

MANAGEMENT OF POSTOPERATIVE EMPYEMA



Funda CANSUN¹
Kenan Can CEYLAN²

INTRODUCTION

Empyema is the accumulation of pus caused by the invasion of organisms of both extrathoracic and intrathoracic sites in the pleural cavity, which is supposed to be sterile. It may be progressive, and treatment may be challenging. Significant causes of empyema include pulmonary infections such as lobar pneumonia, bronchiectasis, lung abscess. In addition to pulmonary infections, thoracic, cardiac, or esophageal surgery, septic pulmonary embolism, trauma, mediastinitis, abdominal infections, non-sterile thoracentesis, esophageal perforations can be added to the list of empyema causes. Both postoperative wound infection of the superficial tissues and empyema after pulmonary surgery is considered a surgical site infection. Postoperative empyema (PE) is not common; however, management is vital since it is a potentially fatal complication after pulmonary resections.

Appropriate antibiotic treatment and surgical interventions are necessary for the treatment of pleural empyema. PE may often be seen together with bronchopleural fistula, which makes the management challenging. There are various options, including closed tube thoracostomy, video-assisted thoracoscopy, emergency open window thoracostomy, and Endoscopic conservative treatment.

HISTORY

The diagnosis and treatment of empyema were first described by Hippocrates, who also first described the treatment of empyema, more than 2000 years ago. There is no precise knowledge about empyema until the early 18th century. The treatment methods described in history include open and closed tube drainage, thoracostomy, and thoracoplasty. Tube thoracostomy has been the primary treatment option since the first description of empyema(1,2). Galen (c. 129-200 CE) describes a similar procedure for abdominal paracentesis but does not comment on thoracic injuries (2)

The following recorded pus evacuation was to facilitate a chest wound healing and was documented by Mitchell in *Medicine in the Crusades*. Baldwin I of Jerusalem (c. 1058-1118) was struck by a lance and the wound's pus drainage treatment was performed experimentally. No other data about similar procedures from this era are present, which leads us to conclude that pus drainage was not precisely known or practiced. (3).

Playfair first described the water-seal chest drainage system in 1873 in the treatment of a child with thoracic empyema. He aspirated the thoracic cavity four times; however, after each aspiration, the pleural fluid re-accumulated. He then opened

¹ MD, University of Health Sciences, Dr. Suat Seren Chest Disease and Thoracic Surgery Research and Education Hospital, Thoracic Surgery Clinic, Izmir, Turkey fcansun@yahoo.com

² Prof., University of Health Sciences, Dr. Suat Seren Chest Disease and Thoracic Surgery Research and Education Hospital, Thoracic Surgery Clinic, Izmir, Turkey kcanceylan@gmail.com

