New ideas - Thoracic general

Use the bulla for pneumostasis

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Abstract

Prolonged air leak following bullectomy is a common problem and increases the morbidity of the procedure and hence the hospital stay for patients. Different surgical methods have been used to decrease the duration of the air leak. One of the common methods is the use of sealant material, synthetic or biological, over which either a stapler or suture closure is made. We report the use of the wall of the resected bulla as a sealant material to achieve pneumostasis with stapler/suture reinforcement, with good results.

Keywords: Pneumostasis; Bullectomy

1. Introduction

Giant bullae causing compromised lung function need resection. Prolonged air leak following bullectomy is a common problem. Different materials have been used as sealant material to prevent air leak but with varying success. Some of these materials are synthetic and ‘foreign’, and add to the cost of the procedure. Biological materials have been used with varying degrees of success. We report a technique using the wall of the excised bulla as a sealant to achieve pneumostasis with acceptable results.

2. How to do it

Standard thoracotomy is performed and the bulla identified. The dome of the bulla is then incised in the long axis direction (Fig. 1a) and the margins of its origin are identified from within (Fig. 1b). Most of the bulla is excised and the wall of the resected bulla, which is usually of significant length and breadth, is spread on a saline-soaked swab and two 4-cm wide strips are cut out. These are then placed on either side of the resected lung margin and held in place with a linear stapler (Fig. 2). The method can also be performed without resecting the bulla by opening it in the centre and evverting the two edges up to the site of origin of bulla [1], and then applying the stapler.

We adopted this modification on a 43-year-old man who presented with a history of increasing shortness of breath over 6 years, due to chronic obstructive airway disease. Increase in size of the right apical bullae and compression of the lower lobe were noted on serial X-rays and confirmed on a computed tomography scan of the chest.

At thoracotomy there was a large apical bulla occupying the apical and the posterior segment of the right upper lobe. The bulla was resected and the wall of the bulla was used to make strips over which a 4.8-mm stapler closure was made. Pneumostasis was confirmed on the operating table. A parietal pleurectomy was also performed.

Postoperatively there was a minor air leak, which persisted for 5 days. The drain was removed on the 6th postoperative day. Chest X-ray confirmed a fully expanded lung. When reviewed in the outpatient clinic after 6 weeks the patient had made very good progress with markedly improved exercise tolerance and an improved postoperative FEV1. A repeat chest X-ray showed a fully expanded lung and no evidence of pneumothorax. We have used this technique in another two patients with very similar results (minor air leak for 3 and 5 days, respectively).
3. Discussion

Patients with giant bullae have a background of disease in the form of chronic obstructive lung disease; therefore the lung parenchyma is not as healthy as in normal lungs. Excision of the bulla reduces air trapping, enables expansion of the compressed lung and results in marked improvement of symptoms. Following resection of the bulla prolonged air leak can be problematic. The mechanism behind prevention of air leak is stabilization and reinforcement of the staple/suture line.

Different materials have been used to prevent the postoperative air leak. Biological materials like parietal pleura and bovine pericardium [2–7], and synthetic materials like PTFE [8], PDA strips [9] and Gore-Tex sheets have all been used. Laser ablation of the resected edge and residual bullae, and oversewing of the cut margins have also been tried.

An ideal sealant material should be effective, easily available, cheap, have good tensile strength, be pliable and be able to stabilize suture/staples. The results should be reproducible. The materials currently in use have some of these properties. However, most of them are expensive and there is no universally acceptable ‘gold standard’.

As an alternative, we recommend the use of the excised wall of the bulla. It is readily available and free. It has many of the properties of an ideal sealant material and the postoperative air leak with its use proved to be minimal.

In most cases of bullectomy, there is more than enough bulla wall to reinforce and seal the resection margin. We recommend the more frequent use of this ‘handy’ material.

References