

The Role of the General Practitioner in Detection and Control of Tuberculosis

Ács Valeria¹, Ianosi Edith Simona²

¹ Doctoral School, University of Medicine and Pharmacy, Tîrgu Mureş, Romania

² Department of Pulmonology, University of Medicine and Pharmacy, Tîrgu Mureş, Romania

In Romania, the detection, diagnosis, treatment and prophylaxis of tuberculosis (TB) is being performed according to the "National Strategy for TB Control 2007–2011", part of the National Program for the Control of TB 2007–2011 that has been approved by Government Decree. The program has been developed by Romanian experts and it observes the WHO requirements regarding the Global Control of TB in the world. The National Strategy for TB Control aims to maintain a 100% coverage of the WHO DOTS (Directly Observed Therapy in Short course) strategy for prevention of abandon, failures and disorganized treatments with missed doses that may lead to development of chemoresistant strains. It is obvious that the family physician in direct contact with the population is the most suitable to identify TB suspects and their contacts, and to contribute to the correct progress of the outpatient treatment of TB.

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The aim of the National Strategy for TB Control is to contribute to the improvement of the general health of the population of Romania, by reducing TB morbidity and mortality and limiting the spread of the infection and of the disease in the population. TB in Romania has one of the highest rates of endemic spread in Europe. Therefore, TB is a priority and a national health issue [1,2,3,4,5].

In 2005 the administration of treatment under direct outpatient surveillance has been extended to the whole country by integration of primary care medical offices into anti-tuberculosis activity.

The primary care network is directly involved in anti-tuberculosis activity. General practitioners from the primary care network have a decisive role in the integrated anti-tuberculosis program [1,6,7,8]:

1. They identify the TB suspects and contacts;
2. They administer anti-tuberculosis medication under direct surveillance;
3. They administer chemotherapeutic prophylaxis to contacts;
4. Role in decreasing non-compliance to anti-TB treatment;
5. They participate in the epidemiologic investigation;
6. They can administer later the BCG vaccine to those with contraindications at birth or skipped patients;
7. They can intervene in the TB infection zone and the control of the transmission of the tuberculosis infection;
8. General healthcare and anti-tobacco education.

1. Identification of TB suspects and contacts

The family physician will contribute to the detection of TB cases both by passive detection (through symptoms), and by active detection in people with risk factors for TB.

Passive detection ensures the best diagnostic efficiency. The family physician will refer the patients with symptoms suggestive for TB to the Pulmonology and Phthisiology Clinics:

- Bacillus impregnation – subfebrility, physical asthenia, loss of appetite, paleness, night sweating, insomnia, anxiety, weight loss;
- Local respiratory symptoms – dry or mildly productive cough that is not responding to medication and it persists 2–3 weeks, perhaps associated with hemoptysis, dyspnea in this clinical context;
- Local symptoms of other organs that may be affected by TB: urogenital system (polakuria, lumbar or hypogastric pain, bladder colics, swelling of the scrotum), skeletal system (pain of the large joints or the spine, pain associated with functional impairment that is worsened at movement and it does not respond to non-specific anti-inflammatory medication), lymphatic system (swelling of a lymph node group, especially in the lateral region of the neck – sometime with fistula formation), pleural or pericardial effusions, signs of meningo-encephalitis, signs of chronic adrenocortical failure, blunt abdominal pain associated with subocclusion, etc. [6].

Furthermore, in case of TB suspicion they will recommend sampling for bacteriology testing (for pulmonary TB – spontaneous sputum or after hypertonic saline aerosol, in 3 – 6 different days) or in case of extrapulmonary TB, other samples obtained through non-invasive or even invasive (if the localization is deep) methods (urine, fistula pus, pleural fluid, biopsies obtained by bronchoscopy or other endoscopies, lymph node excisions, etc.) [9,6].

