indicate that the mass seemed vascular (although this was appreciated more in retrospect), in addition to encasing the inferior pulmonary vein among other hilar structures. However, the extent of hemorrhage encountered during the biopsy was much more than anticipated by the authors even given the imaging data. In today’s increasingly aggressive transbronchoscopic biopsy era, this risk of bleeding should be very carefully considered when assessing the contrast CT. Caution when performing routine biopsies of such peribronchial vascular masses that might represent RDD is important.

Our case, in addition to the one presented by Scott and colleagues [6], brings to light the possible natural history of RDD involving the hilum, progressing from narrowing of pulmonary vessels and bronchi to invasion of the involved structures and ultimately, uncontrolled hemorrhage.

We would like to thank Drs Lawrence Goodman and Luke Falesch for their contributions to this case.

References


Four Cases of Contralateral Pneumothorax After Pneumonectomy

Katsunari Matsuoka, MD, Atsushi Ito, MD, Yoshitake Murata, MD, Taiji Kuwata, MD, Chihiro Takasaki, MD, Naoko Imanishi, MD, Takahisa Matsuoka, MD, Shinjiro Nagai, MD, Mitsuhiko Ueda, MD, and Yoshihiro Miyamoto, MD

Department of Thoracic Surgery, National Hospital Organization Himeji Medical Center, Himeji-City, Hyogo, Japan

We retrospectively investigated the surgical procedures and clinical courses of 4 patients with CPAP treated at our institution between January 2007 and October 2012. All of the patients were male and the average age was 66.5 years (range, 59 to 76 years). The reason for previous pneumonectomy was lung cancer in 3 patients and tuberculosis in 1. The periods between pneumonectomy and occurrence of pneumothorax were 15 days, 3 months, 1 year, and 3 years 4 months, respectively. Three of the patients experienced sudden severe dyspnea and presented at the emergency room of our institution; the remaining patient had suffered dyspnea for several days before admission. All of the patients were treated by conventional chest-tube drainage immediately after the diagnosis of CPAP. Chest computed tomography demonstrated emphysematous bullae, and all 4 patients were treated surgically under general anesthesia without any extracorporeal cardiopulmonary support. Three patients underwent surgery through an anterior axillary thoracotomy and 1 underwent video-assisted thoracoscopic surgery. All patients were treated by bullectomy and coverage with polyglactin mesh. In 1 case, selective double ventilation of the right upper and middle lobes using an intrabronchial blocker was performed to facilitate resection of the bulla on the mediastinal side of the right lower lobe (Fig 1, A, B). In this case, lung cancer at right S8 was also resected (Fig 2). In the case of video-assisted thoracoscopic surgery, intermittent ventilation using high concentration oxygen was required. The mean operation time was 74 minutes (25, 57, 65, and 150 minutes, respectively) and in all cases the bleeding volume was negligible. An extracorporeal membrane oxygenation system was placed on standby for 1 case, but it was not needed. None of the patients required extracorporeal cardiopulmonary support. Paroxysmal atrial fibrillation occurred in 1 case postoperatively, but no other postoperative complication was observed. The average drainage period and length of hospitalization after
surgery were 3.3 and 8.8 days, respectively. One patient died due to cancer recurrence at 1 year 3 months after surgery, but the other 3 patients are currently alive without pneumothorax after surgery for 5 years 11 months, 1 year 6 months, and 1 year, respectively.

The Institutional Review Board approved this retrospective study. The need for subsequent individual consent from patients whose records were evaluated was waived because the individuals were not identified in this study.

**Comment**

Contralateral pneumothorax after pneumonectomy is associated with a high mortality rate because of limitation of the patient's lung reserve. The incidence of CPAP is 0.3% to 1.2% and the overall mortality rate is reported to be about 50% [1].

Treatment methods for CPAP reported previously have included video-assisted thoracic surgery (VATS) with percutaneous cardiopulmonary support [2], VATS with high-frequency jet ventilation [3], VATS under epidural and local anesthesia [4], bullectomy through thoracotomy under double-lobe ventilation [5], and pleurodesis [1, 6]. Although pleurodesis is reportedly effective for CPAP, Furukawa and colleagues [7] reported a case of sudden death due to recurrence of CPAP after pleurodesis. Because agents for pleurodesis sometimes cause lung injury and surgical treatment is associated with a lower recurrence rate than pleurodesis in the treatment of spontaneous and secondary pneumothorax, we basically employ surgery for treatment of CPAP.

