

*A case report*

**Simultaneous hepatic and pulmonary resection for metastatic colonic carcinoma under thoraco-laparotomy with right oblique incision: Case report**

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## **ABSTRACT**

**Abstract** To achieve complete resection of metastatic colonic carcinoma in the liver and lung, thoraco-laparotomy-assisted simultaneous resection was attempted in a 60-year-old male patient who had previously undergone sigmoidectomy for primary sigmoid colon carcinoma. A solitary liver metastasis was observed in segment 7 and a solitary lung metastasis was located in segment 6 of the right lower lung. Simultaneous resection was attempted and, in the left lateral position, a thoraco-laparotomy with oblique incision was made in the right seventh intercostal space. Both tumors could be palpated under a good operative view. A partial hepatectomy was performed followed by a segmental resection of the lung. A chest drainage tube was inserted for two nights after operation. The patient had no remarkable complications including pulmonary troubles after surgery and was discharged at day 20 post-operation. For metastatic tumors simultaneously located in the right subphrenic part of the liver and the lower part of the right lung, thoraco-laparoscopy-assisted complete resection is a safe and useful option to achieve curative treatment.

**Key words** Thoraco-laparotomy. Oblique incision. Metastatic colonic carcinoma. Right liver and lung

## INTRODUCTION

To accomplish a safe hepatic resection, it is necessary to obtain better working space during surgery, minimize the length of incision, reduce operation time, and minimize blood loss or mobilization of the liver (1). In the case of hepatic resection of Couinaud's segments 7 and 8, the usefulness of the thoracoabdominal approach with oblique inter-costal incision for hepatectomy in these areas has been previously reported in some reports, including our report (2-4). The thoracoabdominal approach was safe and associated with less operating time compared to the conventional abdominal approach. On the other hand, colorectal carcinomas often simultaneously metastasize to the liver and lung, and surgical resections have been curative for these metastatic diseases (5). Although two different approaches are necessary to remove these lesions, they can be resected via the same incision using the above approach when metastatic lesions are located in the right supra-liver and the right lower lung. In the present report, we demonstrate the simultaneous resection of liver and lung liver metastases originating from sigmoid colon carcinoma using the thoraco-abdominal approach with right oblique incision.

## METHODOLOGY

At our institute, the thoracoabdominal approach is usually performed using an oblique incision along the seventh or eighth intercostal space (**Figure 1**) (4). Parenchymal dissection was accomplished using the forceps crushing-fracture method and the ultrasonic dissector (USU MH-207, Olympus, Tokyo, Japan) (6). In the present case, vascular clamping at the hepato-duodenal ligament, the so-called 'Pringle's maneuver' (7) could not be used because of severe adhesion at the hepatic hilum due to previous liver resections. We used Endopath-Endocutter ATG 45 (staple load; 4.1 mm x 45 mm, Ethicon Endo-Surgery, Johnson & Johnson, Somerville, NJ) for dividing the isolated branch of the pulmonary vein

and Echelon™ 60 Endopath® Stapler (staple load; 5.4 mm x 60 mm, gold cartilage, Ethicon Endo-Surgery) for dividing the lung.

## CASE

A 60-year-old male underwent sigmoid colectomy for colonic carcinoma 19 months previously. Multiple liver metastases were found 8 months after the primary operation and complete hepatic resection was performed. However, 10 months after the hepatic resection, new metastatic lesions were found in segment 7 and 8 of the liver and in the sixth segment of the right lung (**Figure 2 and 3**), and additional resections were planned. Indocyanine green retention rate at 15 minutes (ICG<sub>R15</sub>) was 11% and Child-Pugh classification was A. The patient had no previous pulmonary diseases and pulmonary functions were within normal range. Cartinoembryonic antigen level was increased to 29.3ng/ml.

A 20 cm incision at the 7<sup>th</sup> intercostal space was made (**Figure 4A**). Partial resection of the diaphragm in segment 7 was performed because of direct tumor invasion (**Figure 4B and 5A**), and partial resection of segment 8 was also performed. After the hepatic resection, segmentectomy of segment 6 of the right lung was performed with staplers (**Fig. 4C, D and 5B**). The wound was closed accompanied with a 20 Fr intra-thoracic drainage tube, which was removed at day 2 after the operation. Histological examination showed moderately differentiated adenocarcinoma that had metastasized from the primary colon carcinoma. The resection demonstrated that no tumor was present at the stump. The patient was discharged at day 20 without any complications and continued to be tumor free after 10 months.

