# Successful antimicrobial therapy of hepatic, intra-abdominal and intrapelvic abscesses

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**Antimicrobial therapy without surgical drainage or therapeutic aspiration was effective in the management of four patients with deep abscesses ranging in diameter from 1.3 to 10.0 cm. Two of the patients had multiple hepatic abscesses, one had hepatic, intra-abdominal and intrapelvic abscesses, and one had an intrapelvic abscess alone. Anaerobic bacteria were isolated from the blood or abscesses in all four patients, and an aerobic–anaerobic infection was present in one patient. The patients were treated with metronidazole, alone or in combination with other antibiotics, for 3 to 6 weeks. Therefore, in selected patients with deep abscesses, a therapeutic trial of antimicrobial agents instead of surgery may be justified.**

**Efficacité d'une thérapeutique antimicrobienne sans drainage ni ponction évacuatrice chez quatre malades porteurs d'abcès profonds dont le diamètre va de 1,3 à 10,0 cm. Il s'agit de deux cas d'abcès hépatiques multiples, d'un cas d'abcès hépatiques, intra-abdominaux et pelviens, et d'un cas d'abcès pelvien isolé. Dans tous ces cas on a isolé des germes anaérobies à partir du sang ou des abcès; une malade montrait une infection mixte aérobie–anaérobie. Le traitement a consisté à prescrire le métronidazole, seul ou en association à d'autres antimicrobiens, pendant 3 à 6 semaines. On conclut que chez certains malades choisis portant des abcès profonds, l'essai d'une thérapeutique antimicrobienne sans intervention chirurgicale peut se justifier.**

The traditional approach to the treatment of intraperitoneal and hepatic abscesses has consisted of surgical drainage and appropriate antimicrobial therapy, the latter primarily to prevent contiguous or hematogenous spread of the infection. Adequate drainage of pus has been considered essential to the successful management of hepatic abscesses, although several recent studies have shown medical treatment alone[1-5] or with aspiration[6,7] to be effective. In this article I describe four patients: two with multiple hepatic abscesses, one with hepatic, intra-abdominal and intrapelvic abscesses, and one with an intrapelvic abscess alone. All the patients were successfully treated with antimicrobial agents, including metronidazole, and did not require surgery or therapeutic aspiration of the abscesses.

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## Case reports

### *Patient 1*

An acutely ill 70-year-old man was admitted to University Hospital, London, Ont. with a history of fever and rigors for 10 days. The source of the fever was initially obscure, but liver function tests yielded abnormal results, and subsequent isotopic scanning with technetium-99m sulfur colloid and ultrasonography showed filling defects in the liver. A computerized tomography (CT) scan showed three defects between 2.0 and 4.2 cm in diameter in the right lobe of the liver. Material obtained by percutaneous needle biopsy of one of the lesions contained gram-negative fusiform rods; after 72 hours *Fusobacterium nucleatum*, an obligate anaerobic organism, was cultured. A broth disc elution test showed that the organism was susceptible to metronidazole (minimum inhibitory concentration [MIC] 5 μg/mL or less).

Surgical drainage was strongly considered, but since the patient had a history of severe chronic airway obstruction and coronary artery disease, antimicrobial therapy alone was instituted. Metronidazole, 500 mg administered intravenously every 8 hours, was given for 2 weeks in hospital; a similar dose was taken orally for 2 weeks at home. Apart from mild nausea, no side effects to metronidazole were noted. During this time the patient's temperature returned to normal and his symptoms gradually abated. Follow-up CT scans of the abdomen demonstrated improvement 2 months later and complete resolution of the lesions another 2 months later.

### *Patient 2*

A 42-year-old man was transferred to University Hospital for continuing treatment of liver abscesses. He had been admitted to the referring hospital approximately 1 month earlier with septicemia caused by *Streptococcus intermedius*. He was allergic to penicillin so was treated with clindamycin, 1200 mg/d given intravenously for 5 days, followed by tetracycline hydrochloride, 2 g/d given orally, with a good initial response. The source of the septicemia was not determined, however, and he was discharged 1 week after admission taking tetracycline orally. Within 48 hours the fever and chills recurred and he was readmitted to hospital for further investigation.

