THORACOSCOPIC SPINE OPERATIONS : CASE REPORT

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ABSTRACT :
Via thoracoscopic approach to thoracic vertebrae; abscess drainage, biopsy, diskectomy, anterior release and fusion operations can be performed. In this manuscript, our initial experience with thoracoscopic spine surgery in İnönü University Faculty of Medicine is presented. We drained and grafted a T5-6 level Pott abscess and a T6-10 anterior diskectomy with hemiepiphysodesis in congenital scoliosis, with video assisted thoracoscopy surgery (VATS).
This method enabled us to achieve our surgical goal with a significant decrease in morbidity.
Key words: *Thoracoscopy, Spine surgery, Anterior fusion*

INTRODUCTION

Anterior approach to thoracic vertebrae via thoracotomy has a high rate of morbidity, including acute or chronic pain and postoperative difficulty in breathing. Thoracoscopy has been applied for diagnostic purposes in a wide variety of pathologies concerning pleura and chest, for many years. Due to the recent technical achievements, therapeutic utilization of thoracoscopy has gained a great popularity. The initial successful results have been encouraging for these techniques to be used in minimally invasive surgery for anterior approach. Today some spinal pathologies, including diskectomy, anterior fusion, abscess drainage and deformities, can be managed by thoracoscopic techniques (1, 2, 3).

The past therapeutic procedures for Pott abscess consisted of bed rest and supportive therapy. The first surgical decompression was performed by Menard and was concluded with neurologic deficit. During the following years, posterior fusion was described by Albee and Hibbs (5, 6). Although more spontaneous healing was observed on the patients which surgical debridement was performed, the lacking of effective chemotherapy resulted with deaths due to disseminated infection, until 1950'es, from which the effective antituberculous drugs have started to be used widely. By then, even with the conservative methods, much more successful results have been reported. The peak level of achievements were reported by Hong Kong group which combined debridement, fusion and chemotherapy. Probably, the only additional improvement may be the internal fixation techniques.

Surgical treatment is frequently necessary in congenital scoliosis, especially when the deformity is severe or when the curve is uncontrollably increasing. There is no age limitation for the operation. There is no standard technique that can be applied to all types of deformities. The success of surgery depends on the selection of the right technique and its application with right timing.

In this report, we introduce our initial experience in spinal surgery with VAT in İnönü University Faculty of Medicine.

PATIENTS AND TECHNIQUE

Anesthesia and position : A double lumen endotracheal tube was inserted immediately after the anesthesia induction. Since the abscess was positioned right antero-laterally, the patient was placed on the operative table in right decubitus position. Position of the right arm was adjusted to give maximum retraction to right scapula.

In both patients, a bone graft was taken from the right iliac crest and the skin was closed by interrupted 3/0 prolene sutures.

Thoracoscopic technique: After deflating the right lung, a 10 mm trocar was inserted in the mid-axillary line at 5th intercostal space, through which the camera was introduced to thorax during the operation. Then, under direct vision, another 10mm trocar at 7th

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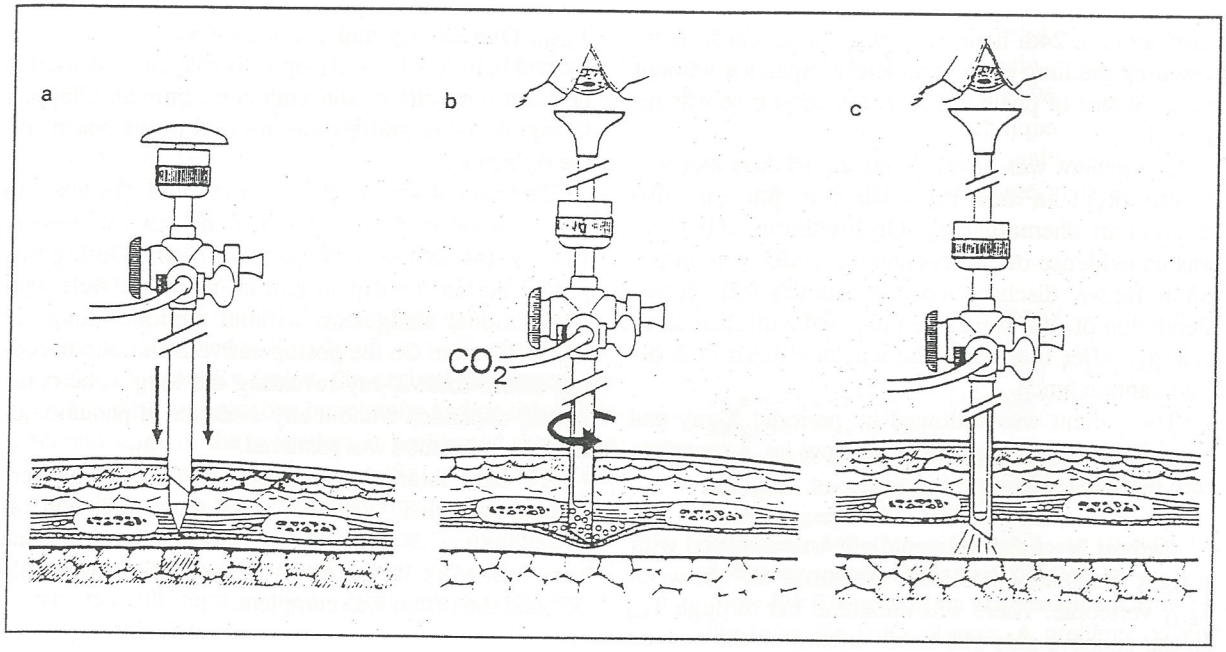

