



FIRST WORLD CONGRESS OF THE
**INTERNATIONAL
LAPAROSCOPIC
LIVER SOCIETY**

**LAPAROSCOPIC LIVER RESECTION:
FROM INNOVATION TO STANDARD
PRACTICE**

JULY 6-8 2017

**MAISON DE LA CHIMIE
PARIS - FRANCE**



RESECTION IN DIFFICULT SEGMENT LAPAROSCOPIC LIVER RESECTION

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Contents

- What is difficult locations now?
- Anatomic liver resection.
- Video clips.

Indications of Laparoscopic Resection

- **Contraindication**

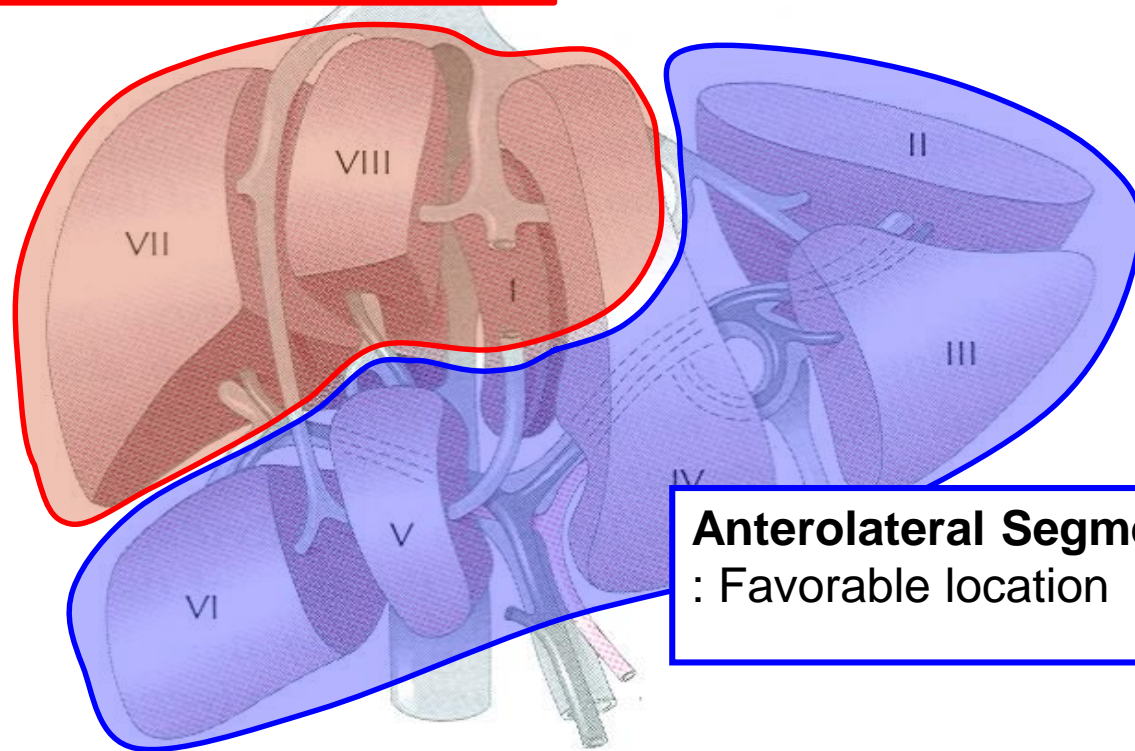
- Large tumor, deeply seated, or **posteriorly** located in the **right lobe**
- Tumor close to the portal bifurcation or suprahepatic junction.

- **Indication**

- Small, superficial, or peripheral
- **Segment 2, 3, 4b, 5, 6**

Still Technically Demanding

Posterosuperior Segments : Unfavorable location



**Anterolateral Segments
: Favorable location**

- Most of the reported cases have had peripheral lesions located in the anterolateral segments (segments 2, 3, 4b, 5, 6).

We, All, have Tried to Overcome Previous Limitation on Location.



JOURNAL OF LAPAROENDOSCOPIC & ADVANCED SURGICAL TECHNIQUES
Volume 16, Number 3, 2006
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Case Report

