# Research on the Diagnosis and Treatment of Bacterial Liver Abscess

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**Keywords:** Bacterial liver abscess; diagnosis; drainage; effect

**Abstract: Objective:** clarify the diagnosis and treatment experience of bacterial liver abscess. **Methods:** conduct retrospective analysis on 40 cases of bacterial liver abscess admitted to the hospital from January 2020 to September 2020. **Results:** biliary tract obstruction and pyogenic cholangitis are the main causes of the disease. Chills, high fever, hepatalgia and leukocytosis are the main clinical manifestations of this disease. Early diagnosis and adequate drainage are the key to cure the disease. **Conclusion:** bacterial liver abscess is a common disease, and the first choice for auxiliary examination is B-scan ultrasonography. MSCT examination can make a definite diagnosis, and non-surgical treatment can be adopted for scattered multiple bacterial liver abscesses with definite diagnosis, short onset time, mild poisoning symptoms, and abscess diameter less than 3cm. Interventional treatment for large abscess stage lesions can achieve good clinical results.

## 1. Introduction

Bacterial liver abscess means that the bacteria enters the liver through different channels and causes secondary infection inside the liver. Bacterial liver abscess is common in clinic, especially in the elderly and young people with diabetes or fatty liver. With the progress of surgical diagnosis and treatment technology, effective prevention and control of gastrointestinal infections such as bacillary dysentery and ascariasis, the use of effective antimicrobial agents and the development of imaging techniques such as ultrasound, CT and MRI, liver abscess has changed greatly in terms of incidence, pathogeny and treatment [1]. The incidence of complications has dropped from 70% to 0 - 15%. At present, conservative medical treatment is generally adopted for small lesions, inflammatory stage and early abscess formation, while interventional treatment is adopted for large abscess formation.

## 2. Information and Methodology

### 2.1. General information

In this study, there were 40 patients, including 24 males and 16 females, aged from 10 to 70 years old. Among them, 8 were over 60 years old. Twenty patients were treated conservatively with an abscess diameter of (3.81±1.27) cm, and 20 patients with a liver abscess diameter of (6.48± 2.15) cm were treated with liver abscess puncture and catheterized drainage.

Among the 40 patients, 28 (70%) presented with chills, high fever and hepatalgia, accompanied by nausea and loss of appetite, 5 (12.5%) had pain associated with the right shoulder dorsum, 4 (10%) had hepatomegally touched, 32 (80%) had tenderness in the right upper abdomen, and 32 (80%) had percussion pain in the liver area, and 9 (22.5%) had signs of peritonitis. Leukocytes were increased in 35 cases (87.5%). Among the 38 cases, 36 (94.7%) were diagnosed as liver abscess by B-scan ultrasonography, and the diameter of the abscess ranged from 2 to 10 cm; 5 (20%) of the 25 cases were diagnosed as liver abscess by X-ray fluoroscopy; and 12 (80%) of the 15 cases were diagnosed as liver abscess by CT liver examination. The 40 cases were misdiagnosed as: cholecystitis in 2 cases (5%), subphrenic abscess in 3 cases (7.5%), hepatitis in 1 case (2.5%), right pleurisy in 1 case (2.5%), right perinephritis in 1 case (2.5%), fever with unknown cause in 2 cases (5%).

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### 2.2. Methodology

Clinically, the diagnosis rate of B-scan ultrasonography is 94%, and some authors believe that the positive diagnostic rate can reach more than 96%. Therefore, B-scan ultrasonography is the preferred imaging method for bacterial liver abscess. The diagnostic rate of CT examination in this group is 88%, and it is generally believed that the positive rate of CT examination is above 90%, which is one of the main imaging methods for bacterial liver abscess. However, it is expensive to carry out CT examination, moving the patient repeatedly in needed in the repeated examination. X-rays may reveal enlarged liver shadows, elevation of the right diaphragm and limited movement, so it is difficult to diagnose. Multi-slice spiral CT was used in this examination, and lesions were scanned in 40 patients by GE16-slice spiral CT. Scanning setting: voltage 120 kV, electricity 250 - 300 mA, layer thickness 6 mm, accurate value 0.75mm. After setting up, the patient's upper abdomen was scanned by MSCT. Scanning range: middle abdomen to top of diaphragm, and pay attention to delay the scanning time of each period. The arterial phase was 26 - 30s, and the portal venous phase was 56 - 70s.

