

Original article:

A critical role of ultrasonography in management of liver abscesses

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Abstract

Aims and objectives: to see the efficacy of ultrasonography in the management of amoebic liver abscess. We assessed whether patient required surgery or can be managed with drainage procedure on ultrasonography basis. **Materials and Methods:** This is a prospective study done from July 2014 to May 2015, in a medical college in remote area. A total of 88 patients diagnosed with liver abscess were included in the study for ultrasound-guided percutaneous aspiration or pigtail drainage management. All patients had been treated with antibiotics or antimicrobials for at least 2 weeks if treated conservatively and were still being continued for another 6 weeks. **Results:** A total of 88 patients with liver abscess were successfully treated, consisting 79 males and 9 female. The age ranged from 18 to 82 years with a mean of 43.6 years. A total number of 76 (86.36%) cases undergone percutaneous catheter drainage and 12 (13.6%) underwent needle aspiration. A total of 73 (82.95%) patients had single large abscess, while 8 (9%) had two and 7 (7.9%) had multiple abscesses. The abscesses were commonly located on the right lobe of liver. The Pigtail catheters of sizes 10 F to 18 F was introduced either directly under the guidance of the guide wire with safety precautions. The volume of pus aspirated averaged from 70 - 1200 ml, while the period of catheter drainage ranged from 7 to 24 days with the follow up on ultrasonography. **Conclusion:** This study shows a success rate of ultrasonography almost 98 % by avoiding unnecessary surgical intervention. It was confirmed that needle aspiration in small abscesses and catheter drainage in large abscesses offers the safest and best modality.

Keywords: Ultrasonography; Liver Abscess; Antibiotics; Drainage; Interventional Radiology

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Introduction:

Patients with liver abscesses continue to present in large numbers in surgical clinics which has an important cause of morbidity and mortality in tropical countries¹. Widespread availability of diagnostic ultrasound has made the diagnosis of liver abscesses faster and reliable. Availability of USG guided procedures has also made the aspiration and insertion of indwelling catheters into the abscess cavities easier

and safer. Although medical treatment is the primary mode of managing small abscesses, larger abscesses require drainage. Percutaneous drainage using pigtail catheters is now considered the treatment of choice for most intra-abdominal abscesses and fluid collections¹⁻³. The present study evaluates the role of ultrasound in management of liver abscess and preventing surgical intervention. The study assesses the response to the procedure, as well as evaluates

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the morbidity and any complications encountered during or after the procedure.

Materials and methods

This was a single-center prospective study done by the department of Radiology. This study was carried out on patients admitted in Maharishi Markandeshwar Institute of Medical Sciences, Mullana over a period of one year from July 2014 to May 2015. A total number of 88 patients were included which were diagnosed with liver abscess for needle aspiration or pigtail drainage procedure. Patients with unruptured liver abscess of small in size of 5 cm and larger in size were studied. Out of the total 88 patients, 79 were males and 9 females. The age of the patient varied from 18 to 82 years with a mean of 43.6 years. All the patients diagnosed to have liver abscess clinically and radiologically on ultrasonography (USG) were included in the study. The cases of liver abscess smaller than 5 cm, any prior intervention, ruptured liver abscess, biliary tract malignancy and bleeding disorders were excluded from the study. Diagnosis of liver abscess was made on the basis of history and clinical examination followed by USG. CT scan was not routinely carried out. Abdominal pain (n=74) and fever (n=14) were the commonest symptoms, while jaundice with raised liver enzymes were found in 10 cases. The complete haemogram, renal function tests, liver function tests, triple antigen (HbsAg, HIV and HCV), alongwith bleeding time, clotting time and prothrombin time were performed in all the patients before the procedure. There were elevated total leukocyte counts (white blood cell count greater than 10,000/cumm) was found in 68 patients. BT, CT and PT were found to be within normal limits, while 7 patients were found to be HbsAg positive. All patients were negative for HIV and HCV. USG showed a well defined or slightly irregular hypoechoic lesion with homogenous low level internal echoes s/o amoebic abscess with predominant involvement of right lobe as single abscess in 69 patients, and in left lobe in 4 and multiple abscesses in 15 patients (figure-1).

