

Non-anatomical liver resection using Kelly clamp-crush technique during interval cytoreduction

✉ Ayush Heda¹, ✉ Shalini Rajaram¹, ✉ Nirjhar Raj Rakesh², ✉ Nilotpal Chowdhury³

¹Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, All India Institute of Medical Sciences, Rishikesh, India

²Department of Surgical Gastroenterology, All India Institute of Medical Sciences, Rishikesh, India

³Department of Pathology and Laboratory Medicine, All India Institute of Medical Sciences, Rishikesh, India

Abstract

Ovarian cancer is frequently diagnosed at an advanced stage, with liver metastases commonly observed, adversely affecting prognosis. Achieving complete cytoreduction (R0) is essential for improving overall survival in advanced ovarian cancer. Liver resections, particularly for isolated and resectable lesions, have demonstrated survival benefits. Non-anatomical resections, while preserving functional liver parenchyma, are increasingly employed in this context. This study showcases a surgical video illustrating a non-anatomical wedge liver resection performed for oligometastatic disease as part of interval cytoreductive surgery in advanced-stage ovarian cancer. A young multiparous woman in her 30s with high-grade serous carcinoma of the right ovary and multiple hepatic metastases at diagnosis had a persistent dominant residual liver lesion following neoadjuvant chemotherapy. She had undergone prior right salpingo-oophorectomy. Interval cytoreductive surgery included peritoneal wash for cytology, hysterectomy with excision of left tube and ovary, retroperitoneal lymph node sampling, total omentectomy, peritoneal deposit excision, and non-anatomical liver resection. The surgical peritoneal cancer index was 7. Intra-operative ultrasound guided localization of a 2.5×2 cm intraparenchymal lesion in liver segments IVB/V. Wedge resection with adequate margins was performed using the Kelly clamp-crush technique, LigaSure, and monopolar cautery after ligation of the distal middle hepatic vein. The postoperative recovery proceeded without complications. Metastatic carcinoma in the liver lesion and peritoneal deposit, with no residual disease in other specimens were reported from histology. The patient received three cycles of adjuvant chemotherapy and remains disease-free at 18 months of follow-up. Non-anatomical liver resections are feasible and safe in advanced ovarian cancer with resectable oligometastatic hepatic disease and should be integrated into cytoreductive surgery when indicated. While recent evidence supports the safety and survival benefits of liver resections, additional research is needed to clarify their prognostic significance in advanced ovarian cancer. [J Turk Ger Gynecol Assoc. 2026; 27(3): 226-8]

Keywords: Advanced ovarian cancer, liver metastasis, non-anatomical liver resection, cytoreductive surgery, oligometastatic disease

Received: January 2, 2025 **Accepted:** July 7, 2026 **Publication Date:** September 04, 2026

Introduction

Ovarian cancer is identified at advanced stages. The International (Federation of Gynecology and Obstetrics stage IIIC-IV) in 60-80% of cases, often necessitating visceral organ resections to attain optimal cytoreduction. Among metastatic

sites, the liver is one of the most commonly affected and is associated with a poor prognosis. At present, the negative correlation between residual tumor after cytoreduction and overall survival is universally acknowledged, and liver resection appears to offer a survival advantage for patients with ovarian cancer liver metastases.



Address for Correspondence: Shalini Rajaram

e-mail: rajaram.shalini@gmail.com **ORCID:** orcid.org/0000-0003-3721-6350

DOI: 10.4274/jtgga.galenos.2026.2024-11-14

Cite this article as: Heda A, Rajaram S, Rakesh NR, Chowdhury N. Non-anatomical liver resection using Kelly clamp-crush technique during interval cytoreduction. J Turk Ger Gynecol Assoc. 2026; 27(3): 226-8



Copyright© 2026 The Author(s). Published by Galenos Publishing House on behalf of Turkish-German Gynecological Association. This is an open access article under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND) International License.

