CHAPTER 8

COMPLICATIONS AFTER LUNG RESECTIONS

Fatih METEROĞLU [1]
Atalay ŞAHİN [2]
Erkan AKAR [3]

A significant increase has been observed in the number of pulmonary resections performed for lung cancer due to the increase in accessibility to health services, the development of medical technology, neoadjuvant treatment, videothoracoscopic resection, and increased experience of surgeons at the present time. However, the cost calculations have also come up after increasing the number of surgical treatments. The hospital stay is leading in the most important factors that increase the cost. One of the most important factors that increase the length of stay is the postoperative complication. Pulmonary complications constitute the most complication group after lung resections [1,2].

The incidence of postoperative pulmonary complications is about 10-40% and this rate reaches up to 50% after pneumonectomy [3].The most common pulmonary complication after lung resections is prolonged air leakage and pleural space, which are seen at a higher rate after upper lobectomy / bilobectomy, regardless of sides excluding pneumonectomies [4]. Apical localized pleural space after lobectomy is one of the most common problems especially in the early period. However, it can be ignored unless it causes clinical symptoms (eg infection, empyema). However, there is no standard definition of this problem and there are very few published articles [4].

Preoperative control of systemic diseases, nutritional support, treatment of infections, clearance of secretions and preoperative respiratory physiotherapy applications reduce the risk of postoperative pulmonary complications and increases forced expiratory volume level (FEV1) in the first second during the postoperative period [1,2.4].

BLEEDING

Bleeding is the most common complication requiring retoracotomy and has a high morbidity and mortality rate. Rapid diagnosis and treatment of these patients is life saving. Hemorrhagic drainage of more than 200 cc / hour in the postoperative period is a sign of severe bleeding. The continuation of this drainage for four hours is considered an indication for retoracotomy [5].

ATELECTASIS

Atelectasis following thoracotomy is the most common complication that initiates the processes leading to infection and respiratory failure if left untreated. Most of the patients underwent general anesthesia develop clinically non-significant atelectasis. Atelectasis is seen between 7% and 30%. The most important risk factors are postoperative

[1] Assoc. Prof., Dicle University, School Of Medicine, Department Of Surgical Medical Sciences, Department Of Thoracic Surgery, drfatihmeteroglu@hotmail.com
[2] Assoc. Prof., Harran University, School Of Medicine, Department Of Surgical Medical Sciences, Department Of Thoracic Surgery, atalaysahin44@yahoo.com
[3] Assoc. Prof., University Of Health Sciences, Bursa Yuksek Ihtisas Training And Research Hospital Clinic Of Thoracic Surgery drerkanakar@hotmail.com

RIGHT PNEUMONECTOMY SYNDROME

Postpneumonectomy syndrome is mostly seen in infants, children and rarely adults. It is a rare clinical condition that occurs due to the compression of the left main bronchus between the aorta and the pulmonary artery or vertebra following an excessive shift of the mediastinum after right pneumonectomy [43]. Mediastinal displacement is observed on serial radiographs taken after pneumonectomy. This causes airway obstruction. After right pneumonectomy, it moves from the mediastinum to the right and posteriorly. Because of the relationship between the heart and the major vessels, these structures also rotate counterclockwise to the posterior, and the left lung herniates to the right anterior chest. The trachea shifts to the right and is trapped between the vertebra and the aorta where the left main bronchus and sometimes the distal trachea is opened under the aorta [42,43]. Computed tomography and magnetic resonance imaging of the thorax can be easily detected. The initial symptoms are progressive shortness of breath, cough and stridor. A variety of methods have been reported in the treatment, such as bypassing the ascending and descending parts of the aorta, the stenting of the left main bronchus, and filling the right pleural space with prosthetic materials [42,43].

