

MONDAY, SEPTEMBER 3RD 2012

275. Tuberculosis: invasive diagnostic and therapeutic interventions

P2692**Diagnostic role of fiberoptic bronchoscopy in suspected smear negative pulmonary tuberculosis**

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Background: Sputum smear-negative pulmonary tuberculosis is a common problem faced by clinicians. Bronchoscopy-related transmission of Mycobacterium tuberculosis is rarely reported.

Methods: The retrospectively study evaluated 40 patients (26 males, 14 females; mean age 45 ± 19.6 years; range: 19-88 years) who had respiratory symptoms and radiographic findings consistent with pulmonary TB, but who were unable to produce sputum spontaneously or had three samples of spontaneously produced sputum that was smear-negative for AFB. Induced sputum tests, bronchial washings and bronchoalveolar lavage were performed where indicated. The relevant specimens were sent for direct smear for acid fast bacilli by Ziel-Neelsen method and culture for M. tuberculosis in Lowenstein medium. Data obtained were analyzed using MS Excel 2007.

Results: Bronchoscopy confirmed or contributed to the diagnosis in 18 patients. In 8 patients (45.5%) upper lobe mucosal inflammation with/without narrowing and scarring was detected. Sputum culture confirmed the diagnosis in 12 (30%) cases: 7 (17.5%) had culture positive specimens ($p < 0.005$), 4 (10%) was culture positive on bronchoscopy and one (2.5%) on induced sputum. All patients had negative HIV test, 31 (77.5%) new cases and 35 (87.5%) with high erythrocyte sedimentation rate. Majority of radiological findings were infiltrative ulcerated and cavitation lesions which affect one lobe lung.

Conclusions: Flexible bronchoscopy is a widely accepted diagnostic modality for tuberculosis specifically in patients who cannot produce an adequate sputum sample despite hypertonic saline induction. Bronchial aspirates obtained during bronchoscopy considerably increase the diagnostic yield in tuberculosis.

P2693**Prospective cytopathological study of bronchial washing for the diagnosis of pulmonary tuberculosis**

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Background: TB diagnosis is mostly complicated and late in sputum smear neg-

ative cases. Bronchial washing cytopathological study may be useful for early diagnosis of pulmonary tuberculosis (PTB) as macrophages can respond to a variety of cellular signals and response to local cues.

Aim: Assessment of possibility of involvement bronchial washing cytopathology in PTB diagnosis as one of the most valuable and rapid method in order to improve surveillance and care of TB-infection.

Methods: 53 sputum smear negative adult patients had undergone diagnostic investigations including CXR, bronchoscopy, bacteriological, immunological and cytopathological tests. Cytopathologically TB diagnosis was established when elements of TB-granuloma and multinuclear macrophages were found in the bronchial washing's smears. All results were compared to bacteriological data ("gold standard").

Results: From patients, 25 were diagnosed cytopathologically as PTB. In 19 cases results were confirmed by "gold standard" and in 6 case – excluded. Notable, that from 19 PTB patients, 11's bronchial washing's smears were negative. From 28 patients, where TB cytopathologically wasn't suspected, in 5 cases PTB was confirmed by bacteriological tests. Hence, cytopathological study's Se was 76% and Sp – 82%, +PV - 79% and -PV-79%, LR+ - 4,26 and LR- was 0,29.

Conclusions: Presented study showed quit high specificity in PTB diagnosis. Main strategic focus was that bronchial washing's samples were sensitive to multinuclear macrophages. and thus, it can be performed a powerful diagnostic tool. Though, further fundamental researches and envelopment of cytospine method in PTB diagnosis is needed.

P2694

Role of minimal invasive transcervical main bronchial surgical closure in MDR destructed lung treatment

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Introduction: Lack of ventilation and atelectasis is an old mean of treatment for TB treatment since preantibiotic era.MDR destructed lung frequent require pneumonectomy but these category of patients are not fit or are reluctant to pneumonectomy.Our method propose an transcervical minimal invasive surgical method non agresive to generate atelectasis to affected lung thus preserving the other good lung and allow the patient the necessary time to become later a candidate for a pneumonectomy indifferent right or left.

