

Late Onset Post-Pneumonectomy Empyema: An Uncommon Complication In A Brazilian Amazon Man.

A Barretto, M Bragagnolo Batalha, L Meguins, F Costa do Nascimento, A de Jesus Leão Janahú

Citation

A Barretto, M Bragagnolo Batalha, L Meguins, F Costa do Nascimento, A de Jesus Leão Janahú. *Late Onset Post-Pneumonectomy Empyema: An Uncommon Complication In A Brazilian Amazon Man.*. The Internet Journal of Pulmonary Medicine. 2008 Volume 11 Number 1.

Abstract

Post-pneumonectomy empyema (PPE) is an uncommon but possibly life-threatening condition. It has a strong association with bronchopleural fistula (BPF), which acts as a continued source of infection into the thoracic cavity and increases mortality. We describe the case of a Brazilian Amazon man that evolved empyema caused by *Escherichia coli* in the thoracic cavity associated with bronchopleural fistula 19 years after pneumonectomy. This case reinforces the importance of an early suspicion of PPE to avoid diagnostic delay and improve outcomes.

INTRODUCTION

Pulmonary complications after pneumonectomy are frequently cited as major causes of both morbidity and mortality. The most mentioned pathologic processes involved with worst outcomes in the post-pneumonectomy state are known to arise at the early postoperative period and include pneumonia, atelectasis, respiratory failure and prolonged mechanical ventilation^[123456]. Post-pneumonectomy empyema (PPE) is an uncommon but devastating complication with incidence reported to range from 0.8% to 15% in recent series, depending upon duration of postoperative follow-up^[78910]. It presents a high mortality rate (16.4%-71.2%) especially when associated with a large bronchopleural fistula^[1112131415].

The aim of the present report is to describe the case of a Brazilian Amazon man that evolved empyema in the thoracic cavity associated with bronchopleural fistula 19 years after pneumonectomy.

CASE REPORT

A 55-years old man, born and residing in the Brazilian Amazonia, was admitted presenting a 3-weeks history of fever and chronic cough with purulent and fetid sputum in association with progressive dyspnea and right hemithorax pain. His past medical history was remarkable for a right pneumonectomy performed 19 years before the beginning of current symptoms due to massive hemoptysis secondary to

pulmonary tuberculosis (Figure 1).

{image:1}

On general clinical assessment, the patient was febrile, tachypneic, tachycardic and with muco-cutaneous paleness. Physical examination of the respiratory system revealed absence of pulmonary murmur and dullness during percussion on the right hemithorax and vicariance of pulmonary murmur on the left hemithorax. Blood laboratory exams showed leukocytosis with neutrophilia. Chest radiography suggested the presence of a fluid collection on the right hemithorax (Figure 2).

{image:2}

Diagnostic thoracosentesis revealed a purulent material that was sent bacteriologic culture. As no other structural abnormality was identified, a diagnosis of post-pneumonectomy empyema (PPE) was made and the symptoms were attributed to it. Based on this diagnosis, right chest tube drainage was immediately instituted with evacuation of the purulent material. Empiric systemic antibiotic therapy was initiated with ceftazidime 6g/day in three divided doses and clindamycin 1.8g/day in three divided doses and was maintained during 21 days. Culture of the purulent material obtained during thoracosentesis yielded *Escherichia coli* as the causative agent sensitive to ceftazidime, cefotaxime, ciprofloxacin and gentamicin. After

clinical stabilization of the patient, bronchoscopy was performed and showed a partial dehiscence of the surgical suture on the right bronchus resulting in a small bronchopleural fistula. Open-window thoracostomy was then performed using the Eloesser technique without complication (Figure 3).

{image:3}

Two weeks later, a new bronchoscopy revealed no BPF. The patient had an uneventful recovery and was discharged in good clinical conditions.

DISCUSSION

Since the German surgeon Rudolph Nissen described the first successful pneumonectomy for benign disease performed in 1931^[1617], empyema and bronchopleural fistula (BPF) after pneumonectomy have continued to represent a diagnostic and therapeutic challenge for the pneumologist and thoracic surgeon. Post-pneumonectomy empyema (PPE) is an uncommon but possibly life-threatening condition with incidence reported to range from 0.8% to 15% in recent series, depending upon duration of postoperative follow-up^[78910]. It presents a high mortality rate (16.4%-71.2%) especially when associated with a large BPF^[71112131415]. Because the symptoms of PPE are nonspecific, and tests are often insensitive, clinicians must have a high level of suspicion, especially regarding late-onset empyema.