Total Laparoscopic Right Posterior Sectionectomy for Hepatocellular Carcinoma

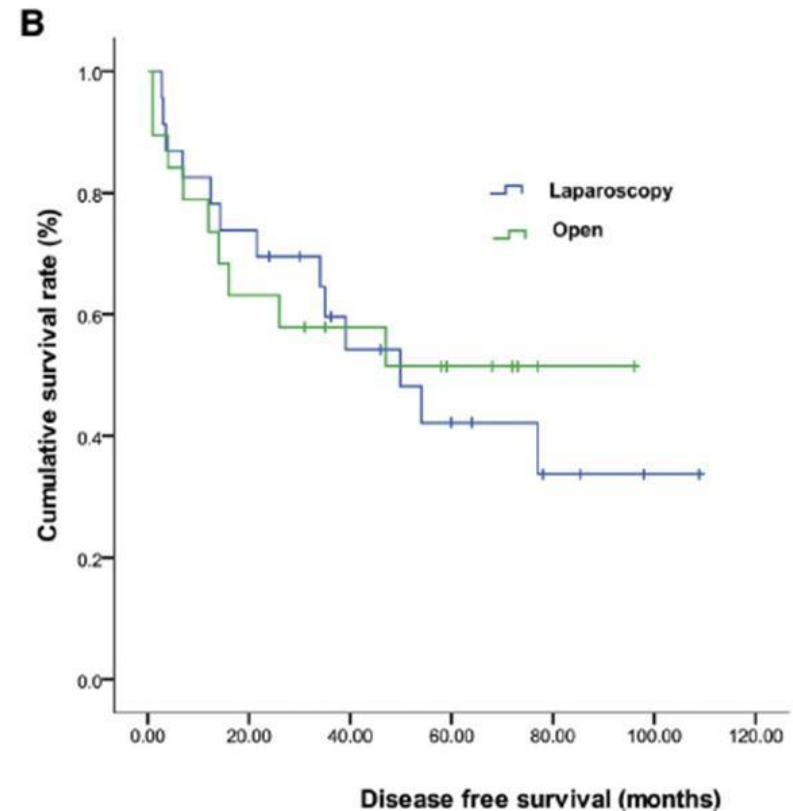
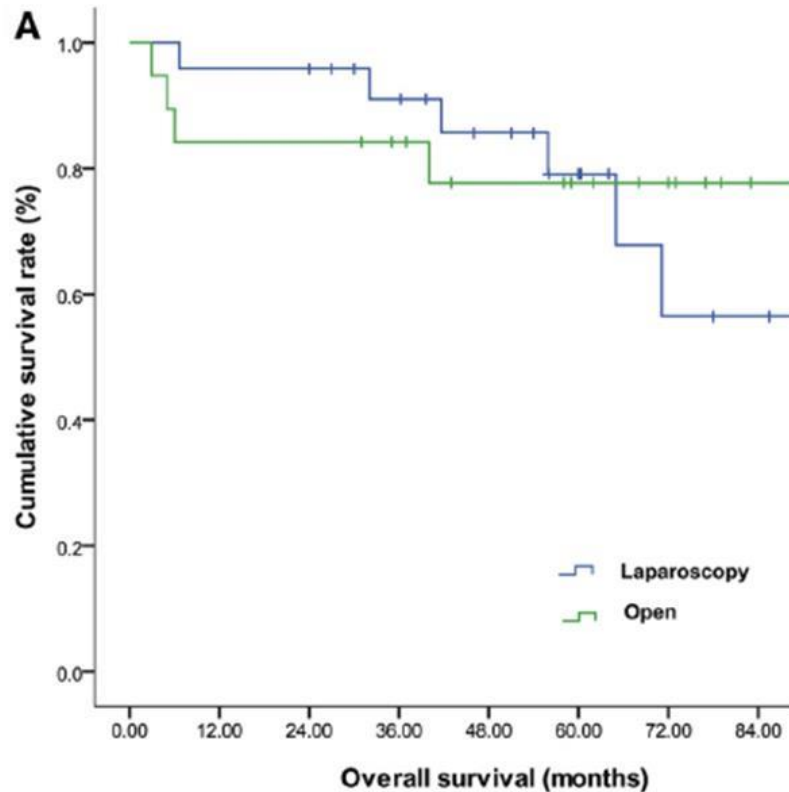
**YOO-SEOK YOON, MD, HO-SEONG HAN, MD, PhD, YOO SHIN CHOI, MD,
JIN-YOUNG JANG, MD, KYUNG-SUK SUH, MD, SUN-WHE KIM, MD,
KUHN UK LEE, MD, and YONG-HYUN PARK, MD**

Outcomes of laparoscopic right posterior sectionectomy in patients with hepatocellular carcinoma in the era of laparoscopic surgery

Jai Young Cho, MD, PhD, Ho-Seong Han, MD, PhD, Yoo-Seok Yoon, MD, PhD,
YoungRok Choi, MD, and Woohyung Lee, MD, *Seoul, Republic of Korea*

Surgery 2015,

Comparison between Laparoscopic & Open Liver Resection after RPS in HCC



Cho JY, Han HS et al. *Surgery* 2015

Feasibility of laparoscopic liver resection for tumors located in the posterosuperior segments of the liver, with a special reference to overcoming current limitations on tumor location

Jai Young Cho, MD, PhD, Ho-Seong Han, MD, PhD, Yoo-Seok Yoon, MD, PhD,
and Sang-Hyun Shin, MD, Seoul, Korea

Surgery 2008;144:32-8.