Material and method: We present the 2 cases of 2 female patients with MDR tb one left side other right side with an intact lung and another destructed lung.We dissect cut and suture the main bronchus transcervically minim invasive and detached the ill lung from the other.

Results: Both patients have supported very well the minioperation with an subsequent lung atelectasis.for the right lung patient we performed later a right 2 step pneumonectomy and the left sided one died 7 weeks after the operation from an miocardial infarctus.Both patients were well tolerating the minioperation and the right one suported perfect the postponed pneumonectomy.No operatory complications or incidents were observed.

Conclusions: Using minimal invasive procedure for cutting the air acces to the affected lung allow a good chance of healing for a poor status MDR patient allow a good cooperation from the patient and later an easy tolerated and accepted pneumonectomy with minimal surgical risk of postpneumonectomy bronhial fistula since the bronhus is already cicatrised at the pneumonectomy etap.We present in first communication a minimal invasive transcervical approach of the right main bronchus.

P2695

Pneumonectomy in pulmonary tuberculosis. To do or not to do?

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Background: Pneumonectomy (PE) often remains an only chance for recovery in pulmonary tuberculosis (PTB) patient with destroyed lung. But the high complications rates often hinder the surgical activeness.

Aims: To assess results and determine optimal conditions for performing PE in PTB patients.

Methods: A review was performed of 47 patients with PTB underwent PE during last 5 years. Male/female ratio 27/20. In all cases there was cavitary disease with total lung spread. Empyema complicated the disease in 9 cases. Drug resistance was in 41(87,2%) cases including MDR in 32(68,1%). Sputum smear negativation was achieved before the operation in 29 (61,7%). Multimodal therapy to reduce PTB activity and to improve patient's general condition was carried out and continued 16-24 months after surgery. Right PE was in 21 patients and left – in 26. Bronchial stump covering was done.

Results: Postoperative complications were in 19 patients (40,4%) including bronchopleural fistulas (BPF) and empyema in 10 (21,3%. Hospital mortality rate was 6,4%. The complications were connected with PTB reactivation. Obvious risk fac-

tors were previous empyema, MDR and MBT+ at the time of operation (p<0,05). In 2 cases BPF were closed by reamputation and in 5 were healed simultaneously with PTB regression in the opposite lung. Of those operated more than 3 years ago and followed up 6 (22,2%) died from PTB progression and 17 (62,9%) are free of disease including those passed through complications.

Conclusions: The rate of recovery achieved approved the active surgery despite heavy subsequent course. The adhesion to treatment is obligatory.

P2696

Surgical treatment of first-found destructive pulmonary tuberculosis

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Resection operations were performed in 261 patients (males – 155, females - 106) with first-found destructive tuberculosis after 3-6 month long ineffective chemotherapeutic treatment. The majority of patients (220 – 84,3%) were in young age – from 20 to 40 years old. After a course of chemotherapy, infiltrative tuberculosis with lysis was diagnosed in 12 patients (4,5%), tuberculoma – in 101 (38,7%), fibrous-cavemous – in 148 (56,8%). Mycobacteria of tuberculosis in sputum were observed in 98 patients (37,5%). Segmental lung resection was performed in 112 patients (43,0%) enucleation of tuberculoma – in 13 (5,0%), lobectomy – in 100 (38,3%), combined resection – in 8 (3,0%), and pulmonectomy – in 27 (10,7%). After operation, bronchial fistula and pleural empyema developed in 8 patients (3,1%), early re-activation of the tubercular process – in 10 (3,8%), pneumonia of the operated lung – in 5 (1,9%). These complications in 5 patients were eliminated by therapeutic treatment, in 9 – by repeated operations. A total of 3 patients died from re-activation of tuberculosis, bronchial fistula and pleural empyema.