## DISCUSSION

Tumors in segments 7 and 8 often invade the diaphragm and combined resection is necessary in these cases. In the present study, it was very easy to reach this invasion and

resect the liver with the diaphragm. Usefulness of the thoracoabdominal approach was indicated by this finding as well. In patients with previous hepatic resections performed with Pringle's maneuver or transection of the hilar hepatic vessels, it is often difficult to reach the hepatic dome via the conventional abdominal approach. Thoraco-laparotomy using a J-shaped incision for right-side hepatectomy allows a better operating field compared with the abdominal approach using subcostal incision (8); however, the disadvantages of this technique include a longer incision and longer operating time (4). The thoracoabdominal approach resolves this problem and excessive mobilization or rotation of the liver can be avoided (2, 3, 9). Patients usually develop pleural effusion and ascites during the postoperative period after thoracotomy. A less invasive approach is necessary in cases of partial resection of the hepatic dome or posterior segmentectomy. The intercostal oblique incision may allow for a shorter incision and a shorter operating time and less likelihood of postoperative fluid collection. Our experience has shown that intercostal or neurogenic pain with thoracotomy is not severe, and most pain suffered after operation might be due to the length of the laparotomy (4). Pleural effusion in the immediate postoperative period cannot be avoided, however, in our experience with liver resections using thoracoabdominal approach, and this complication can be mostly controlled with the use of an intra-thoracic drainage tube for a few days and use of diuretics.

Surgical resection is indicated in metastatic lung carcinomas in order to prolong patient survival (10). Our institute policy is that if a patient has 3 lesions that are at least 3 cm in size, then an operation should be performed, and thoracotomy-assisted lung resection is usually applied (data not published). At this stage, systemic anti-cancer chemotherapy has been used for distant metastasis (11); however, we believe that complete resection is still radical compared to chemotherapy. By applying the thoracoabdominal oblique incision, the right lower lung can be fully observed and pulmonary hilum of this lobe can be confirmed. In

cases such as the present case, it is quite easy to resect the lower lung. Pulmonary complications associated with simultaneous lung resection are a concern (12). At this stage, we cannot determine the relationship between the extension of the lung resection and severity of pulmonary complications using the present method. However, we expect that partial resection or smaller size of segmentectomy of the lung may be tolerated without severe pulmonary dysfunction.

In conclusion, we performed simultaneous resection of the right liver and the right lower lung for colorectal metastases by using a thoracoabdominal approach with limited oblique incision. The patient safely underwent this operation without any postoperative complications, and a sufficient tumor-free period was obtained.

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## Figure Legends

**FIGURE 1** Schematic illustration of the thoracoabdominal incision with an oblique incision.

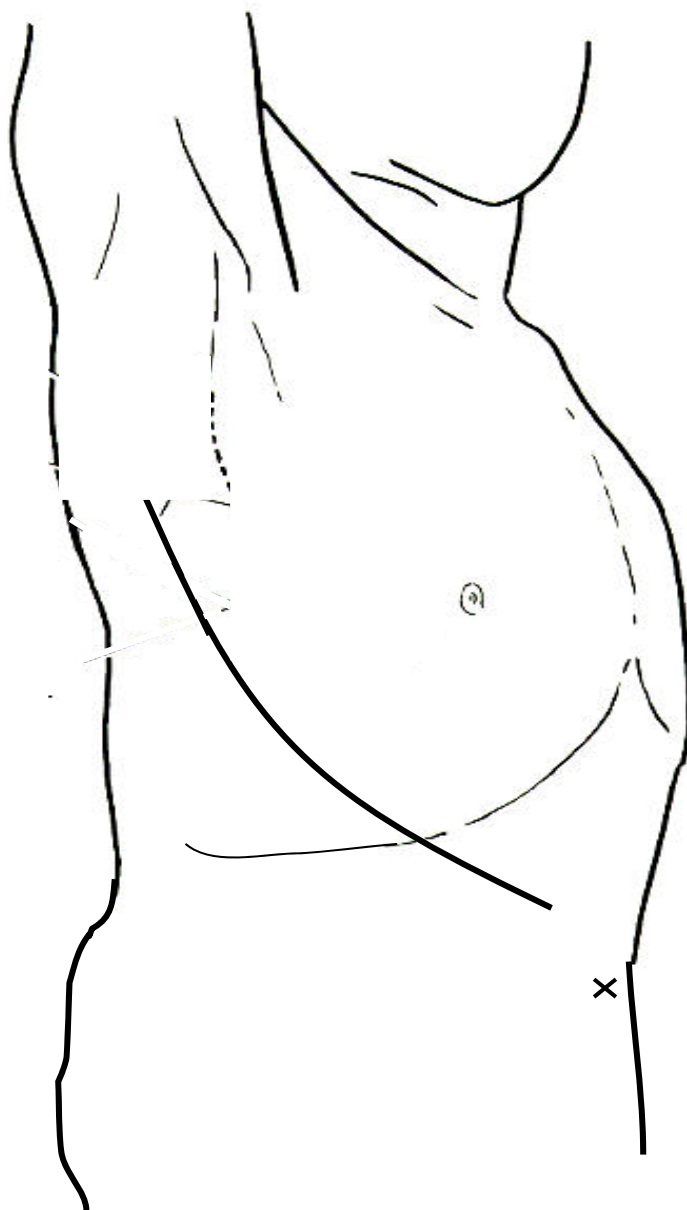
**FIGURE 2** Liver metastases located at the surface of hepatic dome of segment 7 and 8.

