Genitourinary tuberculosis

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ABSTRACT
The World Health Organization estimates that one third of the world population is infected with tuberculosis. Infection probability depends on: length of time of exposure, size of inhaled inoculum, and bacillary virulence. Tuberculosis is the opportunistic disease most often found in patients presenting with human immunodeficiency virus. The genitourinary tract is the most frequently affected organ after the lung, due to hematogenous metastasis during primary infection. The kidney is the principal organ affected within the genitourinary tract. The rest of the tract is affected due to contiguity. In relation to the genitals, the epididymis is the most frequently affected organ. This article reports on a case of renal tuberculosis that highlights important aspects of the disease.

Keywords: Renal tuberculosis, hematogenous metastasis, Mexico.

INTRODUCTION
The species grouped in the Mycobacterium tuberculosis complex are: M tuberculosis, M. africanum and M. bovis. In Mexico M. tuberculosis is the common etiological agent in urological diseases. It is a strict aerobic bacillus that is acid-alcohol resistant, sensitive to sunlight, heat, ultraviolet light, and some disinfectants, but is desiccation-resistant. Mycobacterium tuberculosis reaches the genitourinary organs by means of the bloodstream from the lungs. Once there is primary infection, immune response is sufficient in 90% of cases

RESUMEN
La OMS estima que un tercio de la población mundial está infectada con tuberculosis, la probabilidad de infección depende de: la duración en exposición, tamaño del inóculo inhalado y la virulencia del bacilo. La tuberculosis es la enfermedad oportunista más frecuentemente encontrada en pacientes con HIV. El tracto genitourinario es el segundo órgano afectado en orden de frecuencia, sólo por debajo del pulmón. Se debe a metástasis hematogéneas durante la primo-infección. Dentro del tracto genitourinario el riñón es el principal órgano afectado, el resto del tracto es por contigüidad. Hablando de genitales el epididimis es el órgano de mayor frecuencia de afectación. En este artículo se reporta un caso de tuberculosis renal en donde se remarcan varios aspectos importantes de la enfermedad.

Palabras clave: Tuberculosis renal, metástasis hematogéna, México.

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so that clinical disease does not develop and the bacilli remain latent in small foci. Renal tuberculosis is the most common extrapulmonary disease and makes up 15-20% of all extrapulmonary cases. 2,3

Worldwide, genitourinary tuberculosis is responsible for 14% of non-pulmonary manifestations and 20% of cases have been registered in Caucasian individuals. 4

In the western world, 8-10% of patients with pulmonary tuberculosis develop renal tuberculosis and in underdeveloped countries the proportion of individuals presenting with Mycobacterium tuberculosis in urine can reach 15-20%. 4,5

The bacilli are generally found in the corticomedullar region as granulomas and when the individual is immunologically affected the bacillus is reactivated, resulting in dissemination within the medulla, causing papillitis. 3

The disease progresses slowly and results in extensive necrosis of the papilla and actual cavities with abscesses can be formed that cause renal parenchyma destruction. The disease is generally unilateral and lesions can ulcerate collecting tubules, causing bacilluria.

As disease involvement progresses it can cause fibrosis with eschars, scars, or partial atrophy of the renal parenchyma; high blood pressure is the principal complication. The rest of the genitourinary organs become affected later, either by ascending or descending pathways. Ureteropelvic junction stenosis can develop.

There are two mechanisms that can cause kidney failure. The first is intrinsic infection that causes obliterating endarteritis and the second is kidney atrophy that is secondary to obstruction from ureteral stenosis or from multiple stenoses of the infundibulum. 5,6

Signs and symptoms of genitourinary tuberculosis vary in intensity and duration. 3 Patients usually complain of increasing and painless urinary frequency that does not respond to habitual antibiotic treatment. 4,6 Other clinical manifestations include intermittent total hematuria (10%), microhematuria (50%), nephritic colic (calcified fragment, coagulate, lithiasis), hematospermia (5-10% and 25% in patients with one kidney), asthenia, anorexia, weight loss, and febrile and toxic pyelonephrosis (rare). 1,6

Ultrasound can reveal calyceal system dilatation and other obstructive data and has a 58% sensitivity for renal tuberculosis. Findings can be classified into 6 types: Type 1, ectasia; type 2, hydronephrosis; type 3, empyema; type 4, atrophy and inflammation; type 5, calcification, and type 6, a combination of these types. 7