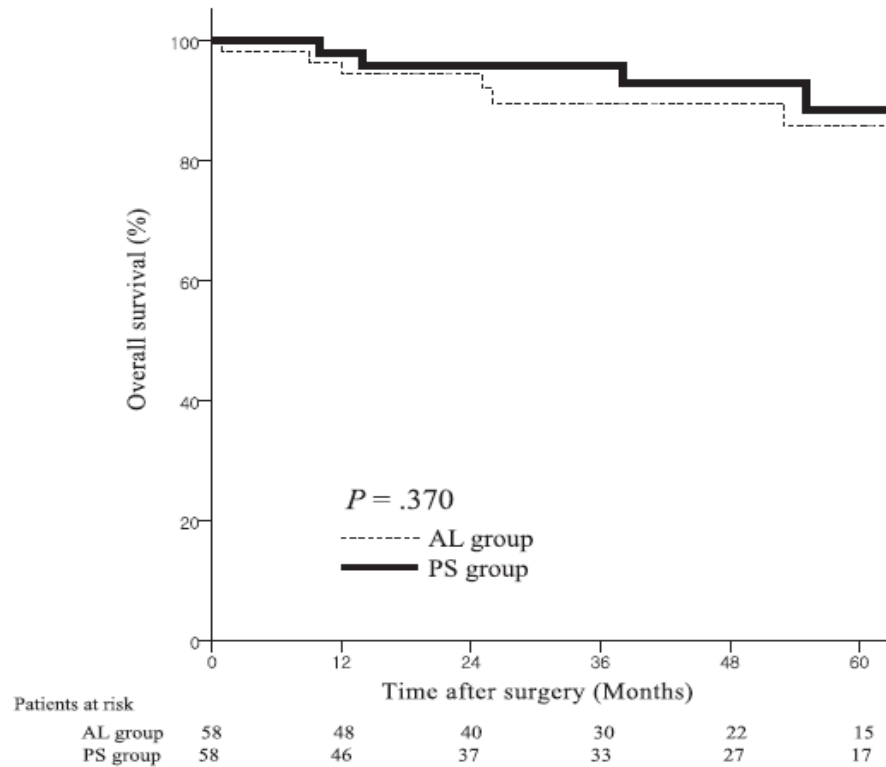
- **Outcomes of laparoscopic liver resection for tumors located in PS is comparable as tumors located in AL.**

Comparison of laparoscopic liver resection for hepatocellular carcinoma located in the posterosuperior segments or anterolateral segments: A case-matched analysis

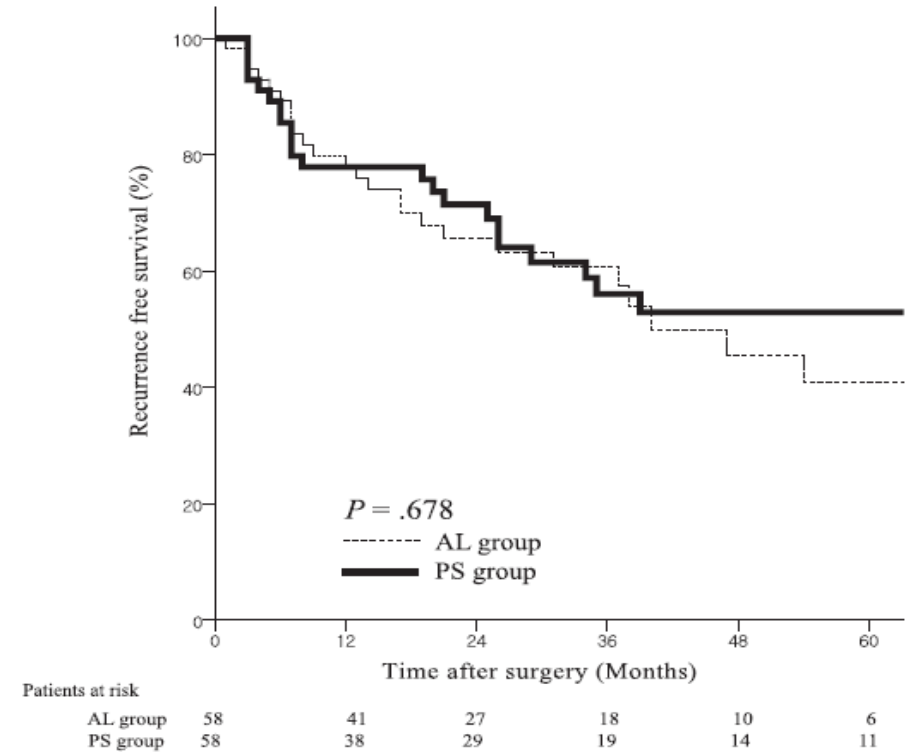
Woohyung Lee, MD, Ho-Seong Han, MD, PhD, Yoo-Seok Yoon, MD, PhD, Jai Young Cho, MD, PhD, YoungRok Choi, MD, Hong Kyung Shin, MD, Jae Yool Jang, MD, Hanlim Choi, MD, Jae Seong Jang, MD, and Seong Uk Kwon, MD, *Seongnam, Republic of Korea*

