

Abdominal tuberculosis – a pictorial review

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Topic: Diagnostic / GI Tract / Other

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Urinary Tract Infections [C12.777.892]

Tuberculosis, Lymph Node [C15.604.315.809]

Keywords: Computed tomography, Gastrointestinal tuberculosis, Urinary tuberculosis, Lymph node tuberculosis

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1. Learning Objectives

Learning objectives

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ABDOMINAL TUBERCULOSIS – A PICTORIAL REVIEW –

Antunes C., Rodrigues L., Ruivo C., Rodrigues H., Teixeira L., Cruz F.,
Caseiro-Alves F.

Learning objectives

- ⦿ Remember, describe and illustrate the imaging findings of abdominal tuberculosis in computed tomography (CT)
- ⦿ Indicate the main differential diagnosis.

2. Background

Background

Background

- ⊙ Tuberculosis keeps on being a public health problem as its prevalence is increasing due to immunocompromised patients.
- ⊙ It is a systemic disease which affects more frequently the lungs and pleura but, less commonly, it can affect abdominal organs.

3

Background

- ⊙ It is a fatal disease in all of the world, namely in underdeveloped countries. One third of the world's population is infected by this bacteria.
- ⊙ Therefore, Portugal continue to be one of the occidental European country with an important incidence of tuberculosis.

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3. Imaging Findings/Procedure Details

Imaging findings

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A presentation slide with a dark background and a light gray curved design on the right side. The title "Gastrointestinal tuberculosis" is centered at the top in a bold, yellow font. Below the title, there are three bullet points in white text. A small number "6" is visible in the bottom right corner of the slide area.

Gastrointestinal tuberculosis

- Any segment of bowel may be affected by *Mycobacterium tuberculosis*
- Ileocecal region is more frequently involved by the disease because it is rich in lymphoid tissue.
- 20-25% of cases have pulmonary tuberculosis

Gastrointestinal tuberculosis

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 - Circumferential or eccentric wall thickening of the segment of bowel affected
 - Typically, this mural thickening involve the terminal ileum and the ileocecal valve. When eccentric, affects the medial wall of the cecum
 - Frequently associated with low-density lymphadenopathy and peritonitis.

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Gastrointestinal tuberculosis

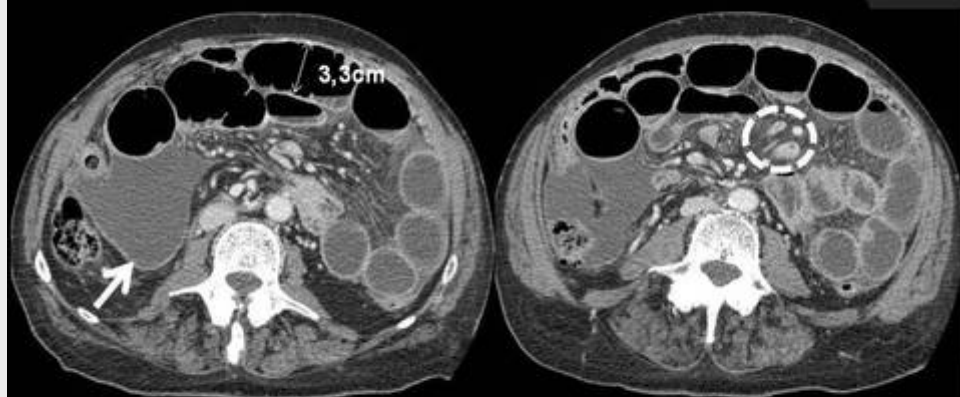
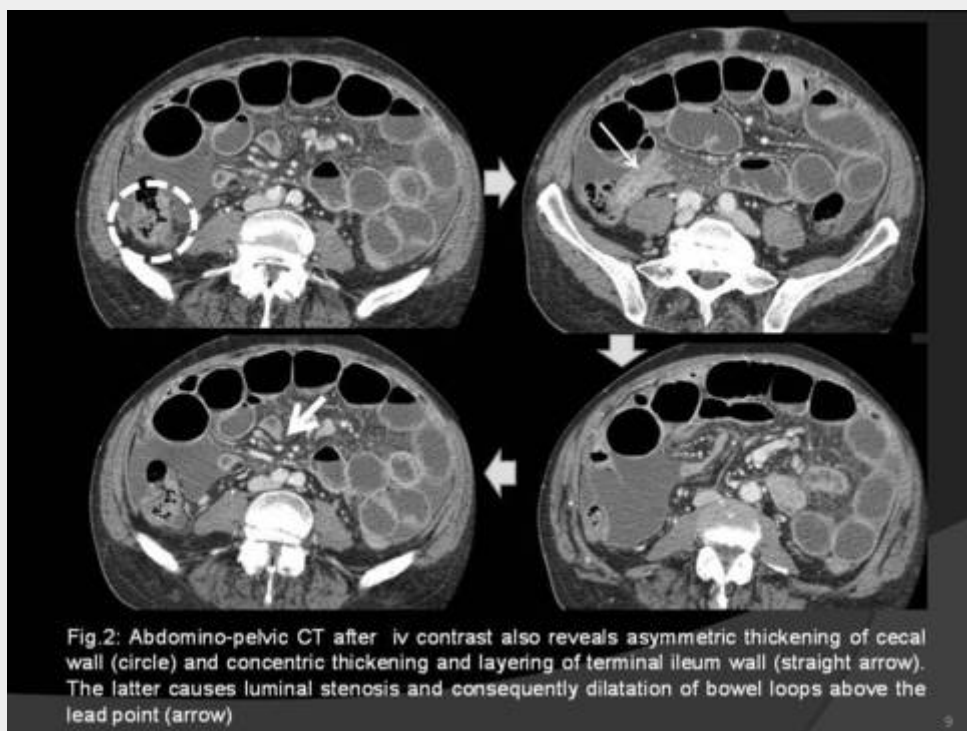


Fig.1: Man, 77 years old with fever, abdominal pain, vomiting and constipation. Abdomino-pelvic CT after iv contrast shows ascitis, thickening and enhancement of peritoneum (arrow), dilated bowel loops and mesenteric lymph nodes. Lymphadenopathy with heterogeneous enhancement (circle)

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Gastrointestinal tuberculosis



Gastrointestinal tuberculosis

- ⊙ Differential diagnosis:
 - Crohn disease
 - Other infectious causes of enteritis
 - Primary intestinal neoplasm ++ lymphoma

11

Lymph Node Tuberculosis

- ⊙ Most common manifestation of abdominal tuberculosis
- ⊙ Multiple groups of abdominal lymph nodes are involved simultaneously by infection.
- ⊙ Mesenteric and peripancreatic lymph nodes are typically affected and generally don't cause intestinal or biliary obstruction.

