

# Non-Operative Management Of Chest Tube Induced Pulmonary Artery Injury

J van der Niet, M Koeman, I Purmer, W Steup

## Citation

J van der Niet, M Koeman, I Purmer, W Steup. *Non-Operative Management Of Chest Tube Induced Pulmonary Artery Injury*. The Internet Journal of Thoracic and Cardiovascular Surgery. 2012 Volume 15 Number 2.

## Abstract

Chest tube insertion (thoracostomy) is a common procedure performed in the emergency department, the operating theatre and the intensive care unit. Inserting a drain into the pulmonary artery is a rare but life threatening complication. We report a case of successful non-operative management of a pulmonary artery injury after tube thoracostomy insertion.

## INTRODUCTION

Chest tube insertion (thoracostomy) is commonly used in the management of thoracic empyema or pneumothorax. Major thoracic vessel injuries are rare but have been reported in literature. We report a case of a pulmonary artery injury caused by chest tube insertion, which has been folded in the pulmonary artery and where the patient was not a candidate for a thoracotomy. We managed this case non-operatively and retracted the drain.

## CLINICAL DETAILS

A 63-year-old female presented to the emergency department with septic shock and somnolence. Six months before, an adenocarcinoma of the upper right lobe had been diagnosed during workup for aortic valve stenosis and mitral valve insufficiency, for which she underwent right upper lobectomy (pT1N0M0 adenocarcinoma) followed by an aortic valve replacement (Edward Magna Fase) five months ago. The mitral valve repair was not feasible because of adhesions after the upper lobe lobectomy. The postoperative cardiac function was still severely impaired. Furthermore the patient had chronic post thrombotic syndrome with ulcers on both legs.

The patient required intubation and intensive care unit admission. A chest X ray showed pleural effusion. On needle aspiration pus was drained. No CT or ultrasound was performed in advance of the procedure. A 16 Fr chest-tube was blunt inserted in the fourth intercostal space at the place of the diagnostic puncture. Directly after insertion, 2000ml of blood was drained in the drainage system. The chest-tube

was immediately clamped. The patient became hypotensive and resuscitation was started with packed red cell and platelet transfusion. Chest X ray showed the tip of the catheter passing across the midline. The drain was retracted a few cm. Subsequently, CT scan showed the catheter to be in the right pulmonary artery and to be double folded (Fig.1, 2) Furthermore the scan showed that the drain was passing through the lower right lobe with widespread pneumonia. Theoretically, the intervention of choice should be a thoracotomy to remove the drain and to treat the empyema. However, the compromised condition of this patient precluded this. Earlier pre-operative lung function test, conducted before the lobectomy, showed the patient could not undergo a pneumonectomy. Because of findings during the aortic valve replacement we believed that central clamping of the pulmonary artery would be a hazardous procedure and surgery therefore would not be an option. We decided on non-operative treatment and to withdraw the catheter 2-3 cm every day, after complete correction of coagulation. On the fourth day the catheter was outside the intra-thoracic cavity without renewed blood loss. The patient was extubated on day five and transferred to the ward after 7 days. Control CT scan showed no embolism or bleedings (Fig. 3). Heparin was restarted 2 days after removal of the chest tube because of the low flow state in the left ventricle and impaired cardiac function inducing a high risk of thromboembolic complications. During the ICU stay the patient was treated with Flucloxacillin combined with Ceftriaxone. These antibiotics started as empirical treatment while the leg ulcers were the expected source of infection. This was confirmed by the microbiological analysis of the

aspirated pus from the empyema was positive for Staphylococcus Aureus. The patient was discharged from the hospital by the twenty first day.

