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Iconography, Physiopathology and Spontaneous Healing of a Broncho – Pleural Fistula Following a Right Pneumonectomy for NSCLC

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Abstract: Bronchogenic fistula with or without empyema is considered among the most life - threatening complications in lung resections. Many proceedings to treat this kind of fistula have been described in Literature, most of them are very aggressive indeed (re - do thoracotomy, re - do bronchial anastomosis, open window thoracostomy). This is a report about a patient who developped broncho – pleural fistula after nearly sixt months from right pneumonectomy fot NSCLC. Unexpectedly in this case healing was spontaneous and requested only a chest drainage and antibiotics. Probably in this patient the fistula at the right main bronchial stump occurred on the basis of a somewhat disorder of the riparative and inflammation pathway. Propensity to infective disease (previous TB end Staphylococcus infection) could confirm this explanation.

Keywords: Broncho - Pleural Fistula, Immunological Disoders, Spontaneous Healing

1. Introduction

Broncho – pleural fistula (BPF) is one of the most challenging complication in Thoracic Surgery. It occurs in 5% of patients submitted standard pneumonectomy and in 10% of patients submitted completion pneumonectomy [1, 2]. Post-pneumonectomy empyema (PPE) as a consequence of a bronchogenic fistula presents a rate of mortality of 28% to 50% [3, 4] and the management can result very difficult. Preoperative radiation, infected lung from inflammatory disease, immunocompromised host and insulin-dependent diabetes favourite the onset of a bronchial fistula. Moreover the incidence can be increased by following conditions: pneumonectomy, right – sided pneumonectomy, a long bronchial stump, residual cancer at the bronchial margin,, devascularization of the bronchial stump, prolonged ventilation or reintubation after resection and surgical inexperience. Survival of BPF depends on high index of suspicion, early diagnosis and aggressive surgical intervention [5].

2. Case Report

This is a 58 aged man, B. P., who was referred the Pneumologist at the beginning of 2021 because of thickness in the right lower lobe at Chest X – Ray and CT - Scan [Figures 1, 2] performed for emoptysis and cough. Biopsy confirmed squamous cancer of the lung. On PET/CT scan a polypoid lesion of the bowel has been diagnosed and subsequently removed. Specimen resulted negative. On April 2021 he resulted quantiferon positive but there was no evidence of active TB. Then the case has been discussed within a multidsciplinary session and surgery was indicated as curative treatement. On 17/06/2021 B. P. has been submitted right thoracotomy and surgical exploration revealed a big neoplastic mass of the lower lobe involving the middle and the upper lobe. So right

pneumonectomy with systematic mediastinal linfadenectomy have been performed. 24 hours after intervention patient referred chest pain and labs revealed Troponine increasing *(131 ng/L; range 0 – 14)*. Ecocardiograhy documented hypocynesia of the left ventriculum so that cornonarography was done: critical stenosis of CDx (80%) was detected and further angioplasty was planned. Post – operative period was uneventful for the rest and B. P. was discharged (Figure 3) Post operative staging was: squamous cell carcinoma pT3 pN1. No chemo was planned because of angioplasty should have had to be done first. On November 2021 swelling on right chest appeared with no symptoms referred. Chest X-Ray and CT were taken and revealed empty right pleural cavity with subcutaneous emphysema [Figures 4, 5]. A broncho – pleural fistula on the main right bronchus was suspected. Bronchoscopy confirmed a broncho – pleural fistula of a few millimetres [Figure 6]. After bronchoscopy B. P. had fever and dyspnoea so that he was readmitted hospital with the diagnosis of pleural empyema. Then a chest tube was positioned and pleural fluid was drained with improving of symptoms [Figure 7]. S. agalactiae was isolated on the pleural fluid. On 12/12/21 re-do bronchoscopy was taken and the bronchial fistula was still present. On 20/12/21 patient has been discharged with the chest tube in – site and went to outpatient. Clinical condition remained well and on 13/01/22 chest tube was removed after chest X- Ray demonstrated regular fulfill of the right pleural cavity [Figure 8, 9]. This is the reason why we decided not to perform a further bronchoscopy. On 01/02/22 B. P. was readmitted with the diagnosis of pleuro – pericarditis and healed with antiflammatory therapy (Aspirin and Colchicyn). He was discharged on 06/02/22. Chest X- Ray and CT Scan demonstrate a regular healing of the right pleural cavity. Further therapeutic strategies planned for this patient are angiography for miocardial revascularization and subsequently chemotherapy.

