P139 ATELECTASIS FOLLOWING BRONCHOSCOPIC LUNG VOLUME REDUCTION (BLVR) IS ASSOCIATED WITH IMPROVED SURVIVAL IN COPD

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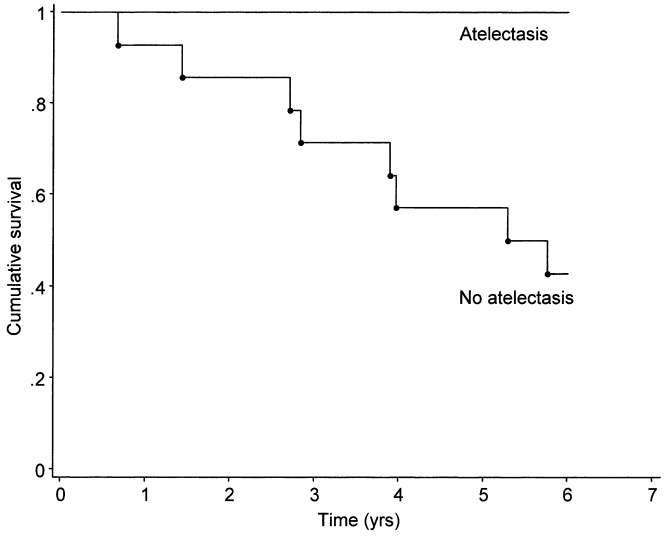
Background A range of bronchoscopic therapies are being developed to reduce lung volumes in COPD patients, either in order to avoid the morbidity and mortality associated with lung volume reduction surgery, or to extend therapy to patient groups in whom LVRS is not appropriate because of disease pattern or severity.

Aims Bronchoscopic lung volume reduction (BLVR), using endobronchial valves to target unilateral lobar occlusion in patients with heterogeneous emphysema has been shown to improve lung function and exercise capacity in patients with emphysema. Benefit was most pronounced in, though not confined to, patients where lobar atelectasis occurred. Little data exists on the long-term outcome following BLVR.

Study population 19 patients (16 males) FEV_1 28.4 (11.9) underwent BLVR between July 2002 and February 2004. Radiological atelectasis was observed in five patients. Survival data to February 2010 was available for all patients. The age dyspnoea obstruction (ADO) score was used to calculate predicted mortality.

Results None of the patients in whom atelectasis occurred died during follow up whereas eight out of 14 in the non-atelectasis group died (χ^2 p=0.026) (Abstract P139 Figure 1). There was no significant difference between the groups at baseline in lung function, quality of life, exacerbation rate, exercise capacity (shuttle walk test or cycle ergometry) or CT appearances, although BMI was significantly higher in the atelectasis group 21.6(2.9) vs 28.4 (2.9) kg. m^{-2} (p<0.001). Pre treatment CT appearances did not differ significantly between the atelectasis and non-atelectasis groups in terms of degree of emphysema at either the upper or lower parts of the lungs or in heterogeneity (slope) in either the treated or non-treated lung prior to treatment. ADO score, predicted 3 year mortality was 31.1 (10.0)% in the non-atelectasis group and 32.2 (15.1)% in the atelectasis group (p=0.8). Four of the eight deaths occurred within 3 years of the procedure, representing a 29% mortality rate for the non-atelectasis group (ie, close to that predicted).



Abstract P139 Figure 1

Conclusions These data suggest that atelectasis following BLVR is associated with a survival benefit which is not explained by differences at baseline.

REFERENCE

1. **Hopkinson,** *et al*. *AJRCCM* 2005;453–60.

P140 THORACOSCOPIC BULLECTOMY FOR DYSPNOEA IN EMPHYSEMA: DEFINING NEW BOUNDARIES

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Objectives There exists only limited historical guidance on patient selection for giant bullectomy in emphysema which is now 20-years-old (1). Operative mortality was reported at about 10%, and patients with FEV_1<50% predicted were excluded. Developments in video assisted thoracic surgery (VATS) and experience with lung volume reduction surgery have reduced our selection threshold. We have reviewed our results in the last decade and their implications for patient selection.