## 3. Control Treatment

### 3.1. Medical treatment

Twenty patients were treated conservatively with an abscess diameter of (3.81±1.27) cm. Bacterial liver abscess is a serious expendable disease, often accompanied by poisoning, anemia, hypoproteinemia, water and electrolyte disorders, so it should be given adequate nutrition, correct anemia, hypoproteinemia and water and electrolyte disorders, if necessary, several small amount of new blood and plasma should be given to enhance the body resistance. Effective broad-spectrum antibiotics or combination of antibiotics should be selected according to bacterial culture and drug sensitivity test of pus. Therefore, in this medical treatment, anti-infection, electrolyte supplementation, blood glucose control and other treatments were mainly given in the acute stage and early stage of bacterial liver abscess. After liver abscess liquefaction, B-scan ultrasonography or CT were reviewed to fully grasp the liquefaction of liver abscess.

### 3.2. Liver abscess puncture and catheterized drainage

Twenty patients selected liver abscess, with abscess diameter of (6.48±2.15) cm. This method has the following advantages: first, there is little risk of anesthesia due to the use of local anesthesia; second, the catheter is thin and the tissue injury is small, so there is no risk of open surgery and perioperative complications; third, the possibility of contamination of abdominal cavity and spread of infection is low; fourth, it is easy for patients to accept, especially for the elderly, weak and cardiopulmonary insufficiency. Catheterized drainage is adopted to facilitate the injection of drugs into the abscess cavity. Antibacterial drugs directly act on pathogenic bacteria, making the lesions heal faster and scar less, which can significantly shorten the course of treatment. The common complications of ultrasound-guided liver abscess puncture and catheterized drainage are obstruction of catheter drainage, infection, abdominal hemorrhage, biliary leakage, etc., among which abdominal hemorrhage is the most dangerous. Patients with severe liver dysfunction caused by sepsis are often accompanied by coagulation dysfunction, and the use of thick drainage tube and accidental puncture of large blood vessels through the diameter of the insertion needle may lead to fatal massive bleeding [2].

Specifically, CT or B-scan ultrasonography localization should be performed to analyze the size, location, shape and distribution characteristics of liver abscesses and to select the best path: the shortest path should be chosen if blood vessels and bile ducts are effectively avoided. It should be noted that normal liver tissue with a certain thickness should be found outside the site of liver abscess to avoid rupture of liver capsule. Routine disinfection: 1% lidocaine, 18 G fine needle, pull out the needle, use a syringe to pump pus, part of the pus was cultured in bacteria, the abscess cavity was repeatedly rinsed with metronidazole liquid, and then placed into COOK 8F or 8.5F pig tail catheter, use 8F pig tail catheter for thin pus, and 8.5F pig tail catheter for thick pus. For patients

with multiple cavities, catheterization should be applied to the larger abscess cavity, bandaged and fixed to keep the drainage smooth, metronidazole should be rinsed once a day, and DSA imaging should be performed regularly to understand the changes of abscess cavity until the patient is discharged successfully.

Ultrasound localization requires that fist, the route of needle entry should be as short as possible; second, it is necessary to avoid bile duct, large vessel, diaphragm and surrounding important organs as far as possible; third, the catheter should be easily fixed, not twisted, and easy to move; fourth, go through a small amount of liver tissue; fifth, the position should be as low as possible in coronal plane and sagittal plane [3].

## 4. Summary

The diameter of abscess, days of fever and days of hospitalization were recorded. Data are processed by software SPSS22.0. The clinical indexes were expressed by x -±s with the t test. When $P < 0.05$, there was a statistical difference between the groups.