**Figure 1**

Figure 1: CT image showing folded thoracic drain in the pulmonary artery



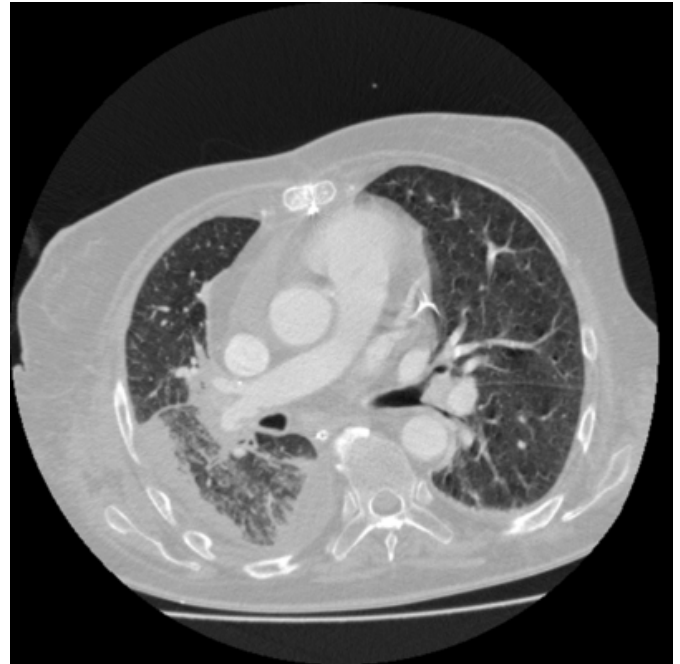
**Figure 2**

Figure 2: CT image showing two lumens of the drain in the pulmonary artery



**Figure 3**

Figure 3: CT image showing no embolism or bleedings one week after drain removal



## DISCUSSION

Tube thoracostomy insertion is a common procedure performed in the emergency department, the operating theatre and the intensive care unit. In some cases it is even performed by out of office emergency personnel. A number of complications have been described (1,2), such as: diaphragm lacerations, laceration of the lung, intercostal artery bleeding and even a perforation of the right atrium of the heart has been reported (3).

The risk of lung perforation during tube thoracostomy is related to several factors. The most important probably being the method used for insertion. Most major pulmonary vascular injury has been reported due to the use of trocar-based thoracostomy tubes (2). Blunt chest wall dissection has replaced the use of a trocar in many institutions. Laceration of the lung, reported frequently, is more likely to occur in patients with lungs that have decreased compliance or when pleural adhesions exist (2).

In this case, after blunt dissection, a 16 Fr intercostal chest-tube traversed the infected lung and ended double folded in the pulmonary artery. Post-lobectomy adhesions probably contributed to this course.

We chose a non-operative approach because earlier reports of surgical intervention for drains inserted into the

pulmonary artery all report a pneumonectomy (1,4,5), which our patient could not tolerate. We have chosen for a non-operative way of dealing with this dilemma and succeeded to remove the drain safely.

### **References**

1. I. Takanami: Pulmonary artery perforation by a tube thoracostomy. *Interact CardioVasc Thorac Surg* 2005;4:473-474
2. K.S.Miller, S.A. Sahn: Chest tubes. Indications, technique, management and complications. *Chest* 1987;91:258-264
3. S. Meisel, Z Ram, I Priel, D Nass and P. Lieberman: Another complication of thoracostomy perforation of the right atrium. *Chest* 1990;98:772-773
4. C.A. Rombola, S.B. Tomatis, A.F. Honguero Martinez, P.L. Atance: Parapneumonic pleural effusion. Accidental insertion of a chest tube into right pulmonary artery. *Eur. J. Cardiothorac Surg* 2008;34:903
5. C.L Kao, M.S. Lu, J.P. Chang. Successful management of pulmonary artery perforation after chest tube insertion. *J. Trauma* 2007;62:1533

**Author Information**

**Joël van der Niet**

Department of Surgery, Lung surgery, Haga Hospital

**Mirelle Koeman**

Intensive Care Unit, Haga Hospital

**Ilse M. Purmer**

Intensive Care Unit, Haga Hospital

**Willem Hans Steup**

Department of Surgery, Lung surgery, Haga Hospital