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Lymph Node Tuberculosis

◎ Abdomino-pelvic CT (fig.4, 5 and 6):

- Enlargement of lymph nodes
- Central low - attenuation due to caseous necrosis and peripheral rim enhancement.
- Less frequently, there are an increased number of abdominal lymph nodes, which may have homogeneous enhancement - more unspecific
- Residual disease manifests as calcified lymph nodes

13

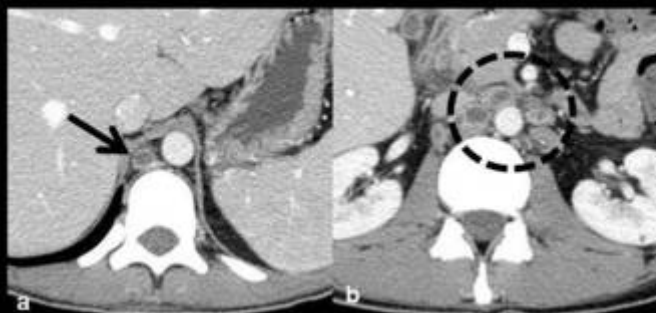
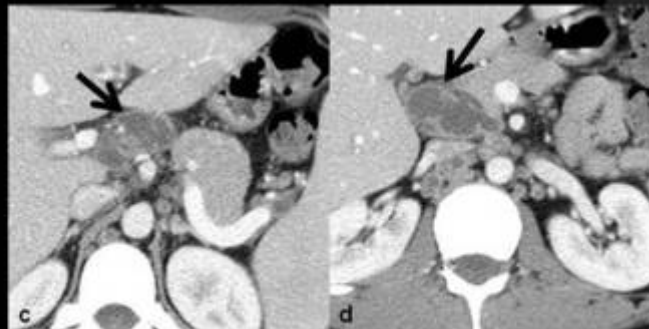


Fig.4: Abdominal CT after iv contrast – axial planes. Lymph nodes enlargement with a low-density center and a peripheral enhancement. a – retrocrural, b- lombo-aortic, c and d- peripancreatic lymphadenopathy



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Lymph Node Tuberculosis



Fig.5: Abdominal CT after iv contrast – coronal planes – discloses better the mesenteric lymphadenopathy (b) and the extension of disease, namely in peripancreatic (a,b) and lombo-aortic (c) areas.

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Lymph Node Tuberculosis –residual disease

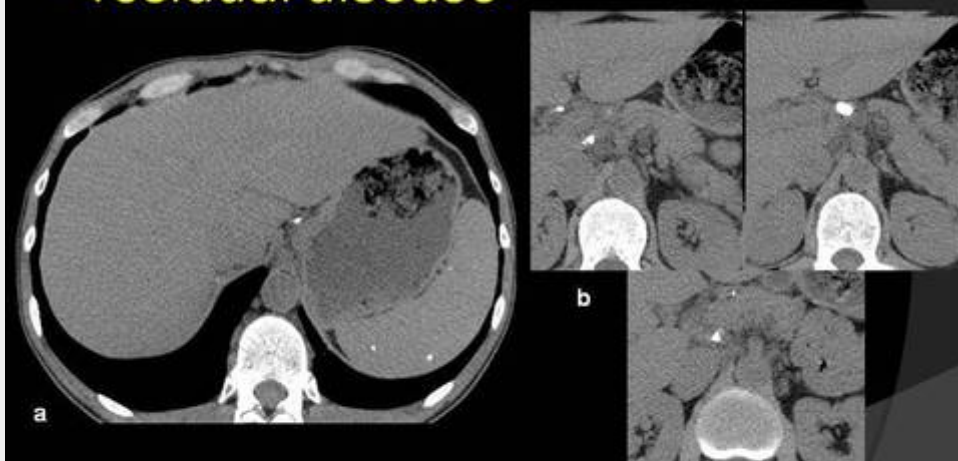


Fig.6: Man, 45 years old, with history of splenic and lymph node tuberculosis. Abdominal CT before iv contrast shows small calcified granulomas in spleen (a) and calcified lymphadenopathy, namely in the peripancreatic area (b).

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- ⊙ Differential diagnosis:
 - Lymphoma
 - Whipple disease
 - Lymphadenitis by *Mycobacterium avium-intracellulare* or *Staphylococcus aureus*
 - Necrotic metastases

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Tuberculous Peritonitis

- ⊙ Involvement of peritoneum frequently occurs together with lymph nodes and/or bowel disease.
- ⊙ Three types of tuberculosis peritonitis are described:
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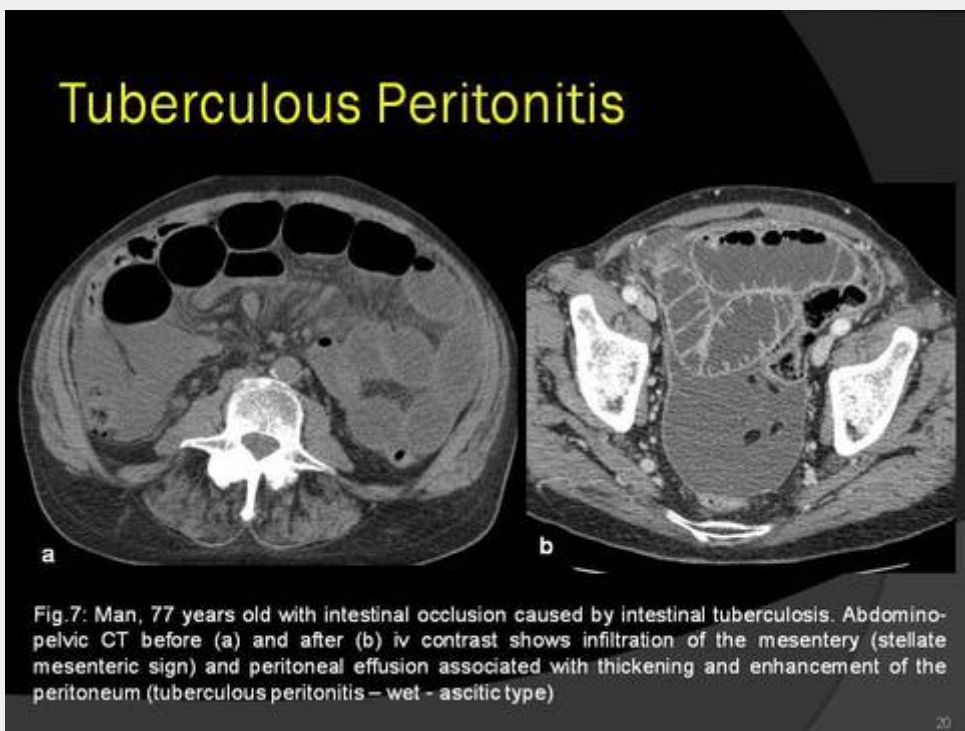
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Tuberculous Peritonitis

- ⊙ Abdomino-pelvic CT:
 - Dry-plastic type:
 - Caseous nodules
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 - Fibrous adhesions
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 - Carcinomatosis
 - Malignant mesothelioma
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Hepato-splenic Tuberculosis

- ⊙ In the setting of pulmonary or intestinal tuberculosis
- ⊙ Three patterns of hepato-splenic disease are known:
 - Miliary pattern – more common
 - Macronodular pattern – tuberculomas or abscesses
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Hepato-splenic Tuberculosis

⊙ Abdomino-pelvic CT:

- Miliary pattern (fig.8,9):
 - Hepatosplenomegaly
 - Multiple scattered hypodense parenchymal nodules
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 - Tuberculoma: one or more low-attenuation parenchymal nodules; size of nodules > 2 cm
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Hepato-splenic Tuberculosis

- Parenchymal calcification – calcified granulomas in end-stage disease (fig.10b,11)

⊙ Differential diagnosis:

- Lymphoma
- Sarcoidosis
- Fungal infection
- Hypovascular / necrotic metastases
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Hepato-splenic Tuberculosis - miliary pattern

