

Ultrasound scan to detect acalculous cholecystopathy in immunocompromised hosts with unexplained fever

We found a significant prevalence of acalculous cholecystopathy in a group of patients with hematologic malignancies and unexplained fever. Ultrasound scan (US) detected a case of acute cholecystitis, two of gallbladder overdistension and biliary sludge, and one of striated gallbladder wall thickening. US proved effective in early identification of abdominal infection site.

Sir,

In immunocompromised hosts, biliary injury may be due directly to opportunistic infection or may be related to endotoxins released during bacterial sepsis.¹⁻³

We investigated 55 unselected immunocompromised patients, suffering from hematologic malignancies and fever of unknown origin (FUO), using abdominal ultrasound (US) scan with the aim of defining the infection site. The US examination was carried out at patient's bedside, within the first 2 days after the appearance of fever and subsequently, using portable Hitachi equipment with a 3.5 MHz probe. US gallbladder examination was used to monitor changes in diameters, wall thickening, formation of intraparietal abscess and perforation.

Of the 55 patients studied, four (7%) had a cholecystopathy in the absence of calculi and of bile duct

obstruction or dilation: 1 case of acute cholecystitis complicated by empyema, 2 cases of gallbladder overdistension and biliary sludge, one of which with wall thickening, and 1 case of striated gallbladder wall thickening (Table 1). None of these four patients had received total parenteral nutrition or had a history of primary gallbladder disease; two (#1 and 3) had received antimicrobial prophylaxis because of a previous course of chemotherapy and had a central venous line inserted. All patients had high grade fever, abdominal symptoms which did not require analgesics, mild alteration in liver function tests and negative microbiological examination. The diagnosis of cholecystopathy was defined by US scan in all cases. The main gallbladder findings were positive Murphy's sign (all cases), wall thickening which was striated in two, overdistension, biliary sludge (three cases) and intraparietal abscess (one case) (Figure 1). Other US findings were hepatomegaly, splenomegaly and mild peritoneal and pleural effusions. In patient #1 computed tomography confirmed the US findings (Figure 1). This patient underwent emergency laparotomy and cholecystectomy: an empyema of gallbladder, without calculi, was found; *Enterococcus faecalis* grew from bile culture. Unfortunately, he died a few days later of cardiorespiratory failure. The other patients received conservative medical treatment including broad-spectrum antibiotics, granulocyte colony-stimulating factor (patients #2 and #3) and bowel rest; during this treatment US follow-up documented improvement of the gallbladder abnormalities.

Our survey confirms that cholecystopathy related

Table 1. Clinical, laboratory and ultrasound findings in immunocompromised patients with FUO and gallbladder abnormality.

Pt.	Sex, age (years)	Basic disease	Immunologic status	Abdominal symptoms	Abnormal liver tests ^o	Gallbladder US findings	Other US findings	Treatment	Outcome
1	M, 71	AML M4	aplastic phase after induction chemotherapy*	fever, right pain, distension, vomiting	transaminases, ALP and γ -GT (x3); albumin 2.9 g/dL	overdistension (diameters: long. 11 cm; antero-posterior 4.1 cm), striated wall thickening (10 mm), biliary sludge, positive Murphy's sign, intraparietal abscess	hepatomegaly, moderate right pleural effusion	cholecystectomy	died of post-operative complications
2	F, 66	RAEB-T	neutropenia related to bone marrow hypofunction	fever, moderate right pain, distension	transaminases (x2); albumin 2.8 g/dL	overdistension (diameters: long. 10 cm; antero-posterior 4.5 cm), wall thickening (4 mm), biliary sludge, moderately positive Murphy's sign	hepatomegaly, mild peritoneal effusion	ceftriaxone 2 g daily, amikacin 1 g daily, G-CSF 300 μ g daily, bowel rest	recovery
3	F, 60	ALL L2	aplastic phase after salvage chemotherapy**	fever, moderate right pain, distension	albumin 3 g/dL	overdistension (diameters: long. 11 cm; antero-posterior 5 cm), biliary sludge, moderately positive Murphy's sign	hepatomegaly, mild peritoneal and right pleural effusion	meropenem 3 g daily, amikacin 1 g daily, teicoplanin 200 mg daily, G-CSF 300 μ g daily, bowel rest	recovery
4	M, 72	WM	mild neutropenia	fever, moderate right pain, distension	transaminases (x2); albumin 2.8 g/dL	striated wall thickening (10 mm), moderately positive Murphy's sign	hepatomegaly, splenomegaly, mild peritoneal effusion	ceftriaxone 2 g daily, bowel rest	recovery