Lee WH, Han HS et al. *Surgery*, 2016

Post Sup vs. Anterolateral



Overall survival

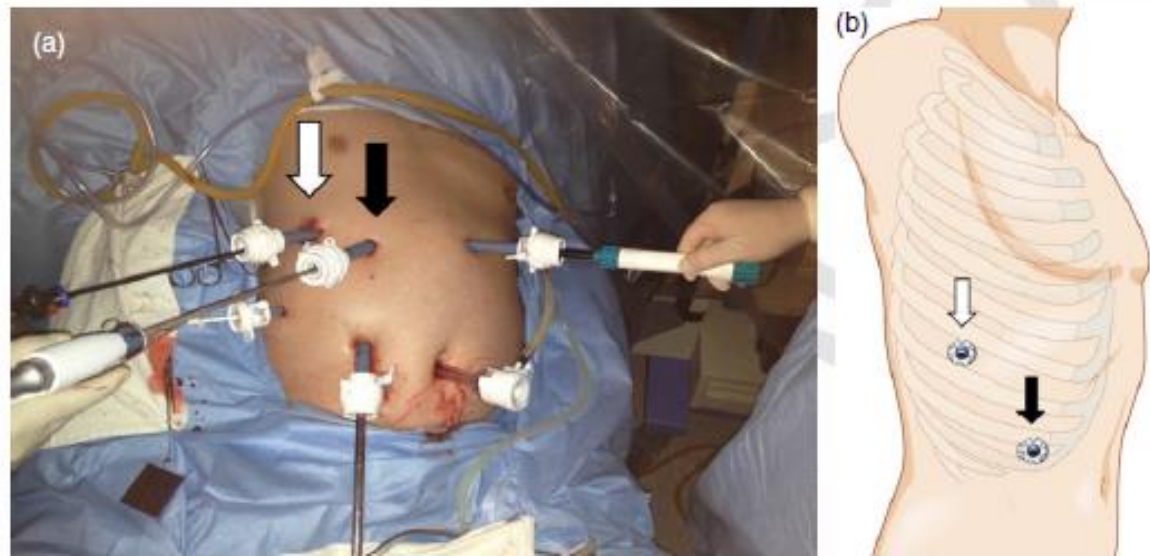


Disease free survival

Role of intercostal trocars on laparoscopic liver resection for tumors in segments 7 and 8

Woohyung Lee · Ho-Seong Han · Yoo-Seok Yoon ·
Jai Young Cho · Young Rok Choi · Hong Kyung Shin

Fig. 1 Trocar placement at the 7th or 9th intercostal space (White arrow, 7th intercostal trocar; black arrow, 9th intercostal trocars)



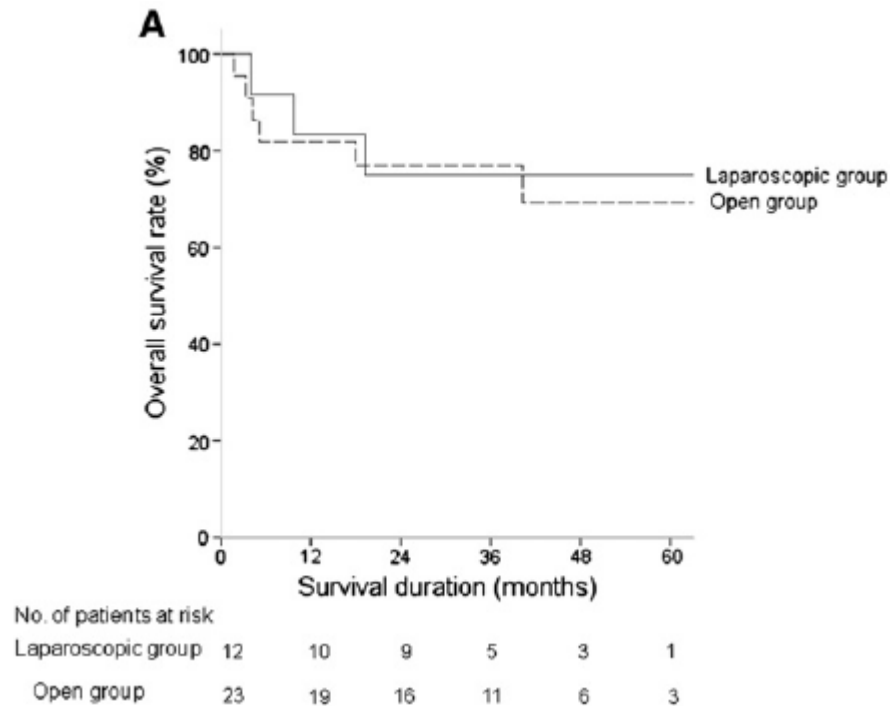
Ishizawa T, Gumbs AA, Kokudo N, Gayet B. Laparoscopic segmentectomy of the liver: from segment I to VIII. Ann Surg. 2012;256:959–64.

