

# Ultrasound Findings in Abdominal Tuberculosis: Usual and Unusual Appearances

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**Abstract:** ***Introduction:** Tuberculosis is a disease whose incidence has increased day by day in developing countries. Tuberculosis infection of abdomen involves peritoneum & its reflections, gastrointestinal tract, lymphatics and solid organ. Early recognition of abdominal tuberculosis is essential by its usual and unusual findings to reduce morbidity. **Material and Methods:** Study was conducted in GCS medical college, Ahmedabad and includes 50 abdominal tuberculosis patients over a period of 6 months from April 2019 to September 2019. Abdominal ultrasound was done by convex and linear probes of Logic P5 of GE. **Result:** In Intestine type, bowel wall thickening was seen in 42 % cases, ulceration in 6% cases, pseudo kidney sign in 10 % cases and String sign of kantor in 8 % cases. In extra intestinal type ascitis was seen in 60 % cases, peritoneum involvement in 40 % cases and Lymphadenopathy in 70 % cases, hepatic involvement in 14 % cases and splenic involvement in 10 % cases. **Conclusion:** As abdominal tuberculosis has non specific symptoms, usual and unusual findings are necessary for early diagnosis of infection, so ultrasonography of abdomen used as a primary screening imaging for diagnosis of tuberculosis infection.*

**Keywords:** Abdominal tuberculosis, ultrasonography

## 1. Introduction

Tuberculosis is a disease whose incidence has increased day by day in developing countries. Abdomen is 6<sup>th</sup> most common site of extra pulmonary tuberculosis infection. Tuberculosis infection of abdomen involves peritoneum & its reflections, gastrointestinal tract, lymphatic and solid organ. Only 15% of patients with abdominal tuberculosis have pulmonary disease. Disease is relatively common in young adults and slight female predominance.

## 2. Material and Methods

Study was conducted in GCS medical college, Ahmedabad and includes 50 abdominal tuberculosis patients (30 females & 20 males) over a period of 6 months from April 2019 to September 2019. Abdominal ultrasound was done by convex and linear probes of Logic P5 of GE.

## 3. Results

Out of 50 patients, 30 were females and 20 were male patients. Among these 8 patients had HIV infection. Most common ultrasound findings were lymphadenopathy, bowel wall thickening and ascitis.

In 7 cases hepatic involvement was observed in form of liver enlargement in 5 cases and calcified granuloma in 2 cases. Out of 5 cases with hepatomegaly, abscess were seen in 3 patients. Out of these 3 patients, 2 patients had HIV infection.

**Table:** USG findings among 50 patients of abdominal tuberculosis.

Findings	No. of patients	Percentage %
<b>A) INTESTINAL TYPE</b>		
<b>Bowel wall thickening</b>	21	42
1. Involvement of terminal ileum, IC junction and cecum	16	32
2. Involvement of isolated ileum	3	6
3. Involvement of ascending & transverse colon	2	4
<b>Ulceration</b>	3	6
<b>Pseudo kidney sign</b>	5	10
<b>String sign of kantor</b>	4	8
<b>B)EXTRAIESTINAL TYPE</b>		
<b>Ascitis</b>	30	60
1. Free ascitis	24	48
2. Loculated ascitis	4	8
3. Localized ascitis	2	4
<b>Peritoneum</b>	20	40
1. Peritoneal thickening	14	28
2. Peritoneal tubercules	6	12
<b>Lymphadenopathy</b>	35	70
1. Discrete	21	42
2. Conglomerated	10	20
3. Cold abscess	4	8
<b>Hepatic involvement</b>	7	14
<b>Splenic involvement</b>	5	10

In 5 cases splenic involvement was observed in form of spleen enlargement in 4 cases and calcified granuloma in 1 case. Out of 4 cases with splenomegaly, abscesses were seen in 3 patients. Out of these 3 patients, 2 patients had HIV infection.

**Abdominal tuberculosis appeared as combination of intestinal and extra intestinal manifestation with some unusual findings as described below:**

Adhesion and layering of bowel loops on one another giving

rise to MULTILAYERED SANDWICH APPEARANCE, seen in 3 cases.

Sub – acute or chronic obstruction was seen in 3 cases. Thickened mesentery with STELLATE SIGN was seen in 4 patients.

#### 4. Discussion

Abdominal tuberculosis infection is relatively common in young adults with slight female predominance.

Most common ultrasound findings were lymphadenopathy, bowel wall thickening and ascites.

Abdominal tuberculosis infection had intestinal and extraintestinal manifestation.

##### 1) Intestinal Manifestation:

According to study of ledar & low et al, intestine was involved in 66% to 79% cases. In our study intestine was involved in 66% cases. Bowel wall thickening noted in 21 cases in which ileocecal junction was most commonly affected because of abundance of lymphoid tissue. Terminal ileum, ileocecal junction and cecum were involved in 16 cases. Isolated ileum was involved in 3 cases.

Ascending colon and transverse colon was involved in 2 cases in form of multiple stricture.

