



# The incidence of subclinical forms of urogenital tuberculosis in patients with pulmonary tuberculosis



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## ABSTRACT

The aim of our study was to determine whether patients with pulmonary tuberculosis may have subclinical forms of urogenital tuberculosis.

Between 2011 and 2012, a prospective study was conducted. Basic demographic parameters were recorded and the following investigations were performed: direct bacilloscopy of sputum, evaluation of affected lung fields and presence of cavities on chest X-ray, Mantoux tuberculin skin test II, and interferon gamma release assay. Culture and molecular methods for *Mycobacterium tuberculosis* in urine were performed. In cases with a positive urine test, an ultrasound examination, computed tomography scan of the abdomen, and endoscopy of the urinary tract were performed.

A total of 102 patients (75 men and 27 women) were included in the study, with a median age of 46.8 years. Subclinical forms of urogenital TB were detected in 7 patients; 5 by molecular methods, 1 by urine culture, and 1 with both methods. The presence of subclinical forms of genitourinary TB was found in 4 patients without and 3 patients with findings on imaging methods corresponding to TB.

A significant number of patients with pulmonary tuberculosis may simultaneously have subclinical forms of urogenital TB.

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## 1 Introduction

Tuberculosis (TB) is an infectious disease that occurs worldwide. It is caused by *Mycobacterium tuberculosis* complex. Most diseases are caused by *M. tuberculosis* (M.TB). TB is currently the second most deadly infectious disease in the world [1].

The Czech Republic is among the countries that have effectively controlled TB, and the incidence of this disease is still declining.

In 2014, a total of 512 cases of TB of all forms and localizations and their recurrence (4.9 patients/100 000) were reported to the TB registry.

TB is clinically manifested by fatigue, loss of appetite, weight loss, decreased physical performance, subfebrile night sweats, and a dry or productive cough, possibly with hemoptysis, dyspnea, and pleural pain. However, the clinical course of TB in some cases can be without symptoms [2].

The aim of our work was to determine whether patients with pulmonary TB may have ongoing subclinical urogenital TB.

## 2 Material and methods

The study included all patients who were admitted to the Department of Respiratory Medicine for pulmonary TB diagnosed according to the criteria of WHO [3]. All patients provided informed

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**Table 1**  
Results of pneumological examination.

| Type of pneumological examination for TB  | Number of examined patients | Number (%) of positive patients |
|---|-----------------------------|---------------------------------|
| Direct bacilloscopy of sputum and/or material obtained during bronchoscopy                | 102                         | 46 (45,1%)                      |
| Standard culture of sputum and/or material obtained during bronchoscopy                   | 102                         | 68/66,7%                        |
| Molecular methods of sputum and/or material obtained during bronchoscopy                  | 102                         | 66 (64,7%)                      |
| Affected lung fields on chest X-ray (average number of affected chest fields per patient) | 102                         | 102 (100%) (2,8)                |
| Presence of cavities on chest X-ray   | 102                         | 47 (46,1%)                      |
| Mantoux tuberculin skin test II   | 83                          | 50 (60,2%)                      |
| Interferon gamma release assay  | 63                          | 47 (74,6%)                      |

**Table 2**  
Comparison of the results of demographic and pneumological parameters between patients with and without subclinical urogenital TB.

| Parameters  | Patients with subclinical urogenital TB | Patients without subclinical urogenital TB | p      |
|---|---|--|--------|
| Age (median)  | 46.3                                    | 53.1                                       | <0,271 |
| Males   | 5                                       | 70   | 1.000  |
| Females   | 2                                       | 25   | 1.000  |
| Positivity of direct bacilloscopy of sputum and/or material obtained during bronchoscopy for TB | 2                                       | 44   | <0,451 |
| Positivity of standard culture of sputum and/or material obtained during bronchoscopy for TB    | 2                                       | 66   | <0,139 |
| Positivity of molecular methods of sputum and/or material obtained during bronchoscopy for TB   | 3                                       | 66   | <0,239 |
| Number of affected chest fields   | 2.9                                     | 2.6  | <0,599 |
| Number of patients with cavities on chest X-ray   | 6                                       | 51   | <0,135 |
| Positivity of Mantoux tuberculin skin test II   | 2                                       | 48   | <0,775 |
| Positivity of Quantiferon   | 3                                       | 44   | 1.000  |

consent. Included patients showed no clinical signs of urogenital TB. Basic demographic parameters in all patients were recorded and the following investigation were performed:

1. Sputum and/or material obtained during bronchoscopy, which included direct bacilloscopy stained using the Ziehl–Neelsen method, standard culture with Loewenstein–Jensen and Ogawa egg-based medium, rapid culture using Bactec MGIT 960, and molecular methods using polymerase chain reaction (PCR) Anyplex MTC/NMT and MTD test – GeneXpert;
2. Evaluation of the affected lung fields on chest X-rays;
3. Evaluation of the presence of cavities on chest X-ray;
4. Mantoux tuberculin skin test II;
5. Interferon gamma release assay (QuantiferonTB Gold – QFT).

An examination for M.TB in urine by culture and molecular methods were performed and urogenital TB was defined as positivity of any of these tests. In case of a positive urine test for M.TB by any method, an ultrasound examination and computed tomography (CT) scan of the abdomen and pelvis and an endoscopic examination of the lower urinary tract were performed.

According to the results, patients with positive M.TB results in urine were divided into subclinical form of genitourinary TB with or without evidence of impairment of the urogenital tract.

Within the study, the following parameters were statistically evaluated and correlated:

1. Occurrence of subclinical forms of urogenital TB;
2. Comparison of results of the demographic, radiologic, and bacteriological parameters;
3. Comparison of the incidence of urogenital TB in patients with pulmonary TB at our hospital and the incidence of urogenital TB in the Czech Republic.

### 3 Results

In the years 2011 and 2012, 102 patients were admitted to our hospital for pulmonary TB, with a median age of 46.8 years, comprising 75 men and 27 women.

#### 3.1 Pneumological examination

Results of the pneumological examination (clinical, radiologic) and bacteriologic findings in sputum for M.TB are displayed in Table 1.

#### 3.2 Urine tests

Subclinical forms of urogenital TB were detected in 7 patients; in 5 patients using molecular methods, in 1 patient by urine culture, and in 1 patient with both methods.

The presence of subclinical forms of genitourinary TB was found in 4 patients (4.0%) without evidence of impairment of the urogenital tract using imaging and/or endoscopic methods, and in 3 patients (2.9%) with findings on imaging methods corresponding to TB.

#### 3.3 Comparison of the results of demographic and pneumological parameters

A comparison of the results between patients diagnosed with subclinical urogenital TB and other patients is shown in Table 2. No statistically significant differences in any parameters were observed between the two groups of patients.

#### 3.4 Urogenital TB at our hospital versus in the Czech Republic

During the 2011 and 2012 study period, urogenital TB was diagnosed in 11 patients. Seven cases of subclinical urogenital TB were seen in patients with pulmonary TB and 4 cases of clinically symptomatic genitourinary TB were recorded.

Between 2011 and 2012 in the Czech Republic, 1109 patients had been diagnosed with pulmonary TB and 27 patients with urogenital TB.

During the study period, the incidence of genitourinary TB among patients with pulmonary and/or genitourinary TB was 10.4% at our hospital while the incidence of urogenital TB among patients with pulmonary and/or genitourinary TB in the Czech Republic, excluding patients from our hospital, was 1.6%. This difference in incidence between our hospital and the rest of the Czech Republic was statistically significant.

## 4 Discussion

Extrapulmonary involvement accounts for 10% of TB cases. Genitourinary TB accounts for 30%–40% of all extrapulmonary TB, second only to lymphonodal infection. In developed countries, urogenital TB occurs in 2%–10% of cases of pulmonary TB, while in developing countries it occurs in as many as 15%–20% of cases [4].

The first major problem in interpreting our results is actually insufficient terminology. Latent M.TB infection and active TB are two ends of a spectrum of states ranging from asymptomatic infection to overt disease [5].

Data on subclinical or latent forms of genitourinary TB in patients with pulmonary TB are sparse. Authors mostly publish individual cases or series of cases. Older studies used only urine culture to detect M.TB in urine [6–10]. In our study, we use the term subclinical genitourinary TB, with or without proven infection of the genitourinary tract.

Data for genitourinary TB are not described in published reports. Therefore, we can do only an approximation using the published data suggesting that genitourinary TB accounts for 30–40% of all extrapulmonary TB. Using this approximation, the number of genitourinary TB cases in 2012 range between 238 952 and 318 603, or 3.9–5.2% of all pulmonary cases [11]. We proved clinical or subclinical urogenital TB in 10.4% of our pulmonary TB patients, proving our hypothesis that if urogenital TB is screened for in pulmonary TB patients, we can identify more cases than currently reported.

## 5 Conclusions

Our work has shown that a significant number of patients with pulmonary TB may simultaneously have ongoing subclinical urogenital TB.

## Competing interests

None declared.

## Ethical approval

Not required.

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