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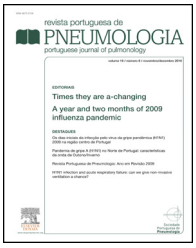

CASE REPORT

Clinical challenges of persistent pulmonary air-leaks—Case report

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KEYWORDS
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Abstract Air leaks are a common problem after pulmonary resection and can be a source of significant morbidity and mortality.

The authors describe the case of a 68-year-old male patient who presented with a persistent air-leak after pulmonary resection. Watchful waiting, surgical procedures, as well as medical therapy like pleurodesis and implantation of endobronchial one-way valves on the bronchial segments identified using systematic occlusion of the bronchial segments, were all tried unsuccessfully. During that time the patient remained hospitalized with a chest tube.

The instillation of methylene blue through the chest tube was used to identify the segments leading to the persistent air-leak; this enabled successful endobronchial valve placement which sufficiently reduced the size of the air-leak so that the chest tube could be removed.

Nonsurgical approaches seem promising and, for some patients may be the only treatment option after all conventional treatments have failed or are considered too high risk.

PALAVRAS-CHAVE
Fístula
alveolo-pleural;
Broncoscopia;
Azul metileno

Desafios clínicos de fugas de ar pulmonares persistentes—relato de caso

Resumo As fístulas pleurais são um problema comum após a ressecção pulmonar e podem condicionar morbidade e mortalidade significativas.

Os autores descrevem o caso de um paciente do sexo masculino com 68 anos que apresentou uma fístula alveolo-pleural persistente após ressecção pulmonar. Foi tentada atitude expectante, procedimentos cirúrgicos, bem como terapêutica médica como pleurodese e colocação de válvulas endobrônquicas nos segmentos brônquios identificados utilizando o método de oclusão sistemática dos segmentos brônquicos, sem sucesso. Durante esse tempo o paciente permaneceu hospitalizado com necessidade de drenagem torácica.

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Posteriormente, a instalação de azul de metileno através do dreno torácico foi utilizada para identificar os segmentos envolvidos na fístula, o que permitiu a identificação de diferentes segmentos relativamente ao método prévio, possibilitando a colocação de válvulas endobronquicas que promoveram redução da fistula e consequente remoção do dreno torácico com sucesso.

As abordagens não-cirúrgicas parecem promissoras e, para alguns pacientes, podem ser a única opção de tratamento depois de todos os tratamentos convencionais falharem ou serem considerados de muito alto risco.

Introduction

Prolonged pulmonary air leaks are common and may cause a high level of morbidity, prolonged hospital stays, infectious and cardiopulmonary complications.[1,2]

Although there is variation among different authors in their definition of air-leaks, recent studies of pulmonary lobectomy have established an approximate average length of hospital stay of 5 days; and so it has been proposed that a persistent air-leak should be defined as an air leak lasting beyond the postoperative fifth day.[3] In fact, this is consistent with The Society of Thoracic Surgeons database definition, which refers to persistent air-leaks as those that typically present when the patient would otherwise be discharged if it were not for the continued air-leak.

The vast majority of postoperative air-leaks are alveolar air-leaks; this is relevant since the management of these is very different from the management of bronchopleural fistula which often require immediate surgical intervention.[3]

The most consistently identified risk factor for prolonged air leak is chronic obstructive lung disease,[4] a low forced expiratory volume on 1st second and low maximum voluntary ventilation percentage.[5,6]

Treatment options of prolonged air leaks include watchful waiting with continuous drainage through a thoracostomy tube,[6] pleurodesis, surgical procedures,[2] as well as the use of endoscopic techniques.

Endobronchial approaches include the application of gelfoam, the use of fibrin glue, coils or endobronchial valves.[1,7] Generally balloon catheter inflation is used to identify the segmental or sub-segmental airway or airways responsible for the air leak.[8] Schweigert et al.[9] reported a different method using methylene blue via the chest tubes. We describe a case of a persistent air-leak treated with endobronchial valves placement in segments identified using methylene blue via the chest tube.

Case report

A 68-year-old male presented with cough, weight loss and a lung mass in the right middle lobe (ML).

He was an ex-smoker with a 45 pack-year smoking history, and during his professional life he had been exposed to asbestos for many years. His previous medical history included a prostatectomy due to prostate cancer 6 years earlier with no evidence of recurrence.

A pulmonary adenocarcinoma was diagnosed by transthoracic needle aspiration biopsy of the ML lesion and the positron emission tomography–computed tomography (PET/CT) scan performed for staging, revealed fluorodeoxyglucose (FDG) uptake not only on the ML mass (maximum standardized uptake value (SUVmax)-11) but also on the right pleura which led to further pleural investigations with multiple biopsies which were negative for malignant cells. He was staged T2N0M0 and was submitted to surgery

A thoracotomy with a right middle lobectomy, which included division of the triangular ligament plus a systematic lymphadenectomy was performed and, since pleural plaques were found during the procedure they were removed and a lower right lobe pleural decortication was carried out.

Pathology confirmed a pT1bN0R0 adenocarcinoma, with no evidence of pleural malignant involvement but a chronic fibrinous pleuritis was also diagnosed.

Patient extubation was possible soon after the surgery and there was no need for postoperative mechanical ventilation. Kinesiotherapy which is a routine and widely recognized intervention aimed at enhancing lung expansion was started as soon as possible.

Although lung expansion was achieved within 2 days, an air leak was identified and the suction necessary to maintain the lung expansion was continued for ten more days until there was no visible air-leak during normal tidal breathing. At this point, the suction was stopped and the tubes were clamped after 2 days. Since there was no clinical compromise, no worsening pneumothorax nor any increase in subcutaneous air, the chest tube was removed (Fig. 1), and the patient was discharged from hospital within 48 h.

Two weeks after hospital discharge – 1 month after surgery – he was re-admitted with the clinical symptoms of chest infection. A thorax CT scan showed a right large anterior hidropneumothorax, pleural thickness and subcutaneous emphysema. An empyema and a postoperative air-leak were diagnosed. Large spectrum antibiotics were initiated, a chest tube was immediately put in place and a bronchofibroscopy used to assess the stump integrity and the absence of other endobronchial complications. Despite these measures, the patient underwent pleuro-pulmonary decortication, which was complicated by dense pleural adhesions. During the procedure suture of pulmonary lacerations was performed and Tissucol® spray used to control the air-leaks. Although the clinical health status and infection