Late-onset PPE can evolve from several mechanisms. It usually develops as a result of hematogenous dissemination from a distant source, such as infected teethes, pneumonia, appendicitis and dental work^[181920]. However, it also can occur following direct contamination of the pleural cavity secondary to bronchopleural or esophagopleural fistulas^[1821]. According to Ng et al (2005)^[22], PPE has a strong association with BPF, which increases significantly the mortality rate. Therefore, bronchoscopy should be routinely performed to identify any BPF and estimate its size. In our patient, bronchoscopy revealed a partial dehiscence of the surgical suture on the right bronchus resulting in a small BPF. However, a second bronchoscopy carried out after clinical and surgical stabilization of the patient revealed no BPF. We believe that a spontaneous closure of the fistula occurred.

Clinically, PPE can present in days to years after the initial surgery, however late-onset empyema may be arbitrarily defined as one which first produces any clinical manifestation more than three months after the resection in a

patient whose immediate postoperative course was uneventful^[18]. A high index of suspicion is needed when diagnosing PPE at its late presentation because signs and symptoms associated with it are usually nonspecific (eg, weight loss, anorexia, weakness, and low-grade fever), making the diagnosis more difficult^[23]. Imaging studies can often be helpful in suggesting the diagnosis, however aspiration of the purulent material from the pleural cavity is frequently necessary to confirm the clinical suspicion^[2123]. In the present report, the patient referred fever and chronic cough with purulent sputum in association with progressive dyspnea and right hemithorax pain. Chest radiography showed a right fluid collection and aspiration revealed a purulent material. The clinical manifestation started only 19-years after pneumonectomy.

The most common organisms causing PPE are *Staphylococcus aureus* and *Pseudomonas aeruginosa*^[2324]. Pairolero et al (1990)^[25] founded multiple organisms infection in 49% of the patients. In our case, purulent material obtained by diagnostic thoracosentesis yielded *Escherichia coli* as the causative agent sensitive to ceftazidime, cefotaxime, ciprofloxacin and gentamicin.

Once PPE is diagnosed, immediate drainage of the post-pneumonectomy space and empiric broad-spectrum systemic antibiotics are frequently the initial therapeutic approach^[23]. Further treatment depends on whether a fistula is present, the overall medical condition of the patient, the organism detected and the surgeon experience^[2223]. In the present report, it was first performed close drainage for evacuation of the purulent material associated with systemic antibiotics (ceftazidime 6g/day in three divided doses and clindamycin 1.8g/day in three divided doses) that were maintained during 21 days. After clinical stabilization of the patient, open-window thoracostomy was performed using the Eloesser technique. The patient had an uneventful recovery.

In conclusion, the present report reinforces the importance of an early suspicion of PPE to avoid diagnostic delay and improve outcomes. We also highlight that, although infrequently seen in association with PPE, *E. coli* is a possible agent responsible to the infectious process and must be considered when choosing an empiric antibiotic scheme.

References

1. Izquierdo Villarroya B, López Alvarez S, Bonome González C, Cassinello Ogea C. Cardiovascular and respiratory complications after pneumonectomy. *Rev Esp Anestesiol Reanim.* 2005 Oct;52(8):474-89.
2. Stevens MS, de Villiers SJ, Stanton JJ, Steyn FJ.

