



Spectrum of Computed Tomography Findings in Abdominal Tuberculosis in a Tertiary Care Center: Case Series

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Abstract

Abdomen is the most common site of involvement in extra intestinal tuberculosis; it is more common in patients with immunosuppression or HIV. It is important to diagnose the abdominal involvement early and high degree of suspicion is required for diagnosis. In this case series the different manifestations of abdominal tuberculosis in CT are described with classic imaging findings in fifty patients. It is also important to differentiate abdominal tuberculosis from the inflammatory bowel disease. Imaging plays an important role in diagnosing the abdominal involvement and early treatment which will help in reducing the morbidity and mortality.

Keywords: Abdominal Tuberculosis, Contrast enhanced computed tomography

Introduction

Tuberculosis has a spectrum of clinical and imaging findings. Clinical features are often non-specific in case of abdominal tuberculosis. Most commonly seen in the immuno-compromised population. So, imaging plays an important role in the diagnosis of abdominal tuberculosis. In this case series we highlight the spectrum of typical imaging findings affecting different parts of abdomen.

Figures

Materials and Methods:

After obtaining the approval of institution board and retrospectively we reviewed CT findings of fifty patients with histopathologically diagnosed abdominal tuberculosis after informed consent. The cross-sectional imaging findings are reviewed between January 2019 to August 2021. The clinical details were recorded from the electronic medical record.

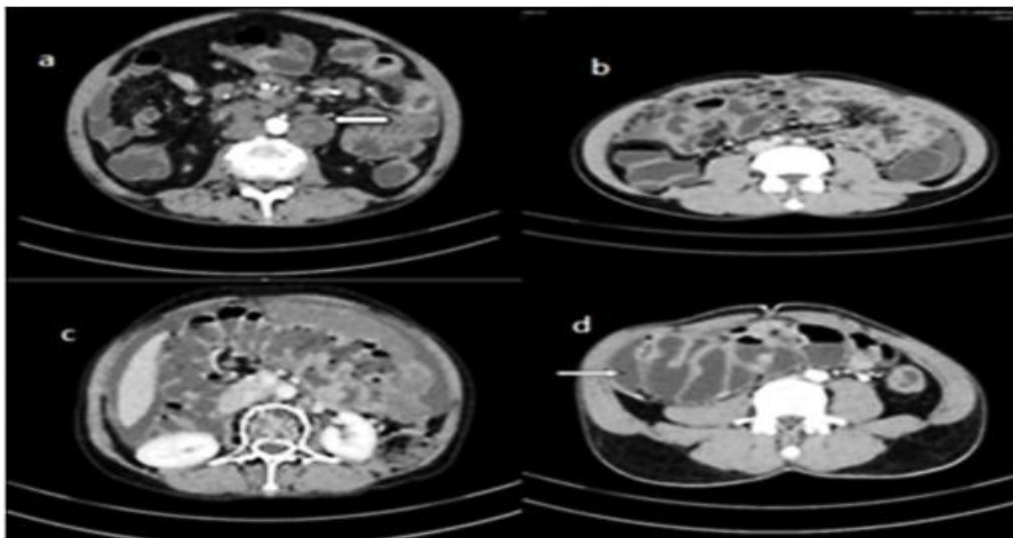


Fig 1: CECT abdomen axial section a) in a 24-year-old male patient, showing multiple necrotic mesenteric and para-aortic lymph nodes (Arrow). b) In a 50-year male patient showing omental thickening and caking with ascites. c) In a 23-year-old female patient, showing ascites, this is wet type of peritoneal TB. d) In a 36-year-old male patient, showing omental thickening and cocoon formation (Arrow)