Conclusion: At first-found destructive pulmonary tuberculosis after ineffective chemotherapy course, sparing resection operations are the final stage of complex therapy with low frequency of post-operative complications and high effectiveness of surgical treatment (96,5%).

P2697

A randomized study of the bronchoscopic valve blockade of the affected part of the lung in the complex treatment of patients with cavitary drug-resistant pulmonary tuberculosis

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In according to the existing hypothesis application of the endobronchial valve will result in a selective curative atelectasis of the affected part of the lung, which contributes to early closure of cavities.

Aims: To assess and to analyze the influence of the endobronchial-valve therapy on the current of the disease.

Methods: We have compared the efficacy of endobronchial-valve therapy in the complex treatment of patients with cavitary drug-resistant pulmonary tuberculosis against the standard therapy. The closure of cavities was selected as a criterion of effectiveness. In total, 68 patients with drug-resistant destructive pulmonary tuberculosis were taken into the study, they were randomly divided on two groups - one for 33 patients for endobronchial-valve installation (EBV) and another – for 35 to receive standard treatment (control group). Standard chemotherapy for all groups was administered continued throughout the study period.

Results: 22 cases (66,7%) in the EBV-group have demonstrated closure of cavities versus 7 (20,0%) patients in the control group (p = 0,001). Cavities remained in 11 cases (33,3%) in the EBV-group and in 28 cases (80,0%) of the control group (p = 0,001).

Conclusions: The application of endobronchial-valve treatment can significantly improve the effectiveness of standard chemotherapy regimens for DR cavitary pulmonary tuberculosis.

P2698

Value of bronchoscopic specimens for the diagnosis of sputum smear negative tuberculosis in high burden multidrug resistant tuberculosis setting

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Background: Rapid diagnosis of pulmonary tuberculosis (PTB) allows timely treatment and infection control. This has a special relevance in subjects with potential multidrug resistant tuberculosis (MDR TB). Bronchoscopy is an alternative method of collecting sputum samples, with an additional benefit in sputum smear-negative (SSN) patients.

Objectives: To assess the diagnostic yield of PTB in SSN patients, using the examination of bronchoscopic specimens (BSS) such as - bronchoscopic aspiration (BA), bronchoalveolar lavage (BAL), bronchial washing (BW) and post-bronchoscopy sputum (PBS).

Methods: A retrospective study of patients, registered in national electronic TB

database, with culture confirmed PTB between January 2008 and December 2011. Patients, who were SSN or non-productive of sputum (NPS) before bronchoscopy, were eligible.

Results: The inclusion criteria were met by 503 subjects. BA was performed in 369 cases, BW - 116 cases, BAL - 18 cases, PBS was available 37 in patients. Microbiological examination of BSS was the exclusive method for the microbiological confirmation of PTB in 344(68,4%) cases. The overall diagnostic rate of BSS for smear positive PTB was 21% (98/466). Higher rate for diagnosis of smear positive PTB were proven for bronchial washing (30,9%) and bronchial aspirate (17,2%) which were superior to PBS (8,5%; $p=0,01$ and $p=0,005$, respectively). The overall rate of MDR TB among smear positive cases was 27,6% (27/98).

Conclusions: Microbiological examinations of BSS give a higher rate of definitive diagnosis of PTB among SSN cases, with an earlier identification of contagious subjects with potential MDR TB.

P2699

Long-term results after pneumonectomy and lobectomy for pulmonary tuberculosis: Quality of life and pulmonary function

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The rate of postoperative complications was 10,2% after lobectomy and 33,3% after pneumonectomy for tuberculosis in our clinic. The aim of this study was to assess long-term results of lobectomy and pneumonectomy for pulmonary tuberculosis.