- Pneumonectomy for severe inflammatory lung disease. Results in 64 consecutive cases. *Eur J Cardiothorac Surg.* 1988;2(2):82-6.
3. Tsuchiya M, Katsuki Y, Enokibori T, Ninomiya K, Fujimura N. Two cases of chronic atelectasis that improved through use of nasal continuous positive pressure. *Nihon Koryuiki Gakkai Zasshi.* 2007 Jun;45(6):503-7.
 4. Wang J, Winship SM, Pennefather SH, Russell GN. Post pneumonectomy respiratory failure. *Anaesthesia.* 1999 May;54(5):495-6.
 5. Rogiers P, Van Mieghem W, Engelaar D, Demedts M. Late-onset post-pneumonectomy empyema manifesting as tracheal stenosis with respiratory failure. *Respir Med.* 1991 Jul;85(4):333-5.
 6. Bigatello LM, Allain R, Gaissert HA. Acute lung injury after pulmonary resection. *Minerva Anesthesiol.* 2004 Apr;70(4):159-66.
 7. Jadczyk E. Postpneumonectomy empyema. *Eur J Cardiothorac Surg.* 1998 Aug;14(2):123-6.
 8. Grégoire J, Deslauriers J, Guojin L, Rouleau J. Indications, risks, and results of completion pneumonectomy. *J Thorac Cardiovasc Surg.* 1993 May;105(5):918-24.
 9. Harpole DH, Liptay MJ, DeCamp MM Jr, Mentzer SJ, Swanson SJ, Sugarbaker DJ. Prospective analysis of pneumonectomy: risk factors for major morbidity and cardiac dysrhythmias. *Ann Thorac Surg.* 1996 Mar;61(3):977-82.
 10. de Perrot M, Licker M, Robert J, Spiliopoulos A. Incidence, risk factors and management of bronchopleural fistulae after pneumonectomy. *Scand Cardiovasc J.* 1999;33(3):171-4.
 11. Asamura H, Naruke T, Tsuchiya R, Goya T, Kondo H, Suemasu K. Bronchopleural fistulas associated with lung cancer operations. Univariate and multivariate analysis of risk factors, management, and outcome. *J Thorac Cardiovasc Surg.* 1992 Nov;104(5):1456-64.
 12. Baldwin JC, Mark JB. Treatment of bronchopleural fistula after pneumonectomy. *J Thorac Cardiovasc Surg.* 1985 Dec;90(6):813-7.
 13. Hankins JR, Miller JE, Attar S, Satterfield JR, McLaughlin JS. Bronchopleural fistula. Thirteen-year experience with 77 cases. *J Thorac Cardiovasc Surg.* 1978 Dec;76(6):755-62.
 14. Puskas JD, Mathisen DJ, Grillo HC, Wain JC, Wright CD, Moncure AC. Treatment strategies for bronchopleural fistula. *J Thorac Cardiovasc Surg.* 1995 May;109(5):989-95.
 15. Müller LC, Abendstein B, Salzer GM. Use of the greater omentum for treatment and prophylaxis of anastomotic and stump dehiscence in major airway surgery. *Thorac Cardiovasc Surg.* 1992 Dec;40(6):323-5.
 16. Fell SC. A history of pneumonectomy. *Chest Surg Clin N Am.* 1999 May;9(2):267-90, ix.
 17. Batirel HF, Yüksel M. Rudolf Nissen's years in Bosphorus and the pioneers of thoracic surgery in Turkey. *Ann Thorac Surg.* 2000 Feb;69(2):651-4.
 18. Kerr WF. Late-onset post-pneumonectomy empyema. *Thorax.* 1977 Apr;32(2):149-54.
 19. Schueckler OJ, Rodriguez MI, Takita H. Delayed postpneumonectomy empyema. *J Cardiovasc Surg (Torino).* 1995 Oct;36(5):515-7.
 20. Holden MP, Wooler GH. "Pus somewhere, pus nowhere else, pus above the diaphragm". *Postpneumonectomy empyema necessitatis.* *Am J Surg.* 1972 Nov;124(5):669-70.
 21. Adebajo SA, Adebo OA, Osinowo O. Management of post-pneumonectomy empyema and bronchopleural fistula in Nigeria. *J Natl Med Assoc.* 1980 Feb;72(2):97-100.
 22. Ng CS, Wan S, Lee TW, Wan IY, Arifi AA, Yim AP. Post-pneumonectomy empyema: current management strategies. *ANZ J Surg.* 2005 Jul;75(7):597-602.
 23. Kopec SE, Irwin RS, Umali-Torres CB, Balikian JP, Conlan AA. The postpneumonectomy state. *Chest.* 1998 Oct;114(4):1158-84.
 24. - Deschamps C, Allen MS, Trastek VF, Pairolero PC. Empyema following pulmonary resection. *Chest Surg Clin N Am.* 1994 Aug;4(3):583-92.
 25. Pairolero PC, Arnold PG, Trastek VF, Meland NB, Kay PP. Postpneumonectomy empyema. The role of intrathoracic muscle transposition. *J Thorac Cardiovasc Surg.* 1990 Jun;99(6):958-66

Author Information

Adriana Rodrigues Barretto

Departamento de Pneumologia, Hospital Universitário João de Barros Barreto

Maria Alice Bragagnolo Batalha

Faculdade de Medicina, Universidade Federal do Pará

Lucas Crociati Meguins

Faculdade de Medicina, Universidade Federal do Pará

Flávia Costa do Nascimento

Departamento de Cirurgia Torácica, Hospital Universitário João de Barros Barreto

Ajalce de Jesus Leão Janahú

Departamento de Cirurgia Torácica, Hospital Universitário João de Barros Barreto