

Bronchoscopic volume reduction: A safe and effective alternative to surgical therapy for emphysema.

Authors: Ingenito E.P., Reilly J.J., Mentzer S.J., Swanson S.J., Vin R., Keuhn H., Berger R.L., Hoffman A.

Publication Date: 2001

Abstract:

Lung volume reduction surgery (LVRS), the removal of damaged, hyperexpanded lung, has been shown to improve respiratory function in many patients with end-stage emphysema. We report the results of an animal study using a new transbronchoscopic alternative to LVRS in which a washout solution and fibrin-based glue are used to collapse, seal, and scar target regions of abnormal lung. Twelve sheep had static and dynamic lung functions measured at baseline. Emphysema was produced by inhaled papain (7,000 U/wk x 4 wk), resulting in a significant increase of lung volumes, compliance, and airway resistance. The animals were then divided into three treatment groups of four animals, and underwent surgical volume reduction (SVR), bronchoscopic volume reduction (BVR), or bronchoscopy alone (Sham-BVR). Response to each intervention was assessed 8 to 12 wk after treatment by measuring lung function and examining lung tissue. BVR and SVR groups responded with significant and similar decreases in TLC and residual volume (RV). Tissue examination demonstrated that BVR caused collapse of the lung with focal scarring in 11 of 20 target territories (55% success rate). Three of the 11 target zones developed sterile abscesses. Postprocedure complications were less frequent with BVR than with SVR. This pilot study suggests that lung volume reduction can be achieved in animals without surgery using a bronchoscopic approach and a novel fibrin-based glue system. BVR has the potential for simplifying volume reduction, extending indications, and reducing morbidity, mortality, and costs in humans.