Endoscopic Valve Therapy: A New Therapeutic Approach for Otherwise Incurable Tuberculosis?

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Since 2003, endoscopic valve therapy has emerged as an effective treatment for patients with advanced emphysematous chronic obstructive pulmonary disease. This therapy involves the implantation of one-way valves into targeted airways of the most emphysematous lung lobe, thus facilitating atelectasis to achieve lung volume reduction. Efficacy of valve therapy in patients with absent interlobar collateral ventilation and complete lobar occlusion was demonstrated in several randomized controlled trials [1–4]. Another indication for valve therapy is the treatment of intractable air leak due to a persistent bronchopleural fistula [5, 6]. In both indications, valve therapy aims at redirection of air with resulting hypoventilation of a targeted lung area.

In a recent issue of *Respiration*, Corbetta et al. [7, 8] described valve treatment as a new complementary approach to treat cavities in patients with tuberculosis (TB). It is hypothesized that hypoventilation and atelectasis, such as thoracoplasty, results in an anaerobic environment unfavorable to the survival of *M. tuberculosis* [9]. Two patients with multi-drug/extensively drug-resistant (MDR/XDR) TB, 2 patients with difficult-to-treat TB, and 1 patient with an atypical mycobacteriosis who were ineligible for surgical resection and showed unsatisfactory responses to drug therapy were treated by a lobar oc-

clusion using endobronchial valves whilst remaining on partially or ineffective anti-TB drug treatment. At the time of intervention, sputum smear microscopy results were positive in 4 out of the 5 patients. Within 1 month following valve implantation, targeted lobar volume reduction with subsequent reduction in cavity size was achieved in 4 patients. The sputum smears and cultures turned negative 3–5 months after valve placement and remained negative till the 60-month follow-up. No severe short- or long-term complications related to the valve treatment were observed with the exception of 1 pneumothorax, which is an anticipated complication in valve therapy. No chest tube insertion was required, and the pneumothorax resolved spontaneously.

These findings are particularly significant because they may offer hope to otherwise incurable TB that has seen resurgence in recent years [10, 11]. Cure of MDR-TB that is defined as 3 negative cultures taken at least 30 days after the intensive drug therapy is achieved in only 31% [12]. The prognosis of XDR-TB is even more dismal with mortality rates higher than in most cancers [13]. Even with the advent of newer drugs such as bedaquiline and delamanid, patients may still fail therapy. In countries such as South Africa, India, China, and Russia, the sheer burden of this problem means that treatment failures are

home-discharged back into the community, resulting in ongoing transmission [14]. This problem is likely to get worse. Access to surgical intervention is poor in such countries, and often patients maybe unfit for surgery.

Summarizing this case series, valve treatment may present a new and complementary approach to treat otherwise incurable TB in patients who are not candidates for surgical intervention. However, whether valve therapy offers clear-cut incremental benefit over medical TB treatment still remains unclear, as the number of treated patients reported is small, follow-up is limited, no control

group was available, and the cases were highly selected. Other considerations worth mentioning include attention to strict infection control and the risk of nosocomial spread of highly DR-TB, and the substantial cost of valve therapy, making it inaccessible to resource-poor TB settings. However, Corbetta et al. [8] have described encouraging results, so that valve therapy may be considered in selected patients with MDR/XDR TB or difficult-to-treat TB with little chance of successful treatment with conventional drug therapy. Controlled studies are now warranted to establish the effectiveness of this new intervention.

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