Intracavitary Urokinase in the Treatment of Multiloculated Liver Abscess: A Case Report

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Radiologically-guided percutaneous abscess drainage has been preferred as a therapeutic modality for hepatic abscesses, though where these have been septated or multilocular, its success rate has often been low. The results of several clinical and in vitro studies have recently suggested that in difficult cases, where abscesses occur in the peritoneal cavity and retroperitoneum, or multiloculated empyema of the thorax, urokinase may be useful. To our knowledge, however, there has been only one report of a case of liver abscess in which intracavitary urokinase was administered. The authors therefore report a case of multisepptated hepatic abscess occurring in a 53-year-old man. Conventional percutaneous tube drainage failed, but the use of transcatheter intracavitary urokinase was successful. Diagnosis and continuing assessment involved a combination of ultrasound and CT scanning.

Index Words: Liver, abscess
Abscess, percutaneous drainage
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Case Report

A 53-year-old man was admitted to hospital for the evaluation of right upper quadrant pain, myalgia and a fever of 39–40°C. Abdominal examination revealed right upper quadrant tenderness, but no rebound. He has no history of heavy alcohol intake, hepatitis or other liver disease but had undergone blood transfusions. For ten years he had suffered diabetes mellitus, without delicate control of blood sugar level, and had undergone a cholecystectomy three years due to acute calculous cholecystitis, previously. His white blood cell count was 18,500 cells/mm³, serum glucose was 251mg/dl, and routine urinalysis showed 3+ glucose.

Abdominal ultrasound revealed a well defined, hypoechoic cystic mass with some septations and an inhomogenous internal echo pattern in the right lobe of the liver (not shown). Abdominal computed tomography in this area showed a well circumscribed, low attenuated lesion, 8cm in diameter and with multiple septations and an enhancing peripheral rim (Fig. 1A). The preliminary diagnosis was pyogenic liver abscess.
and systemic antibiotic therapy was begun soon after this was confirmed. By means of single stage, ultrasound-guided trocar insertion, a 10.3 F all purpose drainage catheter (Boston Scientific Corp., Watertown, Mass, U.S.A) was placed in the abscess pocket, and to keep the catheter lumen clear, 10—15 cc saline was injected every 8 hours. Twenty cc of purulent material was aspirated through the tube; Gram staining, cytologic examination, pus culture, and hemoculture revealed the presence of Klebsiella Pneumoniae. During the following two days, less than 10 cc of pus was drained and the patient remained febrile for 48 hours after catheter insertion.

Follow-up CT scans obtained two days after catheter placement showed a round, low attenuated abscess with some air bubbles, and no shrinkage of the cavity (Fig. 1B) A contrast study through the catheter (sinogram) revealed a complex collection with multiple septation and filling defects (not shown). Using a modified Sheldinger technique, another 8 F drainage catheter was inserted into the abscess pocket; during the procedure, a guide wire was used to disrupt septation or adhesion. With the catheter in place, we tried to evacuate all purulent material from the cavity, but only 10cc, mixed with blood, was removed. We believed that this failure was due to multiloculation and the fibrinous and viscous nature of the abscess fluid, and in an attempt to decreased the viscosity of purulent material and break any septations, intracavitary urokinase therapy was therefore instituted. 20,000 IU of urokinase (Green Cross, Seoul, Korea) dissolved in 10 ml normal saline was instilled via the tube, which was clamped for 30 min so that gravity drainage could occur. Upon withdrawal, about 50 to 70 ml of partially lysed foul-smelling, currant-jelly clot was obtained. Instillation was repeated every 8 hours and continued for three days. The evening after the first irrigation, symptomatic relief occurred; 12 hours after the procedure, the patient became afebrile, and remained so until discharge. Saline irrigation was continued for six
days, and the cavity became smaller and eventually disappeared. No significant complications, including any form of hemorrhage, occurred and treatment with urokinase caused no significant changes in hematocrit, prothrombin time, partial thromboplastin time, and platelet count. Six days after urokinase instillation, repeat CT scanning showed complete obliteration of the cavity (Fig. 1C), and three days later, the catheters were removed.

Discussion

Percutaneous catheter drainage of abscesses is a welcome advance in the treatment of a disease in which mortality was previously 60% (8), and in recent years, a combination of CT and sonographically guided percutaneous drainage of hepatic abscesses has become a widely used, safe, and effective procedure (1, 2). Its benefits include the avoidance of general anesthesia, laparotomy, and prolonged postoperative hospitalization; cure rates, and those for morbidity and mortality, failure, and recurrences compare favorably with traditional surgery (7), and the success rate varies between 76% and 89% (1, 2). Failure is frequently due to multiloculation and phlegmon, fistula-associated abscesses, highly viscous content of the cavity, and improper catheter positioning (7). Complications include sepsis, contamination of the peritoneum, and empyema formation, and these occur at a rate of between 1.7% and 7.3%.

Although ultrasound guided needle aspiration has not gained wide popularity, and is considered by many to suitable only for the diagnosis of hepatic abscesses, it has at some institutions been used in their treatment (8). Baek et al (8) reported that as initial treatment of a hepatic abscess, percutaneous needle aspiration combined with antibiotic therapy was safe, free from complications and effective. In their experience, its advantages over catheter drainage were that the patient suffered less discomfort, patient care was simpler, and costs were lower.

Although many hepatic abscesses are multiseptated, experience has shown that with the use of one drainage tube, many will clear completely (2). Nevertheless, multiseptation is the most difficult problem involved in the nonsurgical treatment of hepatic abscess, and is regarded as one of the significant causes of failure in percutaneous catheter drainage or needle aspiration (1, 8, 10). The most plausible explanation for the varied results with a septated abscess is that fibrin septa in such cavities may be complete or incomplete; when they are complete, drainage is poor, and when they communicate and are incomplete, curative drainage can occur.

The rationale for using urokinase to improve the results of percutaneous drainage of abscesses and fluid collections, and its effectiveness and safety, has recently been documented in the literature (4-6, 9, 10). Park et al (9) showed that in vitro, the urokinase as compared with saline produced a considerable reduction in the viscosity of purulent material and its flow time through catheters of various sizes, and that the greatest benefit was achieved using smaller sizes of catheters. In addition, they stated that an extra theoretical benefit might be the lysis of fibrinous adhesions and loculations, which can also delay or impair drainage. The safety of urokinase in vivo was proved by Lahorra et al (10), who demonstrated that intracavitary urokinase produced an increased turnover of fibrin without any associated bleeding complication or changes in coagulation parameters. They stated, in addition, that urokinase also appeared to improve drainage of thick purulent material and to break any septations; in the above-mentioned study, all abscesses with loculations were successfully drained, as well as three infected hematomas in fungal or recurrent abscesses.

There has, however, been only one case report describing the use of urokinase for the treatment of a liver abscess; this successful procedure involved the administration of urokinase into the cavity of a multiloculated abscess, 8 cm in diameter, in which previous percutaneous catheter drainage had failed (6). For one instillation, 10,000 IU of urokinase dissolved in 10ml normal saline was used; this solution was administered every 8 hours for 3 days. Lahorra et al (10) reported that their use of three different regimens to determine the effectiveness and safety of intracavitary urokinase used for the percutaneous drainage of intraabdominal abscesses. They found that among these regimens, 2500 IU of urokinase per cm of abscess diameter showed the best overall success rate. In our case, CT scanning revealed a multiloculated abscess with a diameter of 8 cm. According to the results of Lahorra et al, a total of 20,000 IU of urokinase solution was injected through the catheter into the abscess cavity during each instillation. In our case, intracavitary urokinase instillation successfully enhanced drainage and broke any septations, without the occurrence of hemorrhagic complications. We are not sure whether urokinase treatment is dose-dependent, but in our opinion, the dosage should vary according to the size of the abscess cavity. To determine the amount which most successfully improves the out-
come of percutaneous abscess drainage, a carefully controlled prospective study is required.

On the basis of this initial experience, we suggest that if drainage after catheter placement is inadequate, urokinase should be used.

References