

Potential surgical challenge: Hooking the staple stump



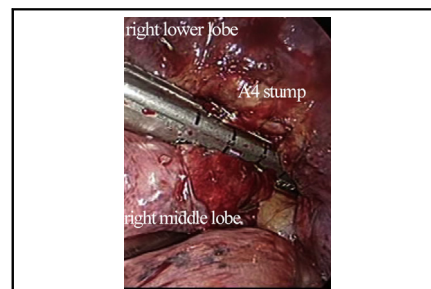
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Video clip is available online.

A 61-year-old man was referred to our hospital with an abnormal shadow on a radiograph of the chest. Computed tomography of the chest revealed a 20-mm nodule in the middle lobe of the right lung, which was suspected as primary lung cancer. This study was conducted in accordance with the Declaration of Helsinki and approved by the research review board of Kansai Medical University Hospital (approval no. 2015630, approval date: December 16, 2019). Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Thoracoscopic right middle lobectomy was performed for diagnosis using an Endo GIA Universal Stapler (Medtronic, Minneapolis, Minn). After minor fissures, A4 and A5 were autosutured, we stapled the right middle lobe bronchus, and tried to open the jaws by pulling the black return knob. The moving lower clamp cover hooked the edge of the staple stump of A4 and stressed the main right pulmonary artery (Figure 1). We immediately stopped pulling the black return knob and released the hooking staple stump using endoscopic forceps without damaging the pulmonary artery (Video 1).

The reported rate of adverse events related to vascular stapling during the video-assisted thoracoscopic surgery is 2.2% to 4.1%.^{1,2} The main causes of vessel injury (90%) are technical and visual insufficiency.³ We used a manual-type stapler, which allowed us to stop stapling. If we used the electric-type, it quite likely would have led to vascular



Involvement of the staple stump using the lower clamp cover of the stapler.

CENTRAL MESSAGE

Knowledge of the potential risk of staple stumps becoming entangled in the lower clamp cover of the stapler could be helpful for decreasing difficulties during stapling.

See Commentaries on pages 78 and 80.

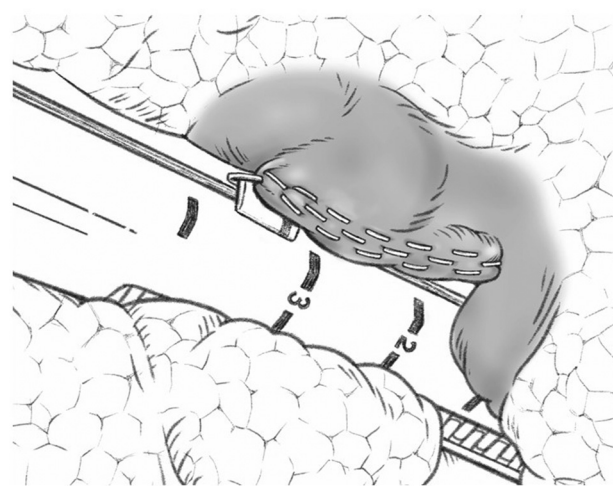


FIGURE 1. The moving lower clamp cover hooked the edge of the staple stump of A4, stressing the main right pulmonary artery.

injury. Since stapling devices other than Covidien and robotic-type staplers lack parts, such as a lower clamp cover, it is highly unlikely that stapling difficulties will occur. To prevent mishaps such as the present case, surgeons should keep the lower clamp cover and staple stump away from each other while stapling.

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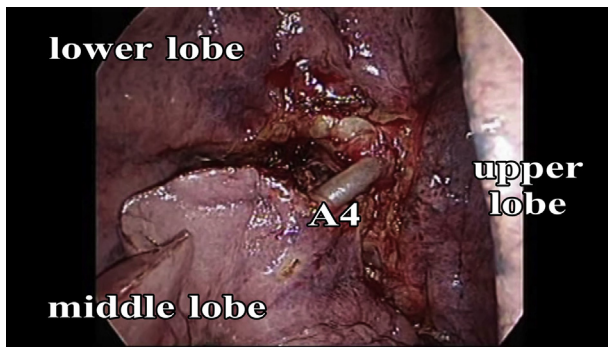
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VIDEO 1. After we dissected the minor fissures, A4 and A5 were isolated and stapled. Next, the right middle lobe bronchus was exposed and stapled. We tried to open the jaws by pulling the black return knob; however, the moving lower clamp cover hooked the edge of the staple stump of A4 and stressed the main right pulmonary artery. We immediately stopped pulling the black return knob and released the hooking staple stump using endoscopic forceps without tearing the pulmonary artery. We then pulled the black return knob completely to transect the residual bronchus. Finally, we autosutured the major fissures and middle lobe pulmonary vein. The Endo GIA Universal Stapler can use different-length cartridges and does not compress the tissue until firing, resulting in less organ damage. Manual-type GIA staplers may pose a risk of failure due to hand movement and different tissue thicknesses, whereas electric-type staplers reduce these risks. However, once the electric-type stapler is activated, the operation should not be interrupted. Video available at: [https://www.jtcvs.org/article/S2666-2507\(21\)00745-8/fulltext](https://www.jtcvs.org/article/S2666-2507(21)00745-8/fulltext).

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