-70 years. Highest of which are fifth and sixth decade. Nearly 66.17% of patients belong to low socioeconomic status group. By Sreevasta et al shows 75% of patients belong to low socio-economic status [5]. V. K. Khana et al study found that amoebic liver abscess were more prevalent in low and middle socioeconomic group [6] In the present study, there were 60.29% of liver abscesses, 11.76% of sub-phrenic abscesses and splenic abscesses (4.41%). Lorber reported the incidence of hepatic abscesses in 86.6% cases and splenic abscesses in 6.5% of cases [7]. Aetiology of the abscess formation was known in some cases, but it was not the primary aim of this study. In 47.05% cases, cause of intra-abdominal abscesses were not known, in 22.05% cases

cause were found to be amoebiasis and 11.76% due to postsurgical. Similarly, the incidence of intra-abdominal abscesses secondary to appendicitis is also reported to 12- 19% [8]. The success rate of percutaneous splenic abscess drainage is lower than percutaneous drainage of abscesses located in the remainder of the abdomen and pelvis, which varies from 80-90%. The lower success rate may reflect both the multiloculated nature and multiplicity of these abscesses [9]. Sample for pus culture and sensitivity were collected and organism grown in 38 samples (55.88%) and 30 samples were sterile (no growth of any organism). Most common organism found was *Escherichia coli* in nearly 22% cases, which is comparable to the study of Aeder (23%) and WA Joseph (21.42%) [10-11]. The sterile culture report may be due to the time lag between collection of samples and testing it in culture broth. From the culture and cytological examination, 15 cases were amoebic liver abscesses and 26 cases were pyogenic liver abscesses. In the present study of intra-abdominal abscesses, 59 cases of intra-abdominal abscesses were taken which are managed by ultrasonography guided aspiration and pig tail catheter drainage. Out of those, 100% cases were cured due to single or multiple times for complete cure. Out of 68 cases, 4 cases were managed conservatively and around 5 cases were required laparotomy and surgical drainage due to multiple and large abscess cavity. We have not noticed any correlation between abscess size and the difficulty or ease of drainage. There is some controversy over the timing of removal of the drainage catheter. We have not experienced any significant difference in outcome when the catheter is abruptly removed instead of gradually advanced, which is the traditional surgical practice. Alan A. Saber suggested the criteria for removal of percutaneous catheters which include resolution of sepsis signs, minimal drain output and resolution of the abscess cavity as demonstrated by a sonogram or

CT scan [12]. The present study shows that 8.82% of complication after ultrasonography guided aspiration and pig tail catheter drainage. Johnson et al, shows the complication rate to be 4-15%. Arun Kumar Prasad et al, study had not found any complication out of 20 patients of amoebic liver abscesses after ultrasonography guided aspiration [13]. The success rate in the present study is approximately 86.8% which is compared and correlated with those reported by different authors Captain MC and Akinci D [14-15]. The above discussion shows that prompt treatment by early recognition has helped to prevent a number of diagnostic laparotomies and has reduced patient morbidity. [16]

### Conclusion:

The method is associated with good success rate, low morbidity and mortality, better patient compliance, low cost, can be performed under local anaesthesia and should be used as an initial procedure in the treatment of intra – abdominal abscesses. The fact that pus should be drained is of prime importance (whether percutaneously under CT/Ultrasound guidance or by surgical drainage). The choice between percutaneous and surgical drainage must be made through full discussion with the radiologist and final decision should be made by the surgeon. Hence, the treating surgeon should not hesitate to undertake surgical drainage whenever and wherever indicated. Thus, percutaneous aspiration/ catheter drainage of intra-abdominal abscess under USG guidance is the accurate, safe, economical and effective method and is the treatment of choice in patients who do not have other indication of exploration. Thus, it should be considered as an initial valid alternative and may not be a total substitute to surgery.

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