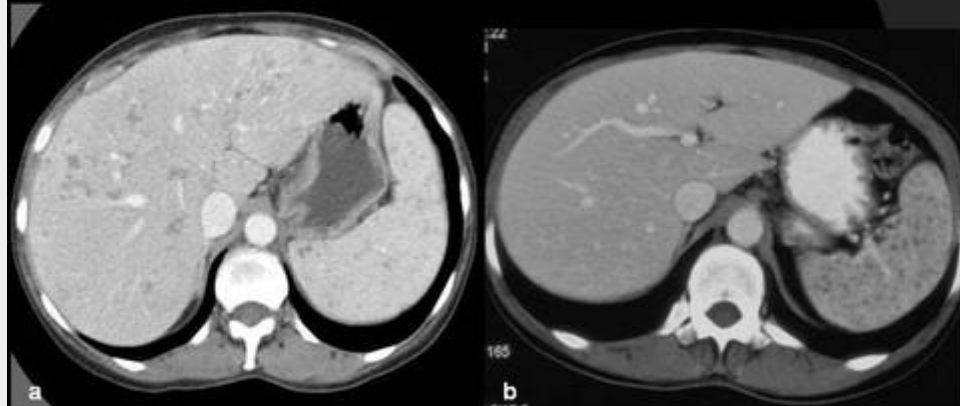


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Splenic Tuberculosis –mixed pattern

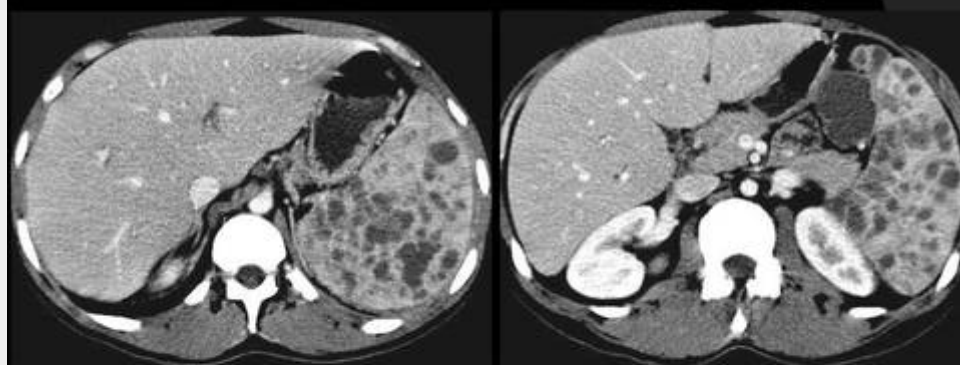


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Hepatic Macronodular Tuberculosis and residual disease

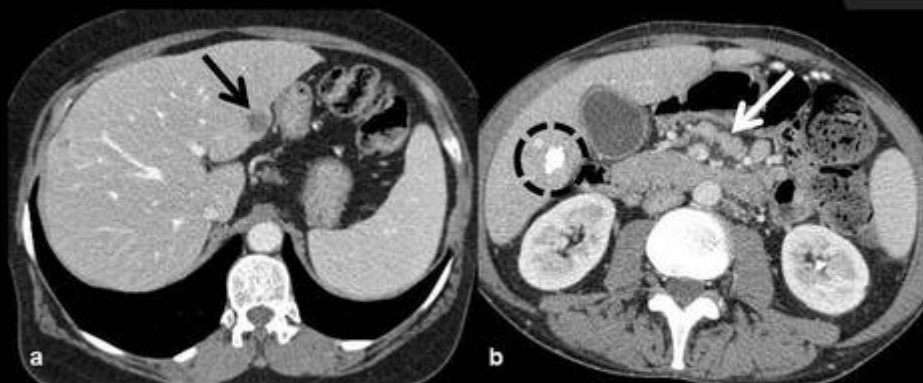


Fig.10: a - Woman, 30 years old, immunocompromised, with fever and weight loss. Abdominal CT after iv contrast discloses a few hepatic hypodense nodules, one of them with central necrosis (black arrow). B - Man, 43 years old, with history of hepatic tuberculosis and actually with lymph node tuberculosis. Abdominal CT after iv contrast shows a coarse calcified granuloma in the liver (circle) and a lot of homogeneous mesenteric lymphadenopathy (white arrow).

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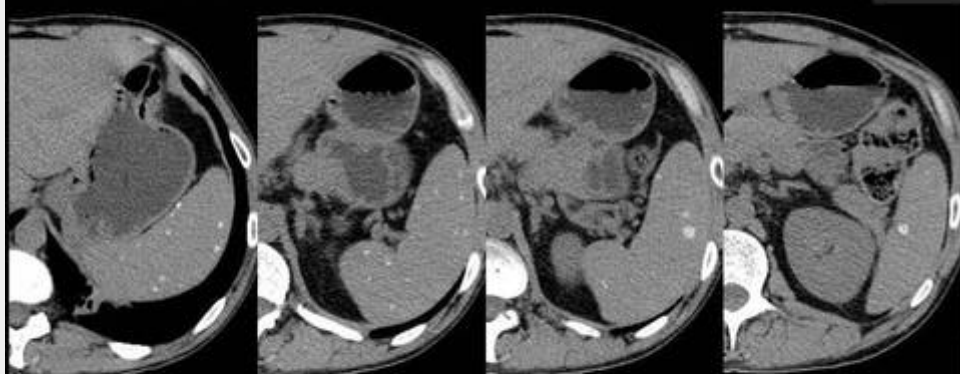


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Adrenal Tuberculosis

- ⦿ It is an uncommon localization of this infection, occurring only in 6% of cases of active tuberculosis.
- ⦿ Usually, it is bilateral and causes adrenal insufficiency.

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Adrenal Tuberculosis

- ⦿ Abdominal CT (fig.12):
 - Bilateral adrenal masses with low-attenuation center due to caseous necrosis +/- foci of calcification
 - Evolves to glandular atrophy and calcification
- ⦿ Differential diagnosis:
 - Metastases
 - Primary neoplasm
 - Hematoma

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Adrenal Tuberculosis

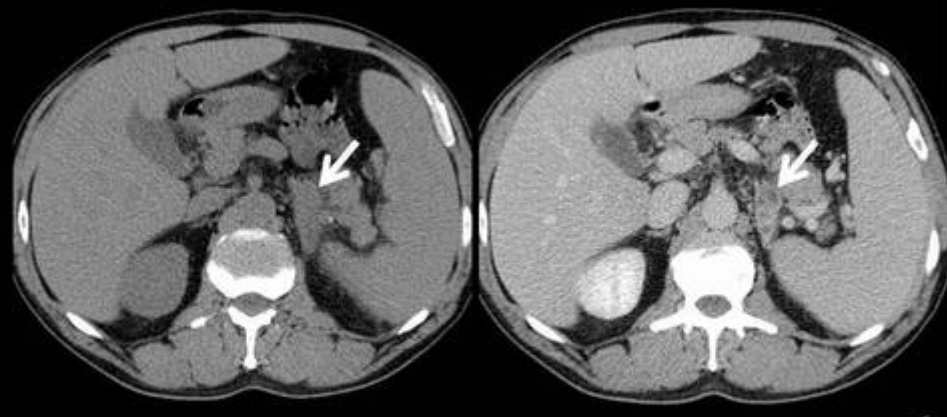


Fig.12: Man, 62 years old, with cerebral tuberculomas. Abdominal CT reveals a mass in the left adrenal, with heterogeneous enhancement due to areas of necrosis.

