

Case Series

Continuous Antibiotic Irrigation for Postoperative Empyema with Large Space in the Thoracic Cavity: Report of Two Cases

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Abstract

Introduction: Treatment of postoperative empyema is often difficult, especially in these cases which large space in the thoracic cavity after pneumonectomy or some lobectomy. We herein report two cases of postoperative empyema which treated by continuous antibiotic irrigation.

Case presentation: First case was a 74-year old female who underwent a right lower lobectomy for a metastatic lung cancer. Because of alveolar-pleural fistula and chylothorax after surgery, re-expansion of the lung was insufficient, and a large space remained in the thoracic cavity. Four months after surgery, the patient developed an empyema with methicillin-sensitive *Staphylococcus aureus*. After the failure of an intermittent irrigation with normal saline during 47 days, continuous irrigation with a solution mixed Minocycline was performed. In this method, the culture became negative on day 7, the patient was discharge after removal of the chest tube. Second case was an 80-year old male who underwent right middle and lower lobectomy for a lung carcinoma five years ago. The patient developed an empyema with *Klebsiella*. Because the culture continuous positive after several treatments, the same method of irrigation as the first case was performed. The culture became negative on day 7, and the patient was able to leave the hospital.

Conclusion: Our method of continuous antibiotic irrigation is considered that an effective option for postoperative empyema with large space in the thoracic cavity and can avoid the surgery such as thoracic cavity reduction or filling procedures.

Keywords: Lung cancer; Surgery; Complication; Infection; Minocycline; Open window thoracostomy

Introduction

Treatment of postoperative empyema is often difficult, especially in these cases which large space in the thoracic cavity after pneumonectomy or some lobectomy. Open window thoracostomy is useful to prevent sepsis and save the life, but long-term wound care is required and some patient cannot be closed of the window due to no organs for filling the cavity, such as omentum and latissimus dorsi muscle. We herein present two cases of postoperative empyema developed in large space of thoracic cavity, treated by continuous antibiotic irrigation.

Case Presentation

Case 1

A 74-year-old female who underwent a right lower lobectomy for colorectal metastatic lung cancer was referred to our hospital because

of purulent discharge from the surgical wound 4 months after the lobectomy. The postoperative empyema with large space caused by Methicillin-Sensitive *Staphylococcus Aureus* (MSSA) was diagnosed by double lumen tube thoracotomy and CT scan (Figure 1). Because she rejected open window thoracostomy indication, the alternative thoracic saline irrigation, 500 ml twice a day, was conducted, resulting in failure to eliminate MSSA even 47 days after the intermittent irrigation. Therefore, we changed the method to continuous antibiotic irrigation by using 1000 ml of saline mixed with 800 mg of Minocycline sensitive for MSSA. It took 10 days to confirm the consecutive 4 days' negative MSSA culture after the new irrigation followed by the tube removal. Her large space empyema was successfully treated, and she is fine and free from the recurrence of empyema for 36 months after the discharge.

Case 2

An 80-year-old man, complaining right chest pain and high grade fever, developed tardive post-operative empyema caused by *Klebsiella* 5 years after the initial middle and lower lobectomy for lung cancer (Figure 2A). Although open window thoracostomy was performed to debride the cavity (Figure 2B), the perfect elimination of *Klebsiella* could not achieved for 3 months despite the grossly purified appearance. Then, the continuous antibiotic irrigation, as we did in case 1, was conducted by closing the cavity followed by the double-lumen tube thoracotomy (Figure 2C). Cultural negative effusion was confirmed 7 days after the procedure, and he is fine and free from the relapsing of empyema for 24 months after the uneventful discharge.

Discussion

Postoperative empyema following lung cancer surgery is a serious

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Figure 1: A): Chest X-ray and computed tomography scan disclosing an insufficiency of re-expansion of the lung and a large space in the right thoracic cavity. B): A chest tube was placed and the empyema cavity can be confirmed.

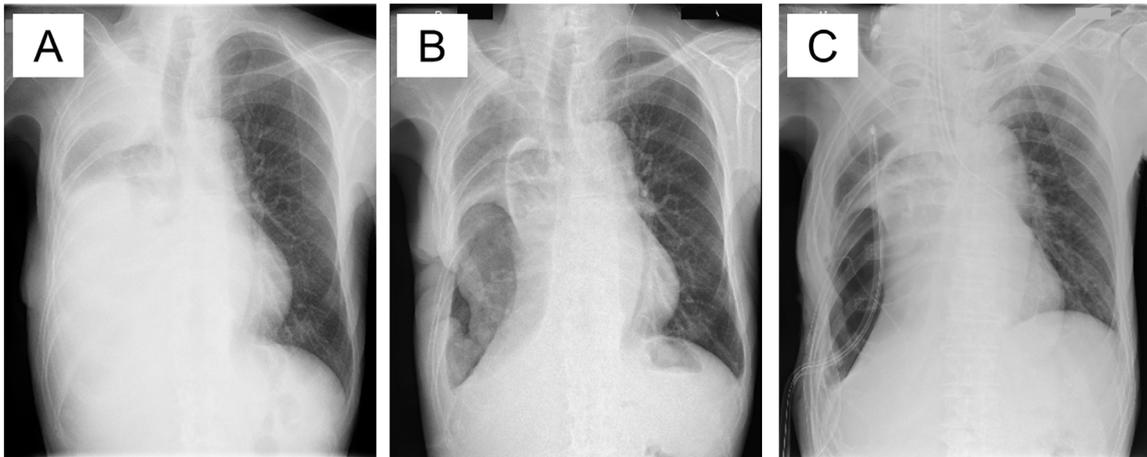


Figure 2: A): Chest X-ray disclosing an expansion failure of the right upper lobe and a large space in thoracic cavity. B): Open window thoracostomy was performed. C): The window of the chest wall was closed and a chest tube was placed in the empyema cavity.

complication, found approximately 0.9% [1]. The open window thoracostomy is one of the most effective treatments for postoperative empyema, especially in the case with large space. However, secondary closure of the fenestra is sometimes impossible when lack organs for filling the cavity such as omentum and latissimus dorsi muscle like our patients.

Some reports described that the continuous irrigation *via*. tube thoracotomy might be effective for empyema even if postoperative empyema following pneumonectomy [2,3]. So, we conducted the method of continuous antibiotic irrigation using Minocycline. Minocycline was used because of sensitive to causative agents and usage experience as the pleurodesis agents for intrathoracic. One of the most important factors for success is considered that rinse solution is always contact with the cavity compared from an intermittent irrigation.

In conclusion, this method of irrigation avoided the thoracic cavity reduction or filling procedures, and the patients were disease

free with no recurrence of empyema after treatment. It is considered that an effective treatment option for postoperative empyema with large space in the thoracic cavity.

Ethics Approval

Informed consent was obtained from the patients for their anonymized information to be published in this case series.

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