

## ULTRASOUND OF FOCAL SPLENIC LESIONS IN PATIENTS WITH HUMAN IMMUNODEFICIENCY VIRUS

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### ABSTRACT

Abdominal ultrasonographic findings of 14 patients with human immunodeficiency virus (HIV) and focal lesions in the spleen were reviewed. There were solitary hypoechoic lesions in 2 patients and multiple hypoechoic lesions in 12 patients. The diagnoses were confirmed by hemoculture (6 patients), lymph node biopsy (5 patients), splenectomy (1 patient), bone marrow aspiration biopsy (1 patient), and response to therapy (1 patient). The causes of focal hypoechoic lesions in the spleen were tuberculosis (7 patients), salmonellosis (6 patients), and nocardiosis (1 patient). For HIV patients with focal hypoechoic lesions in the spleen, particularly in Northern Thailand, a diagnosis of tuberculosis, salmonellosis, or nocardiosis should be considered.

### INTRODUCTION

Splenic abscess is an uncommon disease in general. In population-based autopsy studies the incidence of splenic abscess has been between 0.2 to 0.7 percent.<sup>1</sup> There are five distinct causes of splenic abscess: metastatic infection, contiguous infection, embolic noninfectious events causing ischemia and subsequent superinfection, trauma, and immunodeficiency.<sup>1</sup> As the number of patients with immunodeficiency, including that caused by cancer chemotherapy and acquired immunodeficiency syndrome has increased, the incidence of splenic abscess has also increased. The purpose of this study was to determine the causes of focal splenic lesions seen in ultrasonograms of patients with human immunodeficiency virus (HIV).

### MATERIALS AND METHODS

Between 1992 and 1996, 14 patients with HIV and focal splenic lesions were examined by ultrasound at Chiang Mai University Hospital, 11

men and 3 women, aged between 18 to 38 years old. The diagnoses were confirmed by hemoculture (6 patients), lymph node biopsy (5 patients), splenectomy (1 patient), bone marrow aspiration biopsy (1 patient), and response to therapy (1 patient). No focal splenic lesions were seen in follow-up ultrasonograms of 4 patients. The causes of the focal splenic lesions were tuberculosis (7 patients), salmonellosis (6 patients), and nocardiosis (1 patient).

### RESULTS

**CLINICAL HISTORIES.** The most common clinical histories were fever (9 patients) and abdominal pain (7 patients). Others were neck mass (3 patients), cough (2 patients), and chest pain (1 patient). Physical examination revealed lymphadenopathy in 9 patients, and hepatomegaly in 4 patients.

**ULTRASONOGRAPHIC FINDINGS.** The ultrasonograms of the patients were reviewed for the length of the spleen, focal lesions, intra-abdominal lymphadenopathy, and ascites. A patient was considered to have splenomegaly when the length of spleen was more than 11 cm.<sup>2</sup> Splenomegaly was seen in only 3 patients, one with tuberculosis and two with salmonellosis. All focal splenic lesions were hypoechoic. The ultrasonographic findings are in Table 1.

In patients with tuberculosis the focal splenic lesions were smaller than 1 cm (Fig. 1), except for one patient who had a single 1.5 cm lesion. Intra-abdominal lymphadenopathy was seen in almost all patients. Enlarged lymph nodes

were seen at the splenic hilum in one patient (Fig. 2). In another patient abscesses of the psoas muscles were seen (Fig. 3).

Salmonellosis was caused by *S. enteritidis* in 3 of our patients, *S. choleraesuis* in 2 patients, and an unknown species in 1 patient. Three patients had multiple focal splenic lesions smaller than 1 cm (Fig. 4). Another patient had a 1.5 cm splenic lesion. The two other patients had three splenic lesions, which were 2-4 cm (Fig. 5). Only one patient with salmonellosis had intra-abdominal lymphadenopathy.

The single patient with nocardiosis had multiple focal splenic lesions smaller than 1 cm (Fig. 6) and intra-abdominal lymphadenopathy.