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Urinary Tuberculosis

- ⊙ Manifests itself at many ways and can affect kidney, excretory system and bladder.
- ⊙ It is more frequently unilateral
- ⊙ Abdomino-pelvic CT :
 - Kidney (fig.13,14):
 - Focal stricture in collecting system results in several patterns of hydronephrosis:
 - Infundibulum → hydrocalicosis
 - Pelvis → caliectasis without pelvic dilatation
 - Low-attenuation parenchymal lesions

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Urinary Tuberculosis

- Parenchymal scars and calcification are sequelae of the infection
- Ureter (fig.15,16):
 - Distal 1/3 more frequently affected
 - Mural thickening of ureter
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ureteral stenosis

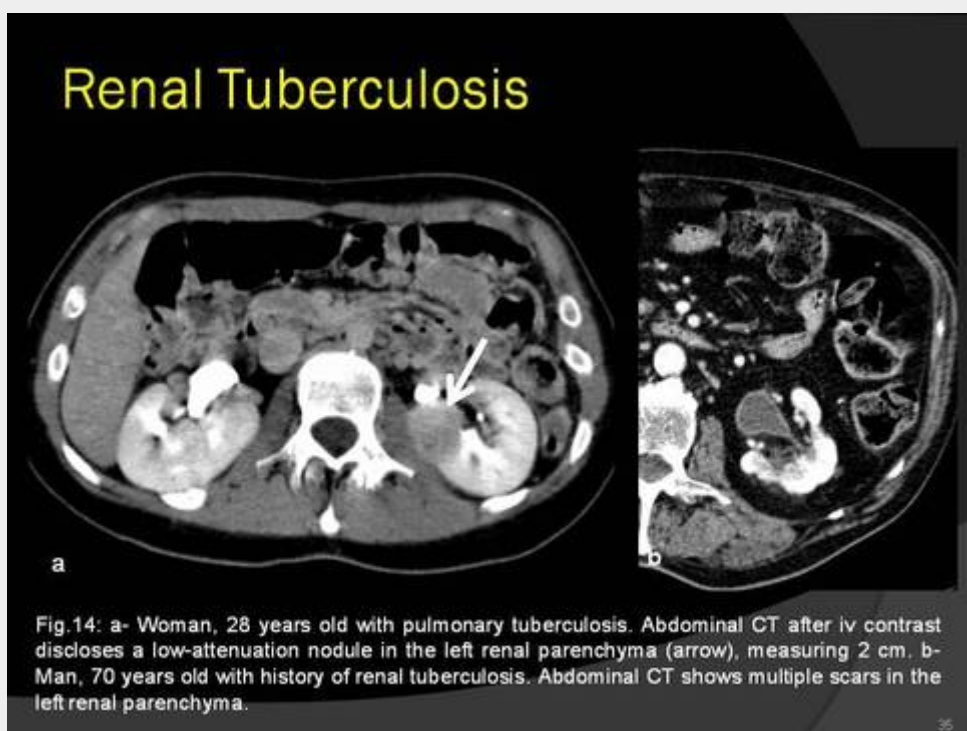
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Chronic hydronephrosis and hydroureter

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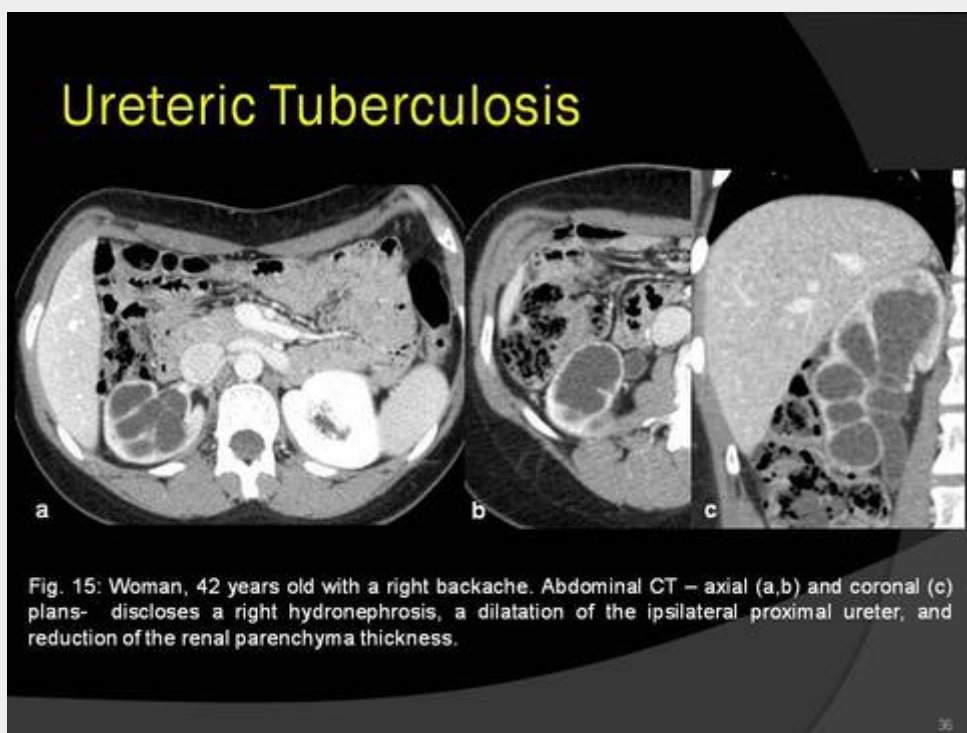
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Renal Tuberculosis



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Ureteric Tuberculosis



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Ureteric Tuberculosis



Fig.16: In the same patient, abdominopelvic CT – coronal (a) and axial (b,c,d) planes – shows a right hydronephrosis and hydroureter (arrow) due to a stenosis in the distal third of this ureter (d). Biopsy reveals a stricture caused by tuberculosis.

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Urinary Tuberculosis

- ◎ Bladder
 - Tuberculous cystitis causes reduction of the bladder capacity in retention of the urine.
 - Pelvic CT (fig.17):
 - Shrunken and deformed bladder + mural thickening
 - In the advanced disease, bladder becomes small, irregular and calcified.

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Urinary Tuberculosis

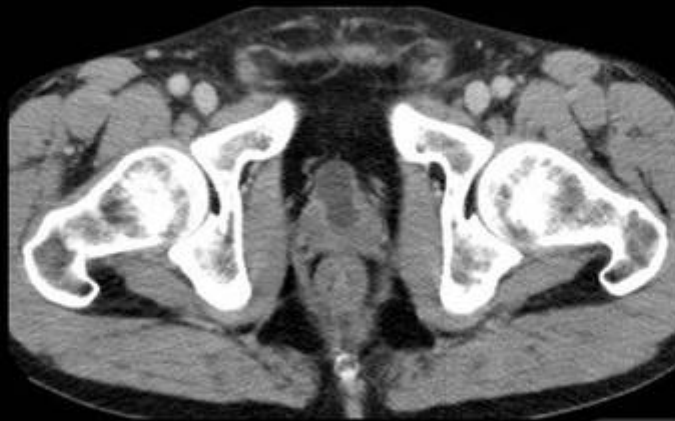


Fig.17: Man, 39 years old with chronic renal failure, fever and anorexia. CT urography contrast shows a small, shrunken and deformed bladder due to tuberculosis. Courtesy of Dr. Hugo Correia, HSTViseu.