Methods: We investigated quality of life (QoL) and pulmonary function in 58 patients after surgical treatment. Out of these 58 patients, 36 underwent single lobectomy (group L) and 22 underwent pneumonectomy (group P). All postoperative examinations were performed more than one year after surgery. QoL was studied by SF-34, St. George's Respiratory Questionnaire (SGRQ), and UCSD Shortness of Breath Questionnaire (SOBQ). Pulmonary function was studied by spirometry and plethysmography.

Results: In patients in group P and group L, respectively, FVC was 58,7±15,2 and 103,3±15,3%; FEV1 - 47,5±13,9 and 84,8±16,7%; TLC - 66,0±11,2 and 98,5±12,8%; FRC - 81,1±21,6 and 110,1±28,0%; IC - 53,8±19,3 and 89,7±19,1% ($p<0,01$ for all cases). All SF-36 components did not differ between groups. Symptoms SGRQ scores were 45,8±26,5 and 32,3±22,3% ($p>0,05$); Activity SGRQ scores were 51,0±22,0 and 30,8±19,5 ($p<0,05$); Impact SGRQ scores were 31,5±18,8 and 17,8±15,9% ($p<0,05$); Total SGRQ scores were 39,9±18,9 and 24,1±16,1% ($p<0,05$); SOBQ scores were 28,4±22,6 and 16,4±15,3 points ($p<0,05$); group P and group L, respectively.

Conclusion: Pulmonary function and QoL were significantly worse in patients after pneumonectomy. SGRQ was more sensible than SF-36 in assessment of QoL. In both groups QoL was worse than in healthy patients. So the patients after these operations need more active treatment including pulmonary rehabilitation.

P2700

The diagnostic yield of ultrasound-guided cutting needle biopsy in the investigation of suspected pleural tuberculosis

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Introduction and Aim Closed pleural biopsy for tuberculosis (TB) using the Abrams needle is long-established and gives yields >75%. Modern practice often employs smaller gauge cutting needles under guidance of ultrasound (US). Few published data have evaluated this technique. We report diagnostic yields from a low incidence setting.

Method: Cases of pleural TB were identified retrospectively over six years from statutory notification data. Direct microbiological and histological evidence for the diagnosis was noted in reference to pleural biopsy method.

Results: Biopsy data were available for 26 of 42 cases. 21 had undergone US-guided pleural biopsy using a narrow gauge (18-20G) cutting needle and 5 had been biopsied by other means (one CT-guided technique, two video-assisted thoracoscopy, a medical thoracoscopy and one Abrams procedure). 7 (33%) of the US-guided biopsies were diagnostic compared to 4 (80%) in the other group. Pathology reports suggested insufficient pleural tissue in 9 of the 15 non-diagnostic samples; all of these were from US-guided biopsies.

Conclusions: The diagnostic yield of biopsy using a narrow gauge needle under

Pleural biopsy results according to diagnostic technique. Figures are numbers (%) of patients

	US-guided narrow gauge needle biopsy	Other type pleural biopsy	Total
Patients who underwent procedure	21	5	26
Adequate pleural tissue obtained	13 (62)	5 (100)	18 (69)
Biopsy sample diagnostic of TB	7 (33)	4 (80)	11 (42)

US guidance was lower than both the established standard using the Abrams needle and the yield from other biopsy techniques. Consideration should be given to the optimum method of tissue biopsy for suspected pleural TB.

P2701

Safety aspects of endobronchial valve application in the complex treatment of patients with cavitary drug-resistant pulmonary tuberculosis

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Aims: To evaluate the safety of endobronchial valve application in TB patients.

Methods: In total, 68 patients with drug-resistant destructive pulmonary tuberculosis were taken into the study, they were randomly divided on two groups - one for 33 patients for endobronchial-valve installation (EBV) and another - for 35 to receive standard treatment (control group).