Serological tests for amoebic infestation were not performed due to their unavailability in our hospital. USG was repeated after intervals of 3-5 days till the abscesses were found to be resolved or not growing further in size (after drainage had ceased). Review USG was carried out 2-3 weeks after removal of catheter. Procedure- The pigtail catheters of size 10F to 18F was used for drainage of the large abscess (figure-3).

This entails no use of serial dilators. After insertion drainage catheter, it was fixed to skin with silk 2/0



Figure-1- ultrasonography showing large abscess

Needle aspiration was done in 12 patients due to of small abscess size and in rest of patients drainage procedure was done in view of large abscess (figure-2).



Figure- 2- abdominal ultrasound revealed small liver abscess of size 5 x 8 cm

to avoid coming out. The catheter was connected to a closed drainage bag and the pus sent for culture/sensitivity. In cases where there were multiple abscesses, the catheter was inserted into the largest abscess.

In deeper seated abscesses, and where the pus was thought to be thicker, the antibiotics were given prior to drainage so the contents should become liquefied. After this, pigtail catheter inserted under ultrasonic guidance using all aseptic measures by preventing injury to the diaphragm and bowel loops as well as major vessels. A safe route for insertion of the catheter was guided by the radiologist. A 3-4mm stab incision was made through which a guide wire introducer needle was passed under sonological control till it reached the center of the abscess cavity. A guide wire was then introduced through the needle

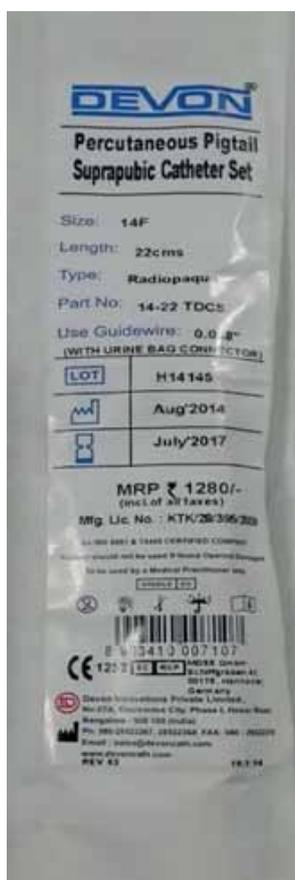


figure-3- The plain pigtail catheter inserted by mounting onto introducer needle. In small abscesses only needle aspiration was done. In easily accessible locations where the abscess was not deep inside the liver, a simple percutaneous pigtail suprapubic catheter set of size 10-12 F was used (figure-4).

and positioned inside the cavity following which the needle was removed keeping the guide wire in situ. The position of the pigtail catheter confirmed in the cavity on USG which was positioned in the center of the abscess. Guide wire was then withdrawn and catheter fixed in place.

The usual antibiotic regime administered was Injection Ceftriaxone plus sulbactam - 1gm twice per day or higher antibiotic as per the condition of the abscess and patient, Injection Amikacin 500mg-BD and Injection Metronidazole 100ml. Injectables were discontinued after 5-8 days and thereafter oral antibiotics were continued, usually Oflox TZ twice a day for another 2-3 weeks according to the status of the pus. In very large and multiple abscesses



Figure-4 - The Devon Nephrostomy set which is comprised of four components

(which yielded anchovy sauce coloured pus), double dose Metronidazole was given. Drain bags were emptied daily and the volume of pus drained recorded. Where there were multiple abscesses, the others (pigtail having been placed into the largest) larger than 2-3cm. were aspirated with spinal needle no.18 under USG guidance. Patients were usually given fluids orally on the first day, and were started on semi solid diet on second day. Clinical conditions were assessed daily and repeat investigations sent where required. Antibiotics were modified as per the C/S reports. USG was usually repeated every 3-4 days, or at the time of aspirating the other abscesses. The pigtail catheters were considered for removal when the drainage became minimal (less than 10ml) and USG showed reduced size or collapsed cavity. After removal of catheter, small sterile dressing was applied and patient discharged on oral antibiotics. Review USG was done after one week to ten days, and then the patients were called for monthly follow up. This study was approved by ethics Committee of Maharishi Markandeshwar Institute of Medical Sciences, Mullana