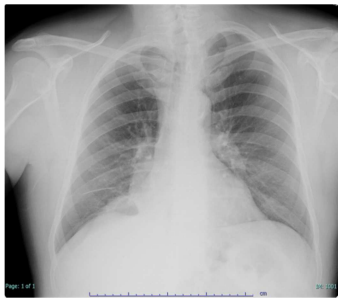

Figure 1. *Chest X Ray before operation.*

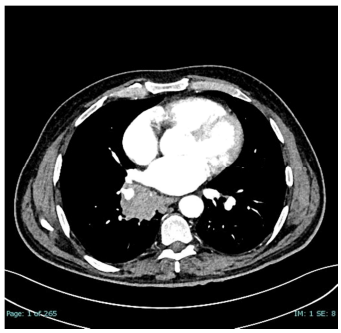

Figure 2. *CT Scan before operation.*

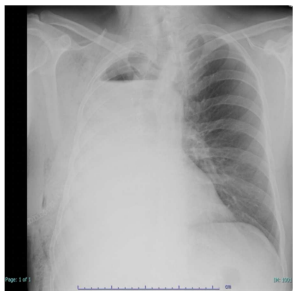

Figure 3. *Chest X Ray after right pneumonectomy (regular healing of the right pleural cavity).*

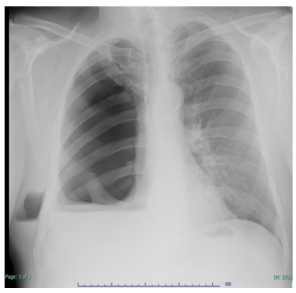

Figure 4. *Chest X Ray after patient discharge (no fluid in the right pleural cavity; right subcutaneous emphysema).*

Figure 5. *CT Scan after patient discharge (no fluid in the right pleural cavity; right subcutaneous emphysema).*

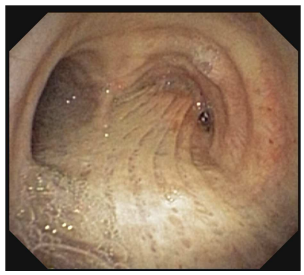

Figure 6. *Bronchoscopy; microscopic fistula on the right main bronchial stump (bleb).*

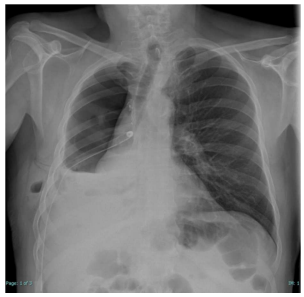

Figure 7. *Chest X Ray after the drainage tube has been positioned (note negative pressure in the right pleural space).*

Figure 8. *Chest X Ray (regular fulfilling of the right pleural cavity after the drainage tube has been clamped).*

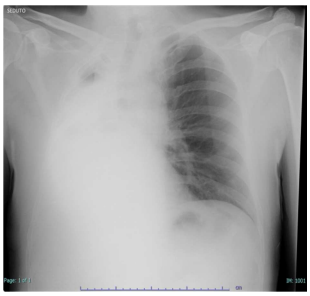

Figure 9. *Chest X Ray; the drainage tube has been removed, regular healing of the right pleural cavity.*

3. Discussion

BPF are related to a failure of the bronchial stump healing process with or without residue of tumor locally.

The standard treatements for BPF with or without empyema due to BPF are pleural drainage, irrigation and surgical repair. Surgical repair of BPF includes not only direct simple repair but also BPF coverage using vascularized pedicle flaps and exspecially for those patients who received preoperative radio or chemotherapy [6-9]. European Association of Cardiothoracic Surgeons in 2015 indicated drainage, antibiotics and even video-assisted thoracic surgery (VATS) for PPE without fistula, but in case of PPE with bronchial fistula more invasive techniques have been recommended [10-13]. Reported risk factors for BPF include an index operation for benign disease, right pneumonectomy, completion pneumonectomy, diminished pulmonary reserve and an extended lymph node dissection [14]. The case we present received benefit from chest tube and antibiotics only, just like is reported in other exsperiences for early mild cases of BPF with empyema [15].

4. Conclusion

On the basis of anamnestic notes, the main pathology (lung cancer) and the post-operative complication (broncho – pleural fistula) we can make the following considerations upon this case:

1) previous TB infection, documented by positive quantiferon test, 2) infection from to right ankle from Staphylococcus Aureus and 3) occurrence of lung cancer can reasonably lead to the suspicion of a common aetiologic factor. In fact it is justyfied to rule out failures of the surgical tecnique, since fistula occurred more than five months after intervention. Similarly fistula could not be related to lung cancer, because intervention has been performed with radical clearence of the neoplasm (*hystological specimen: squamous cell carcinoma of the right lung of 6,3 x 5 cm; lymphonodes were negtive in 4R, 7 and 9R; 3 out of 6 peribronchial lymphonodes resulted positive. Bronchial margins of resection resulted free from disease*). On the contrary it seems more acceptable that fistula sholud have been caused by somewhat related to malfunction of healing - reparative process of bronchial stump. The common factor between lung cancer and infection (Staphylococcus Aureus and Mycobaterium) probably must be identified in an impaired funcion of inflammatory pathway with or without a misdiagnosed immunological disease [16-18].

The aspect of the fistula, that presented only a few millimeters of patency, and its uneventful course can reasonably justify this explanation. In fact fistula requested only a chest tube, antibiotics, adequate nutrition and rest to come into a complete healing. Other similar cases have beeen reported in Literature [19].

References

[1] Eerola S, Virkkula L, Varstela E. Treatement of postpneumonectomy empyema and associated bronchopleural fistula. Experience of 100 consecutive postpneumonectomy patients. Scand J Thorac Cardiovasc Surg. 1988; 22: 235-9.