Laparoscopic liver resection for centrally located tumors close to the hilum, major hepatic veins, or inferior vena cava

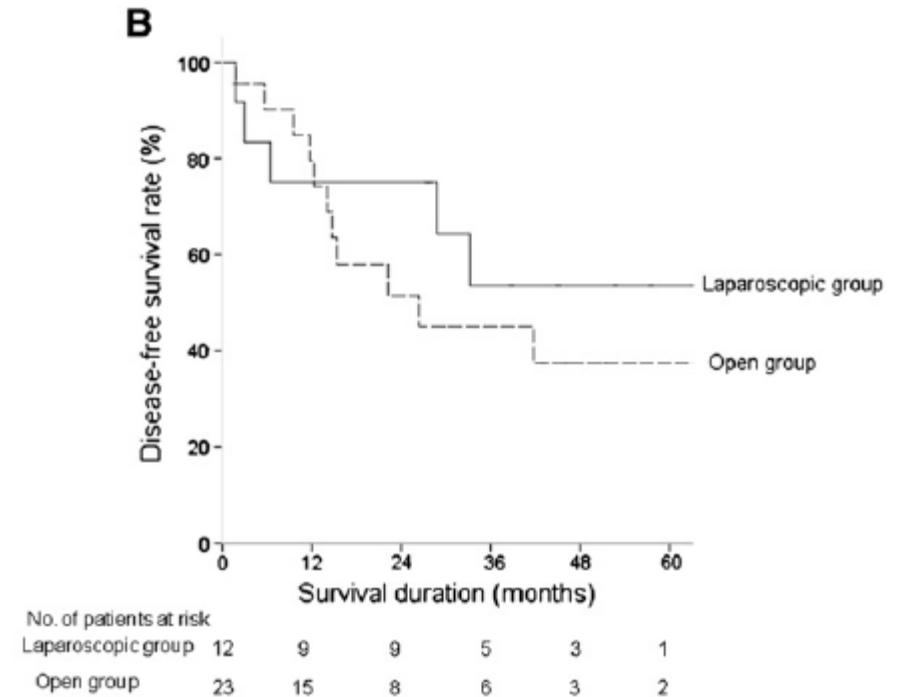
Yoo-Seok Yoon, MD, PhD, Ho-Seong Han, MD, PhD, Jai Young Cho, MD, PhD,
Ji Hoon Kim, MD, *and* Yujin Kwon, MD, *Seoul, Korea*

Yoon YS, Han HS et al. *Surgery*, 2013

Comparison between Open & Laparoscopy



Overall Survival



Ds-free Survival

Fate of Contraindication on LLS



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Anatomic Liver Resection

Anatomic resection including bi & mono-segmentectomy

HCC is usually associated with poor liver function.

Volume preserving as possible.

Resection of only the involved segment.