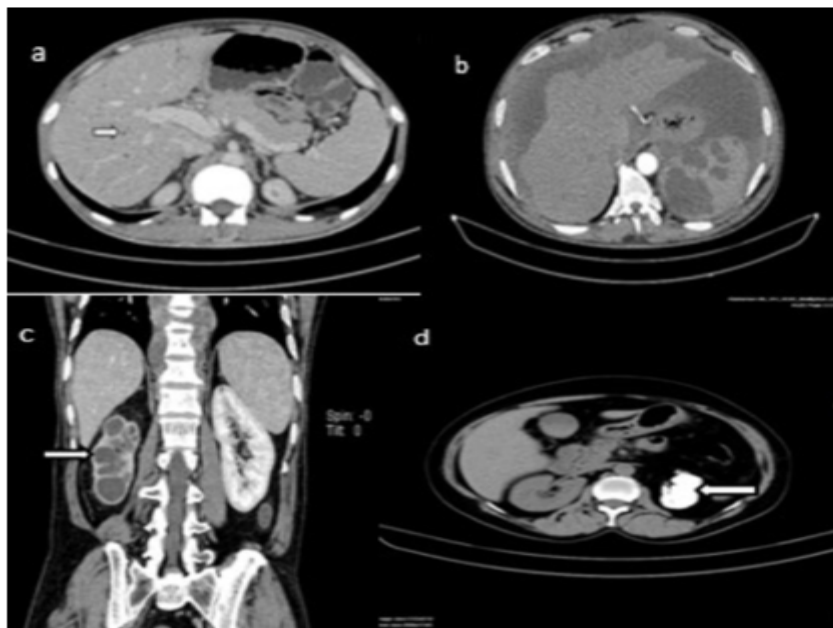


Fig 2: CECT abdomen a) In a 35-year-old male patient axial image showing non-enhancing, multiple low attenuating granulomatous lesions in liver. b) In a 53-year-old male patient axial image showing multiple well defined, lobulated hypoattenuating lesions of varying sizes with gross ascites and scalloping of the liver and spleen. c) In a 38-year-old man coronal reformatted image showing comparatively small right kidney with caliectasis, cortical scarring and cortical thinning with narrowed calibre and wall thickening of right ureter and renal pelvis (Arrow). In the FOV: also, bilateral paraspinal collection. d) NCCT in a 57-year male patient axial section showing putty kidney

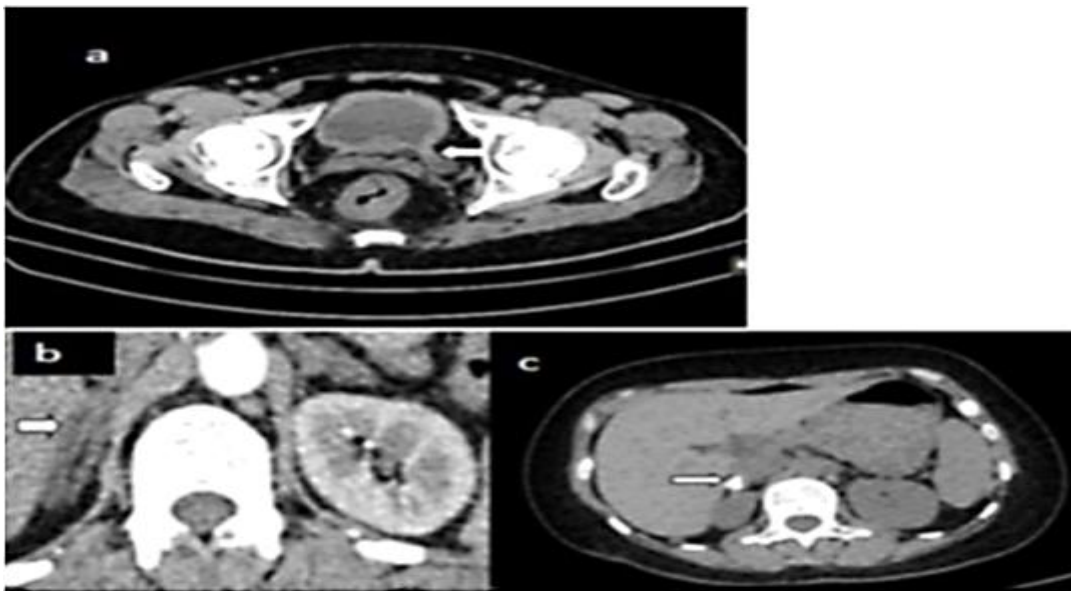


Fig 3: a) Axial NCCT shows left distal ureteric stricture causing upstream moderate hydronephrosis (Arrow) with thickened and irregular urinary bladder wall. b) In a 20-year-old female patient known case of abdominal tuberculosis CECT abdomen, axial image showing bulky right adrenal gland (Arrow). c) In a 51-year-old female patient known case of abdominal tuberculosis NCCT shows right adrenal gland enlargement and dense

