

Role of surgery in pulmonary multidrug-resistant tuberculosis

L Peter Ormerod

Feasible in the context of a good national programme in resource-limited settings, but doubts remain over how widely this may be able to be implemented

Multidrug-resistant tuberculosis (MDR-TB) is a form of TB with high level resistance to both isoniazid and rifampicin, with or without associated resistance to other antituberculosis drugs. The spectrum of this form of TB now ranges from "basic" MDR-TB, with resistance only to rifampicin and isoniazid, to XDR-TB where there is additional extensive drug resistance to at least three of the six main classes of second-line antituberculosis drugs.¹ The extent of the problem of MDR-TB has been examined by cross-sectional surveys of drug resistance either in clinical series or whole country cohorts by the World Health Organisation (WHO).² Such cross-sectional surveys, however, underestimate the burden and number of such cases because they do not take into account the amount of TB in high-burden countries. If the exercise is repeated with a mathematical modelling design using the drug resistance estimates and the number of cases of TB, a more accurate global picture of the burden is given.³ Using this type of data, England has 55 cases (95% CI 29 to 88), the USA 183 cases (95% CI 129 to 275), but the non-DOTS supported part of China has 49 844 cases (95% CI 34 515 to 75 216) and India has 63 136 cases (95% CI 25 885 to 10 8340) annually.³

One part of the WHO response to the threat of MDR-TB is a "DOTS-Plus" strategy where there is a stable and functioning national TB programme. This was trialled in a number of countries including Peru where 298 patients with MDR-TB were treated with a fixed regimen of kanamycin for 3 months and pyrazinamide, ethambutol, ethionamide and ciprofloxacin for 18 months;⁴ 12% died, 48% were cured, 11% defaulted and 28% did not respond. The cost was US\$600 000, which was 8% of the cost of the whole national TB programme. The cost per patient completing treatment was US\$2381 and the cost per death-adjusted year (DALY) was US\$211.⁴

In this issue of *Thorax* (see p 416) Somocurcio *et al*⁵ assess the usefulness of resectional surgery for pulmonary MDR-TB as an adjunct to a national TB control programme in the resource-limited setting of Peru. Pulmonary resection for TB largely ceased in the 1950s following the introduction of combination treatment with streptomycin, isoniazid and PAS. With the development of MDR-TB from the late 1970s following the introduction of rifampicin-containing regimens, surgery for highly selected cases in a first-world national centre was shown to be effective.⁶ Patient selection was by high-grade drug resistance and disease sufficiently localised to be able to resect most of it. This unit has since reported their experience of 172 patients over 17 years, with a 30 day mortality of 3.3% and a late mortality of 6.8%.⁷ Patients received individualised regimens based on their drug susceptibility profiles, continued for up to 24 months after surgery.⁶ Smaller studies in South Korea,^{8,9} Taiwan,¹⁰ Turkey^{11,12} and South Africa¹³ have also shown some benefit of surgery. The selection criteria for some of these studies were similar to those in the USA,^{6,7} but differed in some or were not given, and few were part of a structured national programme for MDR-TB.

HIV-positive patients were excluded in the studies from Turkey,^{11,12} South Korea^{8,9} and South Africa,¹³ but the HIV status of the patients in Taiwan¹⁰ and USA^{6,7} is not given. Routine HIV testing was not done in Taiwan.¹⁰ The exclusion of HIV-positive individuals, who in the UK have a nine times higher likelihood of dying of MDR-TB treated mainly medically,¹⁴ will limit the number of cases in sub-Saharan Africa in particular, to whom the possibility of surgery could apply.

Somocurcio *et al*⁵ show that good results can be achieved in a relatively resource-poor setting. Peru, however, is a middle income country with a strong TB

control programme and (as yet) little HIV. Where there is a poor TB control programme, more HIV or a lower national income, such results will not be possible. The irony remains that the distribution of MDR-TB, even more than TB in general, is in resource-poor countries, and less than 1% is in developed countries with the medical and surgical infrastructure to support the systematic and selective management of patients with complex MDR-TB.

Thorax 2007;**62**:377.

doi: 10.1136/thx.2005.056135

Correspondence to: Professor L P Ormerod, Chest Clinic, Royal Blackburn Hospital, Blackburn, Lancashire BB2 3HH, UK; Peter.Ormerod@elht.nhs.uk

Competing interests: None

REFERENCES

- 1 **Centres for Disease Control and Prevention.** Emergence of *Mycobacterium tuberculosis* with extensive resistance to second-line drugs – worldwide, 2000–2004. *MMWR* 2006;**55**: 301–5.
- 2 **Espinal MA, Laszlo A, Simonsen L, et al.** Global trends in resistance to antituberculosis drugs. *N Engl J Med* 2001;**344**:1294–303.
- 3 **Dye C, Espinal MA, Watt CJ, et al.** Worldwide incidence of multi-drug resistant tuberculosis. *J Infect Dis* 2002;**185**:1197–2002.
- 4 **Suarez PG, Floyd K, Portocarrero J, et al.** Feasibility and cost-effectiveness of standardised second-line drug treatment for chronic tuberculosis patients: a national cohort study in Peru. *Lancet* 2002;**359**:1980–9.
- 5 **Somocurcio JG, Sotomayor A, Shin S, et al.** Surgery for patients with drug-resistant tuberculosis: report of 124 cases receiving community based treatment in Lima, Peru. *Thorax* 2007;**62**:416–21.
- 6 **Iseman M, Madsen L, Goble M, et al.** Surgical intervention in the treatment of pulmonary disease caused by drug-resistant *Mycobacterium tuberculosis*. *Am Rev Respir Dis* 1990;**141**: 623–5.
- 7 **Pomerantz B, Cleveland J, Olson H, et al.** Pulmonary resection for multi-drug resistant tuberculosis. *J Thorac Cardiovasc Surg* 2001;**121**:448–53.
- 8 **Sung SW, Kang CH, Kim YT, et al.** Surgery increased the chance of cure in multi-drug resistant pulmonary tuberculosis. *Eur J Cardiothorac Surg* 1999;**16**:187–93.
- 9 **Park SK, Lee CM, Heu JP, et al.** A retrospective study for the outcome of pulmonary resection in 49 patients with multi-drug resistant tuberculosis. *Int J Tuberc Lung Dis* 2002;**6**:143–9.
- 10 **Chiang CY, Yu M-C, Bai K-J, et al.** Pulmonary resection in the treatment of patients with pulmonary multidrug-resistant tuberculosis in Taiwan. *Int J Tuberc Lung Dis* 2001;**5**:272–7.
- 11 **Kir A, Tahaoglu K, Okur E, et al.** Role of surgery in multi-drug resistant tuberculosis: results of 27 cases. *Eur J Cardiothorac Surg* 1997;**12**:531–4.
- 12 **Tahaoglu K, Torun T, Sevim T, et al.** The treatment of multidrug-resistant tuberculosis in Turkey. *N Engl J Med* 2001;**345**:170–4.
- 13 **Van Leuven M, De Groot M, Shean KP, et al.** Pulmonary resection as an adjunct in the treatment of multiple drug-resistant tuberculosis. *Ann Thorac Surg* 1997;**63**:1368–73.
- 14 **Drobniewski F, Ellingham I, Graham C, et al.** A national study of clinical and laboratory factors affecting the survival of patients with multiple drug resistant tuberculosis in the UK. *Thorax* 2002;**57**:810–6.