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Urinary Tuberculosis

⊙ Differential diagnosis:

- Renal cell carcinoma
 - Lymphoma
- Kidney
- Transitional cell carcinoma
 - Benign causes of ureteral stenosis
- Ureter
- Schistosomiasis
 - Radiation-induced cystitis
- Bladder

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4. Conclusion

Conclusions

Conclusions

- ⊙ Tuberculosis has several radiologic appearances and can mimic others abdominal diseases.
- ⊙ CT helps to make early diagnosis when the imaging findings are correlated with the clinical and laboratory findings, thereby reducing patient morbidity.

5. References

References

References

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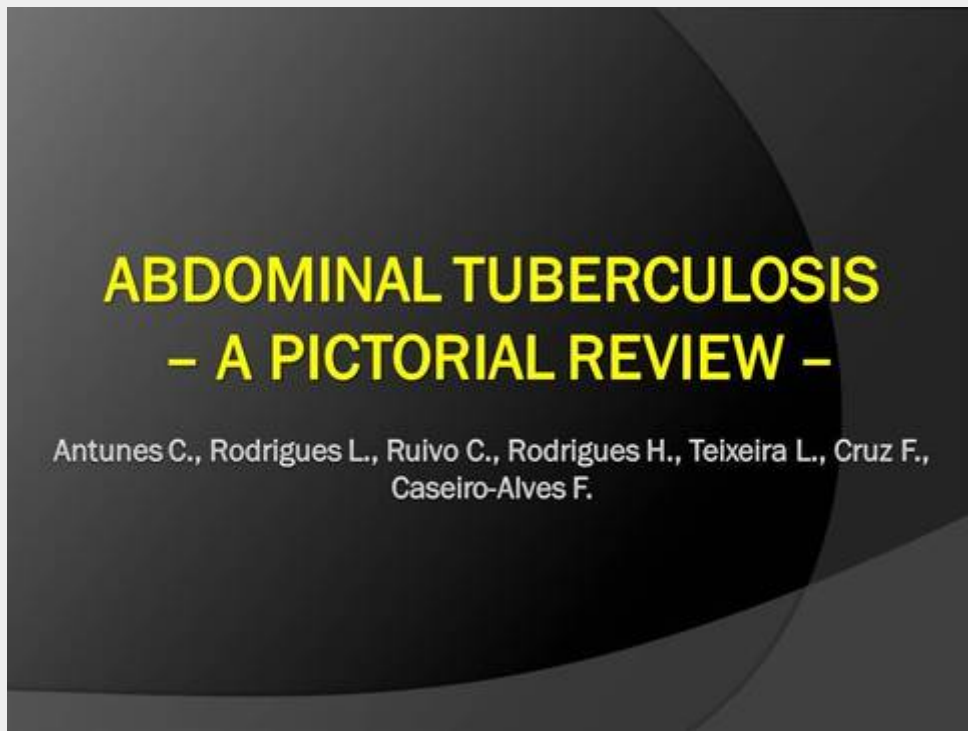
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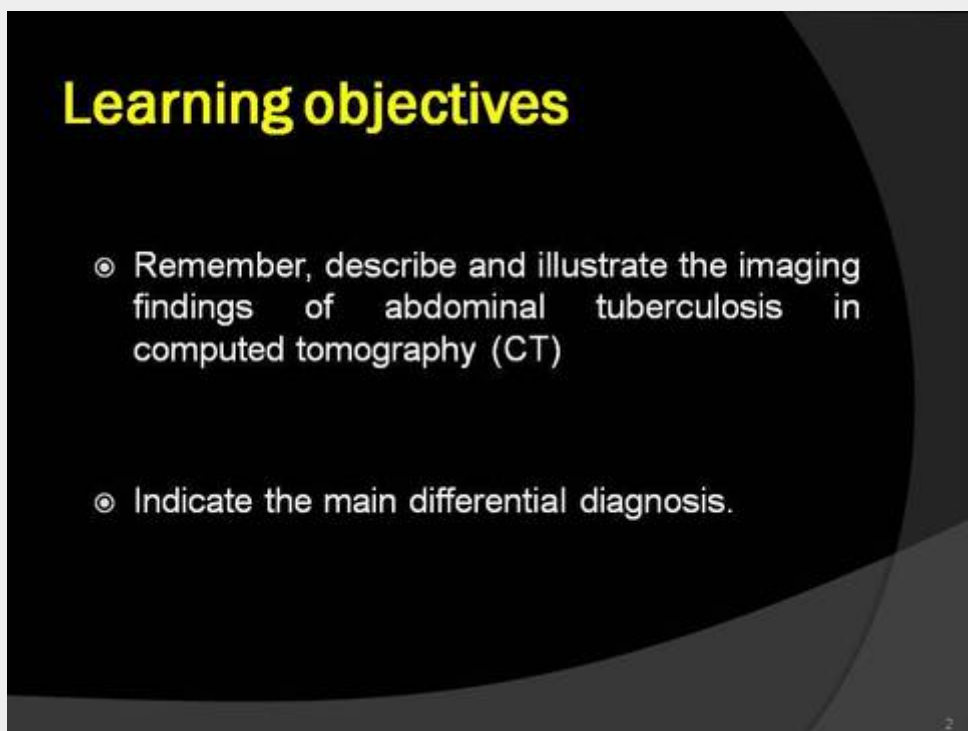
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6. Mediafiles

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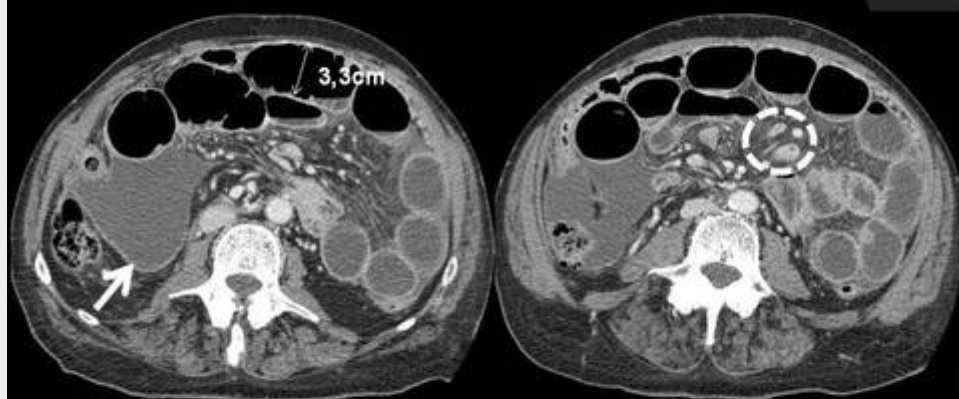
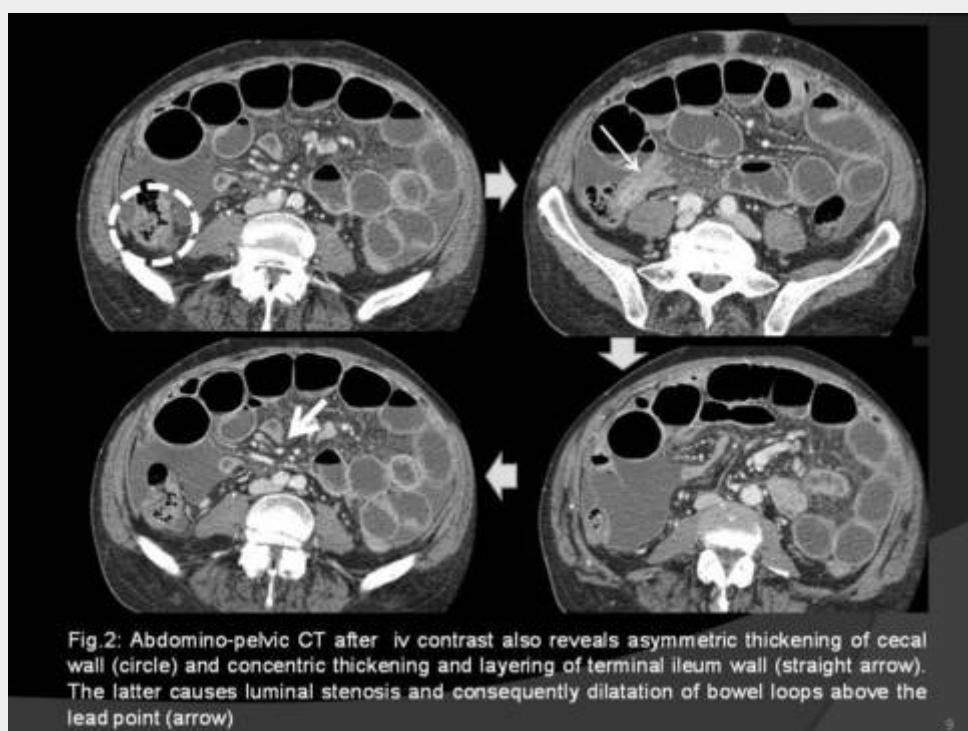


