

Treatment Outcomes of Adjunctive Surgery in Multidrug-Resistant and Extensively Drug-Resistant Tuberculosis

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Received: October 11, 2017; **Published:** October 12, 2017

In 2013, the World Health Organization (WHO) reported that 3.5% and 20.5% of new and previously treated tuberculosis (TB) cases were multidrug-resistant tuberculosis (MDR-TB, resistant to both isoniazid and rifampicin), respectively, and 9.0% of them developed extensively drug-resistant tuberculosis (XDR-TB, resistant to isoniazid, rifampicin, a fluoroquinolone, and 1 or greater injectable agent). The WHO has estimated a global prevalence of 660,000 cases of MDR-TB and 150,000 MDR-TB related deaths annually. A previous multi-country study revealed that among 1,278 MDR-TB cases, around 7% had XDR-TB. Only 136,000 MDR-TB cases (45.3%) among estimated 300,000 MDR-TB cases have been diagnosed and 97,000 cases (32.3%) are treated using appropriate regimens based on drug susceptibility testing (DST). In 2013, the treatment success rate of MDR-TB is only 48.0%; around 47,000 cases improved clinically and biologically. Diagnosis and treatment of these cases is largely suboptimal global programmatic capacity. Currently, MDR-TB/XDR-TB treatment regimens are lengthy, costly, toxic, and associated with unfavorable treatment outcomes as compared with drug-susceptible TB. The previous largest observational, retrospective, meta-analytic cohort study of about 10,000 MDR-TB cases (at least 400 cases of them being XDR-TB) demonstrated 62% of treatment success rate, 7% of failing or relapsing rate, 17% of defaulting rate, and 9% of death rate. Among XDR-TB subgroup, only 40% reached the treatment success, 22% failed treatment or relapsed, 16% defaulted, and 15% died. Among the subgroup of XDR-TB with severe drug-resistance pattern, only 19% achieved treatment success.

Thoracic surgery for MDR-TB/XDR-TB is a potentially beneficial adjunctive treatment. The first surgical intervention on a patient with TB was performed by Barry E in 1726, followed by Forlannini C in 1882, who carried out an artificial pneumothorax. A favorable outcomes for 72 MDR-TB/XDR-TB patients undergoing surgical lung resection in the country of Georgia was reported that 49 (68%) were cured, 6 (8%) were completed. Nevertheless, 4 (5.5%) of them were treatment failure, 5 (7%) were defaulters, and 4 (5.5%) were dead. The surgical procedures were performed as the following: 11% of pneumonectomy, 54% of lobectomy, and 35% of segmentectomy. With utilizing a combination of personal medical treatment for MDR-TB/XDR-TB according to the WHO guidelines and adjunctive surgical treatment, a high rate of favorable treatment outcomes (82%) was obtained. Favorable treatment outcomes was included in 90% of those with MDR-TB and 67% of those with XDR-TB. Surgical treatment for drug-resistant TB has been demonstrated to be safe and effective, with operative mortality rates similar to surgery for lung cancer. Two specific indications for lung resection in drug-resistant TB are failed medical treatment with persistent sputum positivity and patients with medical treatment and negative sputum smear who have bronchiectasis or localized cavitory disease. A systematic review and meta-analysis of adjunctive pulmonary resection for MDR-TB patients that included 15 studies (a total sample size of 949) demonstrated the overall cure rate of 84%. A previous study of 5 Japanese XDR-TB cases revealed that two cases with pneumonectomy and three cases with upper lobectomy (preoperative chemotherapy with sparfloxacin+pyrazinamide+cycloserine+ethionamide+enviomycin; gatifloxacin+cycloserine+enviomycin+para-aminosalicylic acid; gatifloxacin+pyrazinamide+cycloserine; gatifloxacin+pyrazinamide+enviomycin; and kanamycin+cycloserine+ethionamide+para-aminosalicylic acid+sultamicillin tosilate)

Citation: Attapon Cheepsattayakorn and Ruangrong Cheepsattayakorn. "Treatment Outcomes of Adjunctive Surgery in Multidrug-Resistant and Extensively Drug-Resistant Tuberculosis". *EC Microbiology* 12.5 (2017): 202-203.

After the surgical operation, most patients attained sputum negative status, and return to their normal daily activities. The duration of postoperative antituberculous chemotherapy ranged from 12 - 25 months with the median of 19 months and all of them remained free from disease at the time of follow-up.

In conclusion, There has been lack of randomized controlled trials of surgical resections although observational studies with surgical interventions have demonstrated a high treatment success rate when used as adjunctive treatment in MDR-TB/XDR-TB patients. Adjunctive surgical interventions may play a significant role in improving clinical outcomes in many cases of complicated MDR-TB/XDR-TB with localized and tissue destruction accompanying failure to become culture negative.

Volume 12 Issue 5 October 2017

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