may have to wait several years to find whether discovering more cancers early means more lives saved.

Competing interests None.

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Collateral ventilation and selection of techniques for bronchoscopic lung volume reduction

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Lung volume reduction can give substantial benefit to selected patients with emphysema. However, the high morbidity associated with surgery has fuelled the development of bronchoscopic lung volume reduction. Investment in research has primarily focused on the development of endobronchial valves. Three large randomised controlled trials with endobronchial valves have only shown marginal clinical benefit overall, although some patients had significant improvement in pulmonary function.[1–3] Cohort studies have also demonstrated a survival benefit in patients who developed lobar atelectasis.[4 5] Collateral ventilation appears to be the key factor that limits the effectiveness of endobronchial valves.[6] Support for this theory has been enhanced by subgroup analysis of the Endobronchial Valve for Emphysema Palliation Trial (VENT) study, which has shown the greatest improvements in lung function (17.9% improvement in forced expiratory volume in 1 s [FEV_1] at 12 months) in patients who had evidence of an intact fissure on the treatment side providing the endobronchial valves were correctly positioned.[1] The absence of any clinical benefit in patients treated with incomplete bilateral lobar occlusion further supports the theory that complete isolation of the lobe is required for blocking devices to be effective.[3]

Spiracles or transthoracic passages were described by the late Peter Macklem as a method for reducing trapped gas in lungs when there is a high degree of collateral ventilation.[7] This can be achieved in patients with emphysema by creating an artificial passage between the chest wall and emphysematous lungs with a valve that directs the flow of air out of the lung.[8] However, this approach is not well tolerated by patients. An alternative strategy is to create artificial air passages within the lung and bronchial segments that allow trapped gas to escape. This technique (airway bypass) has the greatest benefit in patients with a high degree of collateral ventilation, but benefits reported so far have been only transient.[9]

The development of bronchoscopic treatments that are independent of collateral ventilation is essential and Ingenito *et al* first described the use of a fibrin glue in a sheep model of emphysema to induce lung volume reduction.[10] This strategy has evolved for human use and Magnussen *et al* report on the use of a polymeric foam sealant in advanced emphysema.[11] A polymeric solution (4.5 ml of 2% aminated polyvinylalcohol in phosphate buffer) is mixed with a cross linker (0.5 ml of buffered pentane 1–5 dial). The mixture is then mixed with 15 ml of air to create a foam and the solution is then instilled into the target bronchial segment during flexible bronchoscopy via catheter. The air within the foam is gradually resorbed and the adherent pulmonary tissue in the treatment area also shrinks with the foam. The authors have amalgamated the data from three separate but similar clinical trial protocols and subsequently assessed treatment response according to fissure integrity based on the CT scans. The results for this study are impressive, with improvements in FEV_1 of 19%, exercise capacity by 30 m and quality of life (St George's Respiratory Questionnaire, SGRQ) by about 11 points. Furthermore, the proportion of patients who had a clinically

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significant improvement was 64% for FEV_1 (12% improvement in FEV_1), 31% for exercise capacity (6 min walk test of more than 54 m) and 71% for SGRQ (reduction by four points). However, the degree of improvement needs to be interpreted with caution as small open-label cohort studies tend to consistently demonstrate a greater degree of benefits than are ultimately observed in large-scale randomised trials. This effect may be exaggerated as the authors have only looked at a subgroup (28 patients who had derivable information on fissure status on CT scans) rather than the whole cohort of 54 patients treated.

This study has not reported on the safety aspects but a previous study of 25 patients suggests an early transient systemic inflammatory response with fevers, flu-like symptoms and chest discomfort.[12] There were exacerbations of chronic obstructive pulmonary disease (COPD) in eight patients requiring hospitalisation and one needed treatment in an intensive care unit. The event rate may seem high but should be considered in the context of this population of patients who have severe disease, frequent exacerbations and limited treatment options. However, treatment with the polymeric foam sealant is irreversible. It remains in situ in the lung and induces permanent sclerosis. Longer-term effects remain unclear and it should be used with caution in patients with Global Initiative for Chronic Obstructive Lung Disease (GOLD) stage III disease.

Bronchoscopic lung volume reduction should be considered in patients with severe emphysema with evidence of hyperinflation (residual volume >180% predicted) who are symptomatic despite maximal medical therapy. Endobronchial valves which are easily removed should be considered initially in patients who have an intact fissure on CT scans or evidence of low collateral ventilation. Patients who have significant collateral ventilation may need to be considered for alternative treatments such as the polymeric foam sealant.

Contributors This editorial was jointly written by PS and DG.

Competing interests PS has been involved in a number of clinical trials on bronchoscopic lung volume reduction and the host centres (Royal Brompton Hospital and the Chelsea & Westminster Hospital) have been reimbursed for clinical trial expenses. There are no competing interests with respect to the emphysematous lung sealant (AeriSeal®). DM has no competing interests.

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MDR, XDR, TDR tuberculosis: ominous progression

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Any man's death diminishes me because I am involved in mankind, and therefore never send to know for whom the bell tolls; it tolls for thee… (John Donne, Meditation XV11)

The growing TB epidemic is no longer an emergency only for those who care about health, but also for those who care about justice. (P D O Davies)

For 2 weeks in January, India coughed and the rest of the world paid attention. Drug-resistant tuberculosis (TB), languishing from a decade of neglect by the Indian Revised National Tuberculosis Control Program (RNTCP), was headline news in every Indian newspaper and several international ones as well.

What captured local and international attention was a report documenting the isolation of the first cases of totally drug resistant TB (TDR-TB) from India.[1] The Indian government's response, after initial denial, swung from the ridiculous to the sublime. The WHO response was far more measured and authoritative. Paul Nunn, coordinator of WHO's STOP TB department in Geneva, described the cases as "a wake up call for countries to accelerate provision of proper care, particularly for multi drug-resistant patients". Within a week WHO had a TDR link on its website with answers to frequently asked questions, was planning a new consensus definition of TDR-TB, and had planned an expert meeting to rethink strategy.

TB exists on an epic scale in India. It resolutely remains India's biggest public health problem. India bears a disproportionately large burden of the world's TB, one a developing country can ill afford, with an estimated economic loss of US $43 billion and 100 million productive days lost annually directly due to this disease. The facts speak for themselves: India is the highest TB burden country in the world with 300 million Indians infected, accounting for 21% of the global incidence.[2] It is estimated that TB kills 300 000 Indians annually: one death every 2 min, a grim statistic that has changed little over the decades.[3]

The situation is even worse when it comes to multidrug resistant TB (MDR-TB). Here again India emerges a global hot spot with the latest WHO anti-TB drug

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