Thoracoscopic Thymectomy for Myasthenia Gravis in Children

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The technique for thoracoscopic in children is described. The average operating time is under 2 hours, and the procedure appears to be safe and effective.

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INDEX WORDS: Thoracoscopy, thymectomy, myasthenia gravis.

MYASTHENIA GRAVIS is an autoimmune disorder in which autoantibodies are produced against the acetylcholine receptor resulting in profound muscle weakness. Medical treatment consists of steroids and mestinon (pyridostigmine bromide; ICN Pharmaceuticals, Costa Mesa, CA), and, in severe cases, plasmaphoresis to remove the autoantibodies is required.[1] Complete thymectomy relieves the symptoms in many patients.[2] Traditionally, the surgical approach has been through a median sternotomy[3] or cervical collar incision.[4] Thoracoscopic thymectomy has been described in adults showing equal efficacy with open thymectomy but with the benefits of decreased postoperative pain and shorter hospitalizations.[5] We herin describe technique for the procedure.

MATERIALS AND METHODS

Ten operations in children were done under general anesthesia with the patient positioned on the left side supported with a bean bag. Selective right lung ventilation was established with either right-mainstem intubation, a bronchial blocker, or double-lumen endotracheal intubation. Alternatively, the children were intubated endotracheally, and the left lung was collapsed with CO_2 insufflation to 5 to 10 mm Hg pressure into the left hemithorax.

The mediastinum was accessed through the left chest. The telescope port (10 or 5 mm) was placed in the anterior axillary line in the fourth intercostal space. A 0° or 30° telescope was used for visualization. The 2 working ports (3 or 5 mm) were placed slightly posterior and lateral to the telescope port. Instruments used for dissection included endoscopic dissectors, scissors, monopolar "hook" electocautery, bipolar Ligasure (ValleyLab, Boulder, CO) electrocautery, and in some cases the harmonic scalpel.

Using scissors, the pleura was incised, and the mediastinum was opened at the lateral border of the left lobe of the thymus. The incision was made anterior to the phrenic nerve, which was identified easily and avoided. Visualization was excellent, and the pink-yellow and lobular appearance of the thymus was easy to distinguish from the surrounding mediastinal fat. The entire mediastinum from the thoracic inlet to diaphragm could be explored easily, and visualization of all major vessels and nerves was excellent.

Dissection was done both bluntly and with electrocautery or harmonic scalpel. The inferior horn of the left lobe of the thymus was freed from the sternum anteriorly and pericardium posteriorly. The right inferior horn then was gently pulled into the field and freed in a similar manner. The dissection then was carried superiorly toward the thoracic inlet where small veins draining into the innominate vein were identified and clipped before their division. The arterial supply at the superior pole of each lobe was identified, clipped, and divided, allowing the superior extent of the gland to be mobilized from the thoracic inlet and into the chest. The intact gland then was removed through one of the ports. In some cases it was necessary to enlarge one of the port sites to remove the gland. The entire mediastinum was inspected carefully for hemostasis as well as to assure complete removal of the gland. The ports then were removed, and, when used, the pneumothorax was evaluated. Chest tubes were not used. Chest x-rays were obtained in the recovery room.

RESULTS

Average operating time was 114 (range, 70 to 150) minutes. There were no intraoperative or postoperative complications. All children were allowed a regular diet the night of surgery. Postoperative pain was controlled both parenterally and orally. All but one of the patients was discharged on the morning of the first postoperative day. The 1 child with preoperative respiratory weakness was discharged on postoperative day 3.

DISCUSSION

Although the mechanism is unknown, total thymectomy can reduce or ameliorate the muscle weakness caused by myasthenia gravis. In children, it has been suggested that thymectomy performed early in the course of the disease yields the best results.[6,7] Until the availability of thoracoscopic techniques, thymectomy was done either through a median sternotomy or low cervical incision or a combination of these approaches. Series using thoracoscopic techniques for thymectomy in adults with myasthenia gravis have shown similar rates of

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complete remission and symptomatic improvement compared with the traditional open approaches.[5] The major advantage of the thoracoscopic approach, in our experience, is significantly less postoperative pain, which, in patients already weakened by their disease, can lead to postoperative respiratory complications. There also are cosmetic benefits to the thoracoscopic approach.

To achieve the greatest effect, a total thymectomy must be performed.[2] Thoracoscopic techniques provide excellent visualization of the entire mediastinum, and the thymic tissue is easy to distinguish from the surrounding mediastinal fat. These factors help assure complete removal of the thymus. The procedure is straight forward, easy to learn, and requires no equipment other than standard laparoscopic and thoracoscopic instruments.

Our experience shows that thoracoscopic thymectomy can be performed in children without complication, and we conclude that this is the procedure of choice.

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