Active detection is performed selectively in populations with increased risk for TB, especially if these people are also exposed to the added risk of immunodepression. The general practitioners, school or factory physicians will per-

form a clinical control of these patients, and in case of TB suspicion they will refer them to pneumology and phtysiology specialists for continued testing: radiology, bacteriology testing, bronchoscopy, biopsies, etc. Populations groups with increased risk [1,8]:

- HIV/AIDS infected people, patients undergoing immunosuppressive treatments for different conditions (cytostatics, long-term use of corticosteroids), radiotherapy [10,11,12];
- Patients with TB in the medical history;
- Drug users;
- Population in jails/other corrective institutions,
- Patients with malignant hematologic conditions, tumors, diabetes mellitus, B or C hepatitis or those on chronic dialysis;
- Chronic alcohol abusers;
- People undergoing long-term hospital care in psychiatry units;
- Personnel working in healthcare units; 10 times the risk of general populations (especially young people);
- People from old TB infection zones, where disease episodes repeat;
- Contacts of TB patients;
- Workers exposed to coniosis risks / those with pneumoconiosis, working in construction yards, sleeping in common quarters, commuters;
- Gypsy communities;
- People from retirement homes or sanatoriums;
- Extreme paupers, homeless, social cases;

The family physicians will collaborate with pneumology and phtysiology specialists in establishing the frequency of controls based on the risk for TB development.

2. Administration of anti-tuberculosis medication under direct surveillance

The aim of anti-TB treatment

- Healing of the patients and decreasing the risk of recurrence, prevention of complications and deaths;
- Prevention of development of bacterial chemoresistance;
- Limiting the spread of infection to contacts and reduction of the TB endemic.

The principles of a correct antibiotic treatment (established for increasing the therapeutic efficiency and prevention of chemoresistance) are [1,2,6]:

- The administration of anti-tuberculosis drugs should occur only after a certain diagnosis (no therapeutic tests should be performed, as these lead to chemoresistance);
- Standardized treatment regimens (containing at least 4 anti-TB antibiotics for new cases);
- The therapy should be performed in stages (biphasic regimens): daily saturation phase, 7/7 regimen (intensive with 4–5 drugs), followed by a continuation phase (intermittent 3/7 regimen with 2–3 drugs);
- Regular treatment for a total of 6 – 8 – 12 months

(based on the type of the disease) without missed doses;

- Individual therapy only in the following cases:
 - Replacement of Streptomycin (contraindicated in pregnant women) with Etambutol
 - Chemoresistance
 - Atypical mycobacterial infections
 - Major adverse events
 - Associated diseases and drug interactions
- All required therapeutic methods, including the supporting medication, should be free of charge for all TB patients;
- The treatment should be supervised directly for the entire duration;
- Single morning dose, calculated according to body weight;
- Periodic testing of the hepatic and renal function.

3. Chemoprophylaxis

The aim of anti-TB chemoprophylaxis is to stop the development of active TB in patients who came into contact with an infectious source (pulmonary TB with positive microscopic testing) [10,11].

It involves especially children and adolescents (12–16 years) and young patients (up to 19 years).

Chemoprophylaxis indication is based on IDR2PPD, age and the immunity of the examined person (HIV negative or positive). Interpretation of the PPD skin test is presented in Table I.

The first step is to exclude active TB, then chemoprophylaxis is indicated for people at risk:

- Newborns in the TB infection zone;
- Children 0–14 years:
 - positive skin test, for at least 6 months;
 - positive skin test, for 3 months, then the skin test should be repeated. In case of tuberculin positivity, the chemoprophylaxis should be continued for 6 months, and in case of a negative skin test, it should be discontinued only if the source of infection disappears (bacteriological negativity or isolation).
- Adolescents and adults up to 35 years with risk factors and positive skin test:
 - immunodepression (leukemias, lymphomas, collagenoses, transplantations, acquired or inherited immune deficiencies);

Table I. Interpretation of the PPD skin test [1]

Diameter of the papule	IDR2PPD result
< 5 mm	NEGATIVE
5–9 mm	generally NEGATIVE but POSITIVE: HIV/AIDS patients EQUIVOCAL: recent and repeated contact with a BK+ pulmonary TB case
10–17 mm	POSITIVE if there is a risk factor
> 18 mm	POSITIVE

- drug induced immunodepression (chemotherapy, corticosteroids), radiotherapy;
- chronic renal failure;
- pneumoconioses;
- uncontrolled insulin dependent diabetes mellitus;
- malabsorption syndrome; malnutrition, chronic duodenal ulcer;
- gastric surgery, especially patients with poor diet.

