

GENITOURINARY TUBERCULOSIS IN NIGERIA; A Review of Thirty-One Cases

J. C. Orakwe, P. I. S. Okafor

Department Of Surgery, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria

ABSTRACT

Objective: To report and discuss the characteristics of genitourinary tuberculosis as observed in a sub-Saharan African setting, where reports suggest its rarity despite reported high incidence and prevalence of pulmonary tuberculosis.

Patients and Method: Thirty one consecutive patients with discharge diagnoses of genitourinary tuberculosis seen in a small community-based hospital over a five-year period were retrospectively studied.

Result: There were 28 males and three females, with a mean age of 37.6 (SD 11.5) years. Forty-three sites were involved in seven organs: epididymis 25 (58.1%), kidney 7 (16.3%), testis 4 (9.3%), bladder 3 (7.0%), ureter 2 (4.7%), prostate 1 (2.3%), and cord of the testis 1 (2.3%). The commonest presenting features were scrotal/testicular mass with or without pain/tenderness (80.6%), fever/headache (51.6%), and dysuria (22.6%). Other common features were back, loin, or abdominal pain/tenderness, hydrocoele, scrotal abscess, and haematuria. 26.9% had evidence of concurrent or previous pulmonary tuberculosis, and 9.1% were positive on HIV 1 & 11 screening.

Conclusion: With the prevailing conditions in sub-Saharan Africa and most of the developing world and the slightly different characteristics of the disease in our environment, diagnosis of genito-urinary tuberculosis may be difficult. It is advised that patients with unexplained symptoms in the urinary tract should be investigated for tuberculosis.

Key Words: Genitourinary Tuberculosis, Sub-Saharan Africa, Nigeria

INTRODUCTION

In developed countries, the incidence of tuberculosis has been falling since the beginning of the twentieth century, but there is still an increasing incidence in the developing countries¹. The World Health Organization reported that more than three-quarters of those with tuberculosis live in sub-Saharan Africa², and fifteen to twenty percent of patients with pulmonary tuberculosis in the developing countries are expected to develop genitourinary tuberculosis³. Thus, a high incidence of genitourinary tuberculosis should be expected in Nigeria and the sub-Saharan Africa. However, unlike pulmonary tuberculosis, genitourinary tuberculosis is rarely reported from sub-Saharan Africa. The general impression has been that genitourinary tuberculosis is uncommon in Sub-Saharan Africa⁴. This apparent rarity is thought to be due to the low diagnostic value of clinical features, which are often used in the diagnosis in most cases^{5, 6}. The diagnosis of genitourinary tuberculosis is difficult and a high index of clinical suspicion, with combined investigative tools, is required for accurate diagnosis. However, from the

few available reports, the genitourinary system is a common site of extra pulmonary tuberculosis in Africa⁷⁻⁹. The present report discusses the characteristics of the disease as observed in cases seen over a five-year period in a small community-based general practice hospital with a urological bias in Nigeria.

PATIENTS & METHOD

The authors managed all the patients studied over a five-year period, from July 1, 1998 to June 30, 2003, with a discharge diagnosis of genitourinary tuberculosis. When the urinary system or the male genital system is involved alone or as a part of a more widespread tuberculous disease, the patient was diagnosed as having genitourinary tuberculosis.

History, physical examination, laboratory and radiological investigations were done on the patients, and the primary focus of the disease and the organs involved were determined. All the patients received treatments as indicated.

The laboratory investigations done included urinalysis, full blood count with estimation of erythrocyte sedimentation rate (ESR), Mantoux (tuberculin) skin test, and screening for HIV 1 and 2 antibodies. Twenty-four hour urine specimens were

Correspondence: Dr. J. C. Orakwe
E-mail = jayceeorakwe @ yahoo.com.

collected and the concentrated sediments stained for acid-fast bacilli (AFB). AFB staining was also done on the sputum specimen if available. Specific cultures for *Mycobacterium tuberculosis* were done using the first voided (morning) urine specimens and collections were repeated on three consecutive days. Routine urine microscopy, culture, and sensitivity, and histological examinations of the biopsy and other obtained tissue specimens were done.