Liver resection is indicated in cases where complete resection (R0) extrahepatic cytoreduction can be achieved and when there is an isolated, resectable liver lesion (1). Key considerations for planning hepatic resection include the location, distribution, and number of tumor lesions, as well as the involvement of vascular and biliary structures. Additional factors include assessing the quality of functional liver parenchyma, ensuring adequate vascular supply, and maintaining proper biliary drainage in the residual liver following hepatectomy. Although anatomical liver resections lead to decreased blood loss, non-anatomical resection has greater parenchyma sparing potential (2). Studies have shown that cases with *BRCA* mutations have higher risk of liver metastasis but better survival vis-à-vis women with *BRCA* wild type after liver resection (3). Liver resection has been found to be safe and feasible in advanced ovarian cancer from primary up to quaternary cytoreduction with survival benefits (4).

Case report

A stepwise surgical demonstration of wedge liver metastasectomy integrated into interval cytoreductive management of advanced ovarian carcinoma with oligometastatic hepatic spread.

A multiparous female patient in her 30s, with Eastern Cooperative Oncology Group performance status 1 and body mass index of 31.2 kg/m², was diagnosed with stage IVB high-grade serous carcinoma of the right ovary. She initially underwent right salpingo-oophorectomy with omental biopsy at an outside center. Histopathological review confirmed high-grade serous adenocarcinoma. Subsequent contrast-enhanced computed tomography revealed multiple hepatic metastases. Germline *BRCA1/2* mutation testing was negative.

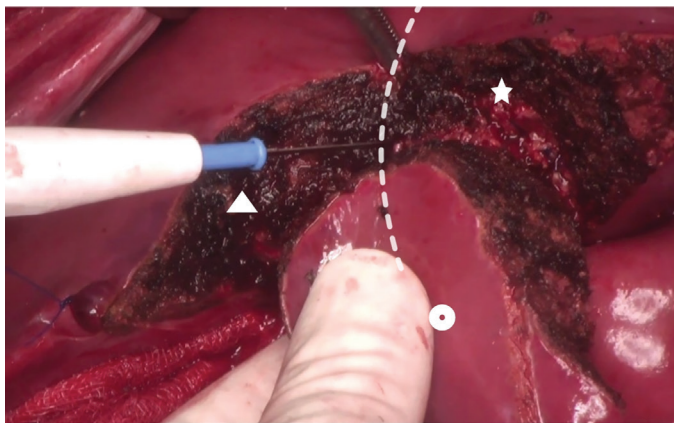


Figure 1. Transection of segment IVB/V of liver with liver metastasis (dotted line, Cantlie's line; star, segment IVB; triangle, segment V; circle, intraparenchymal deposit with 1 cm margin)

The patient received four cycles neoadjuvant chemotherapy with paclitaxel and carboplatin, following which interval imaging demonstrated a reduction in the hepatic disease burden, with a persistent residual hepatic lesion. Following multidisciplinary evaluation, she was planned for interval cytoreductive surgery.

Exploratory laparotomy was performed as part of interval cytoreduction. Following peritoneal washings for cytological assessment, total abdominal hysterectomy with left salpingo-oophorectomy, pelvic lymph node debulking, total omentectomy, and excision of a 2×2 cm subdiaphragmatic peritoneal deposit adjacent to liver segment VI were undertaken. The surgical peritoneal cancer index was 7.

Intra-operative ultrasonography was used to accurately localize a 2.5×2 cm intraparenchymal metastatic lesion involving liver segments IVB/V (Figure 1). After delineating adequate resection margins, non-anatomical wedge liver resection was performed using the Kelly clamp-crush technique in combination with LigaSure and monopolar cautery following ligation of the distal middle hepatic vein (Figure 2). Complete gross cytoreduction was achieved (Figure 3).

Discussion

The post-operative recovery was smooth and without complications. The histopathology report confirmed a metastatic carcinoma in the liver lesion and peritoneal deposit while the rest of the specimens showed no residual disease. Negative surgical margins of the liver specimen were confirmed on histopathological assessment, establishing an R0 resection. Three cycles of adjuvant chemotherapy were administered and the patient is disease free for 18 months and on follow-up at the time of writing.

