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# Liver abscess due to *Yersinia* bacteremia in a well-controlled type I diabetic patient

## Ropień wątroby w następstwie bakteriemii spowodowanej przez pałeczki *Yersinia* u chorego z dobrze kontrolowaną cukrzycą typu 1

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**Abstract**

*Yersiniae enterocolitica*, a gram negative rod-like organism, causes terminal ileitis and mesenteric adenitis in adolescents and adults. Some forms present with liver and spleen abscesses and have worse prognosis.

We report a type 1 diabetic patient with a liver abscess mimicking metastatic liver disease who was successfully treated with percutaneous drainage and antibiotic administration; culture from blood was positive for *Yersinia enterocolitica*, but drainage material from the liver abscess did not yield a positive result for *Yersinia enterocolitica*. Although the prognosis is not good in such cases, with high mortality rates, our patient recovered from the disease with appropriate treatment. **(Pol J Endocrinol 2011; 62 (4): 357–360)**

***Key words:*** *Type I diabetes mellitus, liver abscess,* Yersinia enterocolitica

**Streszczenie**

Gram-ujemna pałeczka *Yersiniae enterocolitica* powoduje zapalenie końcowego odcinka jelita cienkiego i zapalenie węzłów chłonnych krezki u młodzieży i dorosłych. Czasami obserwuje się przypadki ropni wątroby lub śledziony, które wiążą się z gorszym rokowaniem. Autorzy opisują przypadek chorego na cukrzycę typu 1 z ropniem wątroby imitującym guz przerzutowy wątroby, u którego zastosowano skuteczne leczenie obejmujące drenaż przezskórny i antybiotykoterapię. W posiewie krwi wyhodowano *Yersinia Enterocolitica*, jednak z treści uzyskanej w wyniku drenażu ropnia nie uzyskano potwierdzenia obecności tych bakterii. Mimo że w takich przypadkach rokowanie jest niepomyślne i notuje się wysoki odsetek zgonów, dzięki odpowiedniemu leczeniu pacjent powrócił do zdrowia.
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***Słowa kluczowe:*** *cukrzyca typu 1, ropień wątroby,* Yersinia Enterocolitica

## Introduction

*Yersinia enterocolitica* (YE) is a gram negative rod-like organism which causes an infection that presents itself in different clinical forms in children, adolescents and adults and is generally associated with predisposing factors like cirrhosis and haemochromatosis. While the adult form can be seen with erythema nodosum, polyarthritis and Reiter's syndrome, it may also present itself with liver and spleen abscesses which have a poor prognosis [1]. Most cases are sporadic. Multiple serotypes from sporadic cases have been isolated and serotype O:8 has been reported most commonly. The true prevalence rate of *Yersinia enterocolitica* infection is not known, but a study has reported it as 2.8% [1]. Fatality rates of 34–50% have been reported in cases of bacteriemia, death is not frequently encountered. The incidence is equal among males and females. Several serologic methods like tube agglutination, enzyme-linked immunosorbent assay and radioimmunoassay have been used for diagnosis. When cultures do not yield positive results for YE, serologic tests should be interpreted carefully. It must be kept in mind that antibodies can remain positive for years and antibody titres should be followed. Agglutinin levels which rise 1–2 weeks after infection and peak at up to 1:1,200 may be diagnostic. When an abscess is detected, surgical drainage and appropriate antibiotic therapy is necessary. Patients should

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be kept under observation for signs of septicemia, and supportive measures should be taken.

## Case report

A 34 year-old male patient was admitted to our clinic complaining of fever, nausea, vomiting and chills of six weeks' duration. Sweating, palpitations, poor appetite and loss of 10 kg of body weight were also noted. He had had type 1 diabetes mellitus (DM) for 11 years, which was well controlled with intensive multiple daily insulin injections (regular insulin three times and glargin insulin); his haemoglobin A1c level was 7.1. He had background retinopathy and neuropathy. He had no history of travel, exposure to animals, medical invasive procedures, or ingestion of contaminated food, water or milk.

On physical examination, he was conscious, cooperated and oriented with a body temperature of 38.5, pulse rate of 96 bpm, and blood pressure of 100/70 mm Hg. (BMI: 21 kg/m$^2$). Breath sounds were coarse on auscultation and decreased in the right base with dullness on percussion.

