GENITOURINARY TUBERCULOSIS: WHEN and WHY to think about it NOWADAYS

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Learning objectives

Tuberculosis can affect any organ system in the body and can be devastating if left untreated.

In this poster we discuss and illustrate the common imaging features of tuberculosis affecting genitourinary system.

The aim of this work is:

1- To recognise morphologic changes in genitourinary tract in different imaging techniques which make tuberculosis (TB) a possibility of diagnosis even when it is not suspected previously by clinicians. It can affect:

*Kidneys*, 75% unilateral, (calcifications, moth-eaten calyx -due to erosion which progress to papillary necrosis-, infundibular stenosis cortical scarring with dilatation and distortion of adjoining calices, and strictures of the pelvicaliceal system producing luminal narrowing either directly or by causing kinking of the renal pelvis, hydronephrosis tends to have irregular margins and filling defects owing to caseous debris, calcifications in a lobar distribution in end-stage tuberculosis )

*Ureter*, involvement is more common in the distal third of the ureter (filling defects due to mucosal granulomas , strate thickening of the ureteral wall and peri-ureteral inflammatory changes, chronic fibrotic strictures- specially in pelviureteric junction, across the pelvic brim, and at the vesicoureteric junction- and wall calcifications)

*Bladder* ( reduced bladder capacity, filling defects due to multiple granulomas, calcified bladder )

*Genitalia* ( endometrial adhesions, obstruction of the fallopian tubes with multiple areas of constriction, calcified lymph nodes in the adnexal region, epididymo orchitis with focal or diffuse areas of decreased echogenicity with epididymal involvement )

2- To keep TB specially in mind when evaluating patients treated with intra vesical BCG ( Bacillus Calmette-Guerin).

Intravesical instillation of bacille Calmette-Guérin (BCG) effectively treats transitional cell carcinoma of the bladder. Occasionally, BCG infection complicates such treatment.
Local side effects of BCG installation therapy are defined as effects confined to the bladder or those organs that are in contact with BCG bacilli and those are the ones we are going to talk about in this poster. They are drug induced or chemical cystitis, minor and major hematuria, bladder contracture, granulomatous prostatitis, epididymo-orchitis, ureteral obstruction and renal abscess.

Granulomatous prostatitis, epididymo-orchitis, ureteral obstruction and renal abscess can be considered as complication resulting from BCG contaminated urine. Postponement of instillation and antituberculous antibiotics are necessary.

But there are also accepted BCG-related systemic complications like fever, influenza-like symptoms, pneumonitis, hepatitis, arthralgia and arthritis, citopenia and sepsis, that probably represents the immune response to BCG. These symptoms usually resolve spontaneously, being antipyretic drugs helpful, but antituberculous drugs are not necessary unless in case of progressive systemic affection (including granulomatous pneumonitis or hepatitis).

In some patients, infection appears early and in others it is a late presentation disease. Noncaseating granulomas are found in the majority of cases, whether early or late.
Background

The increasing prevalence of tuberculosis in both immunocompetent and immunocompromised individuals in recent years, makes this disease a topic of universal concern.

Tuberculosis has a variety of clinical and radiologic findings. CT is specially useful in depicting genitourinary tuberculosis.

Diagnosis of GUTB (genitourinary tuberculosis) is often delayed owing to non-specific symptoms and insidious onset, and because of its low prevalence in our continent until now. Nevertheless, the number of infected individuals is increasing over the world and GUTB is the second most common form of extra pulmonary tuberculosis (EPTB) after lymph node TB.

Tuberculosis may involve the genitourinary tract as a secondary site following hematogenous dissemination from the lungs but BCG intra vesical therapy has also to be considered in this context. BCG is the attenuated strain of the bovine tuberculous bacterium and consists of living bacilli, dead microorganisms and subcellular debris. It maintains the immunological properties and antibiotic sensitivities of the parent strain. Since it is an attenuated live culture preparation, it is known to be able to produce secondary effects not only locally but also systematically, including genitourinary tract infection.