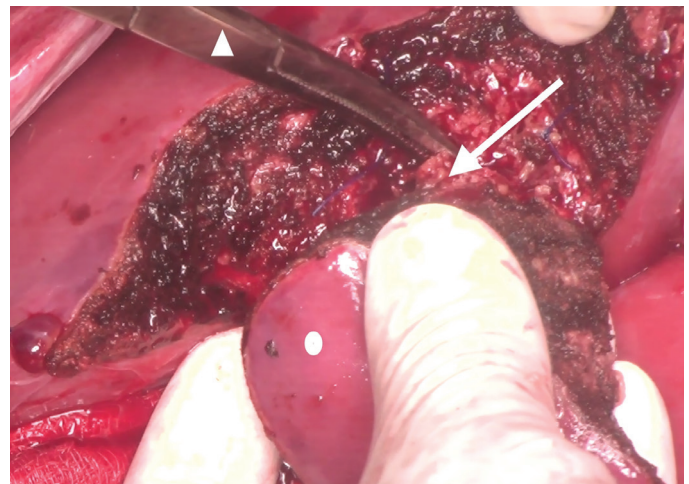


Figure 2. Kelly clamp used to crush the liver parenchyma and identify the underlying vessels (triangle, Kelly clamp; circle, excised liver lesion; arrow, distal middle hepatic vein)

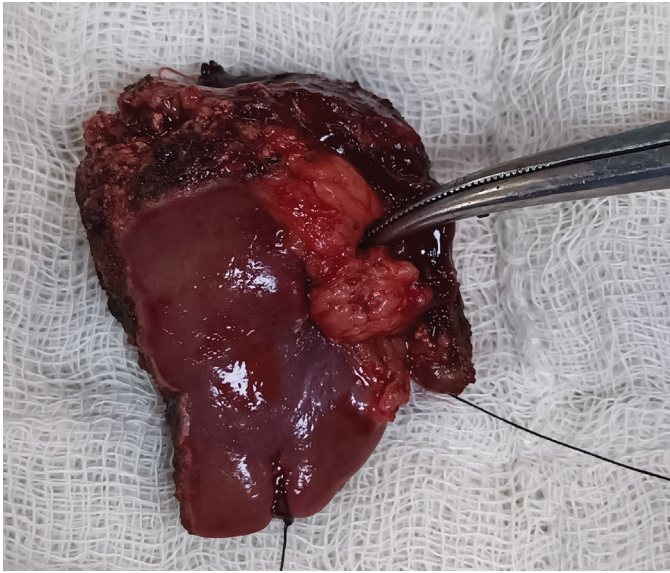


Figure 3. Post-operative specimen for liver segment with 1 cm margin

Conclusion

Non-anatomical liver resection should be integrated into cytoreductive surgical strategies, particularly for cases involving surgically accessible oligometastatic disease. Recent systematic reviews have demonstrated the feasibility and safety of liver resection in such settings. However, additional research is essential to better understand its long-term prognostic implications.

Video 1.



<http://dx.doi.org/10.4274/jtgga.galenos.2026.2024-11-14.video1>

Ethics

Ethics Committee Approval: The ethics committee approval was obtained from Institutional Ethics Committee, All India Institute of Medical Sciences, Rishikesh (AIIMS/IEC/24/62) dated 19/01/2024.

Informed Consent: The authors confirm that written informed consent for publication have been obtained from the involved patients.

Footnotes

Conflict of Interest: No conflict of interest is declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Forte S, Ferrari F, Valenti S, Capozzi VA, Santana BN, Babin G, et al. Liver surgery for advanced ovarian cancer: a systematic review of literature. *European Journal of Gynaecological Oncology*. 2022; 43: 64-72.
2. Braunwarth E, Stättner S, Fodor M, Cardini B, Resch T, Oberhuber R, et al. Surgical techniques and strategies for the treatment of primary liver tumours: hepatocellular and cholangiocellular carcinoma. *Eur Surg*. 2018; 50: 100-12.
3. Zhao H, Xu F, Li J, Ni M, Wu X. A population-based study on liver metastases in women with newly diagnosed ovarian cancer. *Front Oncol*. 2020; 10: 571671.
4. Luna-Abanto J, García Ruiz L, Laura Martínez J, Álvarez Larraondo M, Villoslada Terrones V. Liver resection as part of cytoreductive surgery for ovarian cancer. *J Gynecol Surg*. 2020; 36: 70-5.