Table 1. Causes of focal splenic lesions and ultrasonographic findings

Causes/Ultrasonographic findings	No. of patients
<i>M. tuberculosis</i>	7
Splenomegaly	1
Single focal splenic lesion	1
Two focal splenic lesions	1
Multiple focal splenic lesions	5
Intra-abdominal lymphadenopathy	6
Ascites	1
Abscesses of psoas muscles	1
<i>Salmonella species</i>	6
Splenomegaly	2
Single focal splenic lesion	1
Two focal splenic lesions	0
Three focal splenic lesions	2
Multiple focal splenic lesions	3
Intra-abdominal lymphadenopathy	1
Ascites	0
<i>Nocardia species</i>	1
Multiple focal splenic lesions	1
Intra-abdominal lymphadenopathy	1

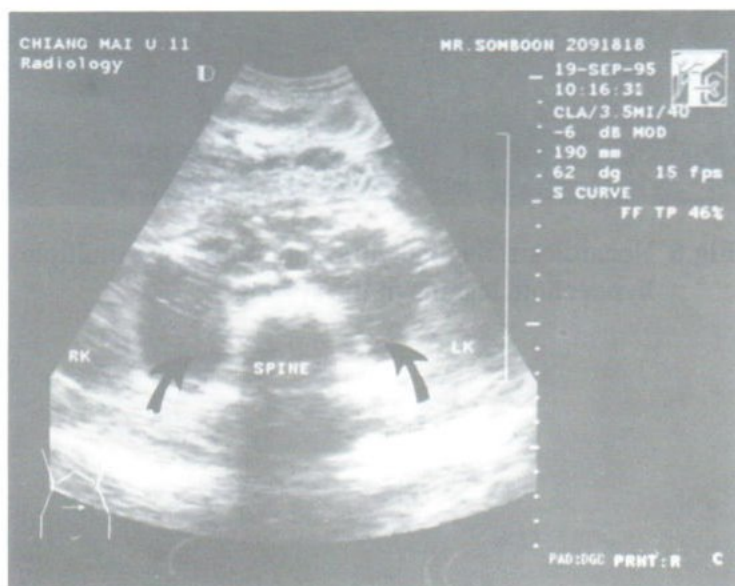




**Fig.1** Tuberculosis. Sagittal ultrasonogram shows multiple hypoechoic lesions in the spleen (K = left kidney).



**Fig.2** Tuberculosis. Sagittal ultrasonogram shows multiple hypoechoic lesions in the spleen. Note enlarged lymph nodes at the splenic hilum (arrows).



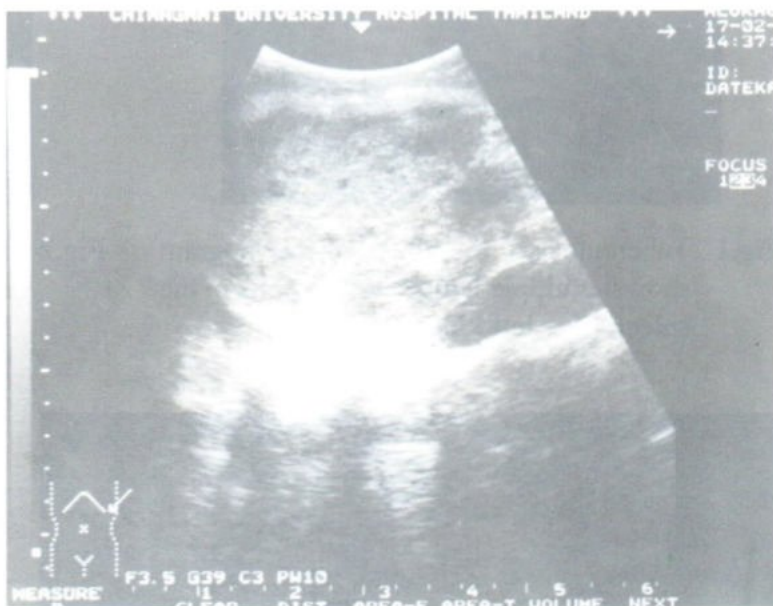
**Fig.3** Tuberculosis. Transverse ultrasonogram shows bilateral psoas abscesses (arrows) and enlarged retroperitoneal lymph nodes (RK = right kidney, LK = left kidney).