**FIGURE 3** Lung metastasis located in segment 6 of the right lower lung.

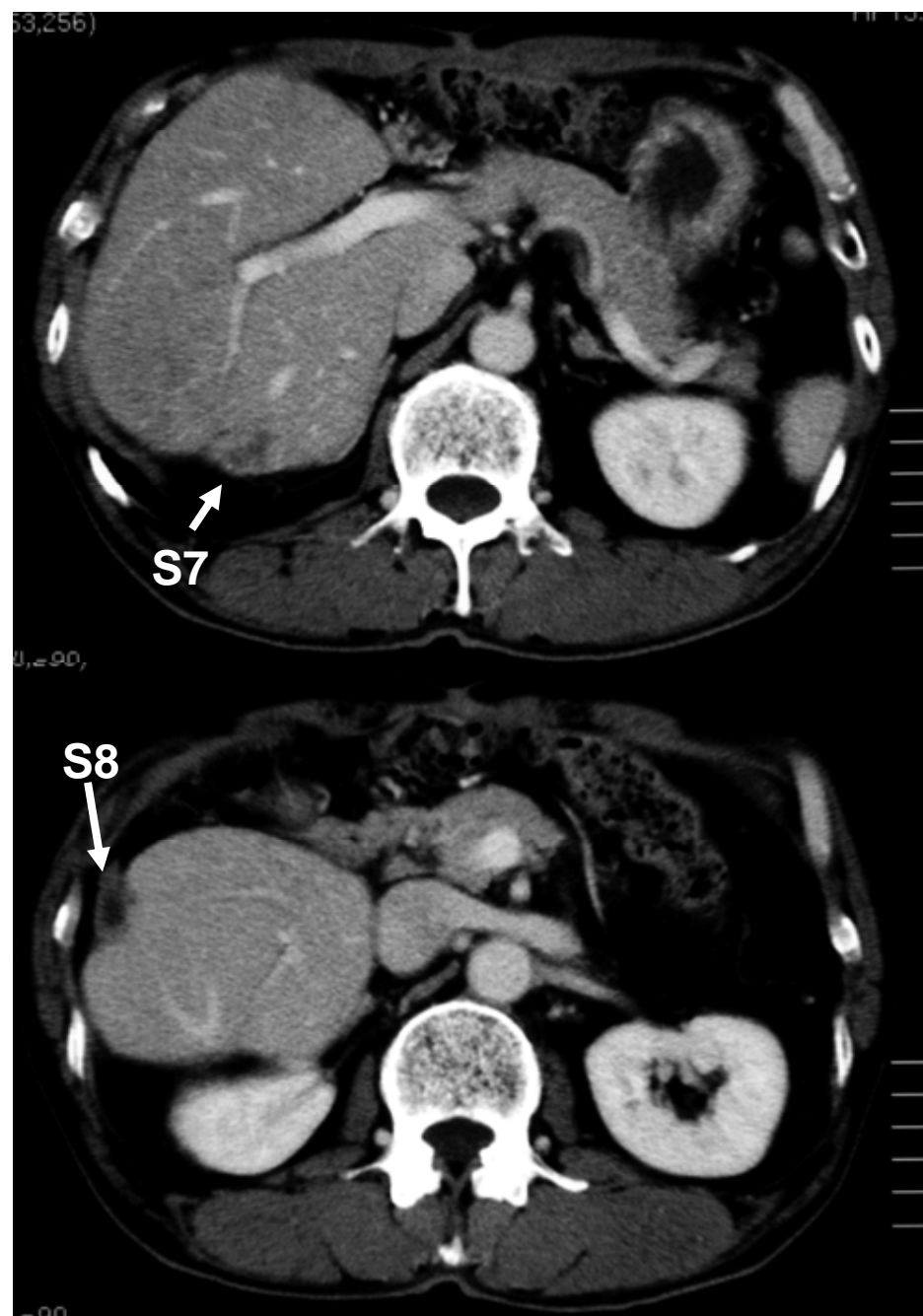
**FIGURE 4** Simultaneous resection of metastatic liver and lung carcinomas. A) Skin incision at the seventh intra-costal space. B) Combined resection of the liver metastasis with invading diaphragm. C) An associated vein in the pulmonary hilum was divided using the stapler. D) Pulmonary segmentectomy of segment 6 was accomplished.

