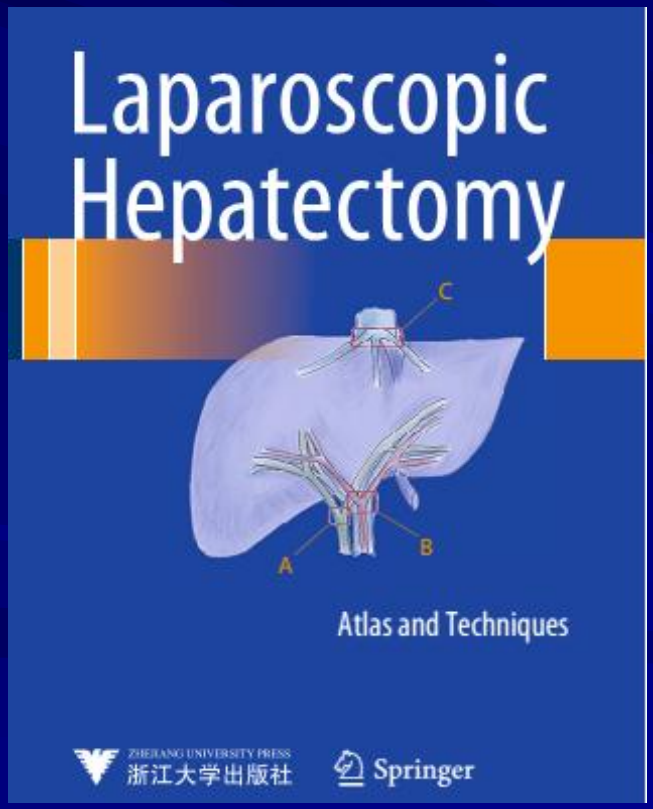
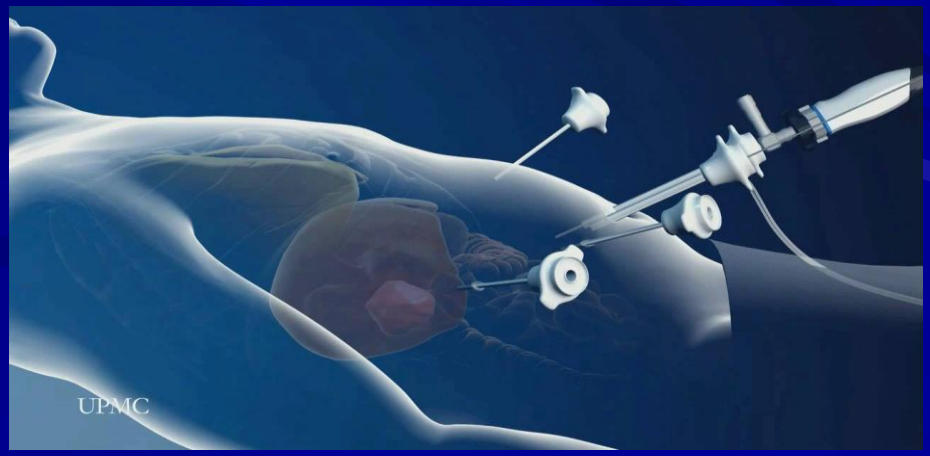
LAPAROSCOPIC HEPATECTOMY IN CHILDREN



TANH NGUYEN, MD

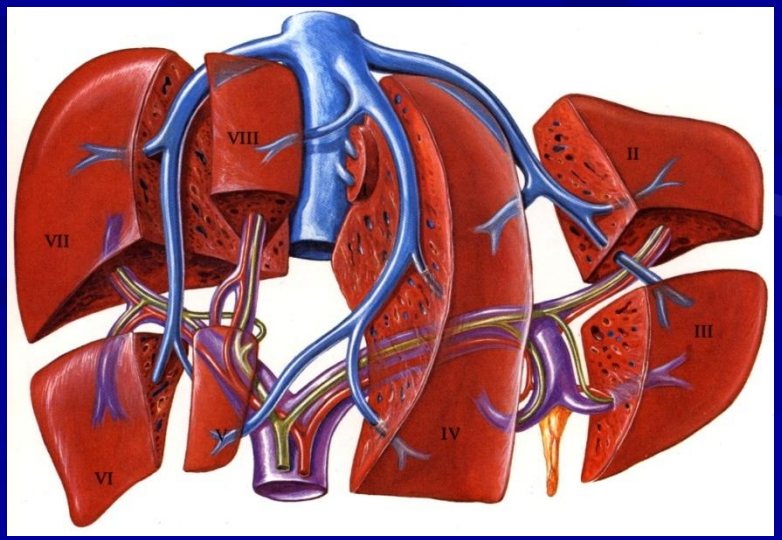
Department of General Surgery

Children's hospital 2



Liver Resection Today

Author	N	Operative Mortality (%)
Scheele ‘91	219	6
Rosen ‘92	280	4
Gayowski ’94	204	0
Scheele ‘95	469	4
Nordlinger ’95	568	2
Jamison, ‘97	280	4
Fong ’99	1001	3