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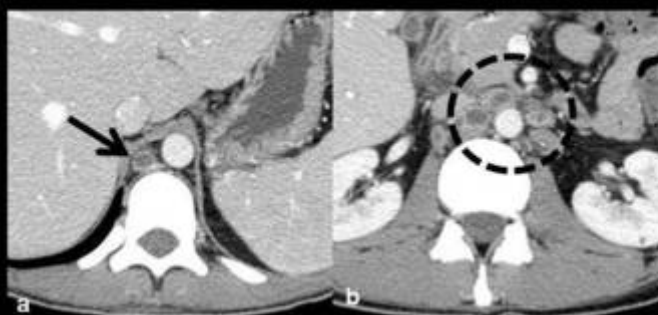
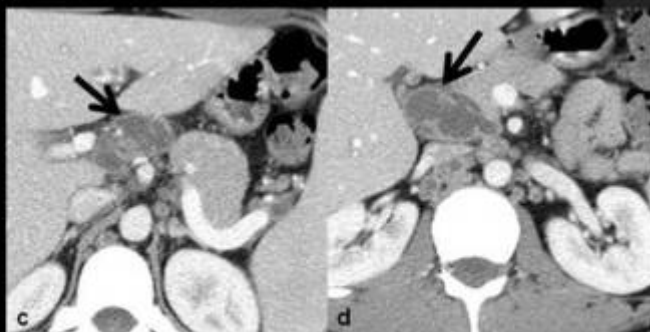


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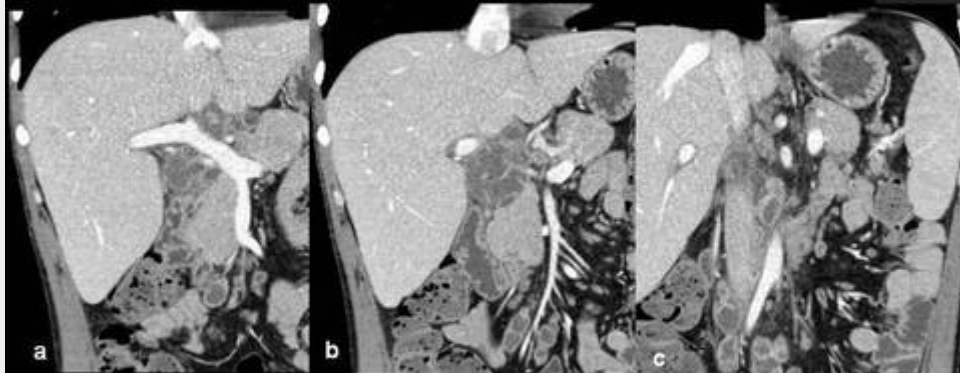


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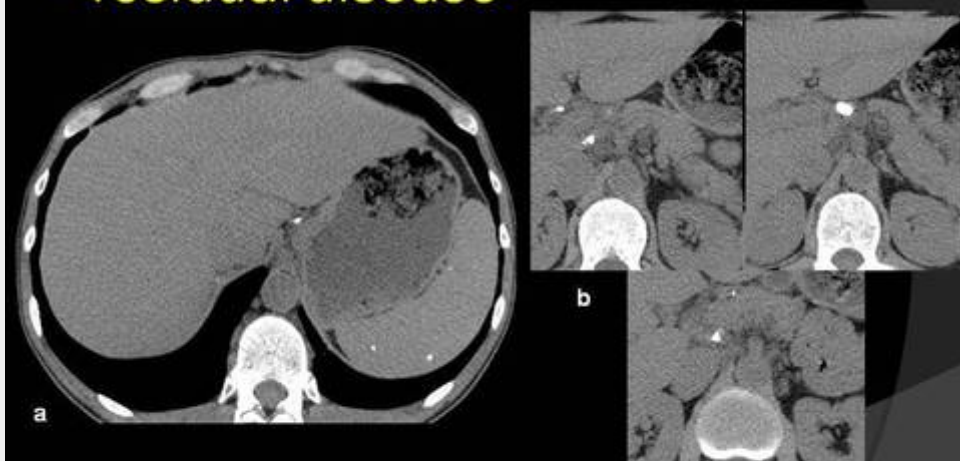


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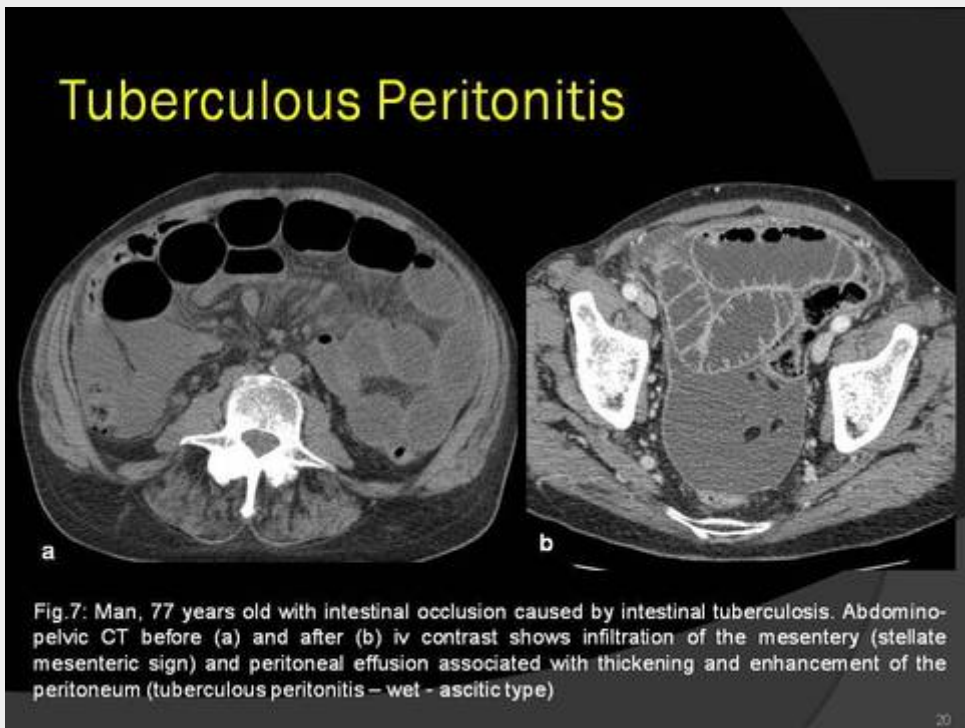
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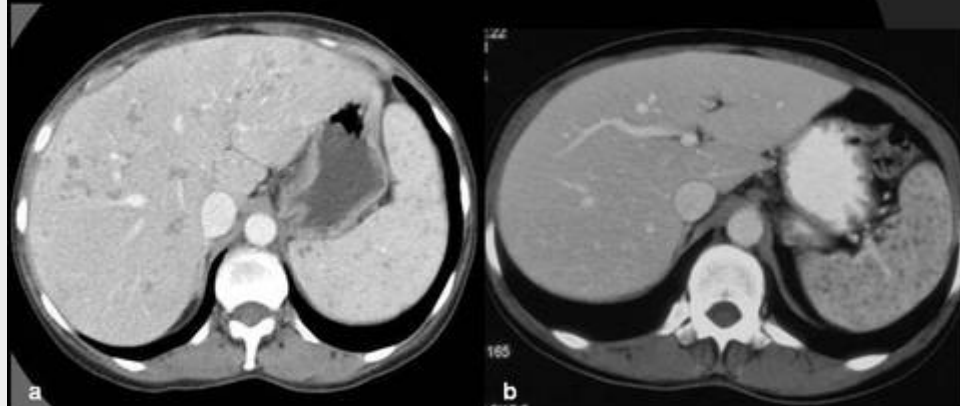