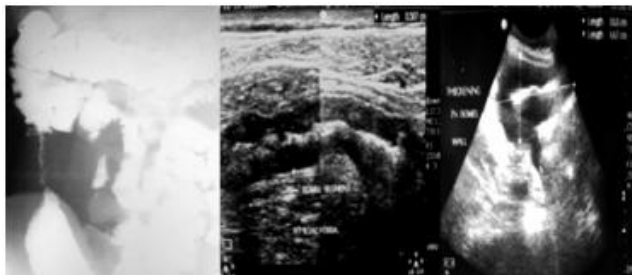


Figure 1: String sign and pseudo kidney sign

Marked luminal narrowing giving rise to STRING SIGN OF KANTOR was observed in 4 cases. Marked bowel wall thickening resulting central echogenic strip giving rise to PSEUDOKIDNEY SIGN due to pulled up ileocecal region in subhepatic region was observed in 5 cases. Ulceration was observed in only 3 cases compared to 7% cases in kedar et al study.



Figure 3: Peritoneal thickening

##### 2) Extraintestinal Manifestation

Include Peritoneal Cavity, Peritoneum & Its Reflection, Mesentery, Lymphnodes, Liver And Spleen.

##### I) Peritoneal Cavity

Ascites was seen in 60% cases compared to 45% cases of kedar et al study. Most commonly free ascites type was observed in 48% cases. Out of these septae in ascetic fluid was seen in 30% cases & internal moving echoes and debris was seen 18% in cases. Loculated ascites was observed in 8% cases. Uncommon type of ascites – inter bowel fluid was observed in 4% cases.



Figure 2: Ascites

Apart from characterization of ascites USG can also helpful for guiding aspiration for biochemical analysis. Ascitic fluid shows low serum ascites albumin gradient (SAAG : <1.1 mg/dl) & increased level of adenosine deaminase (ADA) and lymphocytes.

There are three types of peritoneal involvement based on amount of ascites & associated feature:

- Wet type: most common type, gross free or loculated ascites.
- Fibrotic –fixed type: less common, with matted bowel loops, mesenteric masses and loculated ascites.
- Dry-plastic type: rare, nodular dense fibrotic reaction of peritoneum.

Sclerosing encapsulating peritonitis or cocoon is another rare feature of peritoneal tuberculosis in which part of entire bowel loops is encalculated by fibrocollagenous membrane.

##### II) Involvement of Peritoneum & Its Reflection and Mesentery

According to kedar et al study peritoneal thickening seen in 15% cases and peritoneal nodule / tubercles / granuloma in 3% cases. In our study peritoneal thickening was observed in 28 % cases and granuloma in 12% cases which was least common.

Fixed loops of bowel & mesentery standing out as spokes radiating out from mesenteric root – STELLATE SIGN was seen in 4 patients in our study.

### III) Lymphnodes

According to Hopwell et al study, lymphadenopathy is commonest finding. Lymphadenopathy was seen in 55% cases in Hopwell et al study. In our study lymphadenopathy was observed in 70% cases which were most common finding.



Figure 4: Enlarged lymphnodes

Most common site of lymphnodes were in RIF, pre & para aortic and central mesenteric region. In our study, conglomerated nodes were observed in 20% cases & discrete nodes in 42% cases and cold abscess in 8 % cases. There are different nodal patterns seen in tuberculosis like, conglomerated matted, necrotic and homogeneously hypoechoic. All show absence of central vascularity in color doppler study as they have loss the central normal hilum.

### IV) Liver

In 7 cases hepatic involvement was observed in form of hepatomegaly in 5 cases (abscess in 3 patients) & calcified granuloma in 2 cases patients.



Figure 5: Liver abscess

Out of these 3 patients, 2 patients had HIV infection compared to Agrawal et al study in which hepatic abscess was seen in 11% cases of HIV positive patients with abdominal tuberculosis.

### V) Spleen

In 5 cases splenic involvement was observed in form of spleen enlargement in 4 cases and calcified granuloma in 1 case.



Figure 6: Splenic abscess

Out of 4 cases with splenomegaly, abscess were seen in 3 patients. Out of these 3 patients, 2 patients had HIV infection in our study compared to Agrawal et al study in which splenic abscess was seen in 25% cases of HIV positive patients with abdominal tuberculosis.

**Combination of intestinal and extraintestinal manifestation of abdominal tuberculosis:** Can be seen due to ascites, lymphadenopathy, thickened mesentery and peritonitis. Adhesion and layering of bowel loops on one another giving rise to MULTILAYERED SANDWICH APPEARANCE was seen in 3 cases.

Sub – acute or chronic obstruction was seen in 3 cases.

Due to adhesion of bowel loops, lymphatic enlargement, ascites, thickened mesentery & peritonitis resulting complex bowel mass which was observed in 4 cases.

## 5. Conclusion

As abdominal tuberculosis has non specific symptoms, usual and unusual findings are necessary for early diagnosis of infection, so ultrasonography of abdomen is used as a primary screening tool for diagnosis of tuberculosis infection.

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