**FIGURE 5** Resected specimens of the liver (A) and lung (B). The dotted line shows the diaphragm and white arrows shows lung carcinoma.

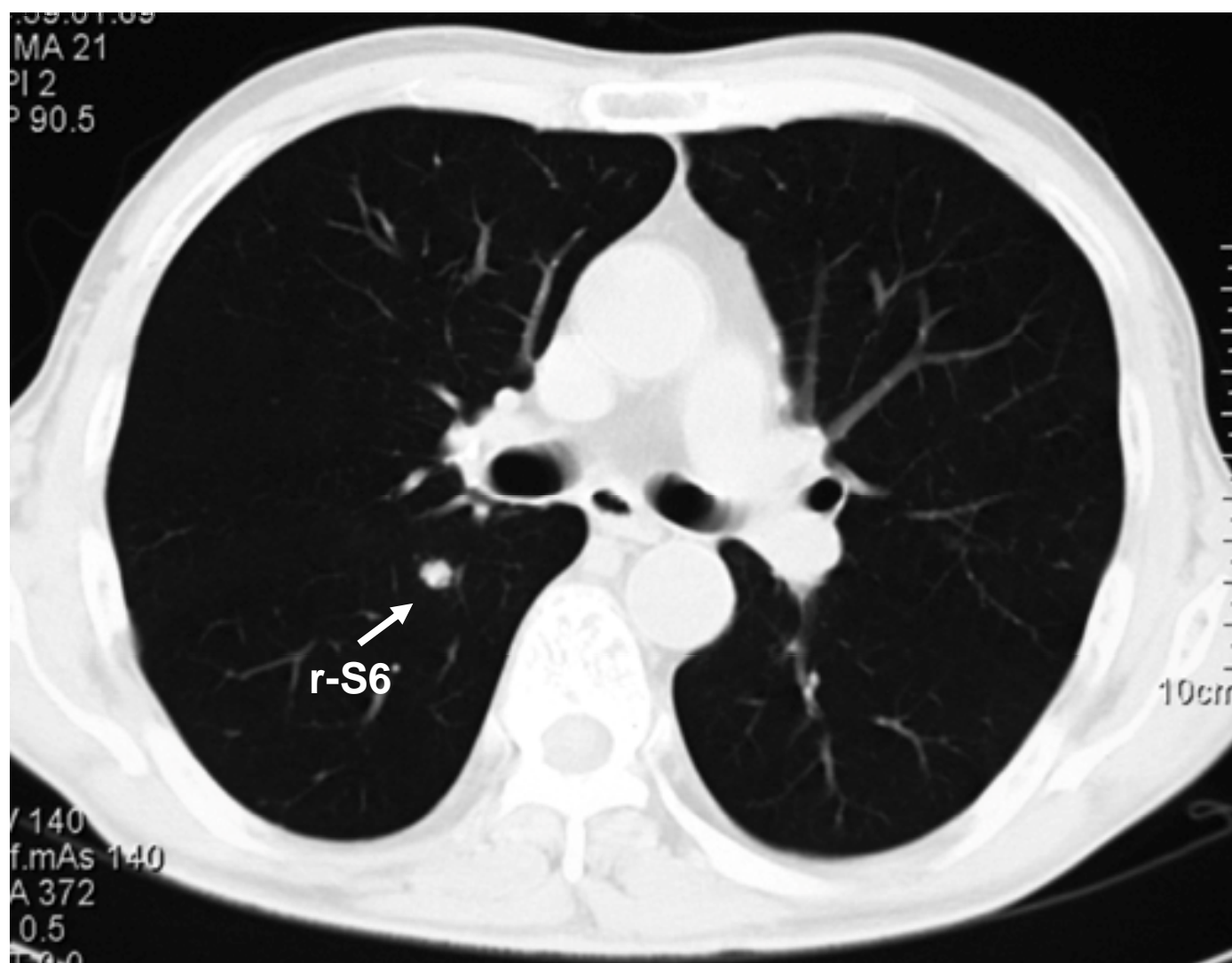
**FIGURE 1**



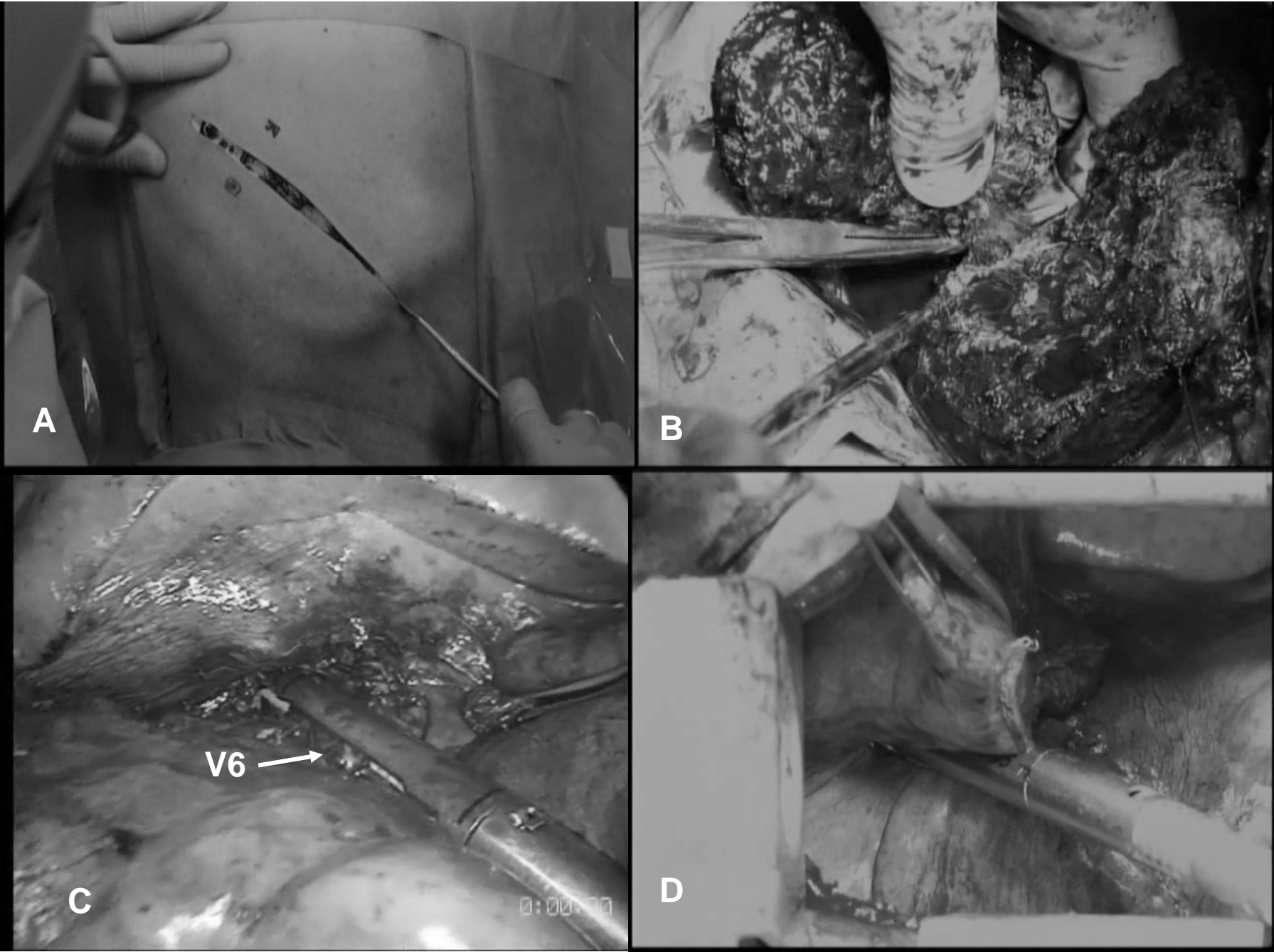
**FIGURE 2**



**FIGURE 3**



**FIGURE 4**



**FIGURE 5**

