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MANAGEMENT OF PRIMARY SPONTANEOUS PNEUMOTHORAX BY VIDEO ASSISTED THORACOSCOPIC SURGERY (VATS)

Abstract

Objective: To evaluate the outcome of treatment of primary spontaneous pneumothorax by VATS
Study Design: Case Series
Place and Duration of study: Dept. of Thoracic Surgery Combined Military Hospital Rawalpindi between April 2007 to Dec 2009.
Patients and Methods: This study included 20 patients with primary spontaneous pneumothorax who were treated by VATS apical stapling and pleural abrasion / pleurectomy. All patients were operated under one lung ventilation. Three ports of 10mm were used and apical stappling / bullectomy was done with linear cutting stapler (ethicon, autosuture). This was combined with pleural abrasion / pleurectomy. Chest was drained via a single chest tube.
Results: We had 21 procedures on 20 patients. There were 18 males and 2 females (9:1). Mean age was 26.4years. Indications included persistent air leak 7, recurrent attack 12, contralateral recurrence 1 and professional hazard 1. Mean hospital stay was 3.2 days. Complications included minor port site infection 5, intercostal neuralgia 3, delayed lung expansion 2 cases and persistent apical space in 1 case. There is no recurrence.
Conclusion: VATS was a reliable approach for managing primary spontaneous pneumothorax with low morbidity.

Article

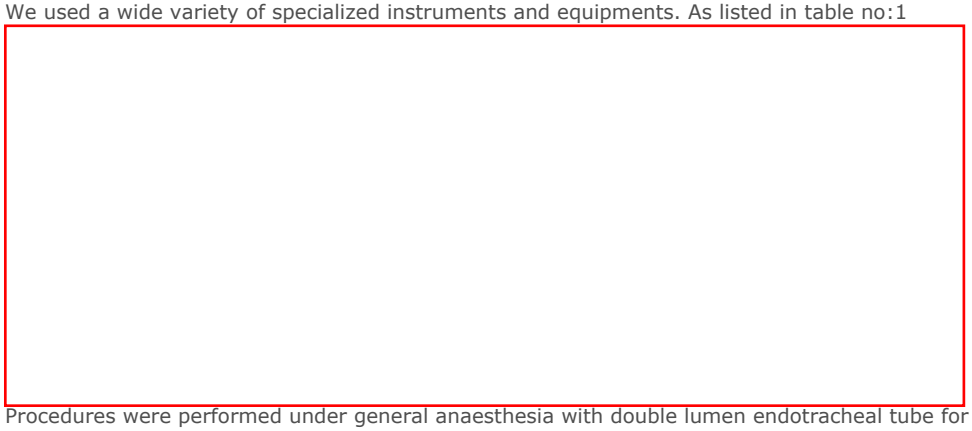
Introduction

Primary pneumothorax remains a significant global problem, occurring in healthy subjects with a reported incidence of 18–28 / 100,000 per year for men and 1.2–6 / 100,000 per year for women1. Spontaneous pneumothorax is rarely seen before puberty. It is more common in men than in women by a ratio of 6:1, and it is more common in smokers than in nonsmokers2,3. Controversy continues over the best method to treat pneumothorax. Some of the most heated debates in the current medical literature involve treatment programs for spontaneous pneumothorax. Optimal surgical management of primary spontaneous pneumothorax has been a matter of debate, especially regarding the type of surgical approach and the method of pleurodesis. Recent advances in video-assisted thoracic surgery (VATS) that combine bullectomy with pleural abrasion or apical pleurectomy provide a feasible alternative for treatment of recurrent primary spontaneous pneumothorax and have been chosen as the preferred management by many physicians4,5. VATS offers superior results in decreased postoperative pain, shorter hospital stay, and decreased morbidity6-8. Our objective was to study the results of VATS apical stappling for PSP in our setup.