REFERENCES

1. Gunluoglu MZ. Postoperatif Pulmoner Komplikasyonlar. Yucel O, Genc O Journal of Clinical and Analytical Medicine Kitap Serisi, Akciğer Hastalıkları ve Tedavisi. doı: 10.4328/jcam.516.2.
2. Kılıçgun A, Gokçee M. Ameliyat Sonrası Görülen Komplikasyonlar. Okten I, Kavukcu HŞ, editörler. Göğüs Cerrahisi. 2. Baskı. İstanbul: Promat Basım Yayın; 2013. s. 435-54.
3. Peer M, Stav D, Cyjon A, Sandbank J, et al. Morbidity and Mortality after Major Pulmonary Resections in Patients with Locally Advanced Stage IIIA Non-small Cell Lung Carcinoma Who Underwent Induction Therapy. Heart, Lung and Circulation 2015;24:69–76.
4. Saito H, Hatakeyama K, Konno H, Matsunaga T. Impact of pulmonary rehabilitation on postoperative complications in patients with lung cancer and chronic obstructive pulmonary disease. Thoracic Cancer 2017;8:451–460.
5. Tekinbaş C, Karapolat S. Ampiyemin Cerrahi Tedavisi. Yüksel M, Balcı A A, editörler. Göğüs Cerrahisi Kırmızı Kitap 2. Baskı. İstanbul: Nobel Tıp Kitabevleri; 2015. s. 541-544.
6. Miskovic A, Lumb AB. Postoperative pulmonary complications. BJA 2017;118:317–334.
7. Isık H. Postoperatif Komplikasyonlar. Yucel O, Yıldızhan A, editörler. Göğüs Cerrahisi Cep Kitabı. Ankara. Merkez Repro Ltd. Şti; 2012. s. 28-31.
8. Elsayed H, McShane J, Shackcloth M. Airleaks following pulmonary resection for lung cancer: is it a patient or surgeon related problem? Ann R Coll Surg Engl 2012;94:422-7.
9. Greening NJ, Vaughan P, Oey I, Steiner MC. Individualised risk in patients undergoing lung volume reduction surgery: the Glenfield BFG score. Eur Respir J 2017;49:1-9.
10. Kumbasar U, Yılmaz Y, Özercan MM, Ancın B. The effect of fibrin sealant spraying on prolonged air leak after pulmonary resections: a single center experience. Curr Thorac Surg 2017;2):81-84.
11. Paone G, De Rose G, Giudice GC, Cappelli S. Physiology of pleural space after pulmonary resection. J Xiangya Med 2018;3:1-9.
12. Siciliani A, Rendina EA. Management of residual pleural space and airleaks after major pulmonary resection. Interact Cardiovasc Thorac Surg 2010;10:923-5.
13. Vannucci J, Scarnecchia E, Cagini L, Puma F. Pneumoperitoneum as a valuable option in the treatment of post lower lobectomy bronchopleural fistula. Interact CardioVasc Thorac Surg 2015;21:121–3.
14. Cao Gq, Kang J, Wang F, Wang H. Intrapleural Instillation of Autologous Blood for Persistent Air Leak in Spontaneous Pneumothorax in Patients With Advanced Chronic Obstructive Pulmonary Disease. Ann Thorac Surg 2012;93:1652–7.
15. Deng B, Tan QY, Zhao YP, Wang RW, Jiang YG. Suction or non-suction to the underwater seal drains following pulmonary operation: meta-analysis of randomised controlled trials. Eur J Cardiothorac Surg 2010;38:210-5.
16. Mueller MR. Marzluf BA. The anticipation and management of airleaks and residual spaces post lung resection. J Thorac Dis 2014;6:271-84.
17. Saracoglu A, Yavru A, Kucukgoncu S, Tuzuner F, et al. Predictive Factors Involved in Development of Postoperative Pulmonary Complications. Turk J Anaesth Reanim 2014; 42: 313-9
18. Pettiford BL, Luketich JD, Landreneau RJ. Kronik Ampiyem ve Bronkoplevral Fistüle Cerrahi Yaklaşım. Issaka A, Yuksel 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.
19. Deniz S. Toraks Cerrahisinde Postoperatif Analjezi. Yucel O, Yıldızhan A, editörler. Göğüs Cerrahisi Cep Kitabı. Ankara. Merkez Repro Ltd. Şti; 2012. s. 26-27
20. Ferreiro L, Porcel JM, Bielsa S, Toubes ME, Management of pleural infections. Expert Rev Respir Med. 2018;12:521-535.

