Section: General Surgery

Original Research Article

STUDY OF USG GUIDED PERCUTANEOUS DRAINAGE OF INTRAABDOMINAL ABSCESSES AND FLUID COLLECTION FOR DIAGNOSTIC AND THERAPEUTIC PURPOSES

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Abstract

Background: An Intraabdominal abscess is a collection of pus or infected fluid that is surrounded by inflammed tissue inside the abdomen. It includes involvement of any abdominal organ or interloop fluid. Present study was aimed to study USG guided percutaneous drainage of intraabdominal abscesses and fluid collection for diagnostic and therapeutic purposes. **Material and Methods:** Present study was single-center, prospective, observational study, conducted in patients >12 years, either gender, admitted for any intraabdominal abscess and fluid collections of size >4cms, underwent USG guided percutaneous needle aspiration / Percutaneous Catheter drainage. Results: Age of the patients included in the study varied from 21-75 years. The Mean age was 46 years. The highest incidence was noted in age groups of 31-40 years (21.88%) and 41-50 years (21.88%). 78.13% of patients were Male and 21.87% were female. 53.13% of the Patients in the study were alcoholics. Among the Intraabdominal abscesses and fluid collections liver abscess were most common in our study 21/32 (65.62%) of the patients. 3/21 liver abscess were multiple rest were solitary. 4/32 (12.50%) of Patients had Pseudocyst of pancreas on USG. 3/32 (9.38%) of patients had pyonephrosis & 3 /32 (9.38%) of patients had Psoas abscess. respectively. 1 patient in the study had splenic abscess on USG. 27/32 (84.38%) of the Patients underwent USG-Guided Percutaneous Catheter drainage as modality of treatment in our study. Aspiration & Percutaneous pigtail catheter drainage. E. coli was the most common organism cultured in our study (21.87%). 2 Patients in our study had major complications (death). But both were due to the underlying disease and not due to the procedure related complications. **Conclusion:** USG/CT guided percutaneous drainage of intraabdominal abscesses and fluid collections has minimal complication rates, less morbidity, mortality and is very well tolerated by all the patients.

INTRODUCTION

An Intraabdominal abscess is a collection of pus or infected fluid that is surrounded by inflammed tissue inside the abdomen. It includes involvement of any abdominal organ or interloop fluid.[1,2] Abdominal abscesses can be caused by bacterial, viral, parasitic infections. The most common bacteria to cause them are found in stomach & intestines. If left untreated the bacteria will multiply, cause inflammation & damage healthy tissue.

Percutaneous Drainage has been an important advancement in Diagnosis and management of Intraabdominal abscesses and fluid collections. In the recent years the indications for percutaneous methods have expanded significantly. Ultrasound Guided Needle aspiration and Percutaneous Catheter drainage permit a definitive diagnosis of fluid collections in the abdomen and are also useful in the management of these fluid collections and abscesses.[3,4] The advantages of Catheter drainage over Surgical drainage include avoiding General Anesthesia, easier Nursing care, less morbidity with shortened hospital stays and reduced cost.[5]

Intraabdominal abscesses continue to be disease with considerable mortality in our country. Rapid diagnosis, effective antimicrobial therapy, treatment of underlying disease & orderly approach to treatment intervention for abscess remain mainstay of care.[6] Present study was aimed to study USG guided percutaneous drainage of intraabdominal abscesses

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and fluid collection for diagnostic and therapeutic purposes.

MATERIAL AND METHODS

Present study was single-center, prospective, observational study, conducted in department of General Surgery, at Karnataka Institute of Medical Sciences, Hubli, India. Study duration was of 18 months (August 2018 to February 2020). Study was approved by institutional ethical committee.

Inclusion Criteria

- Patients >12 years, either gender, admitted for any intraabdominal abscess and fluid collections of size >4cms, willing to participate in present study

Exclusion Criteria

- Children < 12 years.
- In accessible abscesses and fluid collections.
- If abscess is not liquified.
- Multiple small abscesses.
- Patient has severe Anaemia <7g/dl, chronic renal disease, coagulation abnormalities.
- Study was explained to participants in local language & written informed consent was taken. Detailed history of patient was entered in proforma. Patient data collected regarding age, gender, complaints, past surgical history, past history of intraabdominal abscesses, history of alcoholism, diabetes, any immunodeficiency states. Complete hemogram, bleeding time, clotting time, Prothrombin time and INR, RFT, Serum electrolytes, LFT, Chest X-ray, ECG, 2D ECHO (if indicated) were done on presentation.

Preliminary ultrasound of Abdomen and Pelvis was done on the same day of presentation. Patient was put on Conservative line of Management. Patient was followed up daily clinically & USG Abdomen was repeated if symptomatically not relieved. If patient develops any of the complications, patient was immediately taken up for Surgery. Patient was informed about any surgical procedure and consent taken.