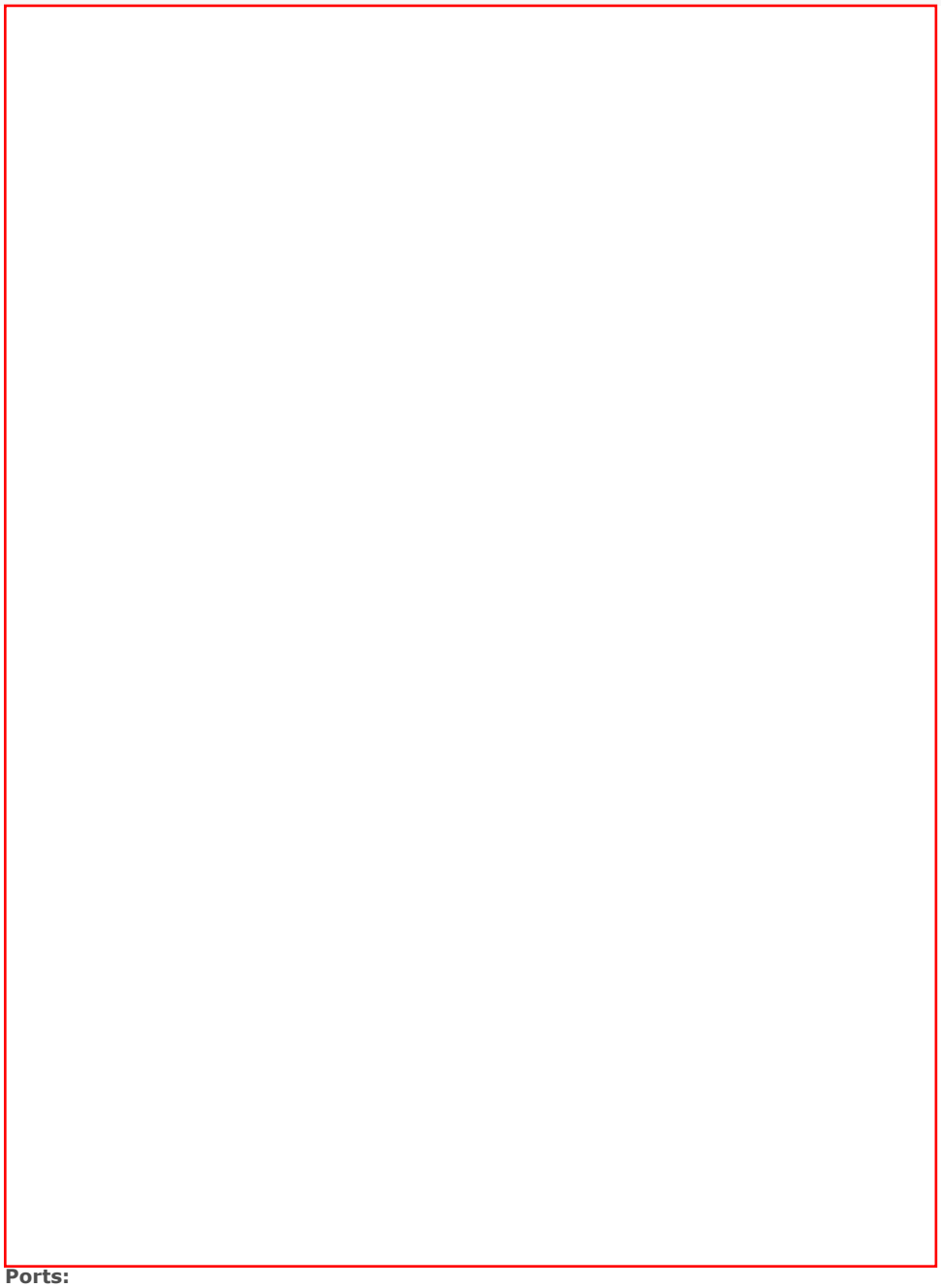
Patients and methods

Text Box: Correspondence: Major Muhammad Rashid Husnain, Classified Surgical Specialist, CMH Rawalpindi Email: rashidhusnainm@gmail.com Received: 13 Jul 2010; Accepted: 26 Aug 2010 This prospective study was carried out at dept of thoracic surgery CMH Rawalpindi between April 2007 to Dec.2009. All patients of primary spontaneous pneumothorax treated by VATS were included. Patients of secondary spontaneous pneumothorax were excluded. The clinical data, operative findings, duration of postoperative chest drainage, length of hospital stay, and complications were recorded on a specified proforma. Patients were followed up by clinical visits / telephone conversation. All patients were followed up for six months after surgery.