Radiological investigations done were intravenous urography (IVU) and chest x-rays. Extra efforts were made to get IVU done on all the patients with overt haematuria, loin and abdominal pain, or other abdominal symptoms.

The diagnosis was considered proven on a positive culture of *Mycobacterium tuberculosis*, or typical histological findings, including the finding of acid-fast bacilli (AFB). In patients where these were negative, diagnosis was made by a combination of positive tuberculin test (Mantoux test), characteristic changes on the IVU, presence of sterile pyuria or haematuria, and highly elevated erythrocyte sedimentation rate (ESR), in a patient with suggestive symptoms and signs.

All the patients were treated with multiple drug chemotherapy comprising streptomycin, rifampicillin, isoniazid and pyrazinamide. Rifampicillin, isoniazid, and pyrazinamide were given for nine months while streptomycin was stopped at two months. Streptomycin was substituted with ethambutol when indicated and was given for three months. Surgical procedures were carried out as and when indicated.

RESULTS

Thirty-one patients who were discharged with a diagnosis of genitourinary tuberculosis were studied. Twenty-eight of the patients were males and three were females, giving a male: female ratio of 9.3:1. Their mean age was 37.6 (\pm 11.5) years, with a range of 20 – 60 years. Patients in the age range 20-29 were seven, range 30-39 were 14, range 40-49 were four, range 50-59 were four, and 60 and above had just two patients.

Presenting features

The presenting symptoms of the patients are shown in Table I. Testicular or scrotal swelling with or without pain, and fever and/or headache, were the commonest presenting complaints, presenting in 25 (80.6%) and 16 (51.6%) of the patients respectively. Lower urinary tract symptoms singly or collectively presented in about 3–24% of the patients. Only three patients complained of weight loss, and four patients gave a preceding history of pulmonary tuberculosis. Table II lists the observed significant physical findings in these patients. Epididymal and testicular masses or indurations that were either tender or non-tender (51.6%), and pyrexia, which was usually low

grade (51.6%), were the commonest findings. Loin tenderness (19.3%), hydrocoele (19.3%) and scrotal induration with sinuses, were the other features found in multiple numbers.

Indurated, nodular prostate suggestive of carcinoma was found in one patient who presented with urinary retention. However the PSA and prostatic acid phosphatase estimations were normal. Subsequent biopsy revealed tuberculous prostatitis. Another patient had a firm mass on the cord of the right testis that on excision biopsy was revealed to be tuberculosis.

Laboratory findings

Urinalysis showed haematuria in 22 patients (71.0%), being microscopic only in 18 (58.1%). Proteinuria was present in 10 patients (32.3%), and pyuria in 18 patients (58.1%) with 13 (41.9%) being sterile pyuria.

Mantoux (tuberculin) test was done on all the patients. Twenty-eight patients (90.3%) had positive reactions, but only 16 patients (51.6%) had positivities regarded as significant in our environment (>10 mm induration)¹⁰. Others ranged from one millimetre to eight millimetres. Three patients (9.6%) were negative.

Erythrocyte sedimentation rate (ESR) was done on all the patients. The mean ESR was 76.4 (\pm 26.8) mm/1st hour (Westergreen), with a range of 20-115. Sixteen patients (51.6%) had ESR values ranging from 61 – 100mm/1st hr, and six (19.4%) patients had ESR greater than 100mm/1st hour. Other ranges were 21-68mm/1st hour in seven patients, and less than 20mm in three patients.

The mean total white blood cell count was 7000 (\pm 2700)/mm³. Total white blood cell count was considered abnormal in only seven patients (22.6%). Of these, four were $>11, 100/mm^3$ and three were $<4000/mm^3$.

Twenty-two patients were screened for HIV I & II antibodies. Only 2 (9.1%) were positive.

Staining for acid-fast bacilli on concentrated sediments from twenty-four-hour urine specimens collected on three consecutive days, could be done on only 24 patients who satisfactorily completed the requirements. Seventeen of these patients (70.8%) were positive and seven (29.2%) were negative for acid-fast organisms (AFB). The two patients who had productive cough on presentation also had AFB on staining of their sputum.

Specific culture for *Mycobacterium tuberculosis* could be done on only seven patients. Four were positive and three were negative. Routine microscopy, culture and sensitivity were done on the entire patients. Seven patients (22.6%) had positive cultures. Cultured organisms were *Staph aureus*, *E. coli*, *Streptococcus species* and *Coliform species*. These were likely to be secondary infections.

Radiology:

IVU was done on only thirteen patients due to extenuating circumstances. Positive findings, suggestive of tuberculosis were found in ten of these patients (77.0%). There were bilateral involvements in three patients and unilateral involvement in seven patients. The spectrum of findings on IVU was so diverse and is listed in Table III. Figures 1 and 2 show some of these findings.

Chest X-rays were done on twenty-six patients. Four (15.4%) showed healed lesions of tuberculosis, three (11.5%) showed concurrent active lesions, and nineteen were negative.

Histology

Histology was done on twenty-six patients. The specimens examined consisted of one prostrate, one cord of the testis and twenty-four epididymes. Twenty-four of the patients had histological confirmation of tuberculosis. Two of the epididymal specimens were non-specific, but the same patients had positive urine cultures for *M. tuberculosis*.

Diagnosis:

Diagnosis was based on histology alone in nineteen patients, on positive culture and/or acid-fast bacilli alone in five patients, and on a combination of findings on seven patients.

Organs involved:

Forty-three sites were involved in seven organs as follows:

1. Epididymis	--	25 (58.4%)
2. Kidney	-	7 (16.3%)
3. Testis(as acute epididymo-orchitis) -		4 (9.3%)
4. Bladder	--	3 (7.0%)
5. Ureter	--	2 (4.7%)
6. Cord of the testis	--	1 (2.3%)
7. Prostate	--	1 (2.3%)

Thus, the epididymis was the commonest site of involvement followed by the kidney. Rare involvements of the ureter, cord of the testis and prostate were encountered in our study.

Treatment

In seven patients, streptomycin was substituted with ethambutol and given for three months. This was mainly because of the vestibular side effects of streptomycin that developed in these patients.

Surgical procedures were mainly biopsies, which were done on 26 patients. Other procedures done included bilateral ureteroneocystostomy on a patient with right ureteric stricture and left vesico-ureteric reflux, and hydro-dilatation in a patient with reduced bladder capacity.

Table I: Presenting Symptoms of Genitourinary Tuberculosis

S/n	Symptoms	No (n=31)	%
1	Testicular or scrotal Swelling /pain	25	80.6
2	Fever/Headache	16	51.6
3	Dysuria	7	22.6
4	Back/Loin/abdominal pain	6	19.3
5	Urgency	6	19.3
6	Overt haematuria	4	12.9
7	Abdominal pains/colics	4	12.9
8	Scrotal abscess	4	12.9
9	Frequency	4	12.9
10	Chest pain	3	9.6
11	Intermittency of urine stream	3	9.6
12	Primary Infertility	3	9.6
13	Loss of weight	3	9.6
14	Cough	2	6.4
15	Splaying of urine stream	2	6.4
16	Nocturia	2	6.4
17	Poor Stream	2	6.4
18	Acute urinary retention	1	3.2

Table II: Physical Findings on Patients with Genitourinary Tuberculosis

S/n	Physical Findings	No (n=31)	%
1	Epididymal (± testicular) mass	16	51.6
2	Pyrexia	16	51.6
3	Hydrocoele	6	19.3
4	Loin Tenderness	6	19.3
5	Scrotal induration with sinuses	4	12.9
6	Testicular atrophy	1	3.2
7	Mass cord of testis	1	3.2
8	Indurated nodular prostate	1	3.2
9	Urethral indurations	1	3.2

Table III: Findings on IVU

S/n	Findings	No
1	Hydroureter and hydronephrosis	6
2	Poor function	4
3	Cavitations	3
4	Reduced bladder capacity	2
5	Calcifications (1 bladder, 1 kidney)	2
6	Ureteric stricture	2
7	Vesico-ureteric reflux	1

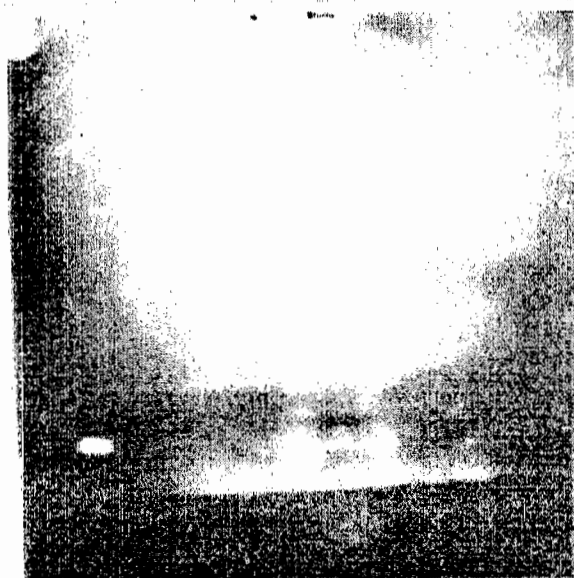


FIGURE 1
Full length IVU film showing bilateral renal caliectases and cavitations

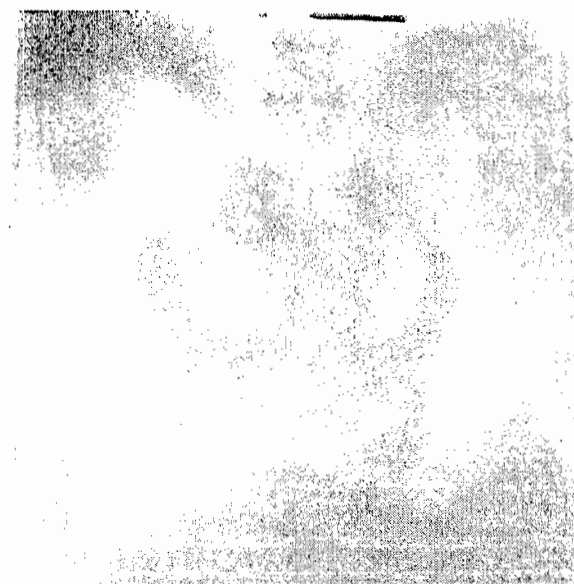


FIGURE 2
Post-micturition IVU film showing bulbous dilatation of the distal ends of both ureters, the right due to a distal ureteric stricture, the left due to a vesico-ureteric reflux

DISCUSSION

Genitourinary tuberculosis is known to be a secondary manifestation of the disease. As in most other forms of extrapulmonary tuberculosis, it originates from a primary tuberculous focus elsewhere in the body, usually the lungs and rarely the gastrointestinal tract. The miliary tuberculosis formed subsequent to dissemination from this focus may be dormant for years and then begin to spread, resulting in caseous and cavitory necrosis of the

genitourinary organs. Infection throughout the genitourinary tract may also result from canalicular spread from an infected kidney by the urine¹⁰. Infection of the prostate, for example, is by this method. Chijioke¹² has discussed the current concepts on the pathogenesis of the renal lesion.

In our study, the male sex preponderance, the mean age of 37.6 years with preponderance of cases in the third and fourth decades, are consistent with the general findings in other studies^{1, 7, 11, 13}. However the commonest reasons for presentation in our patients were testicular or scrotal swellings (as acute or chronic epididymitis or epididymo-orchitis), and fevers and headaches. The commonest sign on physical examination was epididymal/testicular mass or induration. In other studies, the usual presentations were with haematuria, flank pain and lower urinary tract symptoms^{1, 7, 11, 13}. Our observations in this study do not provide or suggest a pathophysiological explanation for this apparent predilection for testicular symptoms and signs in our environment. We hope that an explanation may emerge from further studies. Overt (macroscopic) haematuria that seems to be prominent in many studies occurred in only 12.9% of our patients, but microscopic haematuria was found in 71.0% of patients. It is however pertinent to note that in most of those other studies, the main presenting features were flank pains and lower urinary tract symptoms which suggest the possibility of renal involvement. The classical finding of sterile pyuria occurred in only 41.9% of the patients. Such was also the findings in South Africa⁷ and the USA¹¹, and one wonders at the tenability of 'sterile pyuria' as a clue to the presence of urinary tract tuberculosis. In fact such assumption may be misleading as was well illustrated by William and Maj¹¹. Tuberculin skin tests (Mantoux) and baseline ESR, have been found useful clinically in the diagnosis of extrapulmonary tuberculosis with values of <10mm and > 100mm/1st hour respectively considered significant for diagnosis. A fall in ESR is also regarded as a mirror of improvement during treatment^{7, 14}. In our cases, only 51.6% had significantly positive Mantoux test and only 19.4% had ESR > 100mm/hr, though a further 51.6% had high ESR values of 61-100mm/hr. There is no doubt however that these two parameters do impact positively on case detection in many parts of the developing world where most of the diagnosis of extrapulmonary tuberculosis are commonly made on clinical grounds^{5, 6}.

Unlike the expectation, we found only 11.5% of our patients with evidence of active concurrent pulmonary tuberculosis and a further 15.4% with healed lesions on chest radiographs. Lack of evidence for a concurrent or previous pulmonary or other focus of primary infection is however not an unusual finding in patients with genitourinary

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tuberculosis⁷. We, for now, do not have a clue as to the possibility of any mechanism responsible for this finding. We hope that further studies may elucidate it. Also unlike expectation, only two of the twenty-two patients screened for HIV 1 and 2 antibodies were positive. The World Health Organisation (WHO) believes that the recent upsurge in the incidence of tuberculosis in the developing world is significantly contributed to by the high prevalence of HIV infection as patients with HIV infection are highly predisposed to tuberculosis². Thus, this finding may be puzzling, but there is also a similar finding for extrapulmonary tuberculosis in general in China¹⁵. Again, no pathophysiological or pathogenetical explanation can be provided for this from this study. We hope that an explanation may emerge in the future if other studies reproduce this finding.

Our medical treatment, because of facilitational difficulties, was presumptive and not modified by sensitivity results. As such, we dare not comment on resistance or otherwise of the organisms to our treatment. Also because of unsatisfactory compliance in many cases, and a high rate of default to follow-up visits after completion of the prescribed primary treatment period, it is difficult to comment confidently on responses and recurrences. All patients, however, had satisfactory initial clinical responses to treatment with drugs.

CONCLUSION

Our study confirms the protean nature of tuberculosis and suggests slightly different clinical characteristics of genitourinary tuberculosis in our environment. Genitourinary tuberculosis is difficult to diagnose because its symptoms are non-specific. A high index of clinical suspicion with combined investigative tools is necessary for accurate diagnosis. In the setting of most developing countries, it will thus be difficult to make such a diagnosis in the primary and even the secondary public health care facilities. Though our result does not constitute an impressive high incidence of the entity, we believe that genitourinary tuberculosis may not be that rare in our environment. It may just be a problem of case detection. We therefore advise that because of the known high incidence and prevalence of pulmonary tuberculosis in the environment, any patients presenting with unexplained symptoms in the urinary tract should be investigated for tuberculosis. We apply this policy in our centre.

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