Percutaneous needle aspiration / Percutaneous Catheter drainage was done on patients who had abscesses >4cms. The site, depth, direction of drainage was marked by USG. All patients were administered antibiotics intravenously initially upon admission. If upon C/S, pus revealed growth of organism then appropriate antibiotics were instituted in full course.

Pus was sent for Gram's stain and culture sensitivity, biochemical examination and pathological examination for cell count, cell type & malignant cells. Complications if developed were assessed in detail and management of the same and the further complications was done immediately. Patients were examined daily for clinical improvement. Cure was defined as improvement clinically with reduction of fever and local signs, symptoms, decrease in WBC count and follow-up USG showed reduction in size to less than 3cms in diameter and no evidence of relapse. Patients were followed up for minimum period of 1 month. Patients were followed up in Surgery OPD after discharge, weekly for 1 month.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

RESULTS

Age of the patients included in the study varied from 21-75 years. The Mean age was 46 years. The highest incidence was noted in age groups of 31-40 years (21.88%) and 41-50 years (21.88%). 78.13% of patients were Male and 21.87% were female. Mean duration of hospital stay was approximately 10 days & ranged from 3 days to 20 days.

Table 1: General characteristics

Characteristics	No. of Patients (n =32)	Percentage
Age group (in years)		
21-30	6	18.75
31-40	7	21.88
41-50	7	21.88
51-60	5	15.62
61-70	6	18.75
71-80	1	03.12
Gender		
Male	25	78.13
Female	7	21.87

Pain abdomen and fever were present in 29/32 (90.62%) of the patients. Chills & Rigors were present in 14/32 (43.75%) of patients. Other symptoms such as Chest pain, decreased appetite, Breathlessness, Cough, Nausea, Difficulty in micturition, back pain was present 13/32 (40.62%) of the patients.

Table 2: Symptoms

Symptoms	No. of Patients (n =32)	Percentage
Pain abdomen	29	90.62
Fever	29	90.62
Chills & Rigors	17	53.12
Vomiting	14	43.75

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Others	13	40.62

53.13% of the Patients in the study were alcoholics.

Table 3: Alcoholism in cases of Intraabdominal abscesses & fluid collections:

Alcohol Consumption	No. of Patients (n =32)	Percentage
Present	17	53.13
Absent	15	46.87

68.75% of Patients had WBC > 11000 cells/mm3 & ranged from 2900-32200 cells/mm3. Other abnormal laboratory findings were raised Blood urea (>45 mg/dl) (34.37%), raised Serum Creatinine (>1.4 mg/dl) (21.87%) & raised Serum Bilirubin (>2.4 mg/dl) (6.25%).

Table 4: Laboratory Investigations

Laboratory Investigations	No. of Patients (n =32)	Percentage
WBC > 11000 (cells/ mm3)	22	68.75
B. Urea > 45 (mg/dl)	11	34.37
S. Creatinine (> 1.4 mg/dl)	07	21.87
S. Bilirubin (>2.4 mg/dl)	02	6.25

Among the Intraabdominal abscesses and fluid collections liver abscess were most common in our study 21/32 (65.62%) of the patients. 3/21 liver abscess were multiple rest were solitary. 4/32 (12.50%) of Patients had Pseudocyst of pancreas on USG. 3/32 (9.38%) of patients had pyonephrosis & 3 /32 (9.38%) of patients had Psoas abscess. respectively. 1 patient in the study had splenic abscess on USG.

Table 5: USG findings

USG findings	No. of Patients (n =32)	Percentage
Liver abscess	21	65.62
Pancreatic Pseudocyst	04	12.50
Pyonephrosis	03	9.38
Psoas abscess	03	9.38
Splenic abscess	01	3.12

27/32 (84.38%) of the Patients underwent USG-Guided Percutaneous Catheter drainage as modality of treatment in our study. USG- Guided Percutaneous Aspiration alone was done in 4/32 (12.50%) of patients, out of which 3 patients had Solitary uniloculated Right lobe liver abscess and 1 patient had Pseudocyst of pancreas. 1 patient in the study diagnosed with Right lobe liver abscess underwent percutaneous Aspiration & Percutaneous pigtail catheter drainage.

Table 6: Treatment

Treatment	No. of Patients (n =32)	Percentage
USG-Guided Percutaneous Catheter drainage (PCD)	27	84.38
USG-Guided Percutaneous Aspiration (PCA)	04	12.50
PCD + PCA	1	3.12

E. coli was the most common organism cultured in our study (21.87%). Staphylococcus aureus, Streptococcus pyogens, Non-fermenting Gram Negative bacilli were other organisms cultured each in 2 patients in the study (6.25% each). 59.37% of the cultures showed no growth.