**Fig.4** Salmonellosis. Sagittal ultrasonogram shows multiple hypoechoic lesions in the spleen.



**Fig.5** Salmonellosis. Sagittal ultrasonogram shows three hypoechoic lesions 2-4 cm in the spleen.



**Fig.6** Nocardiosis. Sagittal ultrasonogram shows multiple hypoechoic lesions in the spleen.



## DISCUSSION

Before the AIDS epidemic splenic abscess was an uncommon disease. The most frequently cultured organisms from splenic abscess were *Streptococci*, *Staphylococci*, and *Salmonellae*.<sup>3</sup> The most common symptoms described were fever and abdominal pain.

Since the spread of AIDS worldwide, there has been an increase of splenic abscess in AIDS patients.<sup>4-8</sup> The reasons may be severe depletion of lymphoid tissue, as has been seen in the histopathology of the spleen in AIDS<sup>7,9</sup> and the common involvement of the spleen in systemic diseases.

The causes of focal splenic lesions in patients with HIV infection are infection and tumors. Hyperechoic splenic lesions have been reported in Kaposi sarcoma,<sup>5</sup> *Pneumocystis carinii* infection,<sup>10</sup> and *Mycobacterium avium-intracellulare* (MAI) infection.<sup>11</sup> Hypoechoic splenic lesions have also been reported in tuberculosis, MAI infection, fungal infection, lymphoma, and bacillary angiomatosis.<sup>5,11,12</sup>

In the abdomen tuberculosis can affect the gastrointestinal tract, peritoneum, lymph nodes, liver, spleen, or pancreas. Splenomegaly is the most common splenic involvement in tuberculosis.<sup>13</sup> Tuberculosis of the spleen usually occurs in the miliary form with nodules ranging from 0.5-2 mm in diameter, which cannot be detected on CT scans.<sup>14</sup> The macronodular form of splenic tuberculosis is extremely rare with multiple low-density masses on CT scans or hypoechoic masses on ultrasonograms.<sup>15</sup>

In a review of CT scans of 259 patients with HIV infection, low attenuation lesions in the spleen were found in 21% (55 patients).<sup>4</sup> The splenic lesions were almost always multiple. Three-fourths of the patients with splenic lesions smaller than 1 cm had tuberculosis. This is consistent with

ultrasonographic findings in most of our tuberculosis patients, who had multiple hypoechoic splenic lesions smaller than 1 cm. Murray et al. also found multiple small hypoechoic splenic lesions in ultrasonograms of 6 AIDS patients with tuberculosis.<sup>5</sup> Focal hepatic or splenic lesions are rare manifestations of MAI infection.<sup>6</sup> Even though it is not possible to distinguish between this infection and *M. tuberculosis* infection without cultures, tuberculosis should be considered first in endemic areas such as Northern Thailand.

Our series consisted of only 14 patients, too small for statistical analysis. However, HIV patients with tuberculosis tend to have multiple small hypoechoic lesions in the spleen with enlarged intra-abdominal lymph nodes.

Salmonellal splenic abscess in HIV-infected patients has been reported.<sup>16,17</sup> One patient had two splenic abscesses caused by *S. enteritidis*.<sup>16</sup> Another patient had an 11 cm splenic abscess caused by *S. typhimurium*.<sup>17</sup> Our patients had salmonellal splenic abscesses of varying sizes and numbers.

Nocardiosis is an uncommon opportunistic infection in HIV patients. *Nocardia* can cause lung disease and abscesses in various organs.<sup>18</sup> In our study we found only one nocardiosis patient with multiple hypoechoic splenic lesions and multiple enlarged intra-abdominal lymph nodes.

## CONCLUSION

The incidence of opportunistic infections and tumors in HIV patients varies geographically. In Northern Thailand, for HIV patients with focal hypoechoic lesions in the spleen, a diagnosis of tuberculosis, salmonellosis, or nocardiosis should also be considered.

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