The Urine Bag Used in Pneumothorax

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SUMMARY

Pneumothorax is the presence of air in the pleural cavity. It can be classified into spontaneous, traumatic or iatrogenic. The majority of pneumothorax cases are spontaneous, which can be further classified into primary spontaneous pneumothorax (PSP) or secondary spontaneous pneumothorax (SSP), defined by the absence or presence of obvious underlying lung disease respectively. The treatment of spontaneous pneumothorax includes simple aspiration, intercostal tube drainage or surgical intervention. When intercostal tube drainage is used, it is usually attached to an underwater-seal system. Mobile chest drains, such as the Heimlich valve, replace the underwater-seal and allow outpatient management of spontaneous pneumothoraces. The Heimlich valve however, is costly and not readily available in many local hospitals. Cheaper and easily obtainable alternatives which are also safe are being sought. This is a case report describing the use of the urine bag in the management of a patient with spontaneous pneumothrax.

KEY WORDS:
Urine bag, Spontaneous pneumothorax, Underwater-seal, Heimlich valve

INTRODUCTION

Spontaneous pneumothorax occurs commonly among tall thin male patients between the ages of 10 to 30. The risk is greater among cigarette smokers. Conventionally, the management of spontaneous pneumothoraces may involve intercostal tube drainage attached to an underwater seal and require in-patient care. Devices such as the Heimlich valve, offers the option of replacing the underwater-seal and allows the patient to be treated as outpatient[1]. We describe here the use of a urine bag to manage a patient with spontaneous pneumothorax.

CASE REPORT

The patient, AZJ, is a 37-year-old man who presented to our hospital in October 2006 with a sudden onset of breathlessness and right-sided pleuritic chest pain. He smoked five sticks of cigarettes per day for the past 15 years. Twelve years ago, he was treated for left-sided pneumothorax in the hospital for a week and was discharged well.

On examination, he was alert but very tachypnoiec. His blood pressure was 120/80 mmHg, pulse rate was 90 beats/minute, oxygen saturation was 98% under high-flow mask with 15L/min of oxygen. Jugular venous pressure was not elevated. Examination of his cardiovascular system was unremarkable. Respiratory examination showed reduced breath sounds, hyper-resonance and decreased vocal resonance on the right side of his chest.

Chest radiograph demonstrated right-sided hydropneumothorax surrounding a near-total collapsed right lung. An intercostal tube was inserted into the right pleural cavity and attached to an underwater seal bottle, which bubbled. The patient felt less breathless soon after insertion of the intercostal tube.

On the second day of admission, although the patient was no longer breathless, the underwater-seal continued to bubble and repeated chest radiograph did not show full re-expansion of the right lung. Low-suction was then applied with a pressure of -10 cmH_20.

The pneumothorax persisted even until the sixth day of admission. The patient was clinically stable and could ambulate to the bathroom on his own, without disrupting the underwater-seal system. We referred the patient for cardiothoracic surgical intervention and was given an appointment date after the Hari Raya celebration. Meanwhile, the patient had requested to go home for the holiday.

We replaced the underwater-seal bottle with an adult-size 2L urine bag (E-eureka, Malaysia), commonly used in the ward for bladder drainage. The tapered end of the urine bag tubing was connected to the chest tube and was securely fastened with plaster.

The patient was observed for a day in the ward with the urine bag attached to the intercostal tube and he was taught to release air from the urine bag periodically as it filled up. He was instructed to keep the outlet of the urine bag open at night while he slept. AZJ could handle the urine bag and was discharged from the ward on the seventh day of intercostal tube insertion, with advice to return promptly if he became symptomatically unwell or if the bag stopped inflating.

He was readmitted four days later i.e. the eleventh day of intercostal tube insertion, because the urine bag stopped inflating. He was however, asymptomatic. A repeated chest radiograph showed that the right lung had almost fully re-expanded and only a very thin (<2 cm) of radioluscent area was seen on the superior border of the right upper lobe. The urine bag was replaced with an underwater-seal bottle in the ward and the water level in the tubing was swinging, though not bubbling.

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The patient was advised to undergo pleurodesis but he refused. After we were satisfied that there was full re-expansion of the lung on subsequent chest radiograph and there was no longer any detectable air-leak, the intercostal tube was removed. The patient was discharged well.

DISCUSSION

Small pneumothoraces in asymptomatic patients with clinically apparent normal lungs can be managed by simple aspiration of the pneumothorax [2]. In other cases, intercostal tube drainage may be necessary. If there is persistent air-leak one should suspect the presence of a broncho-pleural fistula. The patient should then be referred for thoracic surgical opinion and intervention. In cases where surgical intervention is not an option (e.g. thoracic surgery not available, or patient is unwilling or unable to undergo surgery), a conservative approach may be taken as one study showed that in the primary spontaneous pneumothorax group, 100% of air-leaks ceased by 14 days [3].

The intercostal tube is conventionally attached to an underwater-seal system. Although it is effective, the underwater-seal system is bulky, restricted mobility and requires in-patient care.

Alternative methods of intercostal drainage have been devised as mobile chest drains. The Heimlich valve[1] for example, allows a unidirectional intercostal drainage (of air, pleural effusion, blood, etc.) through a flutter valve. Although this device allowed more mobility to the patient and was less bulky than the underwater-seal system, it is costly and not available in this hospital.

Two decades ago TN Sharma *et al*[4] had described the Urosac, which was similar to a urine bag, used in 20 patients with spontaneous pneumothoraces and found it to be a safe, efficient and economical alternative to the flutter valves. We have described above, the first occurrence where the urine bag was used to vent spontaneous pneumothorax in this hospital.

The urine bag comes readily with a one-way valve at the inlet of the reservoir bag, which allowed air to escape from the pleural cavity into the bag via the intercostal tube. Once filled up, the bag can be deflated by opening the outlet at the bottom of the reservoir bag. The valve at the inlet makes certain that air in the bag escapes in one direction i.e. through the outlet only. The bag has to be deflated regularly to ensure that the pneumothorax is vented continuously. Otherwise, a filled-up bag will prevent further venting of the pneumothorax and may lead to tension pneumothorax. However, by keeping the outlet open (as in this case, when the patient was sleeping at night), air can escape continuously as the urine bag fills up.

It is also interesting to note that the approximate cost (exact cost may vary according to centre, manufacturer and distributor) of one adult-size 2L urine bag (manufactured by E-eureka), is RM1, whereas the disposable underwater-seal bottle (manufactured by Pacific Hospital Supply Co. Limited) costs RM30 per bottle. A complete Heimlich valve set costs approximately RM300.

CONCLUSION

This case demonstrated the use of a urine bag in a patient with spontaneous pneumothorax. However, studies are needed to further evaluate the use of the urine bag as an alternative to the underwater-seal system.

REFERENCES

1. Chan KY, Fikri-Abdullah M, Sajjad M, Adeeb SM. Outpatient treatment of spontaneous pneumothorax using an improved pocket sized Heimlich valve. Med J Malaysia 2003; 58: 597-9.
2. Henry M, Arnold T, Harvey J. British Thoracic Society guidelines for the management of spontaneous pneumothorax. Thorax 2003; 58(Suppl II): ii39-ii52.
3. Chee CBE, Abisheganaden J, Yeo JKS, *et al.* Persistent air-leak in spontaneous pneumothorax – clinical course and outcome. Respir Med 1998; 92: 757-61.
4. Sharma TN, Agnihotri SP, Jain NK *et al.* Spontaneous pneumothorax: use of urosac as pneumosac. Indian J Tuberc 1987; 34: 194-96.