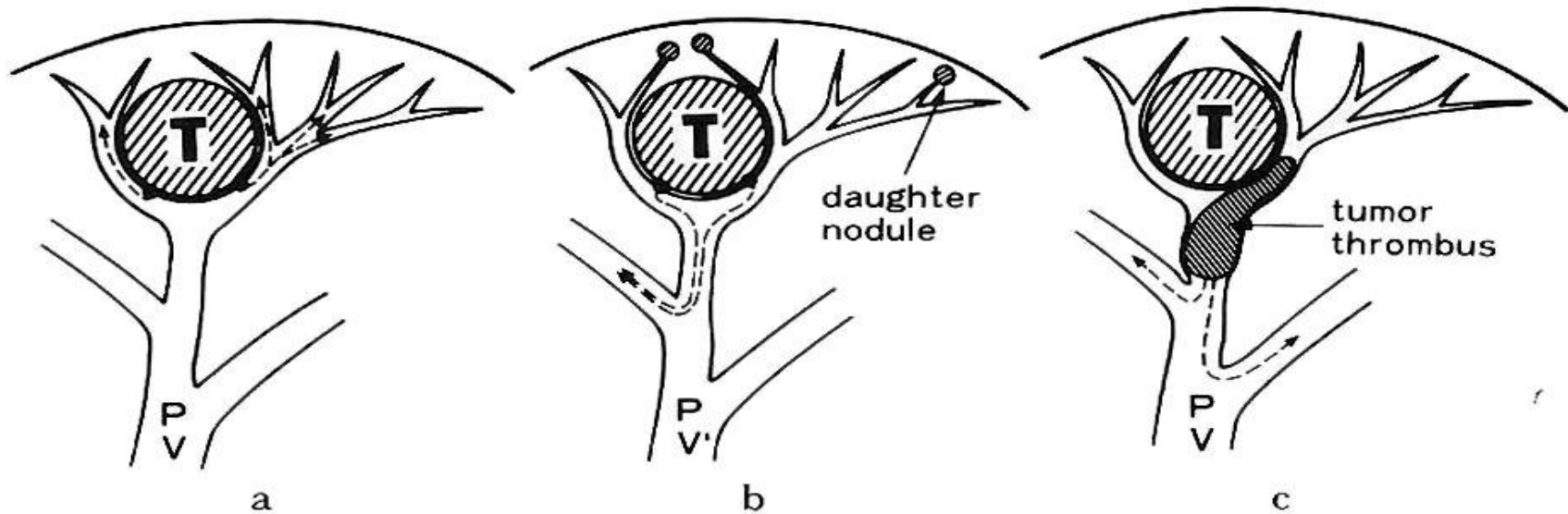
Anatomical Resection

Beneficial in Oncology

HCC invades Portal Vein

HCC intrahepatic metastasis

HCC becomes a source of tumor thrombus



Makuuchi, et al. *Surg Gynecol Obstet* 1985

JAMA Surgery | **Original Investigation**

Association of Remnant Liver Ischemia With Early Recurrence and Poor Survival After Liver Resection in Patients With Hepatocellular Carcinoma

Jai Young Cho, MD, PhD; Ho-Seong Han, MD, PhD; YoungRok Choi, MD; Yoo-Seok Yoon, MD, PhD;
Sungho Kim, MD; Jang Kyu Choi, MD; Jae Seong Jang, MD; Seong Uk Kwon, MD; Haeryoung Kim, MD, PhD



Remnant Liver Ischemia could be more detrimental.

Multivariate Analysis of Prognosis

Table 2. Multivariable Analysis of the Prognostic Factors Associated With Overall Survival and Disease-Free Survival

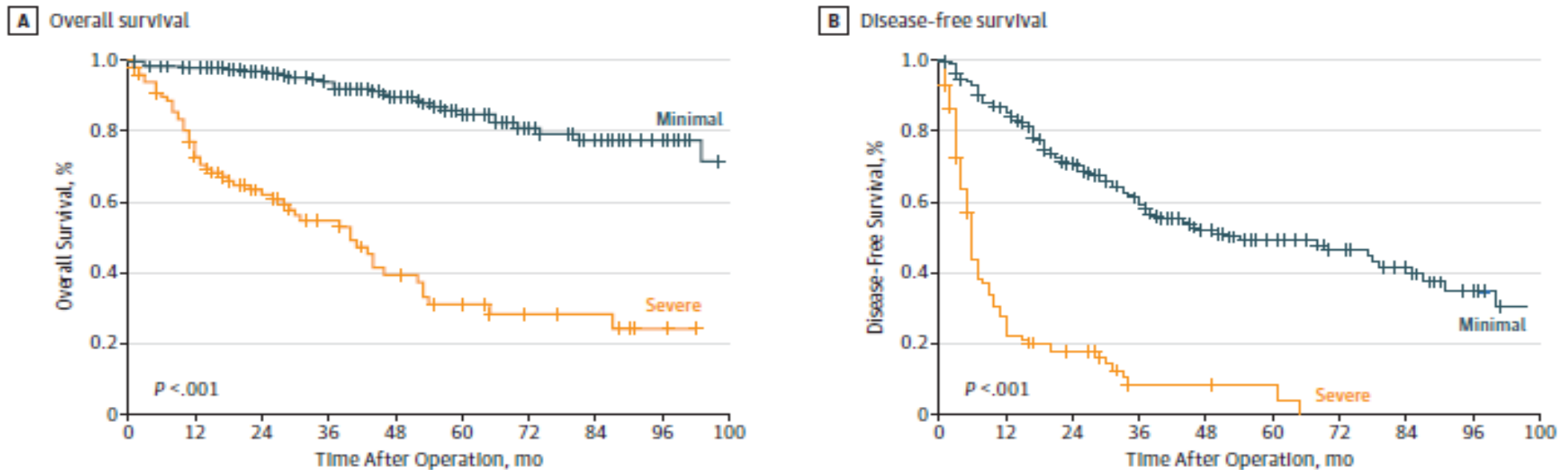
Variable	Overall Survival		Disease-Free Survival	
	OR (95% CI)	P Value	OR (95% CI)	P Value
Male sex	NA	NA	0.84 (0.57-1.25)	.39
ICGR at 15 min >10%	NA	NA	1.25 (0.90-1.73)	.19
Stage T3 or T4	1.66 (0.88-3.13)	.12	1.71 (1.07-2.72)	.03
Previous TACE	NA	NA	0.95 (0.67-1.35)	.78
Child-Pugh classification B or C	1.36 (0.77-2.42)	.29	NA	NA
Severe remnant liver ischemia	6.98 (4.27-11.43)	<.001	5.15 (3.62-7.35)	<.001
Open surgery	1.76 (1.10-2.82)	.02	NA	NA
Intraoperative transfusion	0.98 (0.61-1.58)	.95	NA	NA
Nonanatomical resection	NA	NA	1.57 (1.13-2.19)	.008
Presence of a satellite nodule	1.17 (0.63-2.19)	.62	0.80 (0.51-1.27)	.35
Microscopic vascular invasion	1.16 (0.50-1.42)	.51	1.60 (1.13-2.31)	.008
Multinodular confluent or infiltrative gross tumor type	2.76 (1.13-6.71)	.03	0.81 (0.34-1.94)	.64
Histologically confirmed cirrhosis	1.23 (0.74-2.04)	.43	NA	NA

