How to Do It

The Development of New Instruments (NT forceps) for Video-Assisted Thoracoscopic Surgery

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Abstract
A new type of forceps (NT forceps) was developed in November 2007, designed for dividing connective tissues and for holding tissue together. These forceps measure 32 cm in length and are made of stainless steel. The insides of the forceps have atraumatic dispositions because longitudinal notches are placed on them. Therefore, they can grasp important soft organs such as the lung, azygos, or pulmonary vein. In addition, the acral forceps also possess carbide chips with cross notches. They can therefore hold vessel tape, sutures, etc. There are two types of forceps, which are curved at different angles, either a sharp angle or a slight angle. The forceps can be used for dividing and holding tissue while performing basic surgical manipulations, especially during an operation using a video-assisted procedure with a minithoracotomy. These forceps are useful tools for performing technical manipulations for standard operations, such as a lobectomy.

Key words
Video-assisted thoracoscopic surgery · New instrument · NT forceps

Introduction
New forceps have been produced by Solve Co. Ltd (Yokohama, Japan), and these instruments (NT forceps) are now commercially available in Japan (Fig. 1). The new instruments were developed in November 2007. NT forceps are designed for dividing connective tissue and for holding tissue together. The forceps measure 32 cm in length and are made of stainless steel. These instruments can therefore be used during a video-assisted thoracoscopic surgery (VATS) operation with a minithoracotomy. The insides of the forceps have atraumatic dispositions because they contain longitudinal notches. Therefore, they can grasp important soft organs such as the lung, azygos, or pulmonary vein. In addition, the acral forceps also possess carbide chips with cross notches that improve their grasping ability. Therefore, they can hold vessel tape, sutures, etc. (Fig. 2). There are two types of forceps curved at different angles, either at a sharp angle or a slight angle.

Technique
A lobectomy for a cancer patient (stage I) is usually performed through a minithoracotomy of the auscultatory triangle with a 5–7-cm skin incision using video-assisted procedures, with two access ports. The forceps can be used for dividing and holding tissue while performing basic surgical manipulations, especially during a lung resection using a thoracoscope. The forceps open automatically and easily with appropriate power because they are powered by a spring in a “pencil-grip” manner. Exfoliation of the tissue can be performed when the closed acral forceps are inserted into soft areas of some tissue. The exfoliating forces result from the restitutive spring power of the forceps. The forceps have been used in combination with other techniques and instruments such as electrocautery, scissors, and new devices (e.g., LigaSure; Valleylab, Boulder, CO, USA, and Harmonic Scalpel; Ethicon Endo-Surgery, Cincinnati, OH, USA). The apex of the forceps should alternately be closed and opened while exfoliations are performed. However, the forceps can be opened naturally at a site of exfoliation, because the forceps utilize the power of the spring. Atraumatic exfoliations can also be performed around blood vessels using the forceps. In addition, the ends of the forceps can also be used to hold and grasp sutures or vessel tape. Cavitation trauma can be avoided when using the Harmonic Scalpel.
around important organs by applying the forceps to sites beside the organs (Fig. 3). The combination of these new devices might allow useful techniques when cases are complicated with severe adhesions in an intrathoracic space. Exfoliation can easily be performed by repeatedly opening and closing the forceps in a loose tissue area. The forceps and the new devices provide effective approaches for a lymphadenectomy and can spread the mediastinum space using their spring, especially during a VATS procedure. The forceps and new devices are repeatedly used for dividing and cutting connective tissues during such operations. The combination of the forceps and new devices (such as LigaSure and Harmonic Scalpel) can be effectively utilized for the resection of a mediastinum tumor, because the area surrounding the mediastinum includes many important organs and vessels associated with the cardiovascular system (Fig. 4). A tumor resection can be effectively performed by separating the tumor from those organs in the area of mediastinum. The forceps are useful tools for avoiding important organs surrounding the lesion when there are physical limitations to handling instruments in confined spaces. These forceps have been used for almost all procedures performed at this institute since December 2007, and no complications have occurred as a result of their use.

Discussion

A lobectomy is a standard surgical operation for lung cancer. Recently, the general surgical approach for this