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LIVER ABSCESS DRAINAGE BY NEEDLE ASPIRATION VS PIGTAIL CATHETER: A PROSPECTIVE STUDY

Surgery

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ABSTRACT

BACKGROUND: Liver abscess is a common disease in the differential diagnosis of upper abdominal . These includes a recent increase in incidence reflecting more accurate diagnostic techniques especially after 1965 with the advent of radioisotopes scan and later on ultrasonography and CT scan. The reduction in mortality from 90% at the turn of century to the estimated 10-20% today cannot be ascribed to surgery alone.

METHODS: The study was conducted on 80 patients of liver abscess. Two compared modalities of percutaneous treatment of liver abscess were (1) needle aspiration and (2) pigtail catheter aspiration. All interventions were performed under ultrasonographic guidance. Only those patients having liver abscess/abscesses greater than 6 cm in at least one dimension, liquified & drainable were included in this study.

RESULTS: Amoebic liver abscess , were more common than pyogenic liver abscess . Clinical recovery was significantly earlier in catheter group than in needle aspiration group .Average duration of i.v. antibiotic is significantly shorter in catheter group than in needle aspiration group

CONCLUSIONS: Thus, our study concluded that in view of greater volume of pus drained in first sitting, early clinical recovery, shorter duration of hospital stay and slightly more success rate continuous catheter drainage is effective percutaneous treatment modality than intermittent needle aspiration.

KEYWORDS

Liver abscess, Pigtail catheter, USG

INTRODUCTION

Liver abscess is a disease of common occurrence which figures prominently in the differential diagnosis of upper abdominal and right lower respiratory tract diseases. Even with the advent of good diagnostic investigation like USG, the diagnosis is still delayed because of the nonspecific manifestations of disease and therefore the suspicion of the diagnosis is important. The traditional therapy of intra-abdominal liver abscess has been operative drainage as originally described by Volkmann in 1879. The reduction in mortality from 90% at the turn of century to the estimated 10-20% today cannot be ascribed to surgery alone. During the last few year, the sophistication of newer radiological techniques namely computed tomography (CT) and ultrasonography (USG) has not only prescribed tools for accurate localization of these abscess but has also created the possibility for their safe aspiration and drainage in certain instances obviating the need for surgical intervention.1 Currently, there are 2 alternative methods for drainage of pus from a large liver abscess. Percutaneous therapeutic procedures have been increasingly performed compared with open surgical drainage (SD). This study aims to compare the therapeutic effectiveness and safety of 'Percutaneous continuous catheter drainage' versus 'Percutaneous intermittent needle aspiration' in the percutaneous group of treatment for liver abscesses. Modern treatment has shifted the treatment of liver abscess toward IV broad-spectrum antibiotics and imaging-guided percutaneous needle aspiration or percutaneous catheter drainage (PCD). 2,3

This study includes all the patients with diagnosis of liver abscess->6cm in size by sonography irrespective of their demographics, causative pathogen, clinical presentation, pretreatment LFT's and other blood investigations and concurrent illness for their treatment by 'percutaneous intermittent needle aspiration' or 'percutaneous continuous catheter drainage' and to assess the relative effectiveness and need of either one of these two techniques.

METHODS

Patient inclusion criteria :

This study includes all the patients coming to the RIMS ,Ranchi, surgery OPD with the diagnosis of liver abscess of size >10cm by ultra-sonography, from a period of December 2015 to November 2017 .Only those patients in whom the abscesses were liquefied were taken for aspiration.

EXCLUSION CRITERIA :

Abscesses that were amenable to only surgical drainage (SD), like rupture or concomitant surgical pathology requiring urgent surgical exploration. While the others where the abscess was uniquified, even liquefied but of single small size (<6cm) multiple small size, abscess near the porta hepatis, only antibiotics were given.

Diagnosis of liver abscess will be made on the basis of clinical and imaging findings with ultrasound.

MATERIALS AND METHODS :

The various instruments; equipment's and other materials used in this study are as described below:

1. Ultrasound unit ,All the procedures were performed with real time ultrasound guidance; Curvilinear transducer PVG-3.75 MHz; Curvilinear transducer ranges from 2.5-3.75 Mhz.
2. Aspiration Needles 18 G disposable needle; 18G, 20G, 21G spinal needle ,
3. Pigtail catheter set (with trocar, dilators and guide wire) (6 to 14 F)
4. Trolley settings , Towel, sponge holder , 50 ml syringe , Sterile gloves , Kidney tray , Scalpel blade with Bard Parker handle , Iodine, spirit for cleaning local parts ,Injection lignocaine 2%,Sterile pads and gauze pieces.

The patients were subjected to routine hematological investigations. Blood samples were taken for culture and sensitivity. Chest x-rays were done to note any pulmonary complication in terms of position of diaphragm and any effusion in pleural cavity.

Techniques

(A) For needle aspiration

Depending upon the abscess to be drained the patient was given appropriate position.

- Intravenous line was set up
- The appropriate part of the abdomen and lower chest was cleaned thoroughly with Salon, Spirit and Betadine. The cleaned part was then draped. The transducer probe was covered with sterile gloves
- The abscess cavity was located, and appropriate route decided to avoid important structures (bowel and costophrenic recess)
- The shortest path that causes minimal liver parenchymal trauma was chosen
- Depth of abscess from skin, appropriate angle of the approach and exact site of puncture was determined
- Local anaesthesia with 2% xylocaine was given so as to raise small wheal and then at the site of puncture a
- The patient was asked to hold his breath and the 18G needle was passed towards the abscess cavity with predetermined angle and up to the predetermined depth
- Syringe was applied on the 18G needle and aspirated. Pus sample as collected in a sterile specimen bottle was send for microscopy and culture sensitivity and the pus was drained till the cavity collapsed (as confirmed by ultrasound) or till no more pus is aspirated, even after manipulating the needle
- Intermittent needle aspiration will be done with 18G disposable needle. Aspiration will be repeated if there is either no clinical

improvement or no reduction in size of the abscess cavity/cavities. Aspiration is done up to maximum of three times

(B) Pigtail catheter drainage

- The same procedure as described above was done until local anaesthesia induced and a nick was given over marked site of skin
- Thereafter Seldinger technique was used. Trocar of pigtail set was slowly inserted until it reaches in abscess cavity (confirmed by ultrasound), then a guide wire was passed through it, then over guide wire trocar was removed
- With the help of dilators (provided with pigtail catheter set), the tract was dilated by serially passing the dilators (of increasing caliber) over the guide wire and then a Pigtail catheter drain was kept in abscess cavity
- The draining catheter was properly secured in its place and connected to a collecting system. From this point USG is done every third day until abscess cavity disappears, decreases in size or remains static compared with previous USG and catheter is removed if it was not draining for last 24 hours.

Postoperative precautions The patients were kept NBM (Nil by Mouth) for further 6 hours Intravenous fluids Watch for signs of peritonitis TPR/BP charting Systemic antibiotics Analgesic SOS.

Follow up ultrasound after three days for size of abscess cavity (Residual volume) and echogenicity of abscess cavity was performed. Follow-up was kept in all cases

Antibiotics policy all patients had been treated with intravenous ampicillin, gentamycin, and metronidazole. The antibiotics therapy was adjusted according to the results of culture and sensitivity test of pus aspirated at the time of the drainage procedure. 5,6

Antibiotics adjustment was done immediately when the sensitivity test was available. 7 Patients with negative culture results were continuously treated with same combination. 8 The antibiotic regime was not changed for patients with poor treatment response. Intravenous antibiotic therapy was continued for a minimum of 7 days in all patients. The patients were then put on the appropriate oral antibiotics for a total treatment period of 4 weeks. 9 A sample of pus was routinely taken and sent for microbiological analysis including microscopy, culture, and antibiotic sensitivity tests. Patient follow-up and outcome measures The criteria of successful percutaneous intervention will be taken as adequate drainage of abscess to allow resolution of infection without the need for surgical drainage and subsequent discharge of patient from the hospital. Patient outcomes will be recorded on the basis of: Duration to attain clinical relief Duration of hospital stay Treatment success and failure rates Death. Criteria for discharge of the patient The patients will be discharged from hospital: When the infection had subsided clinically Sonographic evidence of abscess resolution such as disappearance of abscess cavity or static or decrease in size of abscess cavity.

