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Bilateral thoracoscopic thymectomy using a novel positioning system

Francesco Caronia[1], Alfonso Fiorelli[2] and Attilio Lo Monte[3]

Abstract

Several techniques of bilateral video-assisted thoracoscopic extended thymectomy have been proposed, and each has its own proponents. We summarize our experience in 20 patients who underwent bilateral video-assisted thoracoscopic extended thymectomy, using a new patient positioning that amplifies the thoracoscopic view of the cardiophrenic regions which are often difficult to visualize with standard techniques. In all cases, en-bloc thymectomy with complete dissection of the mediastinal fatty tissue was achieved without sternal retractors or additional incisions.

Keywords

Myasthenia gravis, thoracic surgery, video-assisted, thymectomy, thymus gland

Introduction

We describe bilateral video-assisted thoracoscopic extended thymectomy (VATET) using a novel patient positioning to facilitate dissection of the mediastinal fatty tissue, particularly in the cardiophrenic regions.

Technique

Under general anesthesia and single-lung ventilation, the dissection is started leftward with the patient in the 60° right lateral decubitus position. The arm of the operative side is prepared and wrapped in a sterile waterproof stockinet, and maintained parallel to the body by securing it to the hip with adhesive tape. Infusion of lidocaine at the trocar sites is performed before the incisions.[1] The first 10-mm trocar is inserted through the 4th intercostal space in the mid axillary line, for a camera. Two additional trocars (5 and 10 mm) are inserted through the 2–3rd and 6th intercostal spaces on the anterior axillary line, respectively. Resection begins using the phrenic nerve as a landmark: the mediastinal pleura is incised, and thymic dissection is carried out cranially. While retracting the thymus with the left hand, the surgeon's right hand dissects free the thymic and innominate veins. The thymic veins are sectioned between clips. Mobilization of the thymus and upper thymic poles is continued above the left brachiocephalic vein (Figure 1A). Compression of the innominate vein creates enough space to visualize the cervical area above the vein. After careful dissection from the surrounding fatty tissue, the left superior horn is gently grasped and pulled down to obtain complete mobilization until the thyroid-thymic ligament becomes clearly visible to be sectioned. Digital compression of the paratracheal cervical tissue facilitates upper pole dissection. An analogous procedure is carried out on the right upper pole. Thymic dissection is now conducted caudally. Thanks to the patient's position with the arm fastened to the hip, the surgeon can change the triangulation of the instruments and work on the cardiophrenic region, placing himself cranially to the head of the patient (Figure 1B). Maintaining the camera through the same trocar, a fourth 5-mm trocar is inserted through the 7–8th interspace in the posterior axillary line. After completing the dissection, the contralateral pleura is opened, and with the lung in apnea, the left-side dissected specimen is pushed into the right pleural cavity (Figure 1C). The patient is

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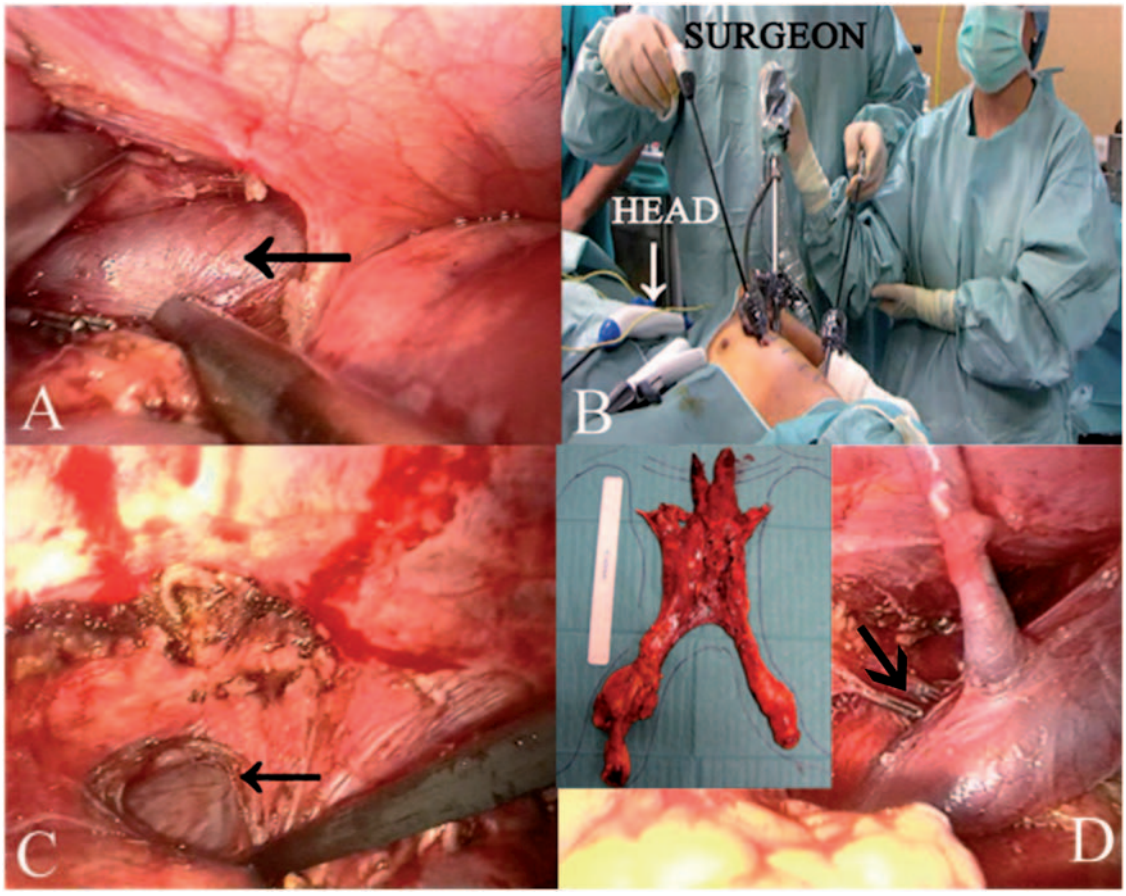

