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Prospective validation of the RAPID clinical risk prediction score in patients with pleural infection: The Pleural Infection Longitudinal Outcome Study (PILOT)

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RATIONALE

Pleural infection is increasingly common and associated with significant morbidity and mortality, with no current robust means of predicting which patients will suffer poor clinical outcomes. A validated risk score at baseline would allow high-risk patients to be identified early, and directed towards more invasive management strategies aimed at improving prognosis.

METHODS

The Pleural Infection Longitudinal Outcome Study (PILOT) was a prospective observational cohort study, recruiting adult patients with pleural infection from 29 centres from four countries, with patients undergoing protocolised management . The study was powered to validate a previously described clinical risk prediction score (RAPID; Figure 1), derived and retrospectively validated using data from two large multicentre randomised trials in pleural infection (MIST1 and MIST2). The primary outcome was mortality associated with pleural infection at 3 months; secondary outcomes included mortality at 12 months, length of hospital stay, need for thoracic surgical intervention, failure of initial medical management (according to pre-defined criteria), and lung function impairment at 3 months. Study follow-up was for 12 months. The study was funded by the UK Medical Research Council, and registered with ClinicalTrials.gov (ISRCTN 50236700).

RESULTS

551 participants were recruited between October 2013 and October 2016, and data was available in 542 (98.4%) patients. 383/542 (70.7%) were male; mean age was 58 years (SD 20). Overall mortality was 10% at 3 months (54/542) and 19% (101/542) at 12 months. Mortality increased according to RAPID score overall (Figure 1a) and 3 month mortality was closely associated with RAPID category; low-risk (RAPID score 0-2) 4/216 (1.9%, 95% CI 0.5 to 3.6), medium risk (RAPID score 3-4) 22/233 (9.4%, 95% CI 5.7 to 13.2), and high-risk (RAPID score 5-7) 28/93 (30.1%, 95% CI 20.8 to 39.4). C-indexes (AUROC) for the prediction score at 3 months and 12 months were 0.79 (95% CI 0.73 to 0.85) and 0.77 (95% CI 0.72 to 0.82) respectively (Figure 1b).

CONCLUSIONS

RAPID is a robust prediction score for mortality in adult patients with pleural infection, and should now be used to guide clinical care. Further studies are now required to assess if targeting more interventional treatment strategies in higher risk groups can reduce mortality.