

Case Report

Re-discovering the Heimlich valve: Old wine in a new bottle

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ABSTRACT

A 14-year-old boy came to our outpatient department with pleuritic chest pain and dyspnea. He was found to have a loculated empyema on the right side. He was taken up for surgery and decortication was done. He developed air leak in the postoperative period. When the air leak did not settle until the 10th day, we decided to attach the atrium Pneumostat™, a modified version of the Heimlich valve to his Intercostal drainage tube and sent him home. On further follow-up, his lung expanded, and ICD could be removed. The patient remains well until the current follow-up. We present this case in an attempt to change the perceptions about various options available to drain the chest. The Heimlich valve appears to be a more compliant option than the conventional underwater seal drainage in terms of early mobility, reduced length of stay, and patient compliance.

KEY WORDS: Decortications, empyema, Heimlich valve, intercostal drainage, underwater seal

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INTRODUCTION

Insertion of an intercostal drainage tube is a painful experience and needs to be experienced to be believed. When the intercostal tube needs to be kept in place for a longer time than needed, it becomes a difficult situation for the patient and the health care provider. Most of the hospitals use underwater seal for draining the chest. Although this is the oldest and most accepted method of chest drainage, there are few negatives to it. The weight of the bottle, increased length of stay, and associated pain are some of the problems. To overcome this, a variety of new devices have been introduced. We have used one of them, Pneumostat™ in our patient. We write this article with the idea of creating awareness about the various options available for intercostal drainage apart from underwater seal.

CASE REPORT

A 14-year-old boy came to our outpatient department (OPD) with complaints of pleuritic chest pain and dyspnea on exertion. On further evaluation, he was found to have a loculated empyema of the right side with a thickened pleura [Figure 1]. After preanesthetic checkup, he was planned for video-assisted thoracoscopic surgery (VATS) decortication on 23rd April 2015. At surgery, VATS was attempted but due to extensive adhesions between the chest wall and pleura procedure was converted into an open decortication. The parietal pleura was removed from the chest wall, and visceral pleura was stripped from the lung. The lung expanded on table. Minimal air leak was noted. The chest was closed with two intercostal drainage tubes. On the immediate postoperative day, chest X-ray (CXR) showed little or no expansion of the right lung. There was a significant air leak. The lower ICD tube was removed on the 2nd postoperative day. However,

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the upper ICD tube was kept in view of persistent air leak. On the 7th postoperative day, a bronchoscopy was done which showed mild bubbling through the right middle lobe bronchus. On the 10th postoperative day, we decided to attach a Pneumostat™ chest drain valve which is a modified Heimlich valve to the intercostal drainage tube [Video 1 and Figure 2]. He was discharged after this valve was attached. He was reviewed in the OPD after a week. Repeat CXR showed expansion of the lung with a small pleural space at the apex. The intercostal tube was removed after one more week on 1st of June 2015 [Video 2]. Repeat CXR showed complete expansion of the lung. The patient remains well until the current follow-up [Figure 3].

DISCUSSION

The oldest known reference to drainage of the thoracic cavity goes back to as early as the fifth century BCE by Hippocrates. Since then there have been various points of debates and arguments over thoracic drainage.^[1] The debate between open and closed chest drainage persisted for centuries. There have been various great surgeons on either side of the pedestal each insisting that their method was better. It was not until 1873 that Playfair first introduced the concept of underwater seal chest drainage by treating thoracic empyema in a child. This began a new era in the treatment of chest collections and pneumothoraces. It was in 1968 that Henry Heimlich first introduced the Heimlich valve which was a one-way flutter valve for the treatment of pneumothoraces and hemothoraces.^[2]

Currently, the most common methods prevalent in most hospitals are the underwater seal drainage bottles which come in various shapes and designs. Most of the surgeons use them because they are comfortable with this type of chest drainage. Although these are easy to use, they are not without problems. The water level in the tubes needs to be maintained at the correct level failing which air might get sucked into the chest. The bottles are heavy and exert a dragging effect on the chest which can be painful when the drainage tube needs to be maintained for a prolonged period of time as in our case. This might lead to a longer length of stay in the hospital and increases the cost of healthcare. Then, finally there is the social stigma of the intercostal tube which is more serious than the disease itself.

This led to the introduction of the portable chest drains. There are a large number of portable drains available and discussion about each one of them is beyond the scope of this article.

We used the Pneumostat™ chest drain valve. This particular device contains a collecting chamber and a one-way valve to let out the air leak. The collection chamber can hold around 30 ml of fluid which can be aspirated using a luer lock syringe. The one-way valve lets out the air and also acts as an indicator to confirm the presence or absence of air leak [Videos 1 and 2]. These drains are easy to use



Figure 1: Preoperative chest X-ray chest of the patient showing right-sided loculated empyema



Figure 2: Picture showing the intercostal drainage tube connected to the Heimlich valve

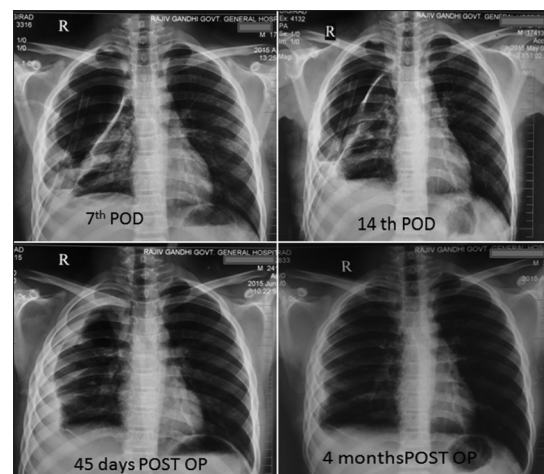


Figure 3: Serial chest X-rays from the 10th postoperative day until 4 months after the surgery

both by the healthcare provider and the patient. They are light and easy to carry and conceal. This avoids the stigma associated with the tube and bag package. These drainage

systems reduce the length of stay in the hospital which offers a long-term cost benefit. All these lead to better compliance by the patient.

We present this case report in an attempt to change the perceptions about various options available to drain the chest. We also feel that physicians and surgeons in general should be more open to the idea of portable and digital chest drains and allow a well-deserved holiday to the underwater seal bottle.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Christopoulou-Aletra H, Papavramidou N. "Empyemas" of the thoracic cavity in the hippocratic corpus. *Ann Thorac Surg* 2008;85:1132-4.
2. Gogakos A, Barbetakis N, Lazaridis G, Papaiwannou A, Karavergou A, Lampaki S, *et al.* Heimlich valve and pneumothorax. *Ann Transl Med* 2015;3:54.