Figure 1: The insertion technique of the 5 mm trocar

intercostal space and a 5mm trocar at 3rd intercostal space in the anterior axillary line were inserted (Fig.1).

In the second case, only 5mm trocars were used for the instruments. The first one was inserted through sixth intercostal space and the second one through fifth intercostal space.

Since the lung was totally collapsed, CO_2 insufflation was not used.

Patient 1: A 23 year old male patient was admitted to our hospital with a complaint of progressive back pain, despite the various treatments he had received. He had also stated that for the last 3 months, his pain got worse and he had become hunchbacked. He had no history of fever, weight loss or night sweats.

On his physical examination, a tender gibbosity was found on $T_{5\text{-}6}$ level. There was no neurological deficit on his examination. His PPD was 20 mm. On his chest X-rays a 50° of kyphosis was observed at $T_{5\text{-}6}$ level. His thorax CT revealed bone destruction on T_5 and T_6 vertebrae and Pott abscess.

The patient was diagnosed as a case of Pott abscess and an abscess drainage, debridement and fusion was planned via anterior thoracoscopic approach.

On the thoracoscopic exploration of the thorax, fluctuant mass of abscess at the level of $T_{4,5,6}$ vertebral corpuses was found. The parietal pleura was opened by spatulated cautery. Segmentary arteries and veins were dissected separately and clipped by "medium-large" clips before transsection by endoscissors. The abscess wall was then incised and about 50cc of yellowish purulent material was drained. The abscess cavity was washed with 0.9 % NaCl solution through an aspirator-irrigator. Then the debridement of the necrotic material was performed by means of 45° curettes of # 2-3 and a spoon forceps, without any difficulty. Although a strut graft was planned prior to the operation, we failed to perform a groove safely with the present instruments and due to excessive fibrosis of the vertebral corpuses. For this reason, the space was filled with chipped spongiose bone grafts. The parietal pleural flaps were closed by 0 Vicryl stitches. A 26F chest tube was inserted through the trocar site at 7th intercostal space and secured to the skin with 2/0 silk sutures. The lung was reinflated under direct vision. The trocar sites were closed by running subcutaneous 3/0 Vicryl sutures. He was extubated in operating room (OR) and was taken to Intensive Care Unit (ICU) in good condition.

The patient was followed in ICU for the first 24 postoperative hours. During this period he had mild pain and he managed well with conventional analgesics, without narcotic analgesic administration. On the

postoperative 24th hour, according to his chest X-ray revealing the lung to be completely expanded without any evidence of pneumothorax, his chest tube was removed.

The patient was hospitalized for 10 days and was strictly kept in bed rest. He was put on antituberculous chemotherapy. On his thorax CT, there was no evidence of abscess and the grafts were in position. He was discharged on the 11th day with recommendation of four weeks bed rest and antituberculous therapy. After four weeks he was mobilized with hiperextantion brace.

The patient was followed by periodic X-ray and CT examination. After a years follow up, a complete cure was observed.

Patient 2: A 3.5 years old girl was admitted with a right congenital scoliosis measured 52° between T_{6-11} vertebrae. There was unilateral bar through T_{6-8} on the concave side and hemivertebra on the convex side. On her physical examination there was only VSD without any therapeutic requirement. Her neurological examination revealed no deficit. Since history of a rapid progression of the curve was given by her parents and due to the structure of the curve, an early surgical intervention was planned.

Thoracoscopic approach was made from the convex side and the pleura was incised at the level of T_{5-10}. Diskectomy and hemiepiphysiolysis was performed between T_{5-10}. Hipophysis rongeur was used to perform diskectomy and endplate removal. Chipped spongiose bone grafts were inserted to the spaces on the right side.

