Genitourinary tuberculosis: a rare but potentially devastating disease

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Extrapulmonary manifestations of tuberculosis (TB) are an uncommon but important disease entity. Genitourinary (GU)-associated infections in particular occur mostly secondary to those of the lungs, but can also occur as primary infections through infected clothing or even via sexual transmission. Two case reports, one of a man with a cutaneous penile tuberculous ulcer, and the other of his wife who later contracted endometrial TB, illustrate the latter route of transmission. While penile ulcers in men and infertility in women have long differential diagnoses, it is important to keep in mind that extrapulmonary TB is a possibility, especially in patients from TB endemic areas. Investigations of these disorders should therefore include a full TB workup in patients in whom TB is a possibility, including Mantoux testing, histopathology looking for caseating granulomas, and chest radiography to differentiate between primary and secondary genitourinary TB. Given the serious complications of genitourinary TB, including sexual dysfunction in men and infertility in women, it is extremely important to effectively recognize and treat GU manifestations of TB.

Introduction

Although the majority of primary tuberculosis (TB) occurs in the lungs, approximately 20% of infected patients will develop an extrapulmonary manifestation over time. The genitourinary (GU) tract is the most common site for extrapulmonary TB, with the most frequently affected sites within the GU tract being the epididymis (42%), seminal vesicles (23%), prostate (21%), testes (15%), and vas deferens (12%) in males, and the fallopian tubes in females.1,8 The first cases of genitourinary TB were described in the 19th century, in which they occurred as a complication of routine infantile circumcision, after which TB-infected surgeons sucked the bleeding penis, thus transmitting the disease to the infant. Now however, other methods of transmission to the GU tract are being described.

Amongst all GU-associated TB infections, penile cutaneous TB is extremely rare, comprising less than 1% of all cases in males.2 It may manifest as primary, secondary, or papulonecrotic tuberculide type. Primary infection may be acquired by direct inoculation of the mucosa through contaminated skin or clothing. Secondary infection, on the other hand, refers to disseminated TB occurring after infection of other organs in the genitourinary system or arising from haematogenous spread from the lungs. Lastly, papulonecrotic tuberculide type is a subset of secondary infection, representing an allergic reaction to bursts of TB antigen reaching highly immune-sensitive skin following haematogenous spread from an internal nidus (such as the lungs).4 Of the three types of transmission, primary is thought to be the most rare. Sexual transmission has been recognized as a legitimate mode of primary spread with important implications for reproductive health, as demonstrated by the following case reports.3

Case 1

A 50-year-old Indian man living in the United Kingdom presented with a painless, indurated ulcer near the penile corona after a recent trip to India. The lesion had been present for two months and had increased in size to measure 1 cm in diameter and 1 cm in depth at the time of examination. Left inguinal lymph nodes were palpable and non-tender, but no additional local or systemic symptoms were present.
Investigations began with a punch biopsy that was negative for penile carcinoma, however granulomas of an unknown cause were revealed. Urine tests, chest radiograph, and abdominal ultrasound were unremarkable. The patient did not consent to HIV testing, but stated that his wife had been his only partner for the past 25 years. An excisional biopsy demonstrated the presence of caseating granulomas which produced *Mycobacterium tuberculosis* on culture.

The initial treatment regimen was combination therapy of isoniazid, rifampicin, pyrazinamide, and pyridoxine for two months. Isoniazid and rifampicin were then to be continued for an additional four months. The ulcer regressed and did not recur. Although screening conducted by the Public Health Department in Oxfordshire could not uncover other cases of TB in the patient’s family, the patient’s wife did not consent to genitourinary screening.

**Case 2**

The 49-year-old wife of the patient in Case 1 presented with menorrhagia, fever, sweats, and weight loss one year after her husband’s diagnosis of penile TB. An endometrial biopsy was obtained and revealed multiple caseating granulomas of an unknown cause. She had no known previous infection with TB, but had been having unprotected sexual intercourse with her husband prior to his diagnosis. Urine and abdominal ultrasound results were unremarkable, but an inactive calcified granuloma in the left apex of the lung was discovered. A second biopsy of the endometrium was performed and culture produced *M. tuberculosis*. Following this discovery, restriction fragment length polymorphism analysis was performed and confirmed that both husband and wife had been infected by identical organism, thus making this the first confirmed case of sexually transmitted TB.

**Presentation**

Clinically, TB of the penis generally presents either as superficial ulcers of the skin or glans of the penis, or as tuberculous cavernositis (inflammation of the cavernous bodies). In most cases, the lesion appears as a superficial ulcer on the glans or around the corona, as this is the most common part abraded during sexual contact or with infected clothing. The normal penile mucosa is highly resistant to tuberculosis, but in the case of sexual transmission, the bacilli are inoculated into abrasions caused by vigorous sexual activity. Although the glans and corona are most commonly affected, the lesions can also be extensive, with involvement of the urethra and corpus cavernosum, and rarely may even present as hardened nodules. Male patients with penile tuberculosis can present with impotence, and advanced cases may also present with erectile failure due to tuberculous cavernositis.

Female genitourinary tuberculosis is associated with infertility, although diagnosis is difficult since patients are usually asymptomatic. Some women (such as the one in the preceding case reports) do however present with symptoms such as menorrhagia, fever, sweats, weight loss, and malaise.

**Making the diagnosis**

The differential diagnosis of chronic penile ulcer with histological features of granulomas is extensive, and thus diagnosis of penile disease can often be difficult. Consideration needs to be given to bacterial and fungal infections (such as syphilis and herpes simplex), parasitic infections, vasculitides, inflammatory bowel disease, sarcoidosis, penile carcinoma, foreign body reactions, and other rare causes.

In general, the basic process used to diagnose TB of the penis includes physical examination revealing typical clinical features, positive Mantoux test, raised ESR, and the typical histopathological findings. More specifically, the presence of acid-fast bacilli in the smear examination, and typical granuloma with giant cells and caseous foci on histopathology with no
evidence of malignancy can help to clinch the diagnosis. Furthermore, chest X-ray, intravenous pyelography (IVP), urine culture and culture for Mycobacteria should be done to differentiate primary from secondary manifestations. Intravenous urography should also be carried out to exclude upper renal tract TB. Clinical cure is possible through the treatment regimen described in the preceding case study, but relapses have been known to occur, making follow-up a necessity. Patients diagnosed with penile TB should be counseled to abstain from sexual contact or at least use a condom for 4 to 6 weeks following treatment.

As with penile TB, the finding of caseating granulomas and Langerhans giant cells in association with chronic inflammation is diagnostic of endometrial TB. Though the tuberculin skin test does have some utility, it is not the most sensitive test available. Hysterosalpingograms (HSG’s) are very useful for visualizing the internal anatomy of the uterus, which may reveal features such as calcifications, occlusions, ‘beaded’ Fallopian tubes (if infected), and irregular uterine outlines if the patient does indeed have genitourinary TB. However, even if a female patient is correctly diagnosed and effectively treated with antitubercular medications, the prognosis for future pregnancies remains poor. Thus, it is important to prevent the transmission of endometrial TB by all possible routes, including sexual transmission.

Conclusions

Although TB of the penis is rare, physicians need to be aware of this infectious disease when undiagnosed ulcers on the penis are observed. In particular, suspicion of cutaneous TB should be raised in countries which still show a high prevalence of tuberculosis, such as India where one third of the population is infected. Given that endometrial TB is associated with infertility, it should also be considered in female patients from TB endemic regions that have difficulty conceiving. Since sexual transmission of TB is possible, as evidenced by the case reports in this article, it is also important to consider the implications for partners of infected patients engaging in unprotected sex. Thus, awareness of the extrapulmonary manifestations of TB and proper counselling of patients with GU manifestations in particular is crucial in preventing the serious sexual and reproductive consequences of this disease.

References