Cho JY, Han HS et al. *JAMA Surg*, 2017

Association of Remnant Liver Ischemia With Early Recurrence and Poor Survival After Liver Resection in Patients With Hepatocellular Carcinoma

Jai Young Cho, MD, PhD; Ho-Seong Han, MD, PhD; YoungRok Choi, MD; Yoo-Seok Yoon, MD, PhD;
Sungho Kim, MD; Jang Kyu Choi, MD; Jae Seong Jang, MD; Seong Uk Kwon, MD; Haeryoung Kim, MD, PhD

Figure 2. Comparison of Overall Survival and Disease-Free Survival



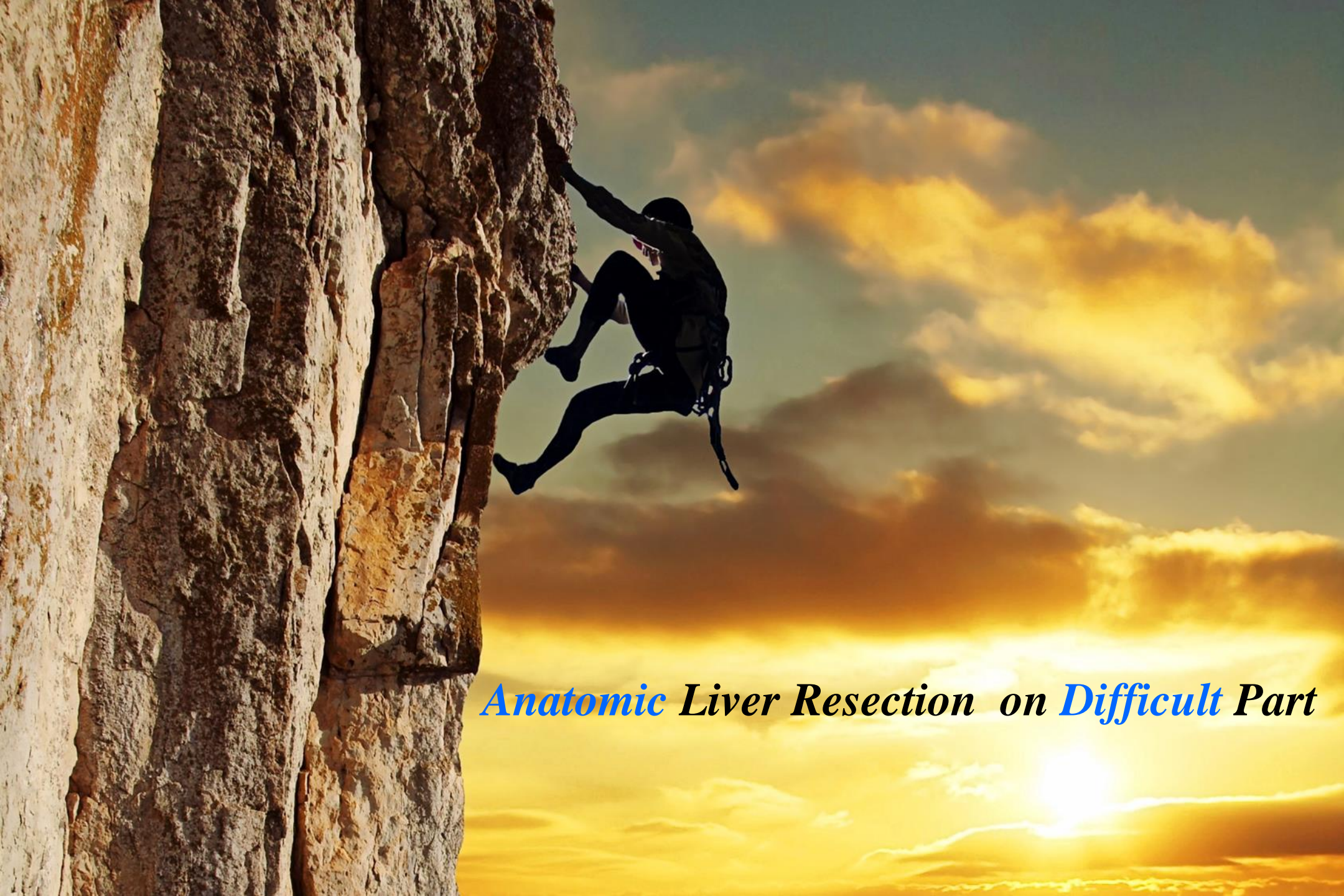
Cho JY, Han HS et al. *JAMA Surg*, 2017

Our Reports on Anatomic LLR

Type of resection	Year	Journal
Left lateral sectionectomy	2006	J Pediatr Surg
Right posterior sectionectomy	2006	J Laparoendosc Adv Surg Tech A
Central bisectionectomy	2009	J Laparoendosc Adv Surg Tech A
Right hepatectomy	2010	Ann Surg Oncol
S5 segmentectomy	2011	J Laparoendosc Adv Surg Tech A
S4 segmentectomy	2011	Surg Laparosc Endosc Percutan Tech
Right anterior sectionectomy	2012	J Laparoendosc Adv Surg Tech A
Extended RPS	2015	Surgery
Living donor right hepatectomy	2015	Surgical Endoscopy
S4a, S4b, ext-S4	2015	J Laparoendosc Adv Surg Tech A,
S3 and S4 Bisegmentectomy	2016	J Laparoendosc Adv Surg Tech A
S2 segmentectomy	2016	J Laparoendosc Adv Surg Tech A
Total caudate lobectomy	2016	J Laparoendosc Adv Surg Tech A
S8 segmentectomy	2017	Ann Surg Oncol
S6 segmentectomy	2017	Surg Laparosc Endosc Percutan Tech

1000 cases of laparoscopic liver resection.

Han HS, Yoon YS, Cho JY, Choi YR et al.



Anatomic Liver Resection on Difficult Part

Total Anatomical Laparoscopic Liver Resection of Segment 4 (S4), Extended S4, and Subsegments S4a and S4b for Hepatocellular Carcinoma

Young Ki Kim, MD, Ho-Seong Han, MD, PhD, Yoo-Seok Yoon, MD, PhD,