Excretory urography is a valuable diagnostic tool that can detect various signs, including those from calyx distortion to calcifications, ureteral stenosis, and vesical fibrosis. 2

Differential diagnosis should be made with acute pyelonephritis, interstitial lesions, occupying masses in abscesses, calyceal diverticuli in caverns, and cystic ureteritis in the ureteral lesion. 5

Current medical treatment begins with short antituberculosis drug regimens that are effective in almost all forms of the disease. These regimens start with rifampicin, isoniazid, pyrazinamide, and ethambutol (or streptomycin) for two months and then four more months with only rifampicin and isoniazid. 2

**CASE PRESENTATION**

Patient is a 30-year-old workman who states he is a non-smoker and non-drinker with an important hereditary familial background, given that his father is in treatment for pulmonary tuberculosis. Past medical history includes appendectomy for acute appendicitis 15 years earlier.

Present illness began 2 years before with terminal dysuria, urinary frequency, bladder straining and tenesmus, all of which remitted spontaneously. He then presented with an episode of total hematuria with amorphous clots and an episode of acute urine retention, after which he continued to have intermittent symptoms that did not improve with antibiotic treatment. Physical examination did not produce relevant data. Initial laboratory test results: hemoglobin 13.1 g/dl; hematocrit 39%; leukocytes 4.4 1000/IU; neutrophils 61%; monocytes 13%; eosinophils 1%; platelets 321,000; glucose 128 mg/dl; urea 24 mg/dl; and creatinine 1.4 mg/dl. Urinalysis: brown color; density 1.025 g/mL; pH 6.5; leukocytes 100 x field; proteins (+); and abundant bacteria. BAAR in urine (+) in 5 out of 6 samples. ELISA HIV non-reactive.

Plain chest film: No alterations in soft tissue or bone material or in the rest of the study. Plain abdominal film: No alterations in soft tissue or bone material, left kidney outline enlarged in regard to contralateral outline. The rest of the study was normal.

Abdominal ultrasound reported normal liver, gall bladder, urinary bladder, spleen, and pancreas. Right kidney measured 10.9 x 4.3 cm and had normal morphology. Left kidney measured 11.2 x 5.3 cm with 2 simple renal cysts in the upper pole measuring 2.7 and 2.5 cm along with hydronephrosis.

Excretory urography revealed left kidney outline in the plain film. When contrast medium was applied left kidney exclusion was seen. The contralateral kidney had no alterations (Figure 1).

Plain and contrasted abdominal computed tomography revealed enlarged left kidney with moderate ectasia and heterogeneous parenchyma with
Calcifications. Contrast medium was not concentrated or eliminated (Figure 2).

Percentage of left kidney distribution was under 15% in kidney scintigram.

Treatment: Patient was referred to the authors’ service where hematuria study protocol was completed. Antituberculosis drugs were administered (rifampicin, isoniazid, pyrazinamide) and then left nephrectomy was performed due to advanced stage and degree of left kidney involvement. Surgical findings included 18 x 10 cm enlarged kidney with caseous material in its interior ureter and thickened walls in the upper third.

Macroscopic histopathological study reported 22 x 12 x 5.5 cm left kidney with scant adipose tissue, multiple retractile scars, grayish tubular ureter, permeable opening, trabeculated pelvic mucosa, and cystic area at the upper pole.

Microscopic study reported hematoxylin and eosin stained slices in renal parenchyma and pyelocaliceal system with casefying, granulomatous, chronic inflammatory process and areas with glomerular sclerosis, renal tubule thyroidization persisting in surgical edges (ureter), caseous necrosis, and urothelium destruction. Study conclusions were granulomatos chronic pyelonephritis with tuberculous process and surgical edges with granulomatous inflammatory process (Figure 3). Renal secretion culture was positive for Mycobacterium tuberculosis.

**DISCUSSION**

Renal tuberculosis is a rare entity that can simulate many diseases that affect the urinary tract and thus its opportune diagnosis to avoid kidney loss is a challenge for the urologist. When diagnosed opportune, conservative management is the treatment of choice.

The case presented here had non-specific symptomatology, but with classic radiographic and microscopic images of advanced renal tuberculosis.
Figure 2. CT scan with oral and intravenous contrast.

Figure 3. Histological slice of surgical specimen showing chronic granulomatous pyelonephritis with tuberculous process.

BIBLIOGRAPHY