Percutaneous drainage of hepatic abscesses

Mohamed M. Rawas, MD, FRCP(C), Salem M. Bazarah, MD, PhD, Chia-Sing Ho, MD, FRCP(C).

ABSTRACT

Objective: To report our experience with percutaneous drainage of hepatic abscesses.

Methods: Retrospective study of patients with hepatic abscesses seen at 2 institutions: Toronto General Hospital in Toronto, Canada and King Abdulaziz University Hospital in Jeddah, Saudi Arabia over a 7 year period.

Results: Complete resolution in 20 out of 22 (91%) patients. Pleural effusions developed in 4 (18%) patients. Death occurred in 2 (9%) patients with multiple abscesses on top of liver malignancy. Procedural related surgical intervention was not required.

Conclusion: Radiologically guided percutaneous drainage of hepatic abscesses remains the gold standard approach to liver abscesses. This is in agreement with studies of other authors.

Keywords: Liver abscess, computerized tomography guided drainage, ultrasound guided drainage, hepatic abscess, percutaneous drainage.


Though hepatic abscesses are rarely seen and few may respond to conservative management, undrained hepatic abscesses still carry a reported mortality approaching 100%. Several factors make surgical drainage rather difficult including: abscess depth within the liver, problems with intraoperative localization of smaller collections and frequent multiplicity. All these lead to significant morbidity and mortality. Percutaneous drainage has been shown by many authors to carry a high success rate, more safety and a shorter hospital stay than with surgery in 50-80% of cases. Other authors went even further, demonstrating that many abscesses that appear multisepated on computerized tomography (CT), intercommunicate, and can be drained percutaneously with single catheter. We successfully drained non-communicating multiple abscesses with multiple abscesses with multiple catheters simultaneously.

Methods. Following a variety of clinical presentations, diagnosis of hepatic abscesses was made by ultrasonography or CT in 22 patients whom we treated by CT guided percutaneous drainage. Ten patients were at Toronto General Hospital, Canada and 12 patients at King Abdulaziz University Hospital, Saudi Arabia (1981-1988). Thirteen patients were male and 9 female. The mean age was 52 years (range 27-73 years). Informed consent, LFTs, CBC and Coagulation Profile were obtained in all patients prior to procedure. Under aseptic technique and local anesthesia, the appropriate site for drainage was located by CT.

An initial diagnostic aspiration was obtained using a 20 gauge needle, which both confirms abscess site and specimens collected carefully for gram stain aerobic and anaerobic cultures. Drainage was then carried out using Seldinger technique, where after dilating the tract a 14 french feeding tube was inserted. (Figure 1a). The tube was sutured to the skin and connected to a close drainage system. All patients were covered with a broad-spectrum antibiotic prior to the procedure, to be modified according to microbiology results. The drain

From the Department of Medical Imaging, National Guard Health Affairs Western Region, Jeddah, Saudi Arabia.

Received 7th February 1999. Accepted for publication in final form 21st April 1999.

Address correspondence and reprint request to: Dr. Mohamed M. Al Rawas, Medical Imaging Department, National Guard Health Affairs Western Region, PO Box 9515, Jeddah 21423, Saudi Arabia. Fax 665 6200 Ext. 1472 Tel.665 6200 Ext. 1461.
remained in place for an average of 14 days (2-35 days) based on radiological evidence of abscess cavity obliteration, cessation of drainage, laboratory and clinical signs of resolution. One patient with a small abscess was managed by needle aspiration only, using 20 gauge needle. Another patient with 2 non-communicating abscesses was drained by 2 separate catheters successfully (Figure 2). Average follow-up post drainage was 6 months.

**Results.** Among 22 patients who underwent CT guided percutaneous drainage of hepatic abscesses, 13 were male and 9 were female, with a mean age of 52 years (range 27-73 years). The procedure was successful with complete resolution in 20 patients (91%). Patients were able to ambulate in a short period, body core temperature dropped towards normal (37 ± 0.3) and white cell count decreased by more than 30% within 24 hours of drainage. The duration of drainage averaged 14 days (range 2-35 days) (Figure 1b).

The complications were minor, 4 patients (18%) developed pleural effusion that resolved spontaneously.

There was no abscess recurrence or late complication. Surgical intervention was needed in 2 patients for reasons unrelated to the procedure. One patient had an impacted stone in the common bile duct, which interfered with the clinical recovery of the patient. The second patient had communicating biloma due to trauma to the liver. Mortality occurred in 2 patients (9%) within 30 days of the procedure. Both died as a result of their primary disease. One patient had cholangiocarcinoma and the other advanced hepatoma. Both had multiple hepatic abscesses for which drainage was attempted as a palliative measure. The predominant site for abscesses was found to be the right lobe in 16 patients (72%). Three patients (13%) had abscesses in the left lobe and in another 3 cases (13%) both lobes were involved by multiple abscesses. Abscess etiology in our series was as follows: Biliary tract disease 29%, Post abdominal surgery 24%, Cryptogenic 19%, Diverticulitis 9%, Amoebiasis 9%. Other causes included post-trauma in 1 patient and 1 patient had diabetes as a possible predisposing factor.

Microbiology results demonstrated mixed pathogen to be common with pseudomonas predominance, which is consistent with the most common etiology being biliary disease in our series. E Coli and anaerobes are noted less frequently. Clinical presentations were variable, all patients had sepsis which was evident by high-grade fever and leucocytosis with neutrophil predominance. Abdominal pain was reported in 70% of cases, in 50% of them it was predominantly RUQ, and vague in the remaining 20%. Additional symptoms documented included nausea, vomiting and diarrhoea in the amoebic abscess patients, weight loss in 2 patients with malignancies, and 1 with biliary tract disease.
Discussion. Liver abscess is an infrequent clinical problem that requires prompt intervention to avoid a significant morbidity or mortality or both. The incidence of pyogenic liver abscesses is estimated to be 18-16 per 100,000 of hospital admissions in North America\textsuperscript{21,22} and 4.9-5.1 per 100,000 hospital admissions in the United Kingdom.\textsuperscript{23} Unfortunately, we do not have a certain figure for the incidences in Saudi Arabia, however, over the 7 years period of this work, we diagnosed and drained 12 liver abscesses of variable etiology at King Abdulaziz Hospital, Jeddah, which approximately to an incidence of 4.3-5.7 per 100,000 hospital admissions.

Contrary to the old belief that the portal venous system plays the main role in etiology of liver abscesses,\textsuperscript{24} our study, in agreement with studies of other authors\textsuperscript{23} demonstrated that abscesses related to the portal system appeared with a relative incidence of 18\%, taking fourth place in order of etiology. We could find no obvious cause in 19\% of cases. Neoptolemos and Macpherson postulated that such cases might represent spread from an occult septic focus by either the hepatic artery or portal venous circulation.\textsuperscript{23}

Abdominal surgery contributed 24\% of cases occupying the second place. None of them involved bowel surgery, which may reflect direct colonization of the liver rather than portal system spread. Hepatobiliary disease, (including cholecystitis, cholelithiasis, cholangitis, cholangic carcinoma and hepatoma), were the predominant etiological factors with a relative incidence of 29\%, in agreement with other studies, which reported even higher incidences.\textsuperscript{25,26} Bacteriological results come in favor of this observation showing pseudomonas to be the predominant microbe grown. The right lobe of the liver remained more susceptible to infection,\textsuperscript{23} confirmed by our observation that 72\% of abscesses in our series occur in the right lobe.

McFadzean et al in 1953 pioneered the concept of draining a liver abscess alongside an antibiotic coverage.\textsuperscript{17} It is his excellent results that inspired more work carried out, mainly from the early seventies to date. Gerzof et al in 1985 published his remarkable results with non surgical drainage of liver abscesses.\textsuperscript{19} He also received the previous literature and compared the results of non-surgical approach to surgical one. He found a mortality rate of 3.4\% in 237 previously reported series compared favorably with a surgical mortality of 40\%. That has been reduced recently to 20\%. The reduction in surgical morality was in most part due to better imaging (ultrasound and CT). The success rate in Gerzof's own series was 84\% and that of previous series averaged 85\%.

In our series, an uneventful complete resolution and recovery was achieved in 91\% of cases. The criteria for healing and recovery included remission of all clinical symptoms, return of laboratory parameters to normal, and obliteration of the abscess cavity radiologically using either CT or ultrasound. All cases except 2 showed dramatic clinical improvement, particularly in the predominant symptom of fever, within 24 hours of the procedure. Leucocytosis, which was observed in almost all the cases, declined by more than 30\% within 24 hours. Complete obliteration of abscess cavity was achieved in an average of 14 days. The 2 failures had malignancies, one with advanced hepatoma, the other with cholangiocarcinoma. Both had symptomatic multiple liver abscesses and both were inoperable. Drainage was attempted as a palliative procedure. Both died within 30 days of the procedure with multiorgan failure. Surgical intervention was needed for 1 patient in our series who remained in pain, febrile and jaundiced, despite successful percutaneous drainage of his abscess, ERCP demonstrated an impacted common bile duct stone which was then removed surgically. The second patient had an operation to treat his communicating posttraumatic biloma.

Bernardino et al reported in his series that multiseptated hepatic abscesses are amenable to percutaneous drainage.\textsuperscript{11} We successfully drained uncommunicating multiple hepatic abscesses by separate indwelling catheters. (Figure 2).

Recent reports have appeared advocating the technique of needle aspiration and intracavity antibiotics to be superior to drainage via an indwelling catheter,\textsuperscript{27} however this needs further studies and evaluation.

In view of this study and studies of other centres, it is evident that pyogenic hepatic abscesses should be accepted as a medical/radiological disease requiring surgical intervention only for correctable offending causes or for failed radiological evacuation.

References

9. Kayabali M, Yilmaz D, Gurel M. Solitary pyogenic liver