Because a relapse of the septicemia was suspected, treatment with cefoxitin, 12 g/d, was begun. However, there was no response in the next 72 hours, so the drug was discontinued. Therapy with clindamycin, 2400 mg/d given intravenously, was reinstituted, and the patient slowly responded. Further investigations, including a CT scan and a gallium 67 citrate scan, demonstrated two lesions in the right lobe of the liver. It was thought that the lesions might be amebic abscesses, so metronidazole, 750 mg by mouth every 8 hours, was added to the treatment regimen; 4 days later the dosage was changed to 500 mg given intravenously every 6 hours because the patient was experiencing nausea with the oral therapy. Serologic tests for amebiasis, howev-

er, gave negative results. The patient refused needle aspiration and surgery. He was transferred to University Hospital for further management, having received a total of 2 weeks' intravenous therapy with clindamycin (discontinued just before transfer) and 9 days' intravenous therapy with metronidazole.

At the time of admission to University Hospital the patient appeared chronically ill and had a temperature of 39°C. He had lost 18 kg since the illness had begun, approximately 1 month previously. He had a hemoglobin level of 94 g/L and an erythrocyte sedimentation rate (ESR) of 58 mm/h. A repeat CT scan of the liver showed that the two lesions in the right lobe measured 1.3 cm and 2.8 cm in diameter. Again they were thought most likely to be abscesses caused by *S. intermedius*. In view of the patient's previous response to antimicrobial treatment alone, therapy with metronidazole, 500 mg by mouth every 6 hours, was continued, and he was discharged 6 days after admission, with a normal temperature. He had received a total of 2 g/d of metronidazole for 27 days and 1.5 g/d for 14 days without side effects. Subsequent follow-up examinations showed marked clinical improvement; 2 months later his hemoglobin level had increased to 147 g/L and his ESR had decreased to 14 mm/h. A CT scan 2 months after admission showed complete resolution of the liver abscesses.

*Patient 3*

A 62-year-old woman was transferred to University Hospital for surgical treatment of multiple abscesses that had developed following rupture of a diverticulum 2 months previously. She appeared chronically but not acutely ill. Her hemoglobin level was 92 g/L, her leukocyte count 16.3 × $10^9$/L and her ESR 58 mm/h. A CT scan demonstrated multiple abscesses ranging from 3 to 10 cm in diameter below the right hemidiaphragm, predominantly in the intrahepatic region, as well as a palpable abscess approximately 8 cm in diameter on the abdominal wall anterior to the liver and a left pelvic abscess approximately 6 cm in diameter in the region of the sigmoid colon. A needle aspiration biopsy of the abscess on the abdominal wall yielded thick pus; Gram-staining showed various organisms, and culture grew five obligate anaerobes, including two strains of *Bacteroides thetaiotaomicron*, *B. ruminicola*, and an identified gram-positive coccus and gram-negative rod, all of which were sensitive to metronidazole, and two aerobes, *Escherichia coli* and *Morganella morganii*.

The patient had a history of severe coronary artery disease and myocardial infarction. It was felt, therefore, that she was not a good candidate for extensive surgery. Since she was not acutely ill a trial of metronidazole, 500 mg every 8 hours, was begun. Antimicrobials specific for *E. coli* and *M. morganii* were not given. Metronidazole was given intravenously for 9 days and then orally. On the 21st day of treatment the patient had a generalized seizure that was attributed to metronidazole, so the drug was discontinued. A repeat aspiration of the abdominal wall abscess, which had decreased slightly in size, was attempted on the 17th day of treatment but was unsuccessful.

The patient was anxious to leave hospital and was discharged 1 week after therapy with metronidazole had been stopped, her condition much improved. While at home she took trimethoprim–sulfamethoxazole, 160–800 mg, twice daily for 2 weeks as additional coverage against the *E. coli* and *M. morganii*. Her condition continued to improve, and a CT scan 3 months later showed complete disappearance of all the abscesses.