We used a wide variety of specialized instruments and equipments. As listed in table no:1

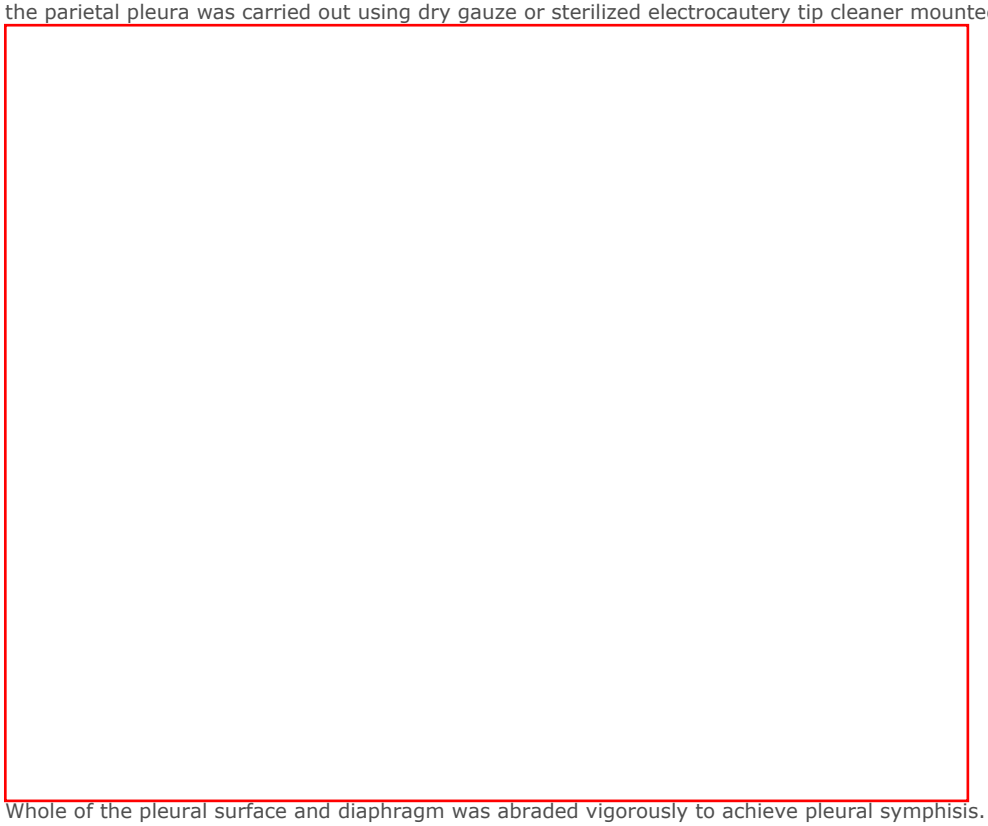


Procedures were performed under general anaesthesia with double lumen endotracheal tube for ipsilateral lung collapse. The patients were placed in lateral decubitus position. Surgery was done with three ports. As in Fig. 1



Ports:
Camera port 10 mm trocar fifth to seventh intercostal space midaxillary line
Posterior instrument port 5/10 mm trocar third to fourth intercostal space placed just lateral to the scapula.
Anterior instrument port 10 mm trocar third to fourth intercostal space, placed in anterior axillary line.
A thoracoscopy trocar for the 10-mm videotelescope was placed at the previous chest tube insertion. After exploration of the pleural cavity, anterior and posterior instrument ports were made under vision. Anterior port was made in submammary area for women. The 5-mm port was used for the endoscopic grasper, and the 10-mm port in the subareolar or submammary area, for the endoscopic stapling device. Pleural adhesions were completely freed using harmonic scalpel. The surface of the lung was carefully inspected and subpleural blebs identified. All the lobes were thoroughly examined with particular attention to the apex and the superior segment of the lower lobe. A grasper from the posterior port was used to grasp the apex of lung which was rolled down and delivered to the jaws of the stapler. The blebs were then resected by firing several staples at their bases (Fig. 2).

