

Intestinal Tuberculosis in AIDS

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Abstract. The radiological appearance of intestinal tuberculosis (IT) in six patients with AIDS is presented. Involvement of the ileocecal segment (five cases), cecum (four cases), and duodenum (one case) was seen on computed tomographic (CT) or barium studies. There were no significant differences in radiological manifestations of IT among patients with or without AIDS, but all six patients had an advanced stage of their disease at the time of diagnosis.

Key words: Intestine, tuberculosis — AIDS, complications — Abdomen, radiography.

The incidence of tuberculosis in Spain is still high, estimated at 60 cases/100,000 inhabitants/year [1]. Pulmonary tuberculosis is the most usual form. Intestinal tuberculosis (IT) is, however, rare in the general population due to improvements in sanitary conditions. Patients with immunosuppression, including those with AIDS, are particularly susceptible to tuberculosis infection, with a high rate of extrapulmonary tuberculosis (72%) [2]. In Spain, the incidence of tuberculosis in the AIDS population has been estimated at 30% [3, 4], rising to 67% in groups which include a high percentage of intravenous drug users (IVDU) and prisoners [4].

The present study describes the radiological findings of a series of six patients with AIDS and IT.

Materials and Methods

Six seropositive HIV males with IT were studied. They ranged in age from 24–46 years (mean 30 years). Their clinical history in-

cluded fever, diarrhea, and/or abdominal pain. All were IVDU and three were prisoners from penitentiaries. Following the diagnosis of IT, four of the patients developed other opportunistic infections included in the criteria for AIDS according to the Centers for Disease Control (CDC) [5].

The following examinations were performed: chest x-ray (6 patients), barium enema (6), enteroclysis (2), upper intestinal barium examination (2), and abdominal computed tomography (CT) (3). CT studies were performed with a Siemens Somatom DR3. Oral contrast material (3% Gastrografin and water) and intravenous contrast material (iohexol 64.7%) were given to the patients before the examination.

Tuberculosis was diagnosed by Ziehl-Neelsen staining or culture examination in sputum or cervical adenopathy in all cases. Material obtained by laparoscopy in one case and colonoscopy in another showed granulomata consistent with tuberculosis. A satisfactory clinical response was observed in all the patients following the administration of antituberculous therapy, although one patient had subocclusive symptoms requiring surgery during this period.

Results

Chest x-ray showed evidence of tuberculosis in four cases: a miliary pattern (N = 2) and mediastinic adenopathies (N = 2). No pathological images were found in the remaining patients. The barium studies showed involvement of the terminal ileum (N = 5), cecum (N = 4), and duodenum (N = 1). The lesions of the terminal ileum were limited to a short segment in all cases but one. Radiologic findings were as follows: fold thickening (4 cases), nodularity (5), marginal ulcerations (2), ileocecal spasticity (2), ileal stenosis with prestenotic dilatation (1), rigidity and incontinence of the ileocecal valve (4), and retraction of the cecum (3) (Figs. 1 and 2).

Abdominal CT was performed in three patients. Two of them had marked thickening of the terminal ileum and the medial wall of the cecum, as well as a mass effect in the ileocecal valve and regional adenopathies (Fig. 3). In the third case bulky peripancreatic adenopathies with low density centers and duodenal wall thickening were observed. A gas