Table 7: Pus Culture Analysis

Pus Culture	No. of Patients (n =32)	Percentage
E. coli	7	21.87
Staph Aureus	2	6.25
Strep Pyogens	2	6.25
Non-fermenting GNB	2	6.25
No growth	19	59.38

5 Patients in our study had minor complication. 3 Patients had. 1 patient each had Catheter dislodgement and recurrence respectively. 2 Patients in our study had major complications (death). But both were due to the underlying disease and not due to the procedure related complications.

Table 8: Complications

Complications	No. of Patients (n =32)	Percentage
Skin reaction around Catheter site	3	9.38
Catheter dislodgement	1	3.12

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Recurrence	1	3.12
Major (including death)	2	6.25

DISCUSSION

In the recent years the indications for percutaneous drainage of intraabdominal abscesses and fluid collections have expanded significantly. This is due to its simplicity, cost effectiveness and reduced morbidity and mortality compared to open surgical techniques.[6,7]

Ultrasound guided and computer tomography guided diagnostic needle aspiration and percutaneous catheter drainage permit a definitive diagnosis of fluid collections in the abdomen and also help in the management of these conditions. Placement of indwelling catheter provides continuous drainage, drains thick pus because of its wider caliber & prevents re-accumulation.

USG / CT guided catheter positioning can be more accurate technique than visual inspection of a surgical operating field, especially when collections are multiloculated or extend widely into the adjacent anatomical spaces. Many of these procedures can be performed on an outpatient basis. Abscesses and other fluid collections may be drained under radiological guidance by using ultrasound, CT scan, fluoroscopy or a combination of these methods.

CT has also proven to be an accurate, fast, cost effective examination for the diagnosis of abdominal fluid collections, with a success rate of up to 96%. CT images are not impaired by air. Abscesses in the retroperitoneum and pancreas are easily detected using CT scan.

As a rule, if the fluid collection is large and superficially located, USG is preferred method for the initially attempts at fluid aspiration. If the collection is small and deeply placed or is close to important vital structures CT is preferred method for localization and percutaneous drainage. The most important aspect of diagnostic needle aspiration and fluid drainage is selection of a safe and appropriate access route. Indeed for percutaneous drainage it is necessary to avoid vital structures and sterile pleural space. Patients who have a well-defined abscess are good candidates for drainage if a clear anatomical pathway is available.[8,9]

In the study performed by Van Waes, et al.,[10] for unusually complicated cases they were able to achieve a cure rate of 64% with no fatalities related to the drainage procedure. The success rate depends on selection criteria. Gerzof et al.,[11] used a liberal criterion so about 90% of all patients were drainable with a cure rate of 70%. The cure rate will be higher up to 90% if one uses more conservative guidelines.

Following an initial report by Gronvell, et al.,[12] of four cases drained under ultrasound guidance, Gerzof, et al.,[11] developed the technique using combined computed tomography and ultrasound guidance. The technique has now been described as the treatment of choice for intraabdominal abscesses and fluid collections.

In study by Wong et al.,[13] aspiration and drainage were guided with computed tomography in 34 patients and with ultrasound in 30 patients. Success rate was 90%. Infected collections were successfully drained in 94% and noninfected collections in 72%. Partial success was achieved in two patients. Recurrence occurred in one. Complications occurred in nine patients, two of which were major (3%) and seven were minor (11%). Image guided percutaneous drainage appears to be the treatment of choice for most of the Intraabdominal collections.

Approximately 25% of intraabdominal abscesses are multiple; with a second collection occurring at some remote location within the abdominal cavity. Experience in recent years has shown that in most cases the multiple abscesses or an abscess with multiple septations can be effectively drained. The abscesses that communicated with enteric and biliary tracts, abscesses in which drainage proved difficult due to presence of thick viscous fluid and necrotic material, primary splenic abscesses, fungal infections, infected hematoma and pancreatic abscesses were considered unsuitable for percutaneous drainage procedures.[14,15]

Urinary, Lymphatic, Pancreatic communication are among other reasons for recurrent collections. Some of the failures are technical and usually are both predictable and avoidable. These include premature withdrawal of the catheter, pleural contamination and inappropriate entrance site selection.[14,15]

Complications of abscess and fluid drainage are infrequent if proper technique is followed. Most of large series report complications varying from 0% to 15% overall. I had 2 major complications in my study with a rate of 6.25% which is in accordance with other reports. Minor complications occurred in 15% of my patients and were treated conservatively with good results.

CONCLUSION

Liver abscess was the most common intraabdominal abscess and fluid collection in our study. Most of the liver abscesses were solitary. Majority of the patients in the study underwent percutaneous catheter drainage as modality of treatment.

USG/CT guided percutaneous drainage of intraabdominal abscesses and fluid collections has minimal complication rates, less morbidity, mortality and is very well tolerated by all the patients. It is also highly effective with minimal recurrence rates. These procedures are simple to perform and are cost effective compared to open surgical procedures. Thus, this technique may become the gold standard for the management of intra-abdominal abscesses and fluid collections in the near future.

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