*Patient 4*

An acutely ill 78-year-old woman was admitted to the referring hospital with a fever, confusion and a history of transient loss of consciousness. Pending the results of laboratory investigations, septicemia was diagnosed and she was treated with tobramycin, 60 mg, and cefazolin, 1 g, administered intravenously every 8 hours. After 5 days *B. fragilis* was cultured from blood samples drawn at the time of admission, so metronidazole, 500 mg given intravenously every 8 hours, was added to the regimen, and tobramycin discontinued. Pelvic ultrasonography and a $^{67}$Ga citrate scan revealed a mass approximately 6 cm in diameter in the left adnexa that was compatible with an abscess; it was thought to be the source of the septicemia. The patient improved considerably while she was receiving cefazolin and metronidazole, and she was transferred to University Hospital 8 days after admission for further management.

Cefazolin therapy was stopped after 12 days, but the metronidazole treatment was continued for 12 days and then changed to 500 mg given orally every 12 hours for an additional 4 weeks. The patient did not have any side effects from this treatment. She gradually improved clinically, and ultrasonography at the time of discharge showed that the pelvic mass had decreased to approximately 4 cm in diameter. Ultrasonography 4 months later showed complete resolution of the lesion.

## Discussion

The cases I have presented confirm the efficacy of antimicrobial therapy alone, without surgical drainage or therapeutic aspiration, in the management of patients with hepatic abscesses. One of the main reasons for the good response is the excellent blood supply to the liver tissue surrounding the abscess. Therefore, the excellent response to this form of therapy in the two patients with extrahepatic abscesses (intra-abdominal and intrapelvic) was somewhat unexpected.

It appears that many antimicrobial agents are effective in the treatment of hepatic abscesses.[1-7] Metronidazole has been used alone[1,5] or in combination, usually with gentamicin,[6] with good results. Theoretically it has the advantages of being consistently bactericidal against organisms in the stationary and logarithmic phases of growth[8] and of penetrating well into abscesses.[9]

The response of patient 3 to treatment with metronidazole alone was unusual in that she had an aerobic–anaerobic infection. However, the patient did receive a 2-week course of treatment with trimethoprim–sulfamethoxazole following her discharge from hospital. It may be that

metronidazole alone eradicated the aerobic organisms, as has been shown in previous studies of aerobic–anaerobic infections in animals and in-vitro models.[10]

The second case I have described, of *S. intermedius* bacteremia and hepatic abscesses, was also interesting therapeutically. It is possible that the patient was effectively treated with the 2-week course of clindamycin, although his clinical improvement appeared to correlate with the addition of metronidazole. However, the MIC of metronidazole for the *S. intermedius* strain isolated was greater than 16 μg/mL. There are several possible explanations for the therapeutic response to metronidazole: (a) it is likely that the serum levels with a 2-g dose of metronidazole given intravenously would exceed 16 μg/mL;[11] (b) the hydroxy metabolite of metronidazole, present in vivo, may be more active than metronidazole against *S. intermedius*, as has been shown with other facultative aerobes;[12] and (c) the combination of clindamycin and metronidazole may have had additive or synergistic effects against this strain of *S. intermedius*.[13]

Neurologic side effects, including seizures,[14] peripheral neuropathy, encephalopathy and cerebellar dysfunction,[15] are uncommon side effects of metronidazole and are usually seen only when massive doses of the drug have been given. In patient 3 no other factor could be implicated in her generalized seizure, and no seizures occurred after metronidazole had been discontinued. Generalized seizures have also been reported in an elderly patient who was receiving the usual therapeutic doses of metronidazole.[5]

The cases I have presented indicate that antimicrobial treatment alone can be effective in selected patients with extrahepatic abscesses. Such patients might include those with multiple abscesses for which the organisms have been identified and those in whom extensive surgery is contraindicated. Because of its theoretical advantages metronidazole, alone or in combination with other antimicrobial agents, may be the drug of choice if susceptible organisms are isolated.

Drs. Ramsay W. Gunton and William J. Wall, from University Hospital, and Dr. Denis A. Wagner, from Midland Hospital, Midland, Michigan, were the referring physicians in the four cases described.

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