21. Koppurapu V, Meena N. A review of the management of complex para-pneumonic effusion in adults. J Thorac Dis 2017;9:2135-2141.
22. Omar A, Elfadl AA, Ahmed Y, Refaat S. Using streptokinase for pleural adhesiolysis in sonographically septated pleural effusion. Egyptian Journal of Chest Diseases and Tuberculosis 2015;64:793–797.
23. Metin M, Yeginsu A, Sayar A, Alzafer S et al. Treatment of multiloculated empyema thoracis using minimally invasive methods. Singapore Med J 2010;51:242-6.
24. Ozer KB, Tukel M, Ozdemir A, Cesur EE. The Effects of Pleural Decortication on Respiratory Functions of the Patients with Pleural Empyema. South Clin Ist Euras 2018;29:99-104.
25. Sherry V, Patton N, Stricker CT. Diagnosis and Management of Postpneumonectomy Empyema With an Eloesser Flap. CJON 2010;14:553-556.
26. Karapınar K, Erdogan S, Sezen CB, Kutluk AC et al. Küçük Hücreli Dışı Akciğer Kanseri Rezeksiyonları Sonrası Gelişen Kanama Nedenleri ve Tedavi Yaklaşımı. Osmangazi Tıp Dergisi 2018;40:33-38.
27. Childs L, Ellis S, Francies O. Pulmonary Lobar Torsion: A Rare Complication Following Pulmonary Resection, But One Not To Miss. BJR Case Rep 2017;2:20160010.
28. Mao R, Ying PQ, Xie D, Dai CY et al. Conservative management of empyema-complicated post-lobectomy bronchopleural fistulas: experience of consecutive 13 cases in 9 years. J Thorac Dis 2016;8:1577-86.
29. Pool KL, Mundenb RF, Vaporciyand A, O'Sullivan PJ. Radiographic imaging features of thoracic complications after pneumonectomy in oncologic patients. Eur J Radiol 2012;81:165-72.
30. Perez AR, Morenza OP, Porres DV, Nuñez EP, et al. Complications after lung surgery: CT evaluation. doı: 10.1594/ecr2010/c-0855.
31. Yazgan S, Gursoy S, Yoldas B, Uçvet A, Usluer O. Bronkoplevral fistüller: Zorlu bir komplikasyon, 50 hastanın sonuçları. Turk Gogus Kalp Dama 2016;24:697-702.
32. Schreiner W, Dudek W, Sirbu H. Combined Clagett procedure, negative pressure therapy, and thoracomyoplasty for treatment of late-onset postpneumonectomy empyema necessitatis. Kardiochirurgia i Torakochirurgia Polska 2015;12:259-261.
33. Zahid I, Routledge T, Bille A, Scarci M. What is the best treatment of postpneumonectomy empyema? Interactive Cardio Vascular and Thoracic Surgery 2011;12:260–264.
34. Heffner JE, Klein JS, Hampson C. Interventional Management of Pleural Infections. Chest 2009;136:1148-1159.
35. Hysi I, Rousse N, Claret A, Bellier J et al. Open Window Thoracostomy and Thoracoplasty to Manage 90 Postpneumonectomy Empyemas. Ann Thorac Surg 2011;92:1833–9.
36. Schild HH, Strassburg CP, Welz A, Kalff J. Treatment Options in Patients With Chylothorax. Dtsch Arztebl Int 2013;110:819-826.
37. Reisenauer JS, Puig CA, Reisenauer CJ, Allen MS et al. Treatment of Postsurgical Chylothorax. Ann Thorac Surg 2018;105:254–62.
38. Kozu C, Jassa K, Judson R. Massive bilateral chylothorax post blunt trauma. Trauma Case Reports 2017;12:63-65.
39. Çobanoglu U, Ekin S, Kemik Ö. Şilotoraks'ın Değerlendirilmesi: Etiyoloji, Klinik bulgular, Tanı ve Tedavi Yöntemleri. Van Tıp Derg 2017;24:198-203.
40. Takuwa T, Yoshida J, Ono S, Hishida T et al. Low-fat diet management strategy for chylothorax after pulmonary resection and lymphnode dissection for primary lung cancer. J Thorac Cardiovasc Surg 2013;146:571-574.
41. Sziklavari Z, Allagauer M, Hübner G, Reiner N et al. Radiotherapy in the treatment of postoperative chlylothorax. J Cardiothorac Surg 2013;8:72.
42. Lutz P, Strunk H, Schild HH, Sauerbruch T. Transjugular intrahepatic portosystemic shunt in refractory chylothorax due to liver cirrhosis. World J Gastroenterol 2013;19:1140-2.
43. Soll C, Hahnloser D, Frauenfelder T, Russi EW. The postpneumonectomy syndrome: clinical presentation and treatment. Eur J Cardiothorac Surg 2009;35:319-324.