

## CASE REPORT

### TUBERCULOUS MENINGITIS ASSOCIATED WITH URINARY TRACT TUBERCULOSIS

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**Abstract.** The association of tuberculous meningitis (TBM) and urinary tract tuberculosis is very rare. Two cases of this condition are reported. Both presented with subacute to chronic meningitis with lymphocytic pleocytosis, elevation of protein content and depression of glucose level of cerebrospinal fluid. Pyuria and hematuria were detected and Ziehl-Neelsen's stain was positive for acid fast bacilli (AFB). Urographic abnormalities were compatible with urinary tract tuberculosis. AFB smear of urine is the simplest method to detect urinary tract tuberculosis.

Tuberculous meningitis (TBM) is a serious disease. Delay in the diagnosis is directly related to poor outcome. A gold standard for diagnosis of TBM is an identification of *Mycobacterium tuberculosis* in cerebrospinal fluid (CSF) by direct smear and culture. However, the rate of positive AFB smear of CSF is too low (Kilpatrick *et al*, 1986) and cultural result takes 6-8 weeks. A variety of laboratory tests for rapid diagnosis have been developed, *eg* CSF adenosine deaminase level (Ribera *et al*, 1987), detection of tuberculostearic acid in CSF (French *et al*, 1987) and amplification of DNA in CSF by polymerase chain reaction (PCR) (Kaneko *et al*, 1990) but these methods are expensive and too complicated for general use. Then, the diagnosis of TBM is mainly based on the clinical syndrome (subacute or chronic meningitis), CSF profile (lymphocytic pleocytosis, elevation of protein content and hypoglycorrhachia with negative result of bacterial and fungal studies) and evidence of tuberculosis elsewhere in the body. Of the latter, the most common of extrameningeal lesion is the lung. The association of TBM and urinary tract tuberculosis very rarely occurs (Chotmongkol *et al*, 1996; Phuapradit and Vejajiva, 1987). This report demonstrates two cases of TBM with urinary tract tuberculosis.

**Case 1:** A 44-year-old male was admitted to Srinagarind Hospital, Khon Kaen, Thailand in April 1999 because of acute confusion for 1 day prior to admission. He had been in good health in the past. Nine days previously, he experienced fever and headache.

On physical examination, he was a sthenic man with body temperature of 38°C, disorientation as to time, place and person, and stiffness of the neck. Other findings were unremarkable.

Complete blood count (CBC), blood glucose, serum BUN, electrolyte, liver function test, chest X-ray were within normal limits. Anti-HIV was non-reactive. Urinary analysis showed a pH of 6.0, albuminuria 2+, white cell count of 50-100 and red blood cell count of more than 100 per high power field. Urine culture grew *S. enterococci*. Ultrasonography of the abdomen demonstrated parenchymal disease of both kidneys. Intravenous pyelography (IVP) showed a small size, lobulated contour and caliectasis of the right kidney with impaired excretory function, a narrowing segment of the right ureter and a pseudodiverticulum of urinary bladder. On cystourethroscopy revealed diffuse inflammation of bladder wall. A mucosal punch biopsy showed chronic nonspecific inflammation. CT scan of

the brain revealed moderate hydrocephalus with basal arachnoiditis. CSF analysis showed an opening pressure of 460 mm of water, protein of 299 mg/dl, glucose of 33 mg/dl (blood glucose of 189 mg/dl), white blood cell of 120 cells/mm<sup>3</sup> with 60% lymphocytes. Gram stain, Ziehl-Neelsen stain, India ink preparation, cryptococcal antigen and culture were all negative.

Tuberculous meningoencephalitis was diagnosed. To search for evidence of extrameningeal tuberculosis, bacteriologic study of urine was established, Ziehl-Neelsen stain was performed with positive AFB smear. The patient was treated with combined antituberculous drugs [isoniazid (I), rifampin (R), pyrazinamide (Z), ethambutol (E) for 2 months and IR for 10 months] and ventriculo-peritoneal shunt. Urinary tract infection was treated with intravenous ampicillin for 2 weeks. His symptoms gradually improved. CSF and urine culture for *M. tuberculosis* were negative. Urinary analysis, after completion of treatment, was normal.

**Case 2:** A 41-year-old, previously healthy man, was admitted to Srinagarind Hospital in May 1999 with the chief complaint of fever and headache for 1 month and alteration of consciousness for 1 week. He had a history of treatment for pulmonary tuberculosis about 20 years ago.

Physical examination revealed a stuporous man with body temperature of 38°C, stiffness of the neck, bilateral lateral rectus muscle palsies and papilledema. The rest of the general and neurological examination were normal.

CBC, blood glucose, serum BUN, electrolyte, liver function test, chest X-ray were within normal limits. Anti-HIV was non-reactive. Urinary analysis showed a pH of 6.0, albuminuria 2<sup>+</sup>, white cell count of 20-30 and red blood cell count of more than 100 per high power field. Urine culture grew 10<sup>3</sup> *Escherichia coli*. Ultrasonography of the abdomen showed left renal stone. IVP revealed left renal stone with severe impairment of function of the left kidney. Cystourethrosopy

demonstrated an edematous bladder mucosa with trabeculation 4<sup>+</sup>. A retrograde ureteropyelogram showed moderate pelvicaliectasis of the left kidney and the upper to mid-part of the ureter had an irregular wall. CT scan of the brain revealed communicating hydrocephalus with diffuse brain edema. CSF analysis showed an opening pressure of 500 mm of water, white blood cell of 400 cells/mm<sup>3</sup> with 98% lymphocytes, protein of 149 mg/dl, glucose of 20 mg/dl (blood glucose of 111 mg/dl). Gram stain, AFB smear, India ink preparation, cryptococcal antigen and culture were negative.

Tuberculous meningoencephalitis was diagnosed. From an experience of case 1, Ziehl-Neelsen stain of urine was done with positive AFB smear. The patient was treated with IRZE for 2 months, followed by IR for 4 months with repeat lumbar puncture. After treatment, his condition markedly improved. CSF and urine culture for *M. tuberculosis* were negative.

In the urinary tract tuberculosis, hematogenous seeding of the kidneys results in granulomatous lesions of the glomeruli. Most of these early lesions heal but some caseate, rupture into the tubular lumen, shed tubercle bacilli into the urine and can infect the renal pelvis, ureter, bladder and urethra. Irritative voiding symptoms (frequency, urgency and dysuria) and gross painless hematuria are the most common complaints. Pyuria, microhematuria and an acid urine are present in the majority of the patients. Urographic abnormalities are dilatation of all or part of the collecting system, parenchymal calcifications, poor renal delineation, cavitation, cortical scarring, ureteral stricture and a small bladder. The most valuable radiological clue to renal tuberculosis is the simultaneous occurrence of multiple abnormalities of the upper and lower urinary tract. Cystoscopy often reveals diffuse inflammation with edema and hyperemia (Psihramis and Donahoe, 1986). Chemotherapy is the mainstay of treatment. Surgery may be unavoidable in certain conditions such as severe or persistent pain, life-

threatening hemorrhage, persistent infection, unresponsive hypertension and strictures with significant urinary obstruction (Psihramis and Donahoe, 1986; Carl and Stark, 1997).

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