Effectiveness of Small-Bore Pigtail Catheters for Management of Spontaneous Pneumothoraces: A Meta-Analysis

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Introduction

Spontaneous pneumothorax (SP) can be a life-threatening condition. It can be primary and caused by unknown reason, or secondary from acute or chronic lung diseases. It was estimated that the spontaneous pneumothorax affected over 20,000 patients and accounted $130 million health-care costs in the United States.

The primary management of spontaneous pneumothorax is to remove air from the pleural space. The recommendations of spontaneous pneumothorax management differ across guidelines. Though the trend tends to suggest the use of less invasive small catheters, applying a large chest tube is still common.

Method

Meta-analyses were performed by the random effect model. Pooled effects of drainage failure and length of hospitalization were calculated to present the effectiveness of tubing methods.

We searched “(spontaneous pneumothorax) AND (chest tube OR pigtail catheter)” to collect English and Chinese studies published up to April, 2016 via Four English databases (Medline, PubMed, CINAHL, and Cochrane Central Register of Controlled Trials) and Three Chinese databases (CEPS, the Chinese Journal database, and the Chinese Thesis/Dissertation database).

Evaluations of study quality were conducted by the 2011 Oxford Centre for Evidence-Based Medicine-Levels of Evidence and the Cochrane Collaboration’s tool for assessing risk of bias.

Results: Search Result

4 English Databases
3 Chinese Databases
26
34
Inclusion for analysis
11
Full text Review
7
4
7

Results: Study Quality of Primary Studies

Characteristics of Primary Studies

Meta-Analysis: Risk of drainage failure

Forest Plot

Meta-Analysis: Hospital stay

Forest Plot

Meta-Analysis: Extubation days

Forest Plot

Results: Characteristics of Primary Studies

Results: Characteristics of Primary Studies

Results: Publication Bias

Discussion

There is no difference in effect between using small-bore pigtail catheters or chest tube for spontaneous pneumothorax treatment.

Including secondary spontaneous pneumothorax cases in the primary studies may influence the outcome of small-bore pigtail catheters due to comorbidity status.

Conclusion

Findings of this study support the use of small-bore pigtail catheters to manage spontaneous pneumothorax. Application of small-bore pigtail catheters may promote patient compliance and comfort.