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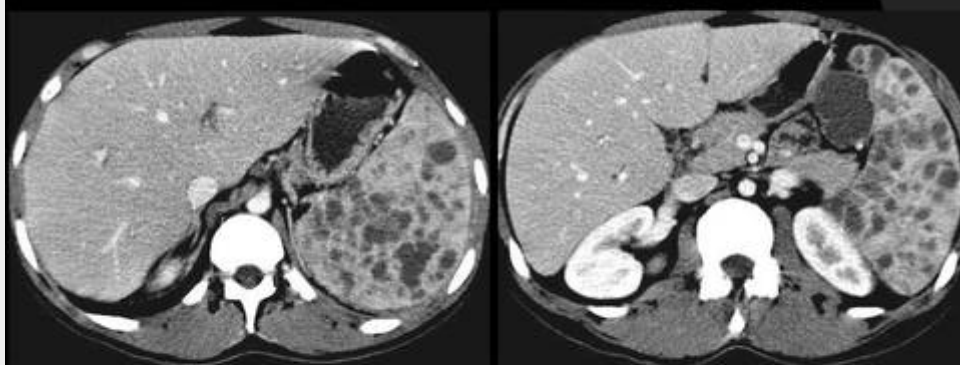


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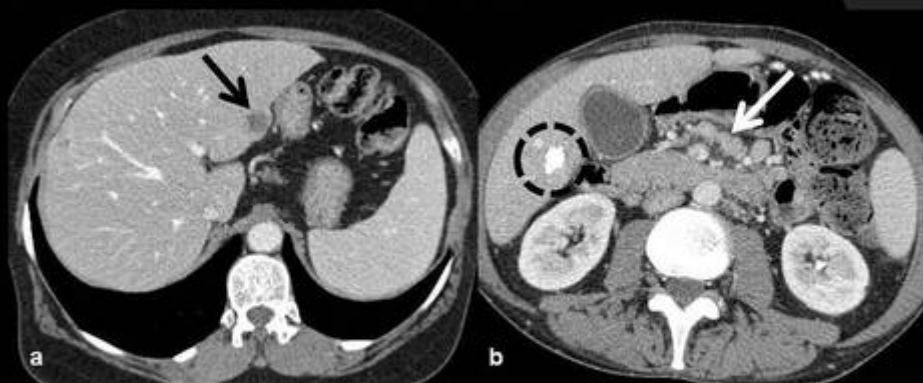


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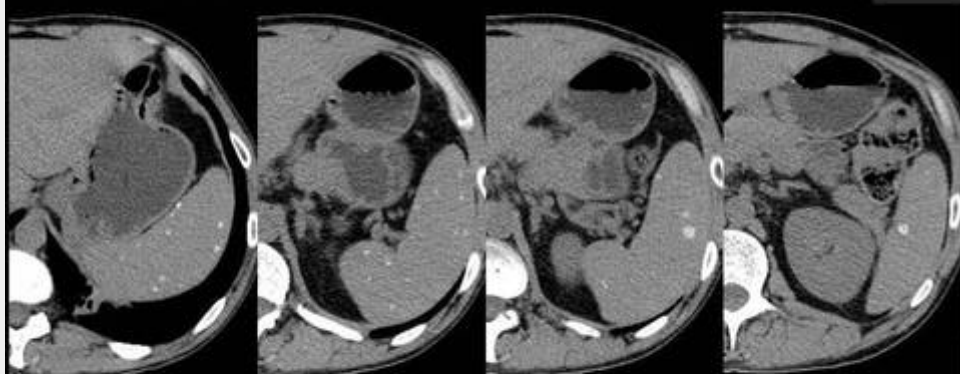


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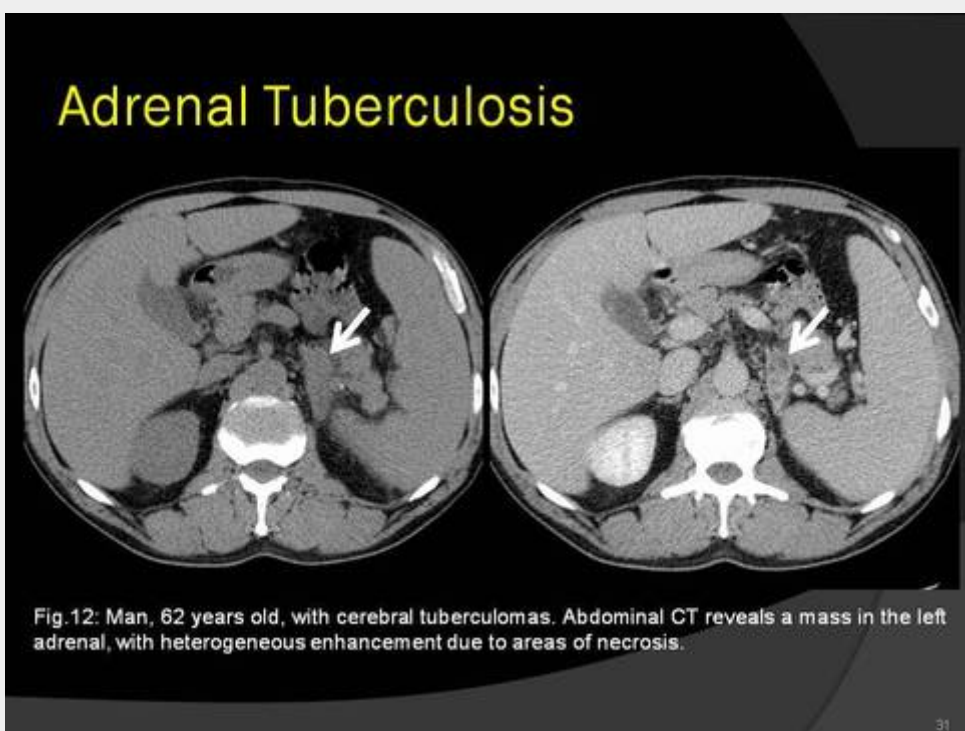


