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**Pulmonary Alveolar Proteinosis**

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Case: a 45 y/o female with a PMH of cough and dyspnea of four years presented with a 2 week history of acutely worsening dyspnea on exertion. Cardiac/MI workup was negative, and CXR/CT chest showed bilateral patchy infiltrates most prominent in the right lung. Pulmonary function tests demonstrated a restrictive condition (FEV1 & FVC of 42% and 38% of predicted respectively), as well as impaired diffusion capacity (DLCO 45%). ABG analysis on 4L nasal cannula showed a PaO2 of 71 mmHg. Bronchoalveolar lavage yielded non-diagnostic specimen, and a subsequent VATS procedure confirmed a diagnosis of Pulmonary Alveolar Proteinosis. An outpatient rheumatologic/hematologic workup was negative, and the patient was electively admitted for right whole lung lavage, with left lung lavage to be scheduled at a later date.

Intra-Operative Course: General anesthesia was induced with Propofol and succinylcholine to facilitate placement of a 35 French left-sided double lumen tube (DLT). Bronchoscopy was performed to insure adequate DLT placement, and NM blockade was maintained with rocurionium, 2% sevoflurane, and 100% O2.

A short period of one-lung-ventilation was tolerated (SpO2 ~92-93%). A test lavage with 120 mL of warmed saline returned approximately 50mis of cloudy pink-yellow fluid. The proceduralist was satisfied with the test lavage and began to infuse a total of 8.5L of warmed saline. Intermittent chest percussion applied, and various positional changes were performed to help facilitate wash-in and wash-out of the lavage fluid. A total of 6.5L was returned to the canister during which the effluent changed from a pink-yellow mixture to a light-pink layering of proteinaceous material. Airway pressure was constantly monitored to ensure that lung-compliance was not unduly affected. The procedure concluded after 2.5 hours, after which the decision was made to keep the patient intubated/sedated. The DLT was exchanged with a single lumen ETT via a tube exchanger, and the patient was subsequently transferred to the ICU and extubated 3 hrs later.

One week later, the patient underwent Left Lung Lavage with a similar anesthetic technique. During the left-sided procedure, a right-sided double lumen tube was placed, and a total of 12L of warmed saline was instilled in aliquots of 700cc. A total of 10.5L of effluent was returned to the canister with similar improvement in color and consistency. This time the patient was extubated in the operating room, and transitioned to BiPap.

Post-Operative: improvement in chest x-ray correlated well with respiratory symptoms. Additionally, post-operative spirometry testing (table 1) and arterial blood gas analysis (table 2) showed objective improvement.
Conclusion: Pulmonary alveolar Proteinosis is characterized by deposition of amorphous lipoproteinaceous material in the alveoli due to abnormal processing of surfactant by macrophages. The cause is largely unknown, however, acquired conditions (e.g. occupational dust exposure, infection, hematologic malignancy, and allogeneic bone marrow transplantation) can cause PAP in some individuals. Presentation is typically subacute with gradual onset of symptoms, and pulmonary function tests are usually consistent with a restrictive condition. First-line treatment of PAP is with whole lung lavage, as it facilitates washout of lipoproteinaceous material, and reduces antibodies associated with the impaired function of pulmonary macrophages. The above report highlighted an uneventful anesthetic case, for which whole lung lavage was remarkably successful.

References:

