Editorial

Contemporary surgical management of thoracic empyema

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Comment on: Semenkovich TR, Olsen MA, Puri V, *et al.* Current State of Empyema Management. Ann Thorac Surg 2018;105:1589-96.

Submitted Aug 07, 2018. Accepted for publication Aug 09, 2018.
doi: 10.21037/jtd.2018.08.55
View this article at: http://dx.doi.org/10.21037/jtd.2018.08.55

In the USA, one million patients diagnosed with pneumonia are admitted each year and among these, 32,000 patients develop empyema (1,2). Empyema is associated with a high morbidity and mortality (2,3).

Empyema was first described by Hippocrates 2,400 years ago. He also performed the first pleural drainage when he created a burr hole to drain the infected fluids and performed daily irrigation (4).

Thoracic empyema is defined as either presence of bacterial organisms and/or presence of grossly purulent fluid in the pleural cavity. A positive culture is not required for diagnosis of patients previously on antibiotics. As well, in the case when a sampling was taken of the inflammatory fluid from around the infected empyema fluid, or in anaerobic bacterial infections which are difficult to be cultured.

Empyema is categorized into 3 stages according to the American Thoracic Society, and can take 3–6 weeks to develop. These stages are (I) exudative (acute) where the lung is compliant, and will re-expand after effusion removal; (II) fibrinopurulent; and (III) organized (chronic), at this stage the visceral and parietal pleurae are covered totally or partially with dense layer of fibrin (rind) which can lead to restricted lung and loculated pleural effusions.

Appropriate management of empyema should include: adequate systemic antibiotics to sterilize the empyema cavity, adequate pleural fluid drainage, adequate lung expansion to obliterate the empyema cavity (this should include removing the internal obstruction such as mucus, foreign body, etc., and removing the external restrictive rind).

Options for pleural fluid drainage include: thoracentesis, tube thoracostomy, VATS, open decortication, open thoracostomy, and vacuum assisted therapy. Thoracentesis alone without pleural drain placement by images guidance or not might be useful in uncomplicated pleural effusion, but it is not recommended alone when the effusion already progressed to empyema (2).

Options for rind removal and fibrin removal include surgical removal or intrapleural fibrinolytic use. Fibrinolytics were used for over 60 years in empyema management, and have demonstrated some benefits (5-7). Both American Association of Thoracic Surgery (AATS) and the European Association for Cardio-Thoracic Surgery (EACTS) have concluded that although it is beneficial, there is not enough evidence for routine use in empyema (2,8).

In a retrospective review paper of over 4,000 patients, Semenkovich *et al.* (3) compare of the outcomes of current surgical management options of empyema as chest tube, thoracostomy, VATS, and open thoracotomy. They demonstrated high rate of initial chest tube utilization in 68% of patients, and almost half of these 44% of these required surgical intervention (VATS or open thoracotomy). Unfortunately, due the retrospective nature of the study, the authors were unable to clarify the intent of chest tube insertion. Was the goal of tube placement for complete resolution and definitive treatment or just temporizing/optimizing the patients' status until definitive surgical treatments occur? On the other hand, it was interesting to know the outcomes of the patients who received fibrinolytic thorough the chest tube (data were not reported).

The authors concluded that patients treated with chest tube have higher mortality rate 15.4%, higher rate of readmission 7.3%, and re-intervention rates 6.1%. These increases maybe due to selection bias; as the authors admit

that this group was of older patients with more serious underlying systemic comorbidities. These data correspond with most of paper previously published (9,10).

The authors also demonstrated that VATS group has lowest mortality rate 3.7%, lowest readmission rate 3.8%, lowest reintervention rate 1.9%, and a was more frequently used in hospitals less than 300 beds capacity. Unfortunately, there was no accurate data about the stage of empyema, nor the comorbidities between the groups to allow comparison between VATS *vs.* open thoracotomy outcomes. Chambers *et al.* reviewed 14 studies about the use of VATS versus an open thoracotomy in adults with mix of stages II and III empyema. These studies demonstrated that VATS offered superior clinical outcomes in terms of treatment of empyema while also resulting in decreased length of stay, less pain and less overall morbidity (11).

The Semenkovich *et al.* article has several limitations due to the retrospective aspect of the study, incomplete data, and uncertainty regarding about the empyema staging. As well, there was selection bias and heterogeneity of the treatment groups. The observed data in the article depicts current practice and management of and this is very helpful in management of a common pathology, that carries high mortality and high treatment cost.

Acknowledgements

None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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Cite this article as: Makdisi T, Makdisi G. Contemporary surgical management of thoracic empyema. J Thorac Dis 2018;10(Suppl 26):S3069-S3070. doi: 10.21037/jtd.2018.08.55