RESULTS

The study was conducted on 80 patients of liver abscess. patients were divided into two groups consists of 40 patients in each needle aspiration group and pigtail catheter group. In all patient's iv ampicillin, gentamycin and metronidazole were started, as soon as diagnosis was made. Well informed consent was taken from patients. All interventions were performed after taking strict aseptic measures. There was no statistically significant difference found in patient characteristics like age, sex, religion, comorbidities etc., between two groups. It was observed that:

- Commonest age group for occurrence of liver abscess was between 30 to 50 years
- Liver abscess occur more commonly in males than in females .
- Commonest symptom in both groups was fever and right upper quadrant pain
- Solitary abscesses were more common than multiple abscesses .
- Right lobe abscesses were more common than left lobe abscesses where as both lobes were involved in cases .
- Amoebic liver abscess were more common than pyogenic liver abscess Volume of pus drained in first sitting by catheter group was significantly more than needle aspiration group
- Clinical recovery was significantly earlier in catheter group (average 5 days) than in needle aspiration group (average 6 days)).
- Average duration of i.v. antibiotic is significantly shorter in catheter group (7 days) than in needle aspiration group (11.5 days)
- Duration of hospital stay is significantly shorter in catheter group than in needle aspiration group (38 patients out of 40 were successfully treated by catheter group (95%) whereas 36 patients out of 40 were successfully treated by needle aspiration group (90%) ,i.e. catheter drainage was slightly more successful.

DISCUSSION

As per Mukhopadhya and Balaji et. al. liver abscess is very common clinical problem in India, which if not taken seriously carries high mortality. 10,11 First published review of liver abscess was done by Bright in 1936. Berger and Osborne reported improvement after needle aspiration in 15 patients only two require more than two aspirations.12 This study is a prospective trial comparing percutaneous needle aspiration and percutaneous catheter drainage in the percutaneous treatment outcome. While performing this prospective study it is observed that patient suffering from liver abscess are also simultaneously suffering from other diseases. 13 These comorbidities includes gall bladder/common bile duct calculi, cholecystitis, diabetes mellitus, cholangitis, colitis, appendicitis etc. 14

A study conducted on Public Hospital Hongkong in 2003 on common symptoms and signs of liver abscess by HAUS-IORG mischances which was also published in world journal of surgery also favors our result.. There are three types of liver abscesses namely amoebic, pyogenic and fungal. 16 standard textbook of General Surgery -quote's that "Pyogenic liver abscess are more common in Eastern countries. 17 It has an increased incidence in elderly, diabetics and the immunosuppressed patients who usually present with anorexia, fever and malaise accompanied by right upper quadrant discomfort". It also text that "Entamoeba histolytica is endemic in many part of the world mainly eastern countries which accounts for more incidence of amoebic liver abscess in these countries probably because of poor sanitation". Over all incidence of amoebic liver Khan A et al. Int Surg J. 2018 Jan;5(1):62-68 International Surgery Journal | January 2018 | Vol 5 | Issue 1 Page 67 abscess are more common in world as compare to pyogenic liver abscess. 20 Rajak in his study conducted at Post Graduate Institute of Chandigarh in 1998 also found that incidence of amoebic liver abscess were more common i.e. 80% (20 patients out of 25):

Simon YU's et al. in 2003 done on 64 patients of liver abscess cases to compare these two treatment modalities concluded both these techniques equally effective and safe for treatment as for as hospital stay, clinical relief, morbidity, mortality, success rate etc. are concerned while because of easier procedural technique, less time consuming and cost effectiveness the intermittent needle aspiration techniques deserve to be considered as first line drainage approach for liver abscess.

CONCLUSION

Thus, our study concluded that in view of greater volume of pus drained in first sitting, early clinical recovery, shorter duration of hospital stays and slightly more success rate continuous catheter drainage is effective percutaneous treatment modality than intermittent needle aspiration. Although because of small no. of patient studied (80 patients) in shorter duration (2 years) and a human error is always possible, result may vary in different studies.

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