Chemoprophylaxis consists of Isoniazid (HIN) monotherapy, administered daily (7/7) 10 mg/kg/day for children and 5 mg/kg/day for adults for at least 6 months. In case of contact with a source with HIN-resistant germs, prophylaxis will be performed with: Rifampicin (RMP) 10 mg/kg/day, daily, for 6 to 12 months. Chemoprophylaxis with two or more drugs is practically forbidden. Pyridoxine (B6 vitamin) 250 mg/day should be associated especially for: breastfeeding infants, children with protein-deficient diet, HIV infected patients, people with conditions predisposing them to neuropathies, chronic alcoholics. In case of HIV infection, chemoprophylaxis should be extended to 9 months and sometimes more [10,11,12].

4. Decreasing non-compliance to anti-TB treatment

Family physicians will repeatedly explain in simple words the problems that this disease raises, its contagious nature and the need to observe the dosage, frequency and duration of medication administration [12,13]. This education has to be initiated during hospital stay and continued in the outpatient treatment phase.

5. Epidemiologic investigation

The epidemiologic investigation is a complex action that starts with a newly discovered TB case and aims to identify all people that came into contact with the patient. The epidemiologic investigation should discover all existing sources of infection and identify all people infected or exposed to infection risk by these sources [1]. The family physician will make lists of all contacts from the infection zone and he will ensure their mobilization for testing, by referring them to the Pneumology and Physiology Clinic.

The epidemiologic investigation comprises epidemiologic actions; clinical, radiological, and bacteriological tests, tuberculin skin test and other necessary investigations based on the specifics of the case, for the diagnosis of each contact – child or adult, followed by different interventions of chemoprophylaxis or treatment based on the condition of the diagnosed patient (infected healthy or ill). The general practitioners will attend courses and symposia for dissemination of actions for TB detection and control [2,8].

Types of epidemiology investigations

1. Ascending investigation – it is initiated in all cases of disease in children, adolescents and young adults, as well as in other cases of disease in adults that may be related to their work (e.g. zoo or vet staff); this type of investiga-

tion is performed also in case of excessive reaction to tuberculin in children. In cases of tuberculin conversion, the origin of the infection should be established, similar to the disease cases. The aim of this investigation is to track down the source of the infection.

2. Descending investigation – it is mandatory, especially in cases of illness in adults; the aim is to discover all those people that could have been infected by this case.
3. Mixed investigation – uses both of the above. When an ascending investigation discovers the source, cannot be stopped here. Further on, this source will be considered as a new case and a descending investigation will be initiated in order to identify other cases that might have been infected by this one, so the investigation becomes mixed.

The epidemiologic investigation has to be initiated within the first 3 days from the detection of the index case or in case of TB suspicion (in this case the epidemiologic investigation becomes a precious element for establishing a probable diagnosis). The following contribute to the epidemiologic investigations: family physician, factory medical office, school medical office, DPF, epidemiologist [1,6].

6. Intervention in the TB infection zone and the control of transmission of tuberculosis infection;

General measures for prevention of infection [1,12,13]:

- immediate treatment of the diagnosed patients;
- disinfection measures; efficient ventilation, natural light (sunlight), UV lamp, chemical disinfection of the potentially contaminated surfaces.

Special measures performed at the facilities for TB patients:

- hospitalization or isolation of cases with bacillus-positive pulmonary TB in adequate conditions;
- contact between HIV+ patients and TB patients should be avoided, especially with positive microscopic findings;
- the medical staff will always use protection masks for breathing, especially in high risk areas (room for collecting sputum);
- sputum sampling will be performed in dedicated rooms;

7. Later administration of the BCG vaccine in case of contraindications at birth,

BCG vaccination (Calmette Guerin vaccine) is an active immunization method obtaining a relative anti-tuberculosis prophylaxis that does not stop infection with mycobacteria and it also does not break the epidemiologic chain of the disease. BCG vaccination induces an infection with attenuated living TB bacteria (*M. bovis* strain) that have lost their pathogenicity, but retained their antigenic, immunogenic properties [1,6].

