RETROSPECTIVE ANALYSIS OF TREATMENT OPTIONS IN FIRST RECURRENCES OF PRIMARY SPONTANEOUS PNEUMOTHORAX IN YOUNG ADULTS

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Aim: Surgical approach in the treatment of primary spontaneous pneumothorax (PSP) is still not well defined. We aimed to evaluate treatment options in first recurrences of PSP.

Methods: We treated 44 male patients with first recurrences of PSP. All cases had been treated with chest tube for the first attack. In first recurrences, treatment strategies were classified into three groups such as chest tube (n:15, mean age 25.4±9.1), VATS (n:14, mean age 24.4±1.91) and open thoracotomy (n:15, mean age 23.2±3.1). These cases were retrospectively evaluated in terms of recurrence and succes rates.

Results: There was no conversion to open thoracotomy in VATS series. VATS group had significant difference in terms of mean time to removal of chest tube when compared to chest tube and thoracotomy groups (p=0,042 and p=0,018 respectively). Also recurrences occurred in chest tube group (n:8), no recurrence was seen in thoracotomy and VATS groups.

Conclusion: The present study strongly suggests VATS for management of first recurrences of PSP following pleural abrasion.

Key words: Spontaneous pneumothorax, chest tube, thoracoscopy, thoracotomy

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INTRODUCTION

Primary spontaneous pneumothorax (PSP) is a common health problem in patients referring to emergency departments (1). Primary spontaneous pneumothoraces occur in people aged 20-30 years and peak incidence is in the early twenties (2). For men, age-adjusted incidence of primary spontaneous pneumothorax is 7,4 to 18 cases per 100,000 persons per year (3). The overall recurrence rate is about 23 to 50% for primary spontaneous pneumothorax after the first attack (2). PSP is typically associated with the rupture of an apical subpleural bleb with no other predisposing lung disease or history of trauma (4). Several treatment options are available for the treatment of PSP such as observation, supplemental oxygen, and simple aspiration, tube thoracostomy with or without the installation of a sclerosing agent, thoracoscopy, and open thoracotomy. A consensus does not exist concerning the treatment of PSP (5).

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Recent studies have shown a wide variation in the management of initial and recurrent PSP. One of the reasons for such variations is that pleural drainage does not bring about a satisfactory cure rate, with a recurrence of 16% to 52%. Some pulmonologists view video assisted thoracoscopic surgery (VATS) as the initial treatment modality for the first recurrence of PSP (3). Optimal management of PSP has been a matter of debate until recently, when some consensus of the treatment guidelines was reached (2).

In our opinion, to choose the first step treatment for PSP is a problem for healthcare professionals. We treated first recurrence PSP patients with three methods chest tube, VATS or open thoracotomy. In this study, our aim was to compare the results of chest tube, VATS and open thoracotomy in patients presented with first recurrence of PSP.

MATERIAL AND METHODS

We conducted a retrospective study of all patients with PSP presenting to the GATA Camlıca Chest Disease Hospital Istanbul, Turkey. From January 2000 to September 2006 a total of 123 young adult cases underwent treatment of PSP. Our hospital is a military hospital and young soldiers' referral center. We selected 44 male patients without an underlying disease who had unilateral pneumothorax. The patients with prolonged air leak in first period and second recurrences were not included to the study. All cases treated with chest tube for the first attack. In first recurrence, treatment strategies were classified into three groups such as chest tube (n:15, mean age 25.4±9.1), VATS (n:14, mean age 24.4±1.91) and open thoracotomy (n:15, mean age 23.2±3.1). Preoperative investigation included a chest radiograph. Computerized tomography (CT) was done in patients who treated with VATS and thoracotomy procedure. We compared three therapeutic strategies with first recurrence as chest-tube, VATS and pleural abrasion, thoracotomy and pleural abrasion. Patients whose pneumothorax recurrenced with pleural drainage underwent the operation of chest-tube, VATS (thoracoscopic bullectomy using 5mm and 10mm instruments and pleural abrasion) and thoracotomy (bullectomy using lineer staple and pleural abrasion).

All VATS and thoracotomy procedures were performed under general anesthesia using single lung ventilation. Complete adhesiolysis, careful lung inspection and air leak detection were systematically carried out. Both of these techniques were designed to obliterate the pleural space by creating symphysis between the two pleural layers.
Data collected from patients' record included initial therapeutic procedure and outcome after procedure and complications.

All patients were followed up in a mean time period of 2 years (8 months to 3 years). In this period the effectiveness of therapeutic strategies were compared and interpreted.
Data analyses were carried out using SPSS 11.0. associations of categorical variables with treatment groups were assessed using Mann-Whitney U test. Statistical significance was set at $p<0.05$ unless otherwise stated.

RESULTS

There were no intraoperative or postoperative complications. There was no conversion to open thoracotomy in VATS series. All patients had complete re-expansion with a chest-tube, VATS and thoracotomy. Eight patients in chest-tube series had recurrences. There was no mortality seen related to any procedures.