Methods Between June 1997 and November 2009, 55 patients (45 males:10 females; median age 61 years (range 39–76 years)) with significant dyspnoea associated with giant emphysematous bullae underwent surgery. Their median preoperative FEV_1 was 31% predicted (range 9–93%). Twenty nine patients had FEV_1<50%pred and fifteen <25%pred. Eight patients were in type I respiratory failure three patients had alpha-1-antitrypsin deficiency. All were cigarette smokers and four had significant cannabis use. In all patients there was evidence of hyperinflation and a bulla occupying >30% of the hemithorax. All operations were performed by stapled VATS bullectomy and in the high risk patients six operations were performed under sedation with spontaneous ventilation and two using intraoperative extracorporeal membrane oxygenation (ECMO).

Results Median hospital stay was 9 days (range 3–64 days). Prolonged air leak (lasting over 48 h) was observed in 21 patients (38%). Three patients (6%) required postoperative ventilation. 30-day mortality was 3.6% (two patients). One-year survival was 94.5% (52 patients). Symptomatic improvement in dyspnoea was reported in 73% patients.

Conclusions VATS bullectomy should be considered for symptom relief even in patients with severe airflow obstruction and borderline respiratory failure.

REFERENCE

1. **Kinnear WJM,** Tattersfield AE. Emphysematous bullae: surgery is best for large bullae and moderately impaired lung function. *BMJ* 1990;**300**:2008–9.

P141 LUNG VOLUME REDUCTION SURGERY—THE FIRST 200 OPERATIONS IN A UK CENTRE: THE BENEFITS OF A MULTIDISCIPLINARY STRATEGY AND MINIMALLY INVASIVE APPROACH

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Objective Despite the supportive results of the randomised, controlled NETT trial, lung volume reduction surgery (LVRS) is still

infrequently performed in the United Kingdom. We however, have persisted with video assisted thoracoscopic (VATS) LVRS and report the results of our first 200 operations.

Patients/methods Surgical candidates for LVRS were selected by a multidisciplinary team approach using radionuclide scintigraphy in all cases. After the initial 20 open cases we adopted policy of two stage bilateral VATS LVRS with the timing of the second operation determined by the patient. 160 patients have completed one-stage LVRS: median age 60 (39–73) years and 20 patients have completed two-stage bilateral LVRS: median age 59 (41–66) years. Data from a prospective database were analysed to assess the postoperative changes in pulmonary function and health status (SF 36 questionnaire) recorded at three, six and, twelve months and thence annually.

Results 30-day mortality was 6% and 25% required post-operative ventilation (9 of 50 for <24 h). Hospital stay was 14 (2–110) days. FEV_1 in both groups showed significant continuous improved at the 3-month, 6-month and 1-year postoperative review ($p \leq 0.035$). Furthermore, significant improvements ($p \leq 0.05$) in SF 36 were seen across the seven domains assessed: Physical Functioning (up to 1 year), Social Functioning (up to 1 year), Role-Physical (up to 1 year), Role-Emotional (at 5 years), Mental Health (up to 1 year), Energy/Vitality (up to 1 year), and General Health (up to 1 year). There has however been a significant reduction in the domain of Bodily Pain up to 4 years post LVRS ($p \leq 0.05$). More lasting improvements are seen in two-stage bilateral group compared to the one-stage group.

Conclusion The use of a multidisciplinary team approach and a prolonged surgical strategy can achieve durable postoperative benefits from LVRS for up to 4 years with acceptable risk.

P142 INFLAMMATORY CELLS IN THE QUADRICEPS OF COPD PATIENTS AND RESPONSE TO RESISTANCE TRAINING

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Background Physical exercise in healthy individuals leads to an acute inflammatory-cell response in skeletal muscles. In COPD, quadriceps dysfunction is an important systemic manifestation that can be offset by exercise training. However, the nature of the muscle inflammatory response in these patients to acute and chronic exercise remains unknown. We therefore measured inflammatory cell infiltration in the quadriceps of COPD patients and healthy controls, in response to a programme of lower-limb resistance training.