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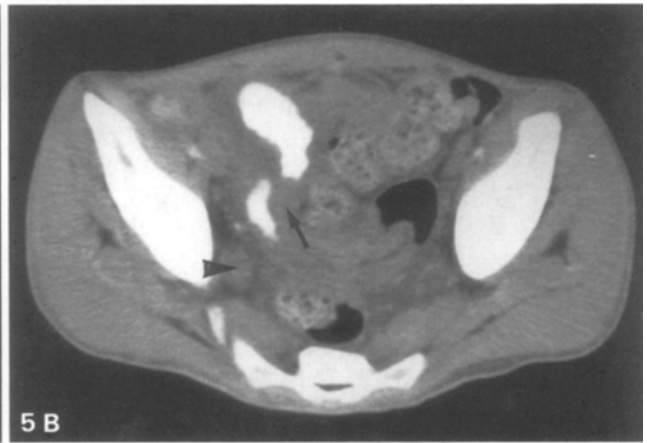
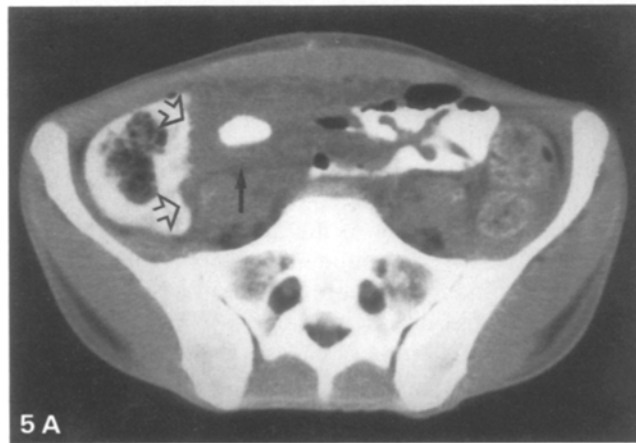
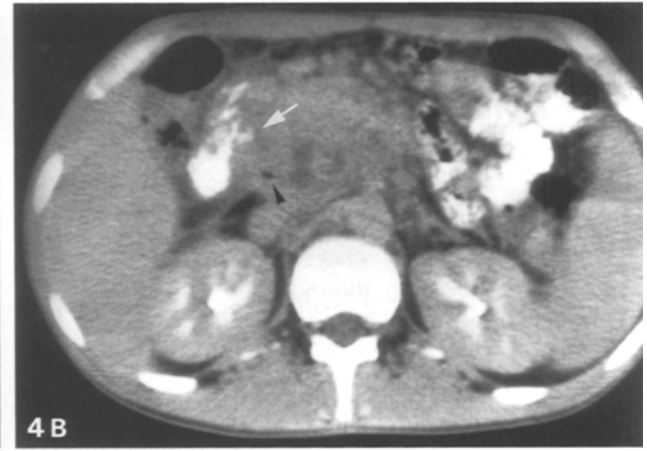
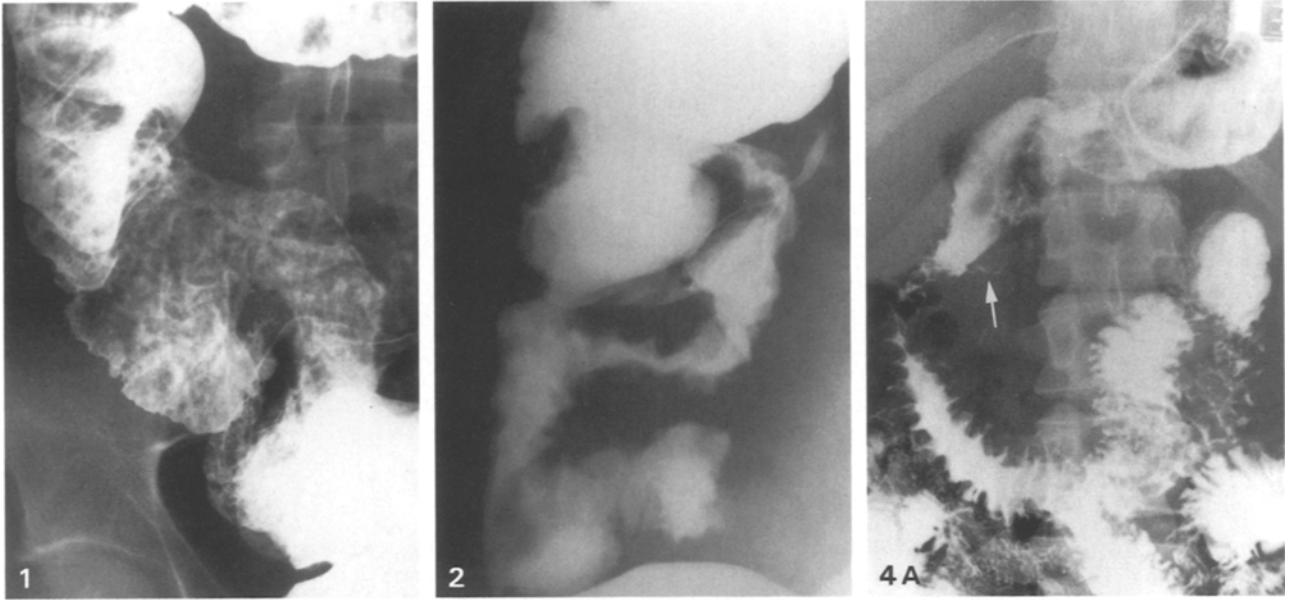


Fig. 1. Ileocecal tuberculosis in a patient with AIDS, causing mucosal inflammation and superficial ulcers. Note the gaping ileocecal valve.

Fig. 2. Barium enema examination in another patient with AIDS. Thickening and rigidity of distal ileum, deformity of the cecum, and nodular folds with ulcerations are visible.

Fig. 3. CT of the lower abdomen shows thickened and distorted walls of the ileocecal segment (arrows). There was evidence for regional mesenteric lymphadenopathy on this and other CT sections.

Fig. 4. Duodenal tuberculosis in AIDS. **A** Barium examination shows widening of the duodenal loop with thickened folds and a fistulous tract (arrow). **B** CT section at the same level reveals a bulky mass with hypodense areas due to lymphadenopathy. The fistulous tract contains some barium (arrow), as well as extraluminal gas bubbles (arrowhead).