Results: On Day 2 of the study, 12 (36,7%) patients from EBV-group had developed sparse, dry cough, in the control group - 2 (5,7%) patients ($p = 0,0019$). 3 (9,1%) of patients from EBV-group were with worsening of COPD symptoms and required symptomatic treatment, vs. 0 cases in the control group ($p = 0,008$). All these manifestations had been happened within 2 weeks of treatment. During assessment of the bronchial tree after 8 months in patients from EBV-group we revealed proliferation of granulation tissue in the targeted bronchi in 100% of the cases, of whom 24 (72,7%) granulations were big (closing over 50% of the lumen of the bronchus). After 10 months, during bronchoscopy in patients with EBV-group we found scars of the bronchus wall 100% of the cases, in 17 (51,5%) we revealed circular stenosis of the bronchi which reduced over 50% of the lumen of the bronchus, in 9 of these cases (27,3%) the lumen of the blocked bronchus was less than 1 mm in diameter. None of these changes were detected in the control group.

Conclusions: Endobronchial-valve treatment leads to the corrected without affecting the course of the disease complications in the first two weeks of treatment, and causes scar deformation of the targeted bronchus.

P2702

The treatment of a destructive lung tuberculosis by valvular lung volume reduction on early terms of therapy

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Lung tuberculosis (TB) can be complicated by cavity forming. Patients with destructions in the Russian Federation in 2010 have made 49,0% from first time revealed lung TB, closing of lung cavities was achieved in 63,0% of cases. The lethality of this patients reaches 14,0% and frequency of early relapses - 30,0%. 60-70% of cases caused by drug resistant strains of Myc. Tuberculosis.

Objective: To increase the efficiency of treatment of a destructive lung tuberculosis by valvular lung volume reduction on early terms of therapy.

Material and methods: The work is the result of supervision over 40 patients with lung TB. 47,5% of patients were smear-positive, drug resistant MBT - in 25,0%. Destructions defined in the top shares of lungs in 72,3% of patients, in 27,7% - in the bottom share (the sixth lung segment). Visualized cavities from 1,0 cm. To 21 patient during a chemotherapy was installed a non-return endobronchial valve (I gr.). The comparison group - 19 persons (II gr.) received only chemotherapy. Valve installation was made with flexible bronchoscope. In all patients with lower lobe cavity localization therapy was supplemented with artificial pneumoperitoneum.

Results: 70,0% of patients became smear-negative in a month, by 3 months - 100,0% of patients (33,3% and 77,8% in II gr.). Destructions closed in 3 and 6 months in 38,0% and 90,5% in I gr., 15,8% and 57,9% in II gr. ($p<0,05$). Duration of lung volume reduction has made 128,9±10,9 day.

Conclusions: Valvular lung volume reduction is an effective non-drug technique in complex treatment of lung tuberculosis, raising efficiency of treatment in 1,7 times on closing of destruction cavities by 6 month.

P2703

A randomized study of bronchoscopic blockade of the affected part of a lung as a part the complex treatment of patients with drug-resistant pulmonary tuberculosis

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At the present time in Russia, there are 60% of TB patients with unsatisfactory results of treatment by standard chemotherapy regimens with anti-TB drugs, and therefore there is permanent search for new treatment approaches to these patients. Scope and purpose: To assess and to analyze the impact of endobronchial-valve therapy on pulmonary function. According to the existing hypothesis, the implantation of an endobronchial valve and exclusion of the affected part from the tidal volume of the lung do not decrease pulmonary function indices.

Methods: We have compared the efficacy of endobronchial-valve therapy with a standard therapy. Changes in rates of FEV1 were the reference points for the study. Of 68 enrolled patients, 33 were randomly assigned to receive endobronchial valves (EBV group) and 35 to receive standard medical care (control group).

