The value of a preoperative ventilation-perfusion scan in patient selection for pneumonectomy

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Abstract

Guidelines regarding operability of patients with lung cancer are well established. The measured and predicted pulmonary function provides a practical guide to the safety of lobectomy or pneumonectomy. We describe a patient who had an unexplained precipitous fall in preoperative FEV, that would have precluded a required pneumonectomy but for an urgent ventilation-perfusion (V/Q) scan. This case highlights the fact that clinical acumen rather than a strict adherence to established guidelines is vital in the assessment of lung cancer patients awaiting potentially curative surgery.

Keywords: BTS guidelines; Ventilation-perfusion (V/Q) scan

1. Case report

A 70-year-old male smoker presented with a three-month history of a persistent cough. Chest radiograph (CXR) and computerised tomography (CT) imaging confirmed a 3-cm spiculated left upper lobe hilar mass with no associated mediastinal adenopathy. Cytology of bronchial washings and histological biopsy confirmed a squamous cell carcinoma. The patient was an amateur football referee until recently with no co-morbidity (performance status – WHO score 0). A pneumonectomy was the planned surgical strategy for resection of this central tumour (clinical stage IB-T2 N0) as radiologically it appeared to extend across the fissure. Spirometry at the pre-admission clinic two weeks prior to surgery showed an FEV, of 2.1 l (69%) and FVC 3.5 l (95%). In accordance with British Thoracic Society (BTS) guidelines no further investigation was indicated [1].

On the day of surgery his operation was cancelled due to lack of theatre operating time, however, he was readmitted a week later for an elective pneumonectomy. Routine repeat bedside spirometry showed a significant decline in his FEV, which measured 1.35 l (44%) and FVC 1.83 l (46%). These measurements precluded carrying out a pneumonectomy safely. The patient’s clinical status was unchanged, however, air entry on the left side was significantly reduced on auscultation. A repeat CXR showed a well aerated left hemithorax. In short there was no evident obstructive pathology to account for this recent precipitous decline in his respiratory function. The anaesthetist was reluctant to proceed with resection and the patient’s operability questioned due to apparent poor pulmonary reserve. An isotope ventilation-perfusion (V/Q) scan was performed on the morning of surgery which demonstrated significant matched defects with the left lung contributing to only 4% and 11% of overall ventilation and perfusion, respectively. The patient proceeded to an uneventful pneumonectomy that same day. At surgery the left lung was grossly hyper inflated with significant air trapping. The patient’s recovery was uncomplicated and he was discharged home three days later.

2. Comment

This brief report illustrates the importance of further investigation of a sudden unexplained deterioration in preoperative spirometry and demonstrates the value of an urgent preoperative V/Q scan. In our institution all patients admitted for elective lung resection, even if previously scheduled and cancelled, routinely get a preoperative bedside spirometry test administered by the attending physiotherapist. The intra-operative finding of a hyper inflated left lung due to air trapping would account for the normal appearance of the most recent preoperative CXR and poor spirometry.

BTS guidelines suggest a pneumonectomy may proceed safely without further formal pulmonary investigation in patients with a preoperative post-bronchodilator FEV, > 2 l in the absence of interstitial lung disease [1]. In patients with abnormalities in FEV, or DLCO, it is essential to estimate the predicted post-resection pulmonary reserve [2]. This case highlights that clinical acumen rather than a dogmatic adherence to established ‘fitness for surgery’ guidelines is essential to ensure lung cancer patients are not erroneously denied a potentially curative resection due to seemingly equivocal spirometry.
References