[2] Massard G, Lyons G, Wihlm JM, Fernoux P, Dumont P, Kessler R et al. Early and long – term results after completion pneumonectomy. Ann Thorac Surg. 1995; 59: 196-200.

[3] Higgins GA, Beebe GW. Bronchogenic carcinoma. Factors in survival. Arch Surg. 1967; 94: 539-49.

[4] Patel RL, Townsend ER, Fountain SW. Elective pneumonectomy: factors associated with morbidity and operative mortality. Ann Thorac Surg. 1992; 54: 84-8.

[5] R J Cerfolio. The incidence, etiology, and prevention of postresectional bronchopleural fistula. Semin Thorac Cardiovasc Surg 2001 Jan; 13 (1): 3-7.

[6] Claudio Andreetti, Cecilia Menna, Antonio D'Andrilli, Moshen Ibrahim, Giulio Maurizi, camilla Poggi, Erino Angelo Rendina, Federico Venuta, Mario Santini, Alfonso Fiorelli. Multimodal Treatment for Post-Pneumonectomy Bronchopleural Fistula Associated With Emyema. Ann Thorac Surg 2018 Dec; 106 (6): -e337-e339.

[7] P H Hollaus, M Huber, F Lax, P N Wurning, G Bohm, N S Pridun. Closure of bronchopleural fistula after pneumonectomy with a pedicled intercostal muscle flap. Eur J Cardiothorac Surg 1999 Aug; 16 (2): 181-6.

[8] T C Mineo, V Ambrogi. Early closure of the postpneumonectomy bronchopleural fistula by pedicled diaphragmatic flaps. Ann Thorac Surg 1995Sep; 60 (3): 714-5.

[9] K Athanassiadi, K Vassilikos, P Misthos, N Theakos, S Kakaris, E Sepsas, I Skottis. Late postpneumonectomy bronchopleural fistula. Thorac Cardiovasc Surg 2004 Oct; 52 (5): 298-301.

[10] Scarci, Marco, Udo Abah, Piergiorgio Solli, Aravinda Page, David Waller, Paul van Schil, Franca Melfi et al. "EACTS expert consensus statement for surgical management of pleural empyema". European journal of cardio-thoracic surgery 48, no. 5 (2015): 642 – 653.

[11] Antonio Mazzella, Alessandro Pardolesi, Patrick Maisonneuve, Francesco Petrella, Domenico Galetta, Roberto Gasparri, Lorenzo Spaggiari. Bronchopleural Fistula After Pneumonectomy: Risk Factors and Management, Focusing on Open – Window Thoracostomy. Semin Thorac Cardiovasc Surg. Spring 2018; 30 (1): 04-113.

[12] Domenico Galetta, Lorenzo Spaggiari. Video – Thoarcoscopic Management of Postpneumonectomy Empyema. Thorac Cardiovasc Surg 2018; 66 (08): 701-706.

[13] De la Riviere AB, Defauw JJ, Knaepen PJ, van Swieten HA, Vanderschueren RC, van den Bosch JM. Transsternal closure of bronchopleural fistula after pneumonectomy. Ann Thorac Surg 1997; 64: 954-7.

[14] Deschamps C, Bernard A, Nichols FC, Allen MS, Miller DL, Trastek VF et al. Empyema and bronchopleural fistula after pneumonectomy: factors affecting incidence. Ann Thorac Surg. 2001; 72: 243-8.

[15] Da-Li Wang, Gui-Yu Cheng, Ke-Li Sun, Ping -Jin Meng, De-Kang Fang, Jie He. Treatement and prevention of bronchus-pleural fistula after pneumonectomy for lung cancer. Zhonghua Wai Ke Za Zhi. 2008 Feb 1; 46 (3): 193-5.

[16] Eric A Engels. Inflammation in the development of lung cancer: epidemiolgical evidence. Expert Rev Anticancer Ther. 2008 Apr; 8 (4): 605-15.

[17] Michael Dougan, Li D, Neuberg D, Mihm M, Googe P, Wong KK, Dranoff G. A dual role for the immune response in a mouse model of inflammation-associated lung cancer. J Clin Invest 2011 Jun; 121 (6): 2436-46.

[18] Liku B Tezera, Bielecka MK, Ogongo P, Walker NF, Ellis M, Garay-Baquero DJ, Thomas K, Reichmann MT, Johnston DA, Wilkinson KA, Ahmed M, Jogai S, Jayasinghe Sn, Wilkinson RJ, Mansour S, Thomas GJ, Ottensmeier CH, Leslie A, Elkington PT. Anti-PD-1 immunotherapy leads to tuberculosis reactivation via dysregulation of TNF-α Elife. 2020 Feb 24; 9: e52668.

[19] Jirì Simek, Pavel Zàcek, Zdenek Vacek, Josef Novotny, Milan Stetina, Petr Habal. Bronchopleural fistula after pneumonectomy. Acta Medica (Hradec Kralove) Suppl 2002; 45 (1): 19-24.