Figure 1. (A) Dissection of the upper thymic poles is carried out above the innominate vein (arrow). (B) The surgeon can also work cranially to the head of the patient (arrow). (C) The right pleura is opened (arrow) to introduce the dissected specimen en bloc with the left pericardiophrenic fatty tissue. (D) The brachiocephalic vein and its junction with the superior vena cava. The intervening thymic veins are divided between Endoclips (arrow). Insert: en-bloc resection of a large thymus with its perithymic and bilateral pericardiophrenic fatty tissue.

then positioned in the left lateral decubitus position, and 3 or 4 ports are inserted in the same manner as those on the left side. Right thoracoscopy allows complete en-bloc thymic dissection of bilateral perithymic and pericardiophrenic fatty tissue. The specimen is removed using an Endobag through one of the ports, or through a utility incision in the case of a large thymus. As on the left side, 1 or 2 tubes are placed through the trocar holes, and the lung is reinflated.

Discussion

In the last 3 years, 20 consecutive patients with myasthenia gravis were successfully treated using this technique. No conversion, major complications, or perioperative death were observed. Their data are summarized in Table 1.

VATET is a widely accepted therapeutic approach for the integrated management of myasthenia gravis.[2] Since the first report by Novellino and colleagues,[3] several techniques have been proposed, and each has its own proponents. Takeo and colleagues[4] combined VATET with a sternal lifting technique, and Ohta and colleagues[5] described an anterior chest wall lifting method to provide a wide field of vision between the sternum and the heart. Hsu and colleagues[6] designed a subxiphoid approach associated with VATET to facilitate bilateral mediastinal fatty tissue dissection. With our patient positioning, the surgeon may work cranially to the head of the patient, and direct surgical instruments toward the pericardiophrenic angles without using sternal retractors or additional incisions. The bilateral thymic lobes are then dissected using standard VATET. The brachiocephalic vein is identified at the upper mediastinum, and traced to its junction with the superior vena cava by meticulous dissection of the thymus, and the intervening thymic veins can be divided between Endoclips (Figure 1D). The only inconvenience of our technique is the need to reposition the patient in the contralateral decubitus position, but it can be accomplished in less than 10 minutes. Clinical evidence suggests a direct correlation between the

Table 1. Data of 20 consecutive patients who underwent bilateral thoracoscopic thymectomy.

Case no.	Age (years)	Sex	Diagnosis	Drainage (days)	Intensive care (days)
1	25	F	Hyperplasia	2	1
2	22	F	Hyperplasia	2	1
3	45	F	Thymoma	2	1
4	60	M	Atrophy	2	1
5	22	F	Hyperplasia	3	2
6	40	F	Thymoma	2	1
7	45	F	Hyperplasia		1
8	60	M	Hyperplasia	3	1
9	60	M	Thymoma	2	1
10	20	F	Hyperplasia	2	1
11	20	M	Normal thymic tissue	2	1
12	17	F	Hyperplasia	3	2
13	22	M	Hyperplasia	2	1
14	25	F	Hyperplasia	3	2
15	29	F	Normal thymic tissue	2	1
16	26	F	Hyperplasia	2	1
17	19	M	Hyperplasia	2	1
18	21	F	Hyperplasia	2	3
19	24	F	Normal thymic tissue	2	1
20	58	M	Hyperplasia	2	2

completeness of thymectomy and the outcome for myasthenia patients.[6] Thus our technique may be a valid development of VATET, allowing complete resection of ectopic tissue in an area such as the pericardiophrenic region, which is often difficult to visualize using the standard technique.

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Conflicts of interest statement

None declared.

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