ASO AUTHOR REFLECTIONS

ASO Author Reflections: Surgical Strategy for Perihilar Cholangiocarcinoma

Pim B. Olthof, MD, PhD^{1,2,3}, and Bas Groot Koerkamp, MD, PhD¹ on behalf of the Perihilar Cholangiocarcinoma Collaboration Group

¹Department of Surgery, Erasmus Medical Center, Rotterdam, The Netherlands; ²Department of Surgery, Amsterdam UMC, Amsterdam, The Netherlands; ³Department of Surgery, University Medical Center, Groningen, Groningen, The Netherlands

PAST

The goal in the surgical treatment of perihilar cholangiocarcinoma is complete R0 resection, which usually requires major liver resection. The extent of biliary or vascular involvement can dictate the side of the liver that has to be resected. In other cases, a left- or right-sided liver resection can be chosen, which is a frequent subject of debate. Often, an extended right hepatectomy is advocated for the highest probability of R0 resection, however this is associated with a high risk of liver failure due to the small liver remnant.^{1,2}

PRESENT

We performed a large retrospective study on 816 patients who underwent left-sided liver resection and 855 patients who underwent right-sided liver resection for perihilar cholangiocarcinoma. The 90-day mortality rate after right-sided resection was twice that after left-sided resection (18% vs. 9%; p < 0.001). Positive resection margins were similar for both groups but median overall survival was 23 months after right-sided liver resection and 30 months after left-sided liver resection (p < 0.001).

This article refers to: Olthof PB, Erdmann JI, Alikhanov R, et al. Higher postoperative mortality and inferior survival after right-sided liver resection for perihilar cholangiocarcinoma: left-sided resection is preferred when possible. *Ann Surg Oncol.* 2024. https://doi.org/10.1245/s10434-024-15115-0

© The Author(s) 2024

First Received: 20 February 2024 Accepted: 20 February 2024 Published online: 6 March 2024

P. B. Olthof, MD, PhD e-mail: p.olthof@erasmusmc.nl

FUTURE

This study is the largest to date on this subject and highlights that a left-sided resection strategy is better tolerated and is associated with better survival. This study contradicts that extended right hepatectomy should be preferentially performed for perihilar cholangiocarcinoma. It also highlights that the perioperative risks of perihilar cholangiocarcinoma surgery are among the highest of any elective cancer surgery. Modifiable risk factors to decrease liver failure after extended right hepatectomy include better preoperative biliary drainage with less preoperative cholangitis, and liberal use of portal/hepatic vein embolization. A prospective study including all surgical decision-making details might be essential to finally settle the debate on the optimal surgical approach.

ACKNOWLEDGMENT Perihilar Cholangiocarcinoma Collaboration Group: Aldrighetti L, Alikhanov R, Bartsch F, Bechstein WO, Bednarsch J, Benzing C, de Boer MT, Bouwense SA, Buettner S, Capobianco I, Cescon M, Charco R, D'Angelica MI, Dewulf M, de Reuver P, de Savornin Lohman E, Efanov M, Erdmann JI, Franken LC, Geers J, Giglio MC, Gilg S, Gomez-Gavara C, Guglielmi A, van Gulik TM, Hagendoorn J, Hakeem A, Heil J, Hoogwater FJH, IJzermans JNM, Jansson H, Jarnagin WR, Kazemier G, Kingham TP, Lang H, Lodge P, Maithel SK, Malago M, Malik HZ, Margies R, Marino R, Molenaar QI, Nadalin S, Neumann U, Nguyen TA, Nooijen LE, Nota C.L.M, Olde Damink SWM, Poletto E,Porte RJ, Prasad R, Pratschke J, Quinn LM, Ratti F, Ravaioli M, Roberts KJ, Rolinger J, Ruzzenente A, Schadde E, Schmelzle M, Schnitzbauer AA, Serenari M, Sparrelid E, Sultana A, Topal B, Troisi RI, van Laarhoven S, Zonderhuis BM.

DISCLOSURE Pim B. Olthof and Bas Groot Koerkamp report no relevant conflicts of interest or relevant funding.

OPEN ACCESS This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source,

provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

REFERENCES

- 1. Lang H, van Gulik TM. Extended right-hemihepatectomy is preferred for perihilar cholangiocarcinoma. *Ann Surg*. 2021;274(1):33-4.
- Matsumoto N, Ebata T, Yokoyama Y, Igami T, Sugawara G, Shimoyama Y, et al. Role of anatomical right hepatic trisectionectomy for perihilar cholangiocarcinoma. Br J Surg. 2014;101(3):261–8.
- 3. Olthof PB, Erdmann JI, Alikhanov R, et al. Higher postoperative mortality and inferior survival after right-sided liver resection

- for perihilar cholangiocarcinoma: left-sided resection is preferred when possible. *Ann Surg Oncol*. 2024. https://doi.org/10.1245/s10434-024-15115-0
- 4. Olthof PB, Wiggers JK, Groot Koerkamp B, Coelen RJ, Allen PJ, Besselink MG, et al. Postoperative liver failure risk score: identifying patients with resectable perihilar cholangiocarcinoma who can benefit from portal vein embolization. *J Am Coll Surg*. 2017;225(3):387–94.
- 5. Wiggers JK, Groot Koerkamp B, Cieslak KP, Doussot A, van Klaveren D, Allen PJ, et al. Postoperative mortality after liver resection for perihilar cholangiocarcinoma: development of a risk score and importance of biliary drainage of the future liver remnant. J Am Coll Surg. 2016;223(2):321-31 e1.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.