Jai Young Cho, MD, PhD, and Woohyung Lee, MD

Laparoscopic Total Caudate Lobectomy for Hepatocellular Carcinoma

Kit-Man Ho, MBBS, FRCS (Edin)^{1,2} Ho-Seong Han, MD, PhD,¹ Yoo-Seok Yoon, MD, PhD,¹
Jai Young Cho, MD, PhD,¹ Young Rok Choi, MD,¹ Jae Seong Jang, MD,¹ Seong Uk Kwon, MD,¹
Sungho Kim, MD,¹ and Jang Kyu Choi, MD¹

ORIGINAL ARTICLE – HEPATOBILIARY TUMORS

Three-Dimensional Laparoscopic Anatomical Segment 8 Liver Resection with Glissonian Approach

Jae Yool Jang, MD¹, Ho-Seong Han, MD, PhD², Yoo Seok Yoon, MD, PhD², Jai Young Cho, MD, PhD², YoungRok Choi, MD², Woohyung Lee, MD³, Hong Kyung Shin, MD⁴, and Han Lim Choi, MD⁵

¹Department of Surgery, Gyeongsang National University Hospital, Jinju, Korea; ²Department of Surgery, Seoul National University Bundang Hospital, Seoul National University College of Medicine, Seoul, Korea; ³Department of Surgery, Gyeongsang National University School of Medicine, Jinju, Korea; ⁴Department of Surgery, The Armed Forces Medical Command, Seongnam-si, Korea; ⁵Department of Surgery, Chungbuk National University Hospital, Cheongju, Korea

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Anatomical S8 segmentectomy for HCC with diaphragm resection



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Laparoscopic total Caudate Lobectomy



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Seoul National University College of Medicine

A sailboat with a large blue sail is sailing on a choppy sea. The sky is blue with white clouds. The water is dark blue with white foam from the waves.

Thank you very much.

Greatness is not in where we stand, but in what direction we are moving. We must sail sometimes with the wind and sometimes against it.

- Oliver Wendell Holmes