Abdominal examination revealed widespread tenderness by palpation without defence or rebound. The rest of the physical examination was normal. Blood tests showed mean fasting glucose levels 138 (70–105) mg/dl, glucose levels two hours post-prandially 165 mg/dl, BUN 21 mg/dl, creatinin 1.4 (normal: 0.5–1.3) mg/dl, aspartate aminotransferase (AST) 423 (normal: 5–34) U/L, alanine aminotransferase (ALT) 158 (normal: 0–55) U/L, alkaline phosphatase (ALP) 561 (normal: 40–150) U/L, gamma-glutamyl transpeptidase 264 (normal: 9–36) U/L, lactate dehydrogenase 861 (normal: 125–243) U/L, albumin 4.3 g/dl, globulin 4.5 (normal: 2.2–3.5) g/dl, potassium (K) 5.8 mmol/L, calcium 8 (normal: 8.4–10) mg/dl, phosphorus 6.2 (normal: 3–4.5) mg/dl, alpha-fetoprotein (AFP) 3.18 (normal: 0.0–9.0) ng/ml, carcinoembryonic antigen (CEA) 1.89 (normal: 0.0–4) ng/ml, C-reactive protein (CRP) 149 (normal: < 0.8) mg/L, leukocyte 38,480/mm$^3$, platelet 388.000/mm$^3$, erythrocyte 405 × 10,000/mm$^3$, haemoglobin 9.4 g/dl, haematocrit 37,2%, international normalised ratio (INR) 1.22, and aPTT 46.5 seconds.

Gastroscopy was performed to evaluate any malignancy, and histopathology of the biopsy material showed chronic active gastritis without any evidence of malignant disease. High Resolution Computed Tomography (HRCT) of the thorax showed a massive pleural effusion at the right hemithorax extending to the major fissure and parenchymal atelectatic areas. Thoracentesis was undertaken and analysis of the pleural effusion showed only neutrophile, macrophage and mesothelial cells without any atypical cells. There was no pathological finding in bone scintigraphy.

Portal system colour Doppler ultrasonography revealed a blunt liver contour with an increase in size and detected a hypoechoic mass lesion measuring 153 × 110 mm at the right posterior lobe of the liver, showing internal septations and indentations into the liver parenchyme, in some parts not well discriminated from the adjacent normal liver. These findings were consistent with liver abscess.

MR showed a mass lesion located at the 7th and 8th segments of the liver, which had a multiloculated appearance with internal septations; the largest diameter of the lesion was 6 cm. The lesion had decreased signal intensity compared with that of liver parenchyma on T1-weighted images and increased signal intensity on T2-weighted images (Figure 1). The lesion revealed homogeneous rim enhancement on postgadolinium images without any solid enhancement, which was strongly suggestive of liver abscess (Figure 2). Perihepatic and perisplenic fluid was also noted on images.

The patient underwent a whole body Fluorine-18 fluorodeoxyglucose (F-18 FDG) positron emission tomography (PET)/CT (F-18 FDG-PET/CT) scan to rule out any possible malignancy. After ten hours of fasting, and having serum glucose 137 mg/dl, the patient was injected with 481 MBq (13 mCi) of F-18 FDG intravenously. After 50 minutes of waiting in a semi-reclined chair, the patient was imaged using an integrated PET/CT scanner which consisted of a full-ring HI-REZ LSO PET and a 6-slice CT (Siemens Biograph 6, Chicago, IL, USA). The CT portion of the study was done without an iv contrast medium, just for defining anatomical landmarks and making attenuation correction on PET images. F-18 FDG-PET/CT images of the liver showed an area of minimally increased F-18 FDG uptake with hypometabolic regions in it, corresponding to a mass lesion with septations in CT (Figure 3). Blood culture demonstrated the presence of *Yersinia enterocolitica*.

Piperacillin/tazobactam (3 × 13.5 gr/day) therapy was initiated before the planned abscess drainage. On the fourth day of antibiotherapy, after the patient's fever had subsided and blood sugar levels had become stable, percutaneous drainage was performed. After drainage, the patient was discharged and further treated with tavanic 1 × 1 (500 gr/day/po) for an additional ten days as an outpatient.