The patient was extubated in OR and was taken to ICU in good condition. The patient was followed in ICU for the first 24 postoperative hours. During this period he had mild pain and he managed well with conventional analgesics, without narcotic analgesic administration. On the postoperative 24th hour, accoding to his chest X-ray revealing the lung to be completely expanded without any evidence of pneumothorax, her chest tube was removed.

14 days later a right posterior fusion was performed through T_{5-11} vertebrae and the patient was followed with a "24 hour" brace for 6 months. After one year follow up the scoliosis between T_{5-11} was only 55° and the fusion was complete.

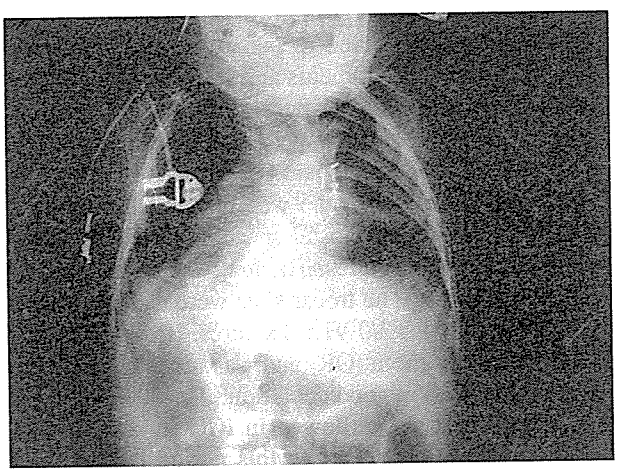

Figure 2: Post operative X-Ray of the patient with scoliosis

DISCUSSION

Thoracoscopy, after being utilized for a long period of time for diagnostic purposes, has now started to be used for complex thoracic operations. Standard thoracic operations including pulmonary bleb resections, lung reduction operations, thymectomy, thoracic sympathectomy are being performed in our hospital by thoracoscopic surgical techniques. Our intention was to perform anterior spine surgery by VAT which might cause less morbidity.

The steps of drainage and debridement in Pott's disease case were easily performed by orthopedic instruments with long handles and laparoscopic instruments without any difficulty. But our initial plan to perform a Strut graft was failed due to the excessive fibrosis on vertebral corpuses which prevented us from creating a groove with the present instruments safely. For this reason we made an operative decision to change the Strut graft to chipped spongiose bone grafts.

Since there are numerous techniques for different types of spinal deformities, the success of surgery depends on the selection of the right technique and its application with right timing. Prophylactic surgical procedures are applied in young patients, presenting small curves with bad prognosis. The objective of the treatment is to prevent further detoriation by balancing the growth of the spine. Although corrective procedure for these small curves are regarded to be unnecessary,

after prophylactic surgery, these curves must be carefully followed due to possible need for further surgical treatment. Theoretically, prophylactic surgery should allow the correction of the concavity in scoliosis gradually by means of the continuing growth process. This is a relatively safe procedure and a convex growth arrest is often sufficient to stabilize the deformity (4). In the classic method, the spine is first approached anteriorly on the convexity of the scoliosis via thoracotomy. The lateral half on the discs and their adjacent endplates are removed at the site of the scoliosis. In order to create an anterior fusion, the excised disc spaces are packed with homologous bone grafts and/or chips. The second stage of the procedure is performed through a separate posterior exposure of the convexity of the curve in order to perform a posterior fusion.

Our limited experience with one case suggest that specially designed instruments for grooving and 3D cameras will improve the surgical aspects of thoracoscopy in this field.

Although there are a very limited amount of reports in literature about this subject, we think that minimally invasive surgical techniques may decrease the operative morbidity rates of the standart techniques. This fact will probably be enlightened by the future comparative trials.

Discharge of our patient without any complication and without acute or chronic pain problems suggest this technique to be meritorious. We also feel confident about performing this technique between the levels T_3-T_9 by having a few additional instruments in our surgical set, for abscess drainage, debridement and graft applications.

REFERENCES

1. Michael J.M., et al: Application of thoracoscopy for disease of spine. Ann Thor. Surg. 56: 736-738, 1993.
2. Mack M., et al: The present role of thoracoscopy in diagnosis and treatment of disease in chest. Ann Thora Surg. 54: 403-409, 1992.
3. Alıcı E., et al: Thoracoscopic anterior applications to the spine. Presented in 3rd International Congress On Spine Surgery, 1994, Antalya, Turkey.
4. McMacter MJ: Congenital scoliosis. The Pediatric Spine. Raven Press. New York 227-244. 1993.
5. Albee FH: Transplantation of a portion of the tibia into the spine for Pott's disease: A preliminary report. JAMA 57: 885, 1911.
6. Hibbs RA: An operation for progresif spinal deformities. NY Med J 93: 1013, 1911.