Results:

Catheter drainage achieved good symptomatic relief in all the patients within 2-3 days, while the leukocytosis came back to normal within 3 to 6 days. The raised serum bilirubin in 6 cases having associated jaundice became normal in 20 days. There were no special problems associated with the HbsAg positive cases. The patient with concurrent lung abscess recovered with repeated aspiration of pus (thrice) from the lung lesion.

The duration of catheter placement ranged from 7 to 18 days with an average of 8 days. The total amount of pus drained from the abscess cavities ranged from 80 to 1200 ml, with an average of 550 ml. In the patients in which there were multiple liver abscesses, the other abscesses (apart from the one in which pigtail was inserted) were aspirated with no.18 spinal needle for a maximum of three times. Culture/sensitivity was positive in 6 cases and showed Streptococcus in two and Klebsiella in four cases. There were hardly any complications encountered with the procedure. Catheter blockage occurred in 6 cases and this was resolved by irrigating/flushing with saline. There was no mortality associated with the procedure. In the two cases where intra-peritoneal rupture of abscess had already occurred at time of insertion of pigtail, the deteriorating general condition mandated laparotomy, and both the cases recovered after the operation. The one with intra-thoracic rupture resolved without open surgery.

Discussion:

Amoebic and pyogenic liver abscesses are common in tropical countries like India. With easy access to advanced imaging techniques, these are diagnosed fairly early if clinically suspected. The importance of clinical suspicion is thus paramount in managing liver abscess. Liver abscess have presented with varied features like pleural empyema, parietal wall abscess etc⁴. Percutaneous treatment of liver abscesses has replaced exploratory laparotomy as the treatment of choice for unruptured abscesses³. Another alternative to indwelling catheter drainage is needle aspiration, but it requires more pricks and not possible in large abscesses as chances of recurrence of abscess formation will be more. Insertion of pigtail catheter at the first instance is less uncomfortable for the patient, and leads to better results in large abscesses. USG and CECT are the most important tools in diagnosing this rare complication. USG is the initial investigation of choice in evaluating acute gallbladder pathology and is often sufficient for a correct diagnosis⁵. Ultrasound is a very sensitive diagnostic tool for both liver abscess and its intra peritoneal rupture; a channel from the intra-hepatic abscess or presence of coexisting hepatic and peritoneal abscess supporting the diagnosis. Ultrasound is safe, economical and easily available with sensitivity as high as 92–97%^{6,7}.

There is still controversy regarding the management of the liver abscess but percutaneous drainage (either needle aspiration or catheter drainage) along with

with systemic antibiotics has become the better choice of treatment for the pyogenic abscess⁸. Other study found percutaneous drainage of liver abscess an easy and effective method for evacuating the abscess. Their method involved active drainage of most abscess cavities even with catheter drainage until the cavity collapses². Our results were also same as above of the study. Though the diagnosis of amoebic or pyogenic liver abscesses could not be confirmed, the results were equally satisfactory in cases of multiple abscesses. The antibiotic regime covered gram positive, gram negative as well as anaerobes and was probably the reason for success in all cases. Needless to say, a careful search was made before inserting the catheters to determine if the abscesses were pyaemic, and catheters were placed only if no such information was forthcoming. We observed that sensitivity of US is nearly 94 to 98%. The low morbidity and high success rate found in treating unruptured liver abscesses with the early drainage under guidance of USG.

Conclusion:

we observed that diagnostic imaging has an important role in early diagnosis and management of liver abscess which prevents surgery. As USG is non-invasive, portable and can be done in deranged renal function. It increases the diagnostic accuracy and is cost-effective. Procedure can be completed without any major complication under the guidance of USG.

Conflict of interest and source of funds- none

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