## Discussion

Given the gradual rise in the number of cases with YE, the fall in mortality rates due to development of new antibiotics, and the difficulty of distinguishing from metastatic lesions, diagnosing abscesses due to YE using

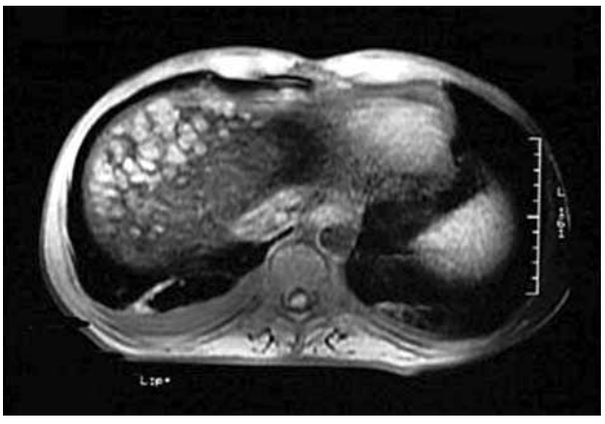

**Figure 1.** *A mass lesion located at 7th and 8th segments of the liver with a multiloculated appearence with internal septations*

**Rycina 1.** *W 7 i 8 segmencie wątroby widoczna jest zmiana o charakterze guza o budowie wielokomorowej z przegrodami wewnętrznymi*

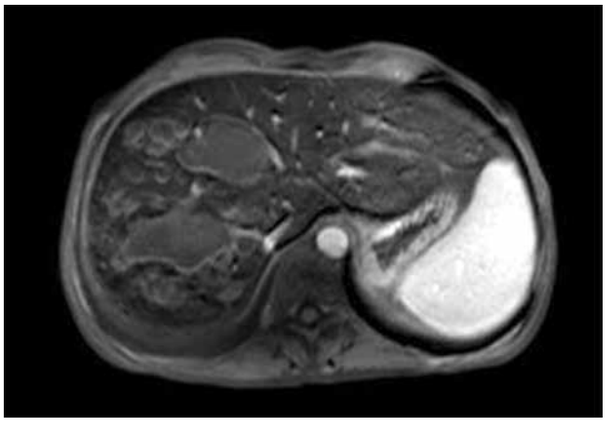

**Figure 2.** *The lesion revealed homogeneous rim enhancement on postgadolinium images without any solid enhancement. Perihepatic fluid was also noted*

**Rycina 2.** *Jednorodna zmiana o wzmocnionym obrazie otoczki na obrazie po podaniu gadolinium bez wzmocnienia masy. Widoczny płyn okołowątrobowy*

