Effect of Bilevel Positive Airway Pressure Ventilation on Procedural Success of Talc Poudrage in Patients with Symptomatic Malignant Pleural Effusions

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Background: In patients with symptomatic pleural effusions, Talc pleurodesis is one of the most effective procedures to prevent recurrent malignant pleural effusion. According to the current guideline, patients with symptomatic malignant pleural effusions should receive intercostal drainage, followed by pleurodesis unless lung is significantly trapped. The key to procedural success is satisfactory apposition of the visceral and parietal pleura, confirmed radiologically, during the procedure.

Objective: To evaluate the benefits of post-pleurodesis Bilevel positive airway pressure ventilation (BiPAP) administration in patients with symptomatic malignant pleural effusions after talc poudrage.

Methods: In this open-label, single-centered, randomized control trial, we randomly assigned (1:1) 24 patients with symptomatic malignant pleural effusions who were eligible for talc poudrage to receive post-pleurodesis Bilevel positive airway pressure ventilation (BiPAP) for at least 2 hours or routine post-pleurodesis care. The primary endpoint, pleurodesis success rate, was assessed by chest x-ray at 4th week after pleurodesis. The secondary endpoints were post-pleurodesis intercostal drainage duration, and other predicting factors for pleurodesis failure.

Results: During June 2016 – December 2017, we enrolled 24 patients: 12 in the Post-pleurodesis BiPAP administration and 12 in the Routine Post-pleurodesis care. Of total population, the pleurodesis success rate at 4th week was 62.5%. The 4th week- pleurodesis success rate of the Post-pleurodesis BiPAP administration group was 66.7% compared with 58.3% of the routine Post-pleurodesis care group, without statistical significance (p-value = 1.0). There was no difference in intercostal drainage duration between the two groups (5 days versus 4.92 days in the control group and the Post-pleurodesis BiPAP group, respectively, p-value= 0.926). We found that Low pleural glucose and low pleural pH were reliable predictors for pleurodesis failure. Pleural glucose < 100 mg/dL had sensitivity and specificity to predict pleurodesis failure of 100% and 70.6%, respectively (AUC = 0.861; 95%CI, 0.712 to 1.000; p-value=0.002). All of the patients could tolerate the BiPAP through 2 hours of administration without any major complications.

Conclusion: In patients with symptomatic malignant pleural effusions, Post-pleurodesis BiPAP administration cannot improve pleurodesis success rate with no benefits on shortening the intercostal drainage duration. Low pleural glucose (<100mg/dL) and low pH (<7.45) may be reliable predictors for pleurodesis failure.

Keywords: Talc poudrage, Bilevel positive airway pressure ventilation, BiPAP, Pleurodesis