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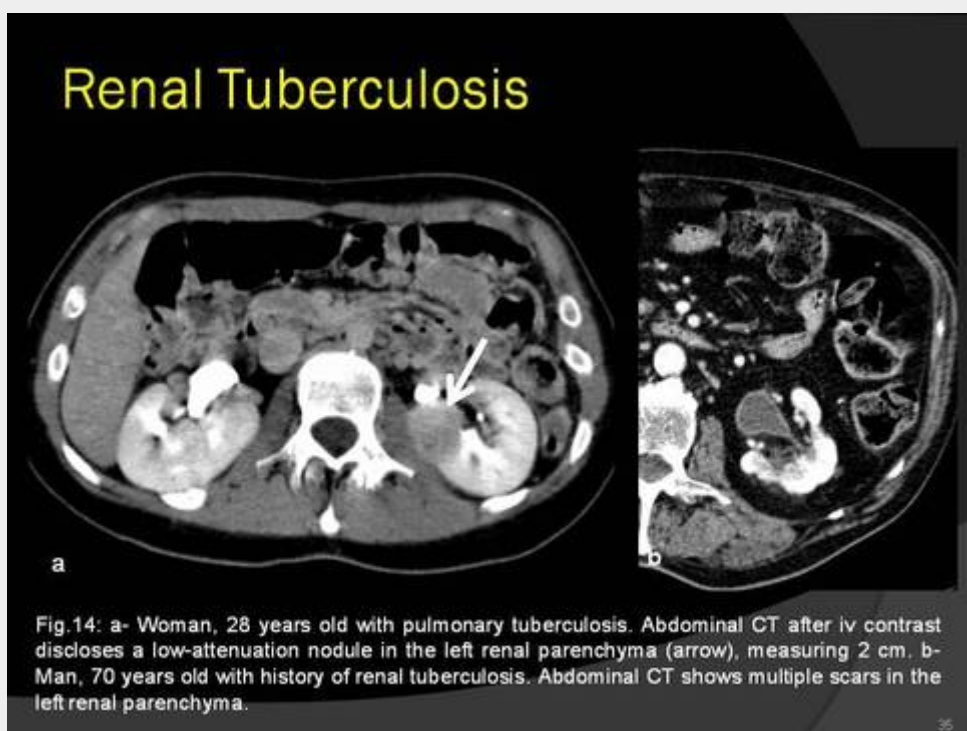
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Chronic hydronephrosis and hydroureter

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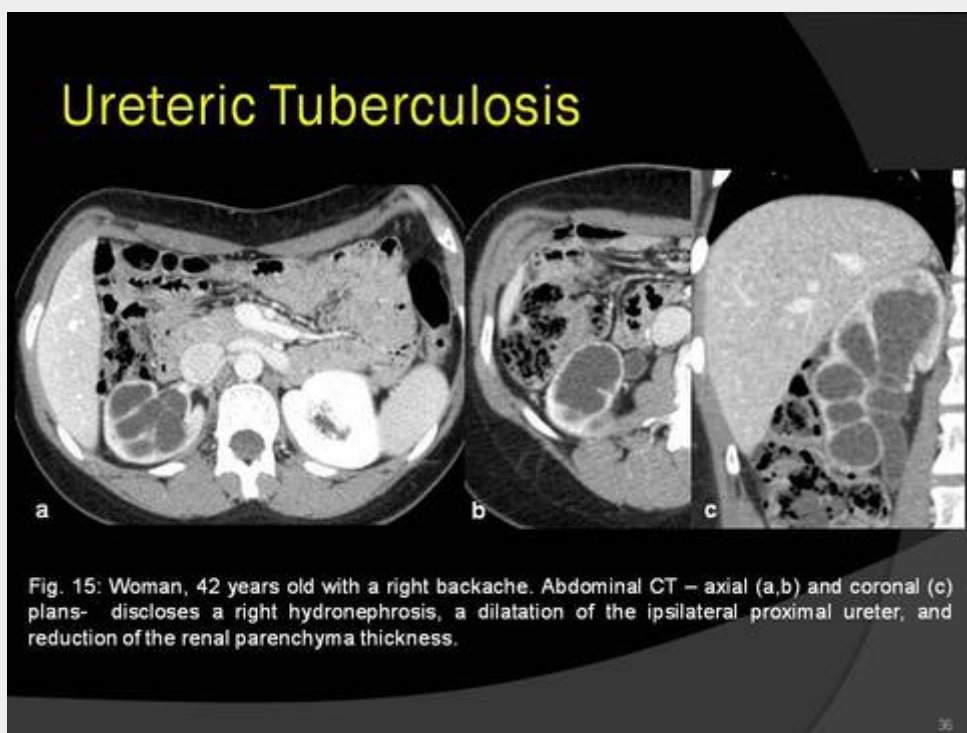
34

Renal Tuberculosis



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Ureteric Tuberculosis



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Ureteric Tuberculosis



Fig.16: In the same patient, abdominopelvic CT – coronal (a) and axial (b,c,d) planes – shows a right hydronephrosis and hydroureter (arrow) due to a stenosis in the distal third of this ureter (d). Biopsy reveals a stricture caused by tuberculosis.

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Urinary Tuberculosis

- ◎ Bladder
 - Tuberculous cystitis causes reduction of the bladder capacity in retention of the urine.
 - Pelvic CT (fig.17):
 - Shrunken and deformed bladder + mural thickening
 - In the advanced disease, bladder becomes small, irregular and calcified.

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Urinary Tuberculosis

◎ Differential diagnosis:

- Renal cell carcinoma → Kidney
- Lymphoma → Kidney
- Transitional cell carcinoma → Ureter
- Benign causes of ureteral stenosis → Ureter
- Schistosomiasis → Bladder
- Radiation-induced cystitis → Bladder

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Urinary Tuberculosis

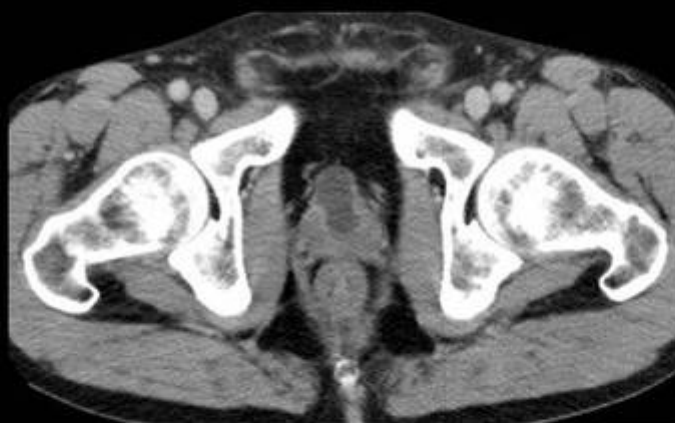


Fig.17: Man, 39 years old with chronic renal failure, fever and anorexia. CT urography contrast shows a small, shrunken and deformed bladder due to tuberculosis. Courtesy of Dr. Hugo Correia, HSTViseu.

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Conclusions

- ◎ Tuberculosis has several radiologic appearances and can mimic others abdominal diseases.
- ◎ CT helps to make early diagnosis when the imaging findings are correlated with the clinical and laboratory findings, thereby reducing patient morbidity.

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