REFERENCES

1. Munnell ER. Thoracic drainage. *Ann Thorac Surg* 1997;63:1497-502.
2. Hughes J. Battlefield medicine in Wolfram's Parzival. *J Medieval Military History*, 2010;8,119-30.)
3. Mitchell P. *Medicine in the Crusades*. Cambridge (MA): Harvard University Press, 2004:160.
4. Playfair GE. Case of empyema treated by aspiration and subsequently by drainage: recovery. *Br Med J* 1875;1:45.
5. Light RW. Parapneumonic effusions and empyema. *Proc Am Thorac Soc*. 2006;3:75-80.
6. Maskell NA, Batt S, Hedley EL, Davies CW, Gillespie SH, Davies RJ. The bacteriology of pleural infection by genetic and standard methods and its mortality significance. *Am J Respir Crit Care Med*. 2006;174:817-23.
7. Ahmed RA, Marrie TJ, Huang JQ. Thoracic empyema in patients with community-acquired pneumonia. *Am J Med*. 2006;119:877-83.
8. Finland M, Barnes MW. Duration of hospitalization for bacteremic infections at Boston City Hospital during 12 selected years between 1935 and 1972. *J Infect Dis*. 1978;138:837-48.
9. Weese WC, Shindler ER, Smith IM, Rabinovich S. Empyema of the thorax then and now. A study of 122 cases over four decades. *Arch Intern Med*. 1973;131:516-20.
10. Işık H. Postoperatif Komplikasyonlar. Yücel O, Yıldızhan A, editörler. *Göğüs Cerrahisi Cep Kitabı*. Ankara. Merkez Rep ro Ltd. Şti; 2012. s. 28-31.
11. Topcu S, Çetin G. Ampiyemin Cerrahi Tedavisi. Yüksel M, Kalaycı NG, editörler. *Göğüs Cerrahisi*. 1. Baskı. İstanbul: Bilmedya Grup; 2001. s. 383-402].
12. Kılıçgün A, Gökçe M. Ameliyat Sonrası Görülen Komplikasyonlar. Ökten İ, Kavukçu HŞ, editörler. *Göğüs Cerrahisi*. 2. Baskı. İstanbul: Promat Basım Yayın; 2013. s.435-54.
13. Pettiford BL, Luketich JD, Landreneau RJ. Kronik Ampiyem ve Bronkoplevral Fistüle Cerrahi Yaklaşım. Issaka A, Yüksel M. Çeviri. *Erişkin Göğüs Cerrahisi*. Sugarbaker DJ, Bueno R, Krasna MJ, Mentzer SJ, Zellos L, Williams M, Adams A. Editörler. Yüksel M. Çeviri Editörü. İstanbul. Nobel matbaacılık. 2011. s. 775-85
14. Collins JD, Burwell D, Furmanski S, Lorber P, Steckel RJ. Minimal detectable pleural effusions. A roentgen pathology model. *Radiology*. 1972;105:51-3.
15. Kocijancic I, Vidmar K, Ivanovi-Herceg Z. Chest sonography versus lateral decubitus radiography in the diagnosis of small pleural effusions. *J Clin Ultrasound* 2003;31:69-74
16. Diacon AH, Brutsche MH, Soler M. Accuracy of pleural puncture sites: a prospective comparison of clinical examination with ultrasound. *Chest*. 2003;123:436-41.
17. Jones PW, Moyers JP, Rogers JT, Rodriguez RM, Lee YC, Light RW. Ultrasound-guided thoracentesis: is it a safer method? *Chest*. 2003;123:418-23.
18. Baber CE, Hedlund LW, Oddson TA, Putman CE. Differentiating empyemas and peripheral pulmonary abscesses: the value of computed tomography. *Radiology*. 1980;135:755-8.
19. Stark DD, Federle MP, Goodman PC, Podrasky AE, Webb WR. Differentiating lung abscess and empyema: radiography and computed tomography. *AJR Am J Roentgenol*. 1983;141:163-7.)
20. Waite RJ, Carbonneau RJ, Balikian JP, Umali CB, Pezzella AT, Nash G. Parietal pleural changes in empyema: appearances at CT. *Radiology*. 1990;175:145-50
21. Grijalva CG, Nuorti JP, Zhu Y, Griffin MR. Increasing incidence of empyema complicating childhood community-acquired pneumonia in the United States. *Clin Infect Dis*. 2010;50:805-13.
22. Smolnikov A, Smolyakov R, Riesenberk K, Schlaeffer F, Borer A, Cherniavsky E, et al. Prevalence and clinical significance of pleural microbubbles in computed tomography of thoracic empyema. *Clin Radiol*. 2006;61:513-9.
23. Cheng DS, Rodriguez RM, Rogers J, Wagster M, Starnes DL, Light RW. Comparison of pleural fluid pH values obtained using blood gas machine, pH meter, and pH indicator strip. *Chest*. 1998;114:1368-72.
24. Sarodia BD, Goldstein LS, Laskowski DM, Mehta AC, Arroliga AC. Does pleural fluid pH change significantly at room temperature during the first hour following thoracentesis? *Chest*. 2000;117:1043-8.)
25. Andrews NC, Parker EF, Shaw RP, et al. Management of non-tuberculous empyema. *Am Rev Respir Dis*. 1962;85:935-6.