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Title: Chartis evaluation of collateral ventilation versus HRCT assessment, in predicting clinical outcomes following endobronchial valve therapy (EBV) in COPD patients

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Body: Studies suggest EBV insertion in heterogeneous severe COPD is most effective in patients with no collateral ventilation (CV-ve) involving the targeted lobe. Aim: To determine whether Chartis evaluation could predict clinical outcomes in COPD pts having EBV insertion and who were assessed as having a complete fissure by HRCT. Methods: A prospective parallel group study with all pts screened with HRCT. Destruction scores were determined for each lobe, fissure integrity was assessed in both lungs. Only pts with >10% differential in destruction scores and complete fissures (for the targeted lobe) were enrolled. All had lung function tests, 6 min walk, differential V/Q, and SGRQ scoring at baseline/30/90 days after EBV placement. Pts had Chartis testing of CV prior to EBV placement, but EBV was placed irrespective of the Chartis result. Results: 49 pts were screened. 9 had intact fissures on HRCT assessment and went onto Chartis Assessment and EBV placement. All had EBV placed in the left upper lobe and lingula. 7 pts were CV-ve on Chartis: 2 were CV+ve. In the CV-ve group. FEV1 [mean(SD)] increased from baseline 0.69(0.15) to 0.93(0.19)L; $p<0.025$; at 90 days. TLC decreased from 6.55 (1.28)L to 6.00 (1.11)L. $p<0.01$. SGRQ scores at 90 days were also significantly lower -43.2(10.5) vs 61.2 (8.7) $p<0.01$. The two subjects in the CV+ve group had no change in lung function. Conclusion: When used as a supplement to HRCT, Chartis assessment of CV predicts improvement in lung function and clinical outcomes in pts with severe COPD undergoing EBV therapy. Chartis should be incorporated into decision pathways relating to EBV insertion.