CASE REPORT

Hemoptysis and coughing up of staples as a late complication of volume reduction surgery for emphysema

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Summary Three patients with very similar clinical symptoms, i.e. hemoptysis and coughing up of staples some time after volume-reducing surgery, are described. There was no deterioration in lung function, nor in the patient’s well-being, which could be ascribed to the coughing up of the staples. Thus, staples can some time after volume reducing surgery erode out into the bronchi and be coughed up, often with some small amounts of blood. This has no clinical significance other than the disturbing symptoms. Possibly, the calf pericardium used as strenghtener of the suture lines will with time cause an immunological reaction, causing destruction of the foreign material and thereby dislodging the staples.

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KEYWORDS
Lung volume reduction; Hemoptysis; Staples; Lung function

Introduction

Lung volume reduction surgery (LVRS) has become an accepted form of treatment of severe emphysema in carefully selected subjects. At surgery about one-third of each lung, constituting the most severely affected parts, are removed with an automatic cutting machine which at the same time staples the remaining lung to ensure that no leakage occurs. Most often, a reinforced staple suture line, consisting of calf pericardium or synthetic material, is used to ensure minimal leakage of air after surgery. We have seen three patients with otherwise very good clinical improvement and a typical slow deterioration of the lung function after operation who presented with hemoptysis 6 months or more months after surgery. They also described that they had coughed up small staples and actually brought this material with them. The patients were investigated with bronchoscopy without revealing any pathological findings.

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Patients

Case 1

A woman, who had smoked moderately in her youth, 52-year old at surgery and with lack of alfa-one-antitrypsin, was operated after careful investigation in December 1996. Bilateral volume reduction was performed via a sternotomy and large parts of her lower lobes were removed. The operation was successful with an improvement of her FEV₁ from a preoperative value of 19 per cent of predicted to 31 per cent 3 months after surgery and a very much improved quality of life. She could even take up part time work again as a secretary. Her lung function deteriorated very slowly and she was still active 18 months after surgery, when she suffered a sudden hemoptysis. Clinical work-up including bronchoscopy did not reveal any cause and the lung function was unchanged. A week later she presented again with a small hemoptysis and this time she brought with her a number of small coughed-up staples (Fig. 1). Careful scrutiny of her chest roentgenogram revealed that some of the staples earlier visible had actually disappeared. She continued to cough up small amounts of blood and staples for about half a year without any other symptoms, and her lung function was stable during this time. At the latest lung function test in December 2001, 5 years after surgery, her values are similar to the original ones, but her quality of life is still better than then though she has now stopped working.

Case 2

This was a 48-year-old man who had been a heavy smoker. He had normal alfa-one-antitrypein levels, but despite this he had advanced emphysema mainly situated in the lower lobes. After careful investigation surgery was performed with removal of large parts of the almost totally destroyed lower lobes in May 1999, using the same technique as described for Case 1. The result was fairly good with an improvement of FEV₁ from 21 to 35 per cent of predicted. There were no immediate post-operative complications, but he presented 7 months after surgery with hemoptysis and coughed-up staples. Investigation including bronchoscopy revealed no obvious cause, the lung function remained practically the same, but he continued to cough up staples for another three months. The lung function continued to deteriorate slowly and he died at home in a pneumonia in September 2001, two and a half years after his operation.

Case 3

A woman, 60-year old, without lack of alfa-one-antitrypsin, but a former heavy smoker also had mainly lower lobe disease and was operated with removal of parts of them. This operation was also successful with considerable improvement of her FEV₁ and quality of life. Nine months later, she also presented with hemoptysis and coughed-up staples without any clinical deterioration, those episodes lasting for about five months. She is still alive 5 years after surgery with still slightly improved lung function values compared to the pre-surgical ones.

Discussion

Six cases of coughed-up staples after volume reduction surgery have to our knowledge been published earlier.1-4 These cases are very similar to our three, the most notably difference being that there was no report of hemoptysis in one of the cases, and that the surgery in these cases were of the upper lobes. All our patients had lower lobe disease, which is interesting since most of the patients we have operated upon have had upper lobe disease, as have the majority of all operated cases in the world. Bovine pericardium strips were used in all cases. Another interesting case report describes migration of a piece of the bovine pericardium causing obstructive pneumonia.5

Figure 1 Coughed up material containing staples.
Surprisingly, the staples came loose one or many together without any obvious deterioration of lung function or other damage, with the exception of hemoptysis. In some of the reported cases there was at the same time signs of infection. Presumably, the staples were situated very close to some small bronchus big enough to be able to contain the staples, which are then coughed up. There must be some erosion of the walls of the small bronchus, the staples penetrating through, but without causing any other damage. All the cases had been performed with bovine pericardium covering the staples. Possibly, this foreign animal material might start an immunological reaction to break it down, causing the staples to loosen. In the other case reports, there was no follow-up; we can now report that the episodes of coughed-up staples do not affect the general course of the patients and the long-time prognosis seems to be the same as for those not suffering this complication.

In conclusion, patients where LVRS has been performed and presumably also other patients where staples have been used together with bovine pericardium, are at risk for hemoptysis and coughing up of staples. This is of no clinical importance, since it does not cause any deterioration of the general well-being of the patient nor of the lung function. The diagnosis is easily made by asking the patient to investigate her sputum and in some cases by scrutinizing the chest roentgenograms for "missing" staples. The patient can be reassured and no further investigation is necessary in these cases, unless there is an infection at the same time.

References