MONDAY, SEPTEMBER 3RD 2012

Results: Before procedures the initial level of FEV1 in the EBV group was 84.18%. In control group it was 85.74% ($p = 0.749$). After 1 month, there was a slight decline in FEV1 up to 81.12% in the EBV group, in comparison to the control group with maintaining the level of FEV1 equal to 84.34%. Thus, the difference of mean values between the groups was 3.22% ($p = 0.187$). After 8 months of treatment (after removal of endobronchial valves), FEV1 in the group of EBV was restored to 83.82% compared to 83.31% of the control group ($p = 0.606$).

Conclusions: Endobronchial-valve treatment does not reduce pulmonary function during the complex treatment of patients with drug-resistant pulmonary tuberculosis.

P2704**Analysis of 177 endobronchial tuberculosis cases in Serbia over 15-years period**

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Introduction: Tuberculosis still represents a significant health problem of population in Serbia, the incidence being for last few decades 32-36/100.000 inhabitants, up to last few years when it decreased to 24-26. Endobronchial tuberculosis (EBTB) is a chronic, progressive tuberculosis infection with often complicated clinical course and bronchostenosis formation.

Aim: The aim of the study was to determine common clinical features and diagnostic aspects of bronchoscopic biopsy proven EBTB in population of Serbia over 15 years period and compare with published data.

Method: Analysis and comparison of clinical features, radiologic, mycobacterial, bronchoscopic and histologic findings of 177 EBTB patients by SPSS ver. 15 for Windows, chi-square test, t-test and calculating Phi correlation coefficient.

Results: Male to female ratio was 1.2:1. Five patients (2.8%) were asymptomatic. None had normal chest radiograph finding; the most frequent localization of concurrent pulmonary TB lesions was in the upper lobes. Two thirds of patients, 116 (65.5%) had cavernous lesions. Atypical TB was evident in 27pts (15.3%).

The most common endoscopic forms of EBTB were edematous hyperemic (40,1%) and non-specific bronchitis (35,6%) unlike majority of published data. Bacteriologic confirmation of TB had 117 patients (66.1%). Sputum cultures for AFB were positive in only 27.7%, bronchial washing culture in 10.1%. Sputum and bronchial washing culture both were positive in 28.2% patients. Correlation between bronchoscopic categories of EBTB and bacteriologic confirmation of TB diagnosis was analysed and discussed.

Conclusion: EBTB in Serbia has some distinctive and specific features in comparison with other published EBTB series.

P2705**Blocking of bronchoscopic endobronchial valve in the complex surgical treatment of patients with pulmonary tuberculosis**

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A randomized study of osteoplastic thoracoplasty (OT), supplemented with bronchoscopic lung by blocking the affected part in the complex treatment of patients with pulmonary tuberculosis category CV + MBT +.

A new strategy for treating patients with epidemiologically dangerous, most of whom standard chemotherapy regimens are not effective anti-TB drugs, pulmonary resection is contraindicated. The combination of OT and a new bronchoscopic method to block endobronchial valve (EBV) has a high effect and preserves lung. Scope and purpose: Evaluate and analyze the impact of bronchoscopic after blocking OT in the combined treatment. According to the existing hypothesis, additional installation endobronchial valve increases the number of patients who can not get close cavities (CV-) and bacterial termination (MBT-).

Methods: We compared the efficacy of blocking the affected part of bronchoscopic lung after OT in patients with advanced pulmonary tuberculosis category CV + MBT + patients that OT was performed without installing an endobronchial valve. Effectiveness of the control points were CV- and MBT-. Estimated risk ratio. A total of 291 patients were involved, of whom 158 fulfilled OT after bronchoscopic block (main group), 133 continued treatment without having to install EBV (comparison group). EBV production company Medlung Inc., Barnaul, Russia.

Results: The proposed complex surgical treatment tactics can increase the effectiveness of remedial measures: the main group more frequently observed cessation of bacterial isolation (RR = 1,43, 95% CI = 1.33 - 1.52), the closure of decay cavities (RR = 1,49, 95% CI = 1.39 - 1.59).