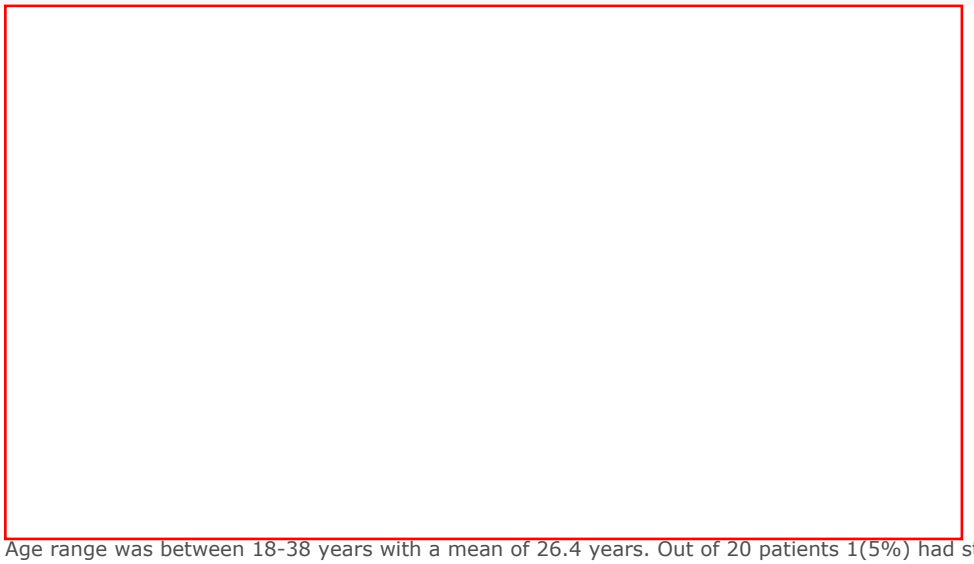
Apical stapling and resection was performed even when no blebs were found.
Pleurodesis was performed in all patients. This was accomplished by means of pleural abrasion or apical pleurectomy. Mechanical abrasion of the parietal pleura was carried out using dry gauze or sterilized electrocautery tip cleaner mounted on a grasper (Fig. 3).



Whole of the pleural surface and diaphragm was abraded vigorously to achieve pleural symphisis. For apical pleurectomy we started bluntly at the upper edge of the instrument ports and dissected bluntly to the apex of the hemithorax. With curved dissector pleura was lifted in the extrapleural plane. The dissection was made in an apical direction. The longitudinal limit of the resection ran along the sympathetic trunk posteriorly and the internal mammary artery anteriorly to the height of the left subclavian artery on the left side or the brachiocephalic trunk on the right side. Accessory ports were removed under direct thoracoscopic guidance and the sites inspected for hemostasis. At end of procedure a single chest tube was placed apically through anterior port. Lung was inflated under direct vision by the scope to verify complete inflation, locate additional blebs, and ensure proper placement of the chest tube to the apex of the hemithorax. Local anaesthesia was given at the port sites for postop pain relief. Remaining both ports were closed primarily. All surgical specimens were sent for histopathological examination.
The patients were extubated in the operating theatre and observed for 1 or 2 hr in the recovery room, then transferred to a general ward. Postoperative analgesics included IV analgesics like Nalbuphin and Tramadol. Lung expansion was encouraged by regular use of incentive spirometry and chest physiotherapy. Negative pressure suction was used in cases of delayed lung expansion. The tube was removed when the lung was fully expanded with no air leak. Without complication Patients were discharged the next day. Patients with delayed expansion or prolonged air leak were kept longer.

Results

A total of 20 patients with PSP underwent VATS during this period. There were 21 procedures in 20 patients. One patient had bilateral surgery. In the study there were 18 males and 2 females (9:1). Indications of surgery are given in table-2.