Methods 12 COPD patients (mean (SD) age 66.7(7.0) years, BMI 26.1(7.2) kg/m^2, FEV_1 46.4 (20.5) % predicted, 10 males) and seven healthy controls (66.7 (5.1) years, BMI 27.7(2.4) kg/m^2, FEV_1 103.4 (17.0) % predicted, five males) underwent 8 weeks of bilateral lower-limb, high-intensity resistance training, thrice weekly, on an isokinetic dynamometer (Cybex II Norm). Quadriceps muscle biopsies from the dominant thigh were obtained at baseline (T0), 24-h after the 1st exercise bout (T1), and 24-h after the last exercise session following 8-weeks training (T2). Glycol methacrylate-embedded muscle biopsies were analysed using immunohistochemistry. Inflammatory cells were identified using antibodies against neutrophil elastase (NE) and CD163 (macrophages). Dual energy x-ray Absorptiometry (DEXA) was used to determine thigh muscle mass and isometric quadriceps strength was measured on the cybex.

Results At T0, neutrophils were not detected in any of the healthy controls, but were present in six out of 12 patients. A significant increase in neutrophil and macrophage counts in both patients and controls was seen at T1 (Abstract P142 Table 1). At T2, inflammatory cell counts in both groups were close to baseline values. Isometric quadriceps strength (COPD: pre vs post -134.0 (44.0) vs 151.8 (47.9) Nm, p=0.002; Healthy: pre vs post 153.4 (42.4) vs 169.0 (43.1) Nm, p=0.04] and thigh lean mass (COPD: pre vs post 4.4 (1.2) vs 4.7 (1.2) kg, p=0.003; Healthy: pre vs post 4.5 (0.6) vs 4.7 (0.7) kg, p=0.004] increased significantly after training in both groups.

Conclusions Acute resistance exercise in COPD leads to an inflammatory-cell response in the quadriceps that is comparable to healthy controls. Regular training results in muscle adaptation characterised by a diminished inflammatory response to a bout of exercise.

Abstract P142 Table 1

	T0	T1	T2
NE (cells/mm^2 interstitial area)			
COPD (n=12)	4.1 (0.0–21.0)	137.9 (30.1–217.9)*	0.0 (0.0–15.9)‡
Healthy (n=7)	0.0 (0.0–0.0)	153.4 (13.0–305.5)†	14.2 (0.0–17.3)
CD163 (cells/mm^2 interstitial area)			
COPD (n=12)	10.4 (2.1–34.1)	90.3 (40.9–135.7)†	26.9 (12.7–72.5)
Healthy (n=7)	0.0 (0.0–27.0)	146.7 (64.3–172.2)†	0.0 (0.0–59.2)§

Values presented as medians (IQR).
Data at various time-points compared using nonparametric repeated measures ANOVA (Friedman's Test) and Dunn's post test.
*p<0.001, T1 vs T0.
†p<0.05, T1 vs T0.
‡p<0.001 T2 vs T1.
§p<0.05, T2 vs T1.

P143 NF-KAPPA B (NF-κB) AND ACTIVATOR PROTEIN-1 (AP-1) DNA BINDING IN THE QUADRICEPS OF COPD PATIENTS

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Introduction Animal work implicates NF-κB and AP-1 activation in muscle atrophy (Cai *et al, 2004 and* Costelli *et al*, 2005). Prior study of seven COPD patients with a low BMI and seven COPD patients with a normal BMI suggested that NF-κB DNA binding was increased in the former (Agusti *et al*, 2004) although others have not demonstrated NF-κB activation in COPD muscle (Plant *et al*, 2009).

Aim Evaluate NF-κB and AP-1 activation in the quadriceps of patients with stable COPD in relation to muscle atrophy.

Methods 114 COPD patients and 30 healthy age-matched controls underwent measurements of lung function and bioelectrical impedance to determine fat-free mass index (FFMI) and a percutaneous Bergstrom needle biopsy of the quadriceps. Transcription factor ELISAs were performed on nuclear extracts from quadriceps muscle to measure quantities of NF-κB P50, P65, and AP-1 c-jun subunits in muscle nuclei capable of binding DNA. Immunohistochemistry was used to determine type I and II fibre cross-sectional area (CSA) from muscle sections.