At the time of surgery of CPAP, respiratory management was difficult due to limited pulmonary volume. However, we safely performed bullectomy through anterior axillary thoracotomy under usual general anesthesia using a single lumen tracheal tube in 3 cases, and extracorporeal cardiopulmonary support was not needed in all cases. If the bulla was difficult to resect due to hyperinflation of the lung, double-lobe ventilation was performed using a bronchial blocker. In 1 case, right upper and middle lobe ventilation readily facilitated resection of the bulla on the mediastinal side of the right lower lobe. Although VATS is less invasive than thoracotomy, VATS makes necessary extracorporeal cardiopulmonary support or special respiratory techniques in single-lung patients [2–4]. In this series VATS required intermittent ventilation using high concentration oxygen, and the operation should be performed.
while stopping ventilation. Extracorporeal cardiopulmonary support also may cause excess bleeding or embolism. Because anterior axillary thoracotomy requires only sparing of the anterior serratus muscle and does not require muscle resection except for intercostal muscles, it is less invasive than posterolateral thoracotomy usually adopted for thoracic surgery. In this series, no patient suffered respiratory failure after surgery and all patients were ambulatory upon discharge from hospital around 10 days after surgery. Our experience suggests that bullectomy through an anterior axillary thoracotomy is safe even in patients with CPAP, and that it can be performed under usual general anesthesia without extracorporeal cardiopulmonary support or any special respiratory techniques.

Polyglactin mesh is useful for preventing recurrence of pneumothorax in patients with spontaneous and secondary pneumothorax, creating tight adhesion between the visceral and parietal pleura [8]. Because recurrence of pneumothorax can be fatal in postpneumonectomy patients, we covered the suture line and emphysematous lung with polyglactin mesh after bullectomy. None of the 4 patients in the present series suffered recurrence. Although adhesion between the parietal and visceral pleura may cause restrictive ventilatory impairment, none of the patients suffered respiratory failure and all were discharged from hospital without any decrease in activities of daily living. Polyglactin mesh is thus effective for preventing recurrence of pneumothorax in patients with CPAP.

Bullectomy through an anterior axillary thoracotomy and coverage with absorbable polyglactin mesh is safe and effective for treatment of CPAP.

References


We describe a case of iatrogenic buffalo chest resulting in spontaneous bilateral pneumothorax in a 14-year-old boy with pectus excavatum in the late postoperative period after the Nuss procedure. The patient presented with a sudden onset of dyspnea 2 months after the Nuss procedure, and a chest roentgenogram showed a bilateral pneumothorax. We performed an emergency operation and found a communication between the chest cavities and a ruptured bulla in the left lung. This case highlights the potential development of simultaneous bilateral pneumothorax caused by a communication between the chest cavities after the Nuss procedure.


The Nuss procedure, introduced by Donald Nuss and associates in 1998, is widely accepted as the standard operation for repairing pectus excavatum [1, 2]. The Nuss procedure involves inserting metal bars that pass behind the sternum and through the mediastinum. After this procedure, the temporary communication between the chest cavities is expected to close, and the development of iatrogenic buffalo chest [3] caused by a persisting communication between the cavities in the late postoperative period is rare. We herein report a rare case of bilateral pneumothorax caused by buffalo chest after the Nuss procedure in the late postoperative period.

A 14-year-old boy was referred to our hospital for the surgical management of pectus excavatum with a computed tomographic (CT) index of 4.38 [4]. He underwent the Nuss procedure with the use of two titanium bars. His postoperative recovery was uneventful, and he was discharged on postoperative day 14. Two months after the operation, he returned to our hospital with severe dyspnea. The chest radiograph revealed bilateral pneumothorax with severe collapse of the right lung and moderate collapse of the left lung (Fig 1). A chest tube was inserted into the right side of the chest cavity, and continuous air leakage was observed. A CT scan showed