Fig. 5. A, B Two CT sections of the lower abdomen demonstrate changes due to ileocecal tuberculosis in AIDS. A long segment of distal ileum is irregularly narrowed and has thick walls (arrows). The medial aspect of the cecum is also ulcerated and nodular (open arrows). Note the iliac adenopathy (arrowhead).

bubble adjacent to the second portion of the duodenum secondary to fistula formation was identified (Fig. 4). Ascites was present in one patient along with diffuse thickening and nodularity of the omentum and mesentery. Their biopsy at laparotomy showed extensive granulomatous infiltration. Extensive involvement of the distal ileum, cecum, and mesentery were also seen (Fig. 5), associated with adenopathy in the celiac area due to disseminated tuberculosis. Retroperitoneal adenopathies of smaller degree were seen in two other patients.

Discussion

A high incidence of tuberculosis has been found in HIV-seropositive patients [2, 4, 6]. The impairment of cellular immunity associated with HIV infection may be the cause of a high rate of disseminated and extrapulmonary tuberculosis [2, 4, 6–8]. This fact led the CDC to include this form of tuberculosis as indicative criteria for AIDS in 1987 [5]. Moreover, the Mantoux test is generally negative reflecting an anergic state [2, 4, 6], and fatal acute sepsis may appear [4]. Certain geographic areas with a high basal incidence of tuberculosis in addition to some depressed social groups, particularly IVDU, are especially susceptible to infection by *Mycobacterium tuberculosis* [2, 5, 6–8]. Furthermore, the intravenous use of heroine seems to act as an immunosuppressive agent, facilitating tuberculous dissemination [9, 10]. Tuberculosis generally appears several months prior to other opportunistic infections associated with AIDS, as found in this series. This fact demonstrates the aggressive character of *M. tuberculosis*, which becomes manifest in the early stages of immunosuppression [2, 6, 8].

Tuberculosis of the digestive tract involves the ileocecal area in 90% of the cases [11]. These patients generally present with chronic diarrhea, fever, abdominal pain (predominantly in the iliac fossa), and a mass in this area [12]. Radiological findings in the first stages are characterized by a thickened ileocecal valve with a wide aperture and submucosal nodules. Ulcers are frequently found in the mucosa of the ileocecal region. The cecum is usually involved with spiculation, stenosis, and retraction. If the process evolves, the terminal ileum may become fibrotic, the ileocecal valve rigid and incompetent, and the cecum retracted and deformed [13–17].

These findings are nonspecific and raise the differential diagnosis with Crohn's disease. However, in tuberculosis the cecum is usually retracted and the ileocecal valve rigid and incompetent, whereas in Crohn's disease, the cecum is usually not involved and the ileocecal valve is competent [17].

In the colon, tuberculosis may produce a short "carcinoma-like" stenotic segment [12]. Rarely, the duodenum is involved. Fold thickening and widening of the duodenal loop may be observed in these cases. Duodenal fistulas may suggest tuberculous origin [13].

Although extrapulmonary forms of tuberculosis in AIDS are frequent, references regarding ileocecal tuberculosis are scarce [18–20]. Clinical presentation, endoscopic findings, and barium studies are not significantly different from classical forms not associated with AIDS.

In less advanced cases of tuberculosis, CT findings include mild symmetric thickening of the walls of the cecum and terminal ileum and small regional adenopathies. These features are nonspecific. However, in the most severe cases of tuberculosis CT findings are more characteristic: (a) the thickening of the cecal wall tends to be more prominent and asymmetric, and predominates in the medial wall and (b) a central mass may be found in the ileocecal valve with entrapment of the terminal ileum also involved [20]. Low density lymphadenopathies are often associated, supporting tuberculosis etiology.

A greater thickening of the intestinal wall and greater regional adenopathies are observed in AIDS patients with ileocecal tuberculosis in comparison to patients without AIDS [20]. No other radiological differences were noted between the two groups. In patients with AIDS it is common to find tuberculosis in segments of the digestive tract where the disease would normally not be found. For instance, one of our patients had duodenal tuberculosis. Likewise, cases of exclusive gastric [21] or rectal [22] involvement have been described.

In patients with IT, CT allows the assessment of disseminated forms of the disease. Involvement of the peritoneum, lymphatic ganglia, and solid viscera (such as the liver and spleen) may be observed. Peritoneal involvement presents as ascitic fluid, either free or loculated and occasionally is hyperdense (20–45 HU). There may also be an increase in density of the mesentery and omentum showing a stellate pattern, multiple small and irregular nodules, or mass formation [23–26]. One of our three patients studied by CT presented disseminated lymphadenopathies and tuberculous peritonitis.

The presence of multiple adenopathies is a frequent finding in an abdominal examination, predominantly in the peripancreatic area, mesentery, and near the involved intestinal segments [20, 26]. These adenopathies present hypodense centers in up to 40–70% of cases [26, 27] and peripheral enhancement following contrast injection [23, 24, 26–28]. The low density centers are probably due to necrotic caseation.

Therefore, abdominal tuberculosis can manifest with various findings that are often nonspecific. Ileocecal involvement in AIDS patients must be differentiated from that produced by Crohn's disease, lymphoma, and Kaposi's sarcoma [29, 30]. Nevertheless, CT allows the detection of abdominal and extraintestinal findings supporting the diagnosis of tuberculosis.

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