FUO = fever of unknown origin, US= ultrasound scan, AML= acute myeloid leukemia, ALL= acute lymphoblastic leukemia, RAEB-T = refractory anemia with blast excess in transformation, WM= Waldenström's macroglobulinemia, ALP= alkaline phosphatase, γ -GT= glutamyl-transpeptidase, G-CSF = granulocyte colony-stimulating factor. ^oFold increase as compared to normal values. *According to the EORTC-GIMEMA AML 13 Protocol. **A schedule containing cytarabine and idarubicin.

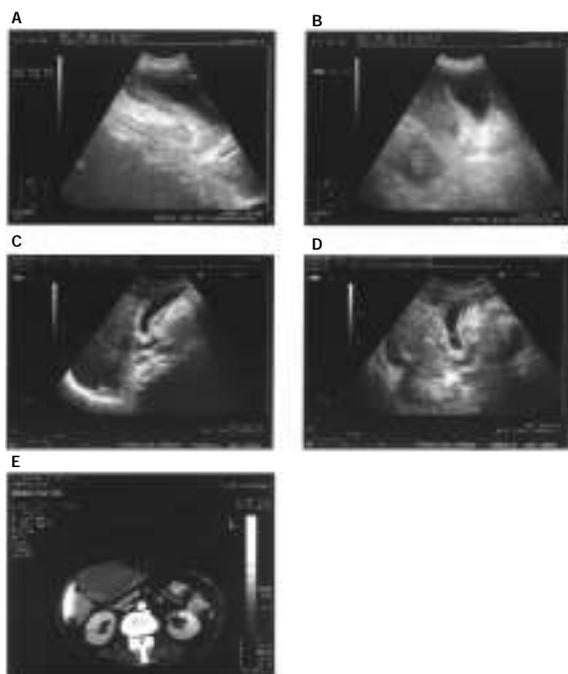


Figure 1. Abdominal US findings in representative cases of immunocompromised patients: overdistended gallbladder with striated wall thickening (A) containing biliary sludge (B) in patient #1; marked striated thickening of gallbladder wall in patient #4 (C and D). Gallbladder CT scan of patient #1, confirming the US findings (E).

to infectious causes, even in the absence of calculi or of bile duct abnormality, has a significant prevalence in a group of patients suffering from hematologic malignancies complicated by F.U.O.^{4,5} In these cases, as in other settings,⁶⁻⁸ abdominal US scan proved to be a valuable tool for rapid detection of the infection site, thus moving a number of patients from F.U.O. to clinically documented infection and ultimately leading to more appropriate treatment.⁹ In our small series, one patient had gallbladder empyema; the others had a clinical syndrome characterized by high fever, moderate right abdominal pain, serositis and US findings strongly suspicious of gallbladder distress.³ In this group of patients, close US follow-up associated with correct antibiotic therapy, supportive treatment and bowel rest were an effective method to avoid potentially dangerous surgery.¹⁰

We see US examination as the natural continuation and extension of the physician's manual action, and a potentiation of his semeiotic sensitivity. It is a rapid, safe, effective and inexpensive diagnostic tool for detecting the site of infection in immunocompromised patients with F.U.O., with special attention to the gallbladder.

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Key words

Acute acalculous cholecystitis, gallbladder abnormality, ultrasound scan, immunocompromised hosts, F.U.O

Contributions and Acknowledgments

MP designed the study and performed the ultrasound examinations. CS, CC and AC were responsible for patient care and follow-up. BR was responsible for data interpretation and revising the paper.

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Fludarabine-containing regimen followed by autologous peripheral blood stem cell transplantation in unselected patients with acute myeloid leukemia: a single center experience

Fludarabine has been recently reported as ineffective in mobilizing peripheral blood stem cells (PBSC) in acute myeloid leukemia (AML) patients. We report herein on 27 AML patients, 9 of them being eligible for peripheral blood stem cell transplantation (PBSC). Eight of the 9 successfully