Mean time to removal of chest tubes was 4.6±1.3 days in chest-tube group, 3.1±1.4 in VATS group and 4.8±1.6 days in thoracotomy group. We compared three groups with PSP in first recurrence and VATS group had significant differences among chest-tube and thoracotomy groups (p=0,042 and p=0,018 respectively). Thoracotomy and chest tube groups had no significant difference for removal time (p=0,838). Recurrences occurred in chest tube group (n:8). There was no recurrence seen in thoracotomy and VATS groups.

DISCUSSION

The present study focuses on the role of three-treatment procedures for the management of the first recurrence of PSP and confirms significant differences between chest-tube and other two groups. VATS for management of first recurrence of PSP following pleural abrasion provides excellent results.

Timing and surgical approach in the treatment of PSP are not well defined (6). The most optimal therapy for first pneumothorax is conservative therapy including observation and/or chest drainage (7). There is no evidence to suggest other treatments except pleural drainage in first attack of SP. In case of recurrent pneumothorax, the recurrence rate is around 50% after a first recurrence and 80% after a second recurrence in which surgery is mandatory (6). In our series, the recurrence rate was 0% in VATS and thoracotomy groups. The recurrence rate was 53% in chest-tube group. Comparing the results of VATS, thoracotomy and chest-tube treatments in first recurrence of PSP, the mean recurrence rate in chest-tube group was higher than the other two groups. Since recurrence rate was very high, surgery should be applied in second period.

Morimoto and colleagues reported 36% of patients in drainage twice strategy were expected to undergo VATS. Consensus statements or other publications also recommend VATS as the initial therapy for those in an active life or strong preference for preventing recurrence (3).

First recurrence of SP is controversial. VATS has been showed to reduce operation time, drainage volume, complication rate and hospital stays (8,9). Our study revealed

significant data about first recurrence of SP and confirmed that VATS or thoracotomy procedures should be performed in the first recurrence of SP.

Naunheim suggests blind apical stapling in patients with no evidence of bullae (10). Cardillo and colleagues are not in agreement with Naunheim (6). Treatment goals of pneumothorax are air evacuation, lung re-expansion, and prevention of recurrence (11). From the analysis of our data, we are not in agreement with authors who suggest blind apical stapling, pleurodesis or pleurectomy. In our opinion, bullectomy/blebectomy and mechanical pleural abration is the right choice in VATS and thoracotomy procedure.

Pleurectomy is preferred by several authors because it is credited at a nearly 100% success rate. However, one should anticipate increased operational difficulties in future. Talc pleurodesis develops dense adhesions and hence jeopardize subsequent thoracotomy (6).

The true prevalence of subpleural blebs is difficult to ascertain. It is argued that only about 15% of blebs will be detected on plain chest radiography and that CT is more sensitive (4). VATS gives a more precise view of the entire lung compared to thoracotomy (a). Successful surgical treatment depends on obliteration of the ruptured bleb and creation of adhesions between the pleural surfaces (4). We performed apical blebectomy or bullectomy and performed pleural abration in VATS and thoracotomy procedures.

Ayed and colleageus reported VATS as a standard approach in the treatment of a recurrent SP. Ayed obtained good results with VATS technique in terms of postoperative pain, short hospital stay and low recurrence rate (8). Recent studies have suggested VATS as a valid alternative to the transaxillary approach for the treatment of recurrent PSP (12). Our study revealed that VATS and thoracotomy is of great advantage in patients with recurrent SP. Two years follow-up results from our series were comparable with those reported in the literature for pneumothorax. Most series have reported favorable long-term results in patients with primary SP treated by VATS techniques (8).

Advances in endoscopic instruments and improvement of the laparoscopic skills even in the field of thoracic surgery, the use of VATS has increased throughout the world and thoracoscopic bullectomy for SP have been well-accepted (13). We performed successful VATS procedures and pleural abration in 15 patients of SP. Thoracotomy procedure was used for 15 patients and VATS procedure for 14 patients with SP. There were no intraoperative or postoperative deaths and no recurrences. The most frequent postoperative complication was prolonged air leak (more than 5 days). We observed no recurrence in VATS and thoracotomy series even in 8 recurrences in chest-tube series. VATS for patients with PSP has become a popular procedure because it is less invasive than conventional thoracotomy. A smaller length of skin incision reduces the surgical trauma, cosmetic problems and facilitates post-operative wound healing (7).

There is still a debate on the best surgical approach to treat pneumothorax, but mini thoracotomy with pleurectomy remains the gold standard in terms of efficiency, with a substantial morbidity. In clinical practice, VATS tends to challenge medical thoracoscopy with recurrence rate of about 5%. Doddoli strongly suggests VATS in the management of recurrent PSP (9). VATS blebectomy/bullectomy remains the procedure of choice for the treatment of SP because of low acceptable recurrence rate of 4-5% (14). Our study suggested VATS as the best option for the first recurrence of PSP.

Chest-tube group has a high recurrence rate compared to other groups. In the present study, no patient was converted to open thoracotomy due to intraoperative complications. Reoperation due to postoperative complication was 0% in VATS and thoracotomy groups. This shows us that these two procedures are satisfactorily safe and effective. Nevertheless, VATS have some extra advantages for PSP in first recurrence.

Our study has demonstrated that the VATS for PSP is a safe, effective, feasible, cosmetic and less painful. Therefore, we strongly suggest VATS in the management of first recurrence of PSP.

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