A remarkable outcome after video-assisted thoracoscopic resection of a giant bulla

J. Marco Schnatera, Peter W. Plaisiera,*, Paul M. van den Bergb, P. Ronald Schüttea

aDepartment of Surgery, Albert Schweitzer Hospital, P.O. Box 444, NL-3300 AK Dordrecht, The Netherlands
bDepartment of Pulmonology, Albert Schweitzer Hospital, Dordrecht, The Netherlands

Received 27 May 2003; received in revised form 25 July 2003; accepted 27 July 2003

Abstract

A 56-year-old woman visited our hospital for mild exertional dyspnea. Radiological investigations revealed a giant bulla of the left lung that was treated with video-assisted thoracoscopic bullectomy. The result of treatment was a better stamina, and, more strikingly, a major change of voice.

© 2003 Elsevier B.V. All rights reserved.

Keywords: Giant bulla; Bullectomy; Video-assisted thoracoscopic surgery

1. Introduction

A unilateral hyperlucent lung on a chest X-ray can be due to a (tension) pneumothorax or a giant bulla [1]. Thoracoscopy has been used for establishing a definitive diagnosis when it is difficult to differentiate between both diagnoses [2]. In the past, different surgical techniques have been described for the treatment of giant bullae [3,4], and video-assisted thoracic surgery (VATS) has become more and more an accepted procedure for the treatment of giant bullae and spontaneous pneumothorax world-wide [5–7]. We describe a case in which bullectomy of a giant bulla with VATS was performed with an unexpected and remarkable outcome for both patient and surgeon.

2. Case report

A 56-year-old woman with no medical history visited our outpatient clinic for mild exertional dyspnea. This disability had already existed over 10 years and occurred only during the performance of her hobbies, which were long-distance cycling and mountain walking. Because the symptoms did not improve, “she finally wanted to be sure that there wasn’t anything wrong”.

At physical examination, a healthy-looking woman without dyspnea was seen with a body mass index of 22. There was a slight asymmetry of the chest with hyper-resonant percussion and reduced breath sounds on the left side. Laboratory parameters did not show any abnormalities and an electrocardiogram was normal. Her ventilatory function was slightly decreased (total lung capacity 5.87 l (105% of predicted value (PV)), vital capacity 3.08 l (91% of PV), FEV1 2.34 l (84% of PV)). A chest roentgenogram revealed a large pneumothorax or a giant bulla (Fig. 1). A computed tomography scan confirmed the latter diagnosis that appeared to be a giant bulla of the left lower lobe (Fig. 2). A VATS bullectomy was performed with a 30-mm staple of an Endo-GIA linear endoscopic stapling device (Autosuture). Suture reinforcement was not performed. After the procedure the left lung was able to be insufflated totally. To everybody’s astonishment the entire lung showed a maiden aspect and a decortication was not necessary. Recovery was uneventful and the thorax drain was able to be removed on the third postoperative day. The patient was discharged in good condition 1 day later. During follow-up, chest roentgenograms and ventilatory functions were normalized (total lung capacity 6.02 l (108% of PV), vital capacity 3.64 l (108% of PV), FEV1 3.03 l (109% of PV)). The patient’s life, however, had changed tremendously. Her physical condition, which was already good preoperatively, improved in such a way that her friends could not keep up with her anymore during
bicycle tours or mountain walks. More striking, though, was the fact that her peers no longer recognized her when she answered the telephone because her voice had changed dramatically.

3. Discussion

A large bulla is defined as a bulla of the lung occupying more than one-third of the hemithorax [5]. A bullectomy has been indicated for a number of reasons as summarized by Nakahara et al.: (1) to relieve restrictive changes in the normal lung tissue in the vicinity of the giant bulla; (2) to increase both the elasticity of the remaining normal lung and the diameter of the airway calibre, thus increasing the expiratory force; (3) to increase the ventilation-perfusion ratio in the non-bullous region, thereby minimizing the effect of venous admixture; and (4) on rare occasions, to decrease the physiological dead space that exists if the giant bulla ventilates substantially [8].

During the last decade, VATS has become the surgical treatment of choice for giant bullae in many institutions, and different techniques have been described [5,7,9,10]. The indications, operative technique, and complications have been well documented and in most cases the patients’ quality of life shows an obvious improvement. This latter statement was confirmed in our presented case. The complete re-expansion and recovery of pulmonary function in spite of a long period of complete collapse has been described before [1]. However, two remarkable findings were noticed in our patient. First, there was the maiden aspect of the entire lung after insufflation, making decortication redundant. Although the underlying and neighbouring lung parenchyma in case of bullae often show a physiological aspect without tissue alteration, it is mostly seen in a segment or a specific lobe. Remarkable in our case was that the entire left lung (of a 56-year-old woman) showed this maiden aspect. We speculate that this was the result of the subtotal collapse of the remaining healthy (unventilated) lung tissue on the left side, in which accumulation of waste products present in the inspired air had not been possible. More striking was the occurrence of the change of voice. To our knowledge, this has never previously been described as occurring after bullectomy, with or without VATS. The change of voice might be explained by the changed ‘sound-box’ of her chest which led to this remarkable finding. The power and frequency (= pitch) of the voice depends on the subglottic pressure, which is influenced by the gas volume that can be expired and the velocity of the exhaled air. The increased total lung capacity and FEV1 are probably responsible for a change in subglottic pressure, resulting in this dramatic change of voice. One could argue whether one has to define the change of voice as a complication or as a logical result of the treatment of a giant bulla, but more importantly it...
indicates that one has to keep in mind that this may occur occasionally.

In conclusion, VATS bullectomy has become the treatment of choice with good results and has led in the majority of cases to an obvious improvement of the patients’ quality of life. The complete re-expanded lung may have a maiden aspect, probably the result of the impossibility of accumulation of waste products present in the inspired air in the unventilated healthy lung tissue. One has to bear in mind that a change of voice after bullectomy may occur.

References