Intravesical installations of bacillus Calmette-Guerin (BCG) have been shown to be effective treatment and prophylaxis against recurrent stages in superficial vesical tumors. Many investigators believe that an inflammatory reaction is an important component of the response to BCG therapy. The majority of patients tolerate BCG instillations well but adverse effects can and do occur. It is believed that granulomas outside the primary inoculated site are the results of hypersensitivity reactions to BCG antigens.
Findings and procedure details

We present five patients with GUTB, (with microbiological, anatomopathological or optimal response to tuberculostatics diagnoses), one of them after BCG therapy.

None of them were initially suspected by clinicians.

In all cases, radiologists suggested TB as the first possibility of diagnosis.

CASE 1

48 year old male. AIDS positive. Epididymal mass and symptoms of prostatitis.

Intravenous urography shows:

**Fig. 1 on page 8**: Right kidney with delayed elimination

**Fig. 2 on page 8**: Precalicial cavity and infundibulum stenosis

**Fig. 3 on page 9**: Ureteral dilatation and stenosis

CASE 2

24 year old female. Background: uterine Ewing Sarcoma. Control CT shows:

**Fig. 4 on page 10**: Confluent uterine masses. Ewing Sarcoma.

**Fig. 5 on page 11**: Control. Iliac adenopathy and uterine density alteration with myometrium involvement, thought to be tumor recurrence. Final diagnostic: TB

CASE 3

78 year old male. Cystitis repetition. CT shows:
**Fig. 6 on page 12**: Renal cortical scar

**Fig. 7 on page 13**: Multiple filling defects

**Fig. 8 on page 14**: Infundibular stenosis

**Fig. 9 on page 15**: Mural ureteral thickening

**Fig. 10 on page 16**: Stenosis and prestenotic distention

**Fig. 11 on page 17**: Ureteral stenosis

**Fig. 12 on page 18**: Nodular mural thickening in bladder wall

**CASE 4**

45 year old male. Ureteral obstruction diagnostic in another institution. CT shows:

**Fig. 13 on page 19**: Staghorn litiasis

**Fig. 14 on page 20**: Focal cortical nodule

**Fig. 15 on page 21**: Changes in chalices

**Fig. 16 on page 22**: Segmental ureteral distention

**Fig. 17 on page 23**: Focal ureteral stenosis

**CASE 5**

66 year old male. Fever post intravesical BCG instillation. CT shows:

**Fig. 18 on page 24**: Multiple hipocaptante nodules in renal parenchyma
Fig. 19 on page 25: Nodules tend to decrease size with antituberculous drugs.
Fig. 1

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Fig. 2

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Fig. 3

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CONFLUENT UTERINE MASSES: EWING SARCOMA

Fig. 4

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ILIAC ADENOPATHY

UTERINE DENSITY ALTERATION WITH MYOMETRIUM INVOLVEMENT: THOUGHT TO BE TUMOR RECURRENCE.

Fig. 5

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Fig. 6

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Fig. 18

MULTIPLE HIPOCAPTANTE NODES IN RENAL PARENCHYMA IN PATIENT TREATED WITH INTRAVESICAL BCG

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Fig. 19

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Conclusion

There are several imaging findings which make TB a great possibility even when it is not suspected by clinicians, and consequently the radiologist plays an important role in the decision-making process.

A high degree of clinical suspicion and familiarity with the various radiologic manifestations of tuberculosis allow early diagnosis and timely initiation of appropriate therapy, thereby reducing patient morbidity.

Currently, not only the natural incidence of TB favoured by migration flows but also the secondary effect due to BCG therapy, make TB an entity to take into account when evaluating genitourinary tract.
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Spectrum of Bacille Calmette-Gue´rin (BCG)

Infection after Intravesical BCG Immunotherapy

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