Laparoscopic Caudal Approach of the Inferior Vena Cava for Isolated Segment 1 Liver Resection.

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Research Article

Keywords: liver surgery, laparoscopy, segment I, caudate lobectomy, caudal approach, inferior vena cava.

Posted Date: March 2nd, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-252782/v1>

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Version of Record: A version of this preprint was published at Journal of Gastrointestinal Cancer on July 12th, 2021. See the published version at <https://doi.org/10.1007/s12029-021-00665-3>.

Abstract

Introduction:

Isolated segment 1 laparoscopic liver resection is a very challenging procedure. Very few references are available about this laparoscopic technique, so the aim of this article is to show the main technical aspects of laparoscopic caudal approach for segment 1.

Material and Methods:

A 64 years old woman with a past medical history of a breast cancer previously operated (pT1N0M0, with positive hormonal receptors). Adjuvant treatment was done with radiotherapy and hormone-therapy (Tamoxifen). After 12 months of follow-up, a 18 mm single liver metastasis was detected in the segment 1, suggestive of metastatic disease. A complementary study was done with Magnetic Resonance Image, Computed Tomography and Positron Emission Tomography, without other lesions proven.

Result:

A laparoscopic resection of isolated liver segment 1 is performed with a caudal approach of the inferior vena cava. All the steps are carefully described. The surgery time was 120 minutes and the blood loss was less than 100 ml. No postoperative complications were registered. The patient was discharged on the third postoperative day.

Conclusion:

Liver 1 segment resection by laparoscopy with a caudal approach of the inferior vena cava is a secure technique in selected patients and it should be performed in experienced liver surgery and advanced laparoscopy centers, because of its high complexity.

Introduction

Laparoscopic liver resection has shown its benefits around the last years [1]. In the beginning, it was only performed for anterior liver segments but, with technical improvements, it has been extended to more complex resections and also for posterior liver segments resections.

Isolated segment 1 laparoscopic liver resection is a very challenging procedure. Some few references are available about this laparoscopic technique [1–5], so the aim of this article is to show the main technical aspects of laparoscopic caudal approach for segment 1.

Case Report

A case of a 64 years old woman is presented, with a past medical history of a breast cancer previously operated (pT1N0M0, with positive hormonal receptors). Adjuvant treatment was done with radiotherapy

and hormone-therapy (Tamoxifen). After 11 months of follow-up, an 18 mm single liver metastasis was detected in the segment 1, suggestive of metastatic disease. A complementary study was done with Magnetic Resonance Image, Computed Tomography and Positron Emission Tomography, without other lesions proven. The patient was evaluated in a multidisciplinary committee and proposed for liver resection.

Laparoscopic Technical Aspects

The patient was situated in a supine position, with anti-Trendelenburg and French position. A vacuum mattress was used to fix the patient to the surgical table. The surgeon was situated between the legs of the patient, the first assistant on the left side of the patient and the second assistant on the right side of the patient. Trocars were positioned as follows: 12 mm supraumbilicus (for the 30° camera), 12 mm in the right and left side of the abdomen and 5 mm subcostal right, subcostal left and in the epigastrium.

An exploratory laparoscopy was done, showing no other findings in the abdomen cavity. A laparoscopic liver ultrasound was performed intraoperatively and a single segment 1 liver lesion was confirmed.

The first step, as shown in the video, was to section the round ligament and the left triangular ligament, to allow moving the left hepatic lobe to the right side of the patient. The left paracaval edge of the segment 1 was initially approached. Then, a caudal approach of the inferior vena cava was done (Fig. 1), separating it from the segment 1 of the liver, using a sealant instrument (LigaSure™) to ligate the inferior vena cava branches. A Pringle maneuver was done with an ischemic preconditioning (10 minutes of liver ischemia followed by 10 minutes of liver perfusion) and then a continue extracorporeal Pringle maneuver was done; the liver parenchyma transection was performed with an ultrasonic dissector, bipolar and monopolar coagulation. The segment 1 portal branch was sectioned with an endo GIA™ (Fig. 2). The specimen was removed from the abdomen with a protector bag through a 3 cm skin incision supraumbilical. The surgery time was 120 minutes and the blood loss was less than 100 ml.

The postoperative course was excellent, without any complication and the patient was discharged on the third postoperative day. The definitive histopathological analysis showed a hepatocellular adenoma associated to α -1-FHN mutation. The liver margins were free of disease.

Discussion

In 2006 were published the first cases of segment 1 laparoscopic liver resection[2], showing that localization of liver metastases is not a limitation for a laparoscopic approach.

Depending on the site and number of metastases, the segment 1 of the liver can be addressed by different sides [4]: by the left side of segment 1, which is the most common approach in laparoscopic liver resection, because there are more technical advantages [5]; by the posterior right approach, which is more often used in great tumors located in the right side of segment 1. Finally, exist a completely posterior approach, which is less used because its difficulty.

In this case, we chose a combined approach: left and caudal. The reason is because laparoscopic approach gives a better vision of the anterior wall of the inferior cava vein and makes it easy to mobilize the segment 1.

Finally, in our opinion, laparoscopic resection of liver 1 segment with a caudal approach of the inferior cava vein is a secure technique in selected patients and it should be performed in experienced liver surgery and advanced laparoscopy centers, because of its high complexity.

Declarations

Authors contribution: JTM and EHF wrote the manuscript, EHF edited the video, LSC and DCH performed references searching and all authors critically evaluated the manuscript and the video and apported significant contributions.

Conflict of interest: All authors have no conflict of interest. The authors confirm to have full control of all primary data and that they agree to allow the journal to review their data if requested.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

No ethical committee is required. An informed consent of the patient was obtained.

Acknowledgments: None

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Figures

Figure 1

Figure 1

Caudal approach of the liver segment 1 and the inferior vena cava.

Figure 2

Figure 2

Dissection of the portal pedicle of the liver segment 1.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [TurSegment1LapEnd.mp4](#)