Age range was between 18-38 years with a mean of 26.4 years. Out of 20 patients 1(5%) had stapling of both upper lobe and superior segment of Rt. lower lobe rest all have stapling of upper lobe. 1(5%) patient (n=20) had surgery on both lungs on two different occasions. There was no case of conversion to open procedure. Apical blebs were seen in only 13 cases (61%) but apical stapling was done in all cases and histopath revealed emphysematous changes in all the resected samples. None of the patients required Postop ITC care. Blood transfusion was given in only 1 (4.76%) case of apical pleurectomy. Postop hospital stay was between 2-7 days and mean duration of chest intubation was 3.2 days. Complications of the procedure included minor port site infection 5(23%), intercostal neuralgia 3(14%), persistent air leak with delayed lung expansion 2cases (9.5%) and persistent apical space in 1 case (4.7%).

Discussion

The role of thoracoscopy and VATS in the surgical treatment of pneumothorax has evolved over the past two decades. Preliminary reports by Melvin9, LoCicero (1992)10, Inderbitzi and their associates11 have been encouraging. The latest ones by Bayram12 and Ramic13 et al. reinforce the earlier recommendations to consider VATS as the primary mode of surgical intervention. Most series do report a recurrence rate with VATS that is slightly higher than that with minithoracotomy. In general, VATS with stapling of bullae is very effective at managing spontaneous pneumothorax, with an overall recurrence rate of approximately 5%8,14. Most series do report a recurrence rate with VATS that is slightly higher than that with minithoracotomy. Kim15, and Miller et al. 16 compared VATS with axillary thoracotomy express doubt about the effectiveness of the VATS approach. Hyland, and Cardillo and their colleagues reinforce the earlier recommendations to consider VATS as the primary mode of surgical intervention. Lang-Lazdunski (2003)17 report a large series of patients with good follow-up treated by thoracoscopic bleb excision and pleural abrasion.

We used the standard three port technique in all the cases and used endoscopic stapling device for treatment of bullae18. The primary disadvantage of the endostapler is its expense19. Other methods include electrocoagulation, and use of endoloop which were associated with a higher recurrence rate11. We performed the apical stapling in those cases in which no bullae were seen because of persistent apical microscopic blebs as evident from histopath of all the cases which showed emphysematous changes in all the specimens as concluded by Czerny20 that endostapling of the lung apex was associated with a decreased recurrence rate even if no blebs are visible . The recurrence rate in the series after a mean follow-up of 38.7 months was 7% in the 57 patients who did not receive the stapling, whereas there were no recurrences in the 69 patients who received the stapling.

We performed pleurodesis on all patients because this has been historically associated with the lowest incidence of recurrent pneumothorax21. Recurrence rates are higher when only the blebs are treated. The primary means are mechanical abrasion of the pleura, partial parietal pleurectomy and talc insufflations22. We performed pleural abrasion in most of our cases because it is easy, quick and less invasive as compared with pleurectomy. We believe that this is the most important step in the procedure. We are encouraged by not having any recurrence in this series to date, but our follow up at a mean of 6 months is still too short to establish firm conclusions about the long term efficacy of VATS. However, since the procedure mimics the procedure performed at thoracotomy, we would expect similar long term results with respect to recurrence. These early results are encouraging. The hospital stay has been reasonably short, despite our caution because of it being a new procedure, post-operative pain has been minimal and the cosmetic result is satisfactory. There have been few complications, and the procedure appears to be safe. Video-assisted pleurectomy is also feasible and safe23. Early results with this procedure are comparable to those with the open method. We believe that the long term results of video assisted surgery will compare with the open method. Video of our surgical technique is available on the web at http:// www.youtube.com/watch?v=ztbnhEwX-zA&feature =related

Conclusion

VATS provides a feasible and safe procedure for treating primary spontaneous pneumothorax. Morbidity has been low, especially among young, otherwise healthy patients, in terms of speed of recovery and comfort compared with the conventionally treated patients. We believe that the thoracoscopic approach is the preferred approach in all patients undergoing surgery for PSP.

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