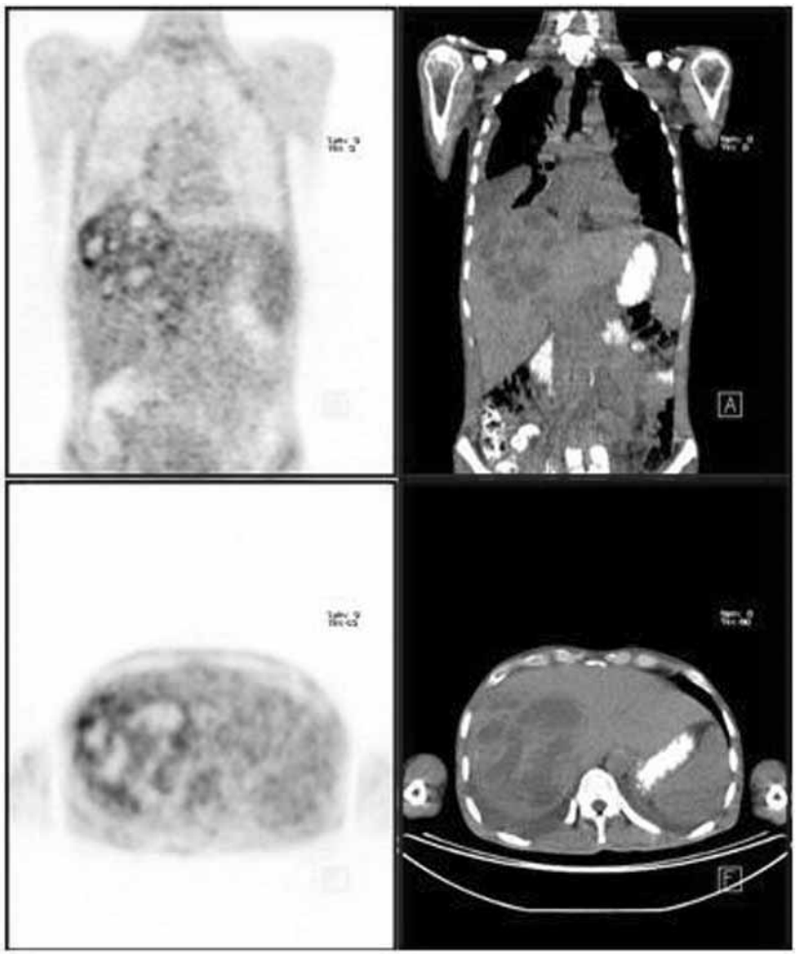

**Figure 3.** *Positron emission tomography (PET)/computerized tomography (CT) images of the liver showed an area of minimally increased F-18 FDG uptake with hypometabolic regions in it, corresponding to a mass lesion with septations in CT*

**Rycina 3.** *Obrazy pozytronowej tomografii emisyjnej (PET)/tomografii komputerowej (CT) wątroby wykazały obszar minimalnie zwiększonego wychwytu F-18 FDG z fragmentami o zmniejszonym metabolizmie odpowiadający zmianie guzowej z przegrodami w CT*

laboratory tests and imaging modalities has growing importance. In a review of the literature, we found that nearly 50 cases have been reported with hepatic abscess secondary to YE [2–5]. One study showed that 45 cases of hepatic abscess secondary to YE have been registered. Of the 45 reported cases, 64% had underlying haemochromatosis and 29% had diabetes mellitus. The overall mortality was 31%. Mortality prior to 1987 was 60% (n = 20); since 1987, it has been 8% (n = 25) [2].

While investigating the multiple noncharacteristic lesions in the liver and distinguishing between an abscess and neoplastic disease is the issue, metastasis from colon carcinoma, ovarian carcinoma, lung carcinoma, carcinoid tumours, malignant melanoma and sarcomas are among possible reasons. The MRI images of the foci of fungal abscesses usually present as multiple foci of lesions less than 1 cm in diameter. There are often coexisting lesions in the spleen [6–12]. Our patient's MRI images showed a lesion with irregular, heterogenous and gradually increasing contrast enhancement circumferentially and peripheric oedema, rather than early uptake and following wash-out. Imaging and clinical findings were consistent with abscess rather than malignancy or metastasis.

F-18 FDG PET/CT imaging has been well accepted in oncology as an effective modality in the diagnosis, staging, restaging and therapy response evaluation for a variety of malignancies. F-18 FDG accumulates in cancer cells due to an increased glucose metabolism of the cancer cells, but it is not a tumour-specific agent. F-18 FDG is also known to accumulate in inflammatory cells infiltrating various inflammatory and infectious lesions, such as lymphocytes, neutrophils, and macrophages, which have elevated glucose requirements [13, 14]. FDG uptake by infectious and inflammatory lesions may also cause false-positive results by resembling metastases when exploring the metastatic sites in cancer patients. It is important to be aware of this pitfall when interpreting PET/CT images in patients with malignant diseases.

The cases reported in the literature have mostly been associated with immune deficiency and unregulated DM [15–17]. In our case, $HbA_{1c}$, fasting blood sugar and postprandial blood sugar levels showed that it was a well controlled DM case without any findings which would raise suspicion of ketoacidosis on admission. The patient's serum iron, iron binding capacity and ferritin levels were normal, ruling out any predisposing iron overload due to diseases like haemochromatosis. When the initial symptoms are taken into account, the patient was supposed to have been infected via the alimentary tract.

Mortality rates due to YE are decreasing with the development of new antibiotics. Following parenteral and oral antibiotherapy, together with percutaneous drainage of the abscess, the symptoms of the patient improved and recovery in the general status of the patient was observed. Insulin and fluid replacement was done since the course of the blood glucose levels of the patient was labile.

It should be kept in mind that even if it is well controlled, DM is a predisposing condition for infections, and glycaemic regulation might also be disturbed because of infection.

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