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Pleural abrasion via axillary thoracotomy in the era of video assisted thoracic surgery

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Abstract

***Background*—Recurrent episodes of spontaneous pneumothorax can be managed medically or surgically by various methods, video assisted thoracoscopy being the latest and most attractive.**

***Methods*—A retrospective analysis was made of 43 pleural abrasions performed in 39 patients through a 4–6 cm axillary thoracotomy incision.**

***Results*—There were no deaths and complications were few. At a mean follow up of 33 months there were two recurrences, neither of which required drainage.**

***Conclusions*—Compared with results achieved with video assisted thoracoscopic surgery, open pleural abrasion via a small thoracotomy may be the treatment of choice in most hospitals.**

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Treatment of spontaneous pneumothorax has evolved in recent years, the standard surgical management consisting of open pleurectomy or pleural abrasion. Treatment using video assisted thoracic surgery has become popular. We present our experience with pleural abrasion performed via a small axillary thoracotomy in an attempt to evaluate its merits in comparison with non-surgical methods and video assisted thoracic surgery.

Methods

Between 1986 and 1993 250 episodes of spontaneous pneumothorax in 124 patients were treated. Charts of patients managed surgically were reviewed; only those operated on via an axillary thoracotomy were included, thus excluding three patients treated thoracoscopically. We also excluded those with spontaneous pneumothorax secondary to pneumonia, tumour, cystic fibrosis, or chronic obstructive pulmonary disease.

The indications for pleural abrasion were: (1) unresolving pneumothorax with an air leak for at least 10 days; (2) acute recurrent spontaneous pneumothorax (patients who were operated on early after a recurrence of the pneumothorax); and (3) elective cases (patients scheduled for elective surgery after at least two ipsilateral episodes of spontaneous pneumothorax).

Patients were ventilated via a single lumen endotracheal tube and positioned with the operative side raised to 45°. The incision was oblique along the fourth rib between the anterior border of the latissimus dorsi and the posterior border of the pectoralis major muscles. In the initial period of the study the incision was 6–8 cm, which was gradually shortened to 4–6 cm. The lung was allowed to collapse partially by using low inspiratory tidal volume ventilation, and was explored by an examination directed by preoperative thin section computed tomographic (CT) scans. Small bullae were treated by electrocoagulation or occasionally by neodymium:yytrium-aluminium-garnet (YAG) laser, whereas larger bullae or conglomerates of bullae were sutured or stapled. The procedure was completed by rubbing the visceral and parietal pleurae with a 4 × 4 cm electrosurgical tip cleaner. A medium sized drain was positioned four intercostal spaces below the incision, reaching up to the apex. The entire procedure lasted about 20 minutes.

Postoperative pain was determined by the use of narcotic and analgesic medication. As the study was retrospective, analogue scales were not used.

All patients were followed at intervals of three months with a chest radiograph. They were specifically questioned for pain and activity.

Results

In all, 39 patients (33 men) had 43 mini thoracotomies. Their average age was 25 (range 13–69) years.

The average number of pneumothoraces per patient before pleural abrasion was 3·5 (range 1–15). Eleven procedures were performed in patients with an unresolved pneumothorax; 19 procedures were performed in patients with an acute recurrence and 13 were performed electively. The average length of postoperative stay for all the patients was 4·6 days (three days for the elective patients and five days for the other two groups). Bullae or blebs were identified in 24 patients at surgery.

Postoperative complications consisted of superficial wound infection in two patients with unresolving pneumothoraces who had prolonged drainage before surgery; one case of contralateral persistent pneumothorax requiring operation; and one prolonged air leak due to missed apical bullae sutured at reoperation.

Total follow up was 1287 patient months (mean 33 months/patient). All patients returned to regular daily activity within 7–10 days. Pain, as determined by the outpatient notes and by retrospective questioning, was mild to moderate, and no patient required regular analgesics at follow up. There were two

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radiological recurrences: one six weeks after surgery which was localised, did not require drainage, and has not recurred, and a second patient who developed a small pneumothorax two years after pleural abrasion which did not require drainage.

Discussion

Prevention of recurrent pneumothorax can be achieved either by obliteration of the pleural space or by ablation of the ruptured air spaces, or both. Chemical obliteration was introduced in 1906, and since then many substances have been used to produce pleurodesis, talc probably being the most effective.[1] The main disadvantage of chemical pleurodesis is that it does not address the underlying lung pathology.[2]

Surgical treatment for recurrent spontaneous pneumothorax aimed at treating the bullae and causing pleural obliteration[3] was introduced by Gaensler in 1956.[2] Parietal pleurectomy required a standard posterolateral incision. Complications associated with this operation led Clagett to advocate pleural abrasion rather than excision.[4] In order to further reduce morbidity and hospital stay, Deslauriers *et al* used a transaxillary incision.[5] Pleural abrasion has a low morbidity and a low rate of recurrence.[6 7] Murray *et al*[8] used an incision similar to ours in 14 patients with a short follow up.

Using video assisted thoracic surgery and electrocautery, Wakabayashi treated bullae in patients with recurrent spontaneous pneumothorax and reported success in sealing ruptured blebs but failure to control air leaks from larger ruptured bullae.[9] Two recent reports[10 11] have shown that the carbon dioxide laser is more effective in sealing air leaks than electrocautery. Despite an initial failure rate of 25%, Wakabayashi *et al*[11] concluded that video assisted thoracic surgery laser ablation is an effective definitive treatment of spontaneous pneumothorax even without pleurodesis. In a small group of patients with blebs smaller than 2 cm Torre and Belloni reported no recurrence using a combination of video assisted thoracic surgery, Nd:YAG laser, pleurodesis, and scarification.[12] However, patients with larger blebs were referred for open thoracotomy. Inderbitzi and colleagues[13] described a thoracoscopic pleurectomy with excellent results in patients with extensive bullous lung disease. Melvin *et al*[14] treated six patients with initial or recurrent spontaneous pneumothorax by video assisted thoracic surgery with a combination of electrocautery, pleurectomy, and chemical or surgical pleurodesis. The recurrence rate in our study was 4·6% which seems lower than that associated with video assisted thoracic surgical treatment of recurrent spontaneous pneumothorax, even after the short periods of follow up reported so far.

The shorter hospital stay for video assisted surgery requires considerable experience. It can be reduced to 4·2 days,[14] 3·3 days,[13] and rarely to two days.[11] The hospital stay for our patients was comparable.

The overall cost of video assisted thoracic surgery, consisting of the price of the basic equipment plus that of disposable instruments and thoracoscopic staplers, is high. In countries where the price of hospitalisation is relatively low, video assisted thoracic surgery has no financial advantage.

Our experience with open pleural abrasion via a minimal axillary thoracotomy demonstrates that it is highly effective, has minimal morbidity, with a short hospital stay. There is little postoperative pain, and the scar is aesthetically satisfactory. The long term recurrence rate is low.

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