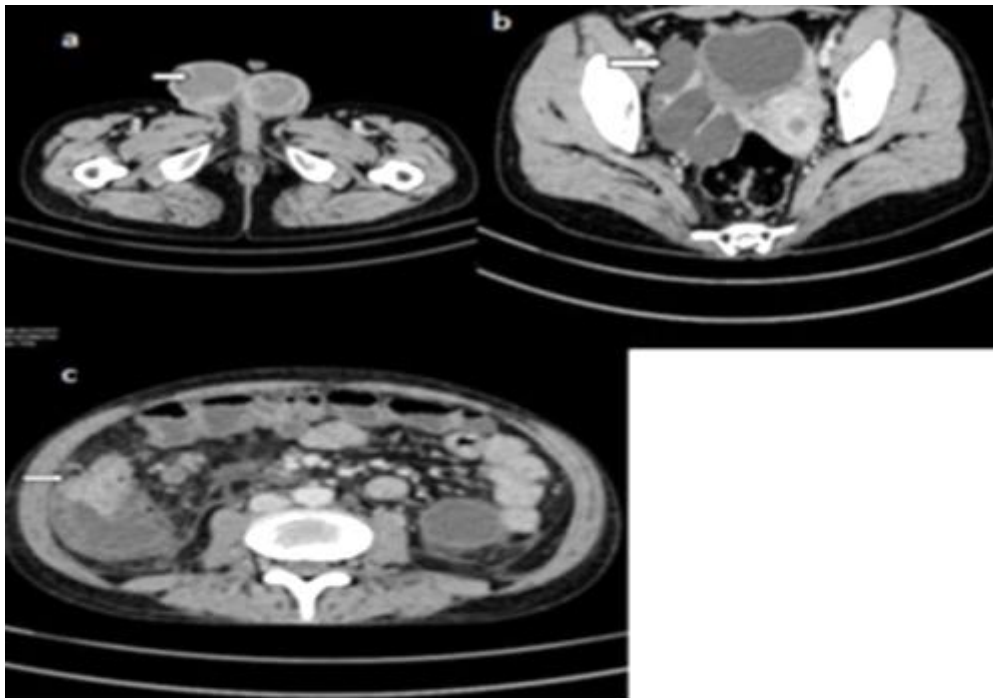


Fig 4: a) In a 55-year-old male patient known case of abdominal tuberculosis CECT pelvis, axial image showing bilateral epididymo-orchitis. b) In a 20-year-old female patient CECT axial image showing right sided hydro salpinx (Arrow). c) CECT axial image in a 57-year-old female patient showing asymmetric, enhancing wall thickening involving the terminal ileum, ileocecal junction with adjacent necrotic mesenteric lymphadenopathy. (Arrow)

Discussion:

Lymph Nodes

Lymph node involvement is the commonest presentation of abdominal tuberculosis. Omental, peripancreatic, celiac and mesenteric lymphoid tissue chains are most typically involved. The lymph nodal involvement can present with multiple normal sized lymph nodes to massive conglomerated or matted lymph nodes with periadenitis and adhesion.

On non-contrast CT scan the lymph nodes may show low attenuation values. With contrast administration, different patterns of nodal morphology are seen.

Common pattern includes those showing peripheral enhancement and central non-enhancing areas because of caseous necrosis (Fig 1a). Another pattern is heterogeneous enhancing lymph nodes because of intranodal granulomas and fewer necrotic areas. ^[1]

Peritoneum

Involvement is haematogenous, secondary to rupture of lymphatic tissue, gastrointestinal dissemination or fallopian tubal involvement in females.

It is subdivided into three main types, wet type, dry and fibrotic and types.

Fibrotic Type:

It is seen as matting of bowel loops with large omental and mesenteric cake like masses with loculated fluid collections. ^[1] (Fig 1b)

Wet Type:

It is the most common type seen in 90% of cases. Imaging findings includes large ascites or as loculated collections. The HU of ascitic fluid is slightly more [20-40 HU] due to its high cellular and protein content. (Fig 1c)

Dry Type:

Findings in dry type includes fibrous adhesions, smooth and regular thickening of mesentery and caseous nodules. ^[1]

Abdominal 'cocoon' could even be considered a fourth variety of peritoneal TB. (Fig 1d)

Hepatic Tuberculosis:

Isolated involvement of liver is rare. Liver involvement in tuberculosis is divided into two,

hepatic miliary tuberculosis [micro nodular type] is the commonest type and associated with diffuse enlargement hematogenous dissemination and second type is abscess or tuberculoma of liver. On CT, hepatosplenomegaly is seen in miliary and small hypodense lesions are seen sometimes. ^[2] (Fig 2a)

Splenic Tuberculosis:

It is commonly involved with hepatic TB and imaging features are similar. Splenomegaly with small hypodense lesions is seen in miliary forms. Single or multiple larger nodules or masses are seen in macronodular form that are hypodense on CT and show showing peripheral enhancement on post contrast CT images. ^[2] (Fig 2b)

Pancreas:

Involvement in tuberculosis is unusual and rare. It presents as multiple cystic components within a solitary lesion, located typically in the head region. Also associated with peripancreatic lymph nodal enlargement. ^[2]

Renal Tuberculosis

Imaging features are divided into pelvicalyceal system changes and renal parenchymal changes.

The most characteristic imaging finding is uneven caliectasis due to varying degree of fibrosis and obstruction at different sites. ^[3]

Dilated calyx filled with fluid attenuation of HU between 1 to 10, caseation and debris have HU between 10 to 30, putty kidney has HU between 50 to 120 and calculi has HU more than 120.

Early parenchymal changes are papillary necrosis and granulomas of size less than 3 mm.

Other commonest finding is cavitary lesion adjacent to calyx with cortical thinning. Advanced disease has features of cortical scarring which can be focal or diffuse with features of non-functioning kidney. Renal parenchymal calcifications are commonly seen. ^[4] (Fig 2c, d)

Bladder And Urethra

Bladder is involved due to spread of infection downward along the ureters. Bladder becomes distorted in shaped with ragged walls and shrinks in the end stage. CT shows thickened and trabeculated bladder, shrunken in size. In advanced stages fibrosis

of the ureteral orifice cause vesicoureteral reflux. [5] (Fig 3a)

Adrenal Tuberculosis

Involvement of adrenal gland is the most common cause of Addison's disease. Imaging findings includes enlargement, central necrotic areas or calcifications in unilateral or bilateral adrenal glands. [5] (Fig 3 b, c)

Genital Tuberculosis

In male patients with genital tuberculosis, seminal vesicles or prostate are mainly involved. On contrast CT hypo attenuating areas are seen which represent inflammation and caseous necrosis. [1] (Fig 4a)

In females with genital tuberculosis fallopian tube is most commonly affected. This can cause salpingitis which is always bilateral. (Fig 4b)

Gastrointestinal Tract

Intestinal tuberculosis:

Ileocecal region is the most common location in GI tuberculosis The stomach, esophagus, and duodenum are rarely involved. [6]

There are three patterns of lesion with includes small sub-mucosal ulcers, pseudo nodular hypertrophic lesions or both.

Ileocecal Tuberculosis:

Ileocecal region is the most common location because of abundant lymphatic tissue and lymphatic stasis. In CECT we can look for both intra and extra luminal involvement. Asymmetrical wall thickening of the ileocecal region the ileocecal region and medial wall of colon is the most frequent finding seen. May be associated with dilatation of the proximal intestine. [7] (Fig 4c)

In advanced stages, symmetrical stenosis, tethering and shortening associated with obstruction. Later retraction of cecum into the hepatic flexure seen.

Oesophageal involvement manifests as esophagitis, mucosal thickening, ulcers, plaques, fistulae formation and stenosis. [7]

Gastric tuberculosis reveals regional lymphadenopathies and benign ulcers. In later stages features of pyloric stenosis with distortion of antropyloric region can be seen on imaging. [7]

In duodenal tuberculosis thickening of the mucosa, adjacent lymphadenopathy and mesenteric thickening is seen on CT. [7]

In Jejunal tuberculosis CT imaging shows nonspecific findings like ulcers, thickening of folds and stenosis is seen. [7]

Conclusion

In our case series majority of the patients had lymph nodal and bowel involvement followed by peritoneum. Imaging plays an important role in diagnosing abdominal tuberculosis. As radiologists have an important role in interpreting different imaging findings of abdominal tuberculosis which helps in early treatment and reduce the patient morbidity. CECT plays an important role in detecting the visceral, peritoneal tuberculosis or lymph nodal involvement. It also helps to decide on management of patients and also in follow up.

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