The diameter of abscess in conservative treatment group was (3.81±1.27) cm, fever days were (10.94±3.26) d, length of stay (22.73±5.34) d, the diameter of abscess in puncture drainage group was (6.48±2.15) cm, fever days (7.23±2.18) d, length of stay (13.82±3.08) d. The clinical indicators of treatment methods of the two groups were respectively compared, and there was a significant difference between the conservative treatment group and the puncture and drainage group ($P < 0.05$), as shown in the Table 1.

Table 1. Comparison of Clinical Indicators of Treatment Methods in Two Groups

| Group | Number of cases | Abscess diameter (cm) | Fever days (d) | Hospital days (d) |
|---|---|---|---|---|
| Puncture group | 20 | 6.48±2.15 | 7.23±2.18 | 13.82±3.08 |
| Conservative treatment group | 20 | 3.81±1.27 | 10.94±3.26 | 22.73±5.34 |
| t | - | 4.904 | 4.562 | 7.020 |
| p | - | 0.000 | 0.000 | 0.000 |

## 5. Discussion

The liver has rich blood supply, which receives both hepatic artery and portal vein blood flow, and the biliary system is connected with the intestine, so the liver is vulnerable to bacterial infection. However, the liver of healthy people has rich blood circulation and the phagocytosis effect of mononuclear macrophage system, which can eliminate the invading bacteria and is not easy to form abscess. If there is biliary obstruction, systemic infection, trauma, major surgery, or body resistance decline due to diabetes, the invasion of bacteria may cause liver abscess. There are several common ways of infection: first, biliary system; second, hematogenic infection of hepatic artery; third, hematogenic infection of portal vein; fourth, abdominal trauma (e.g. liver rupture); fifth, cryptogenic; sixth, other factors. It used to be thought that this disease was secondary to acute suppurative appendicitis and pyogenic portal phlebitis, and the patient's age was mostly 10 - 50 years old, especially in young men [4]. In recent years, due to the widespread application of antimicrobial agents, the progress of surgical diagnosis and treatment techniques, and the early diagnosis and treatment of portal venous system infections such as acute appendicitis and bacillary dysentery, the incidence of this disease has been significantly reduced.

For the early stage of the disease, the patient is generally in good condition, the abscess is determined to be isolated or multiple, and the abscess with a diameter below 3 cm is not suitable for surgical treatment. Effective broad-spectrum antibiotics or combined drugs are selected, and B-scan ultrasonography review is made at any time. According to the changes of the abscess, appropriate adjustment or use of sensitive antibacterial drugs is made until the abscess is cured. B-scan ultrasonography (coarse needle) abscess puncture was used in patients with ineffective conservative

treatment or abscess diameter between 3 and 6 cm. It should try to draw out pus completely at one time, and inject proper amount of antibiotic into pus cavity next. After 5 to 7 days of clinical treatment, B-scan ultrasonography was performed again, and puncture can be repeated again if the condition requires.

Generally speaking, the diameter of abscess, days of fever, days of hospitalization and other clinical indicators in the conservative treatment group were all lower than those in the puncture and drainage group, with significant differences in data ($P < 0.05$). Multislice spiral CT is one of the common methods in clinical diagnosis of bacterial liver abscess. Examination can not only further clarify the location of liver abscess, but also help clinicians to distinguish the cause of liver abscess, the nature of abscess and choose the appropriate treatment. The implementation of puncture and drainage treatment can help patients quickly discharge pus in pustules. Combined with metronidazole anti-infection treatment, it can shorten the duration of fever and hospital stay of patients, and effectively improve the symptoms of fever, chasm and pain. MSCT examination can accurately show the location, size, and shape of abscess, and has a clear localization diagnosis, especially enhanced scan, which is of great qualitative significance to liver abscess [5]. Interventional therapy for large abscess lesions can effectively control fever and enable patients to recover as soon as possible. In addition, the treatment of bacterial liver abscess should be individualized. According to the patient's whole body condition, the time of illness, the location, size and number of abscess, the surgical treatment can choose not only percutaneous liver puncture abscess drainage, but also abdominal incision drainage and extraperitoneal incision drainage. As long as the indications are strictly controlled, satisfactory curative effects can be achieved.

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