Phrenic neuropathy: A missed issue in chronic obstructive pulmonary disease

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Body: Diaphragmatic weakness in chronic obstructive pulmonary disease (COPD) is ascribed to hyperinflation-induced diaphragm shortening as well as impairment in cellular and subcellular structures. Although phrenic neuropathy is known to cause diaphragmatic weakness, phrenic neuropathy was not previously considered in COPD patients. Objective: This work aimed at assessing phrenic nerve conduction in COPD patients and its relation to radiographic hyperinflation and pulmonary function. Methods: Twenty COPD patients were evaluated. Radiographic measures of hyperinflation included diaphragmatic angle of depression (DAOD), lung height, lung width, heart size, and diaphragm level. Flow volume loop parameters were obtained from all patients. Phrenic nerves were transcutaneously stimulated in the neck and diaphragmatic potentials were recorded at xiphoid process and ipsilateral 7th intercostal space. Fifteen healthy subjects were enrolled as controls. Results: terminal latency of diaphragmatic potential was significantly prolonged in patients compared to controls (P=0.006 & 0.005 for right and left sides). Phrenic neuropathy was found in 9 patients (45%). Electrophysiological measures of phrenic neuropathy correlated with DAOD on lateral chest film (r=-0.75, P=0.02) as well as with lung height (r=0.67, P=0.003); however they did not correlate with the flow volume loop data. Conclusion: Phrenic neuropathy is an appreciated finding in COPD patients. Diaphragmatic descend secondary to hyperinflation would induce stretch neuropathy of the phrenic nerve that can negatively affect diaphragmatic function. ¹- Ottenheijm CA et al. Am J Respir Crit Care Med. 2007;175(12):1233-40 ²- Wilcox PG, Pardy RL. Lung 1989;167:323-41.