The vaccine establishes a partial protection of the vaccinated patients against TBC with a variable duration of

5 to 7 years. Some authors have suggested the idea of a prolonged protection of 50 years [14]. The immunity provided by the vaccine is not absolute, but it will prevent the development of the disease after infection or it will provide protection for those who have developed mild forms of the disease, as opposed to disseminated (meningitis or miliaria) or extensively caseous complications.

Immunization by vaccination is not absolute as it will gradually diminish if there are no “natural expositions or repeated vaccinations”. Post-vaccination immunity is reinforced especially in highly endemic TB regions, by natural microinfections that the populations experiences during their lifetime [14].

Indication of vaccination [1]

In Romania, BCG vaccination is mandatory only for newborns. Vaccination is performed without discrimination on all newborns, at the age of 4 to 7 days (if there are no contraindications), at the time of discharge from the maternity ward and without previous tuberculin testing. If the newborn has not been vaccinated at the maternity ward for any reason and there are no contraindications, the vaccine will be administered by the maternity through the family physician, and up to the age of 3 months without tuberculin testing.

Control of the post-BCG post-vaccine scar formation is performed after the age of 6 months by the family physician. Unvaccinated children and those with a post-vaccine scar under 3 mm will be registered in order to establish a follow-up cohort for BCG vaccine efficacy.

The repetition of the vaccine is not justified. Revaccination has been stopped in Romania in 1995.

Vaccination consists of strictly intradermal administration of 0.1 ml (0.1 mg BCG) vaccine suspension in the skin of the upper third of the left forearm on the postero-external surface, after proper disinfection of the skin. If the technique was correct, a papule with the diameter of 5 to 6 mm is obtained, that has the aspect of “orange peel”. This should not be wiped off.

Contraindications of BCG vaccination for newborns:

- temporary: febrile condition, eruptive skin conditions, weight under 2500 g;
- absolute: symptomatic HIV infection, immunodeficiency (congenital, leukemias, lymphomas, generalized tumors), immunosuppressive treatments with corticosteroids, alkylating agents, antimetabolites, etc.

8. Health education

It addresses patients and their relatives, and it aims at spreading information about the following [4,7,8]:

- The contagious nature of TB, ways of transmission and an obligation to observe certain measures that would stop the spread of the disease;
- The symptoms of the disease and the need for quick presentation at the physician after their occurrence
- The need to observe medical instructions regarding

isolation of patients, if required, and to strictly follow the treatment and cooperate during testing;

- Measures of hygiene related to diet, housing, workplace and healthy lifestyle;
- The noxious effects of alcohol consumption and chronic tobacco use;
- Education of population for increasing the natural resistance through natural factors (air, water, sun cure, sports, physical and mental activities) and for a healthy lifestyle.

Summary

Tuberculosis is an specific endemic infectious disease widespread in the world. It represents a priority problem for the public health authorities from Romania. Although between 2003 and 2010 the global incidence of TB decreased compared to EU countries, in our country the incidence is still high. According to official WHO/Europe data, in 2010 Romania was the 4th out of the 52 countries of the WHO Europe Region according to incidence (101.00‰000 people) – after Kazakhstan (147.4‰000), Kirgizstan (126.2‰000) and Moldavia (124.4‰000).

Starting from 1998, Romania has implemented the strategy against tuberculosis – DOTS (Directly Observed Treatment Short-Course) – recommended by the World Health Organization (WHO).

In the framework of the National Program for Controlling Tuberculosis (PNTC), the family physician has the task of identifying TB suspects and contacts, to administer anti-tuberculosis medication under direct surveillance, to take part in the epidemiologic investigation and to contribute to the healthcare education of contacts. The important role of the family physician in fighting tuberculosis resides in his direct contact with the people registered at his practice, thus being the first screening stage for clinical detection.

The current concept of tuberculosis control based on the strategy recommended by the WHO for control of tuberculosis (DOTS) has managed to channel quantitatively and qualitatively the available resources to reduce the endemic extension and the epidemiological and social impact of the disease on society.

The actions against tuberculosis performed by the healthcare system from Romania have to be doubled by actions that would target the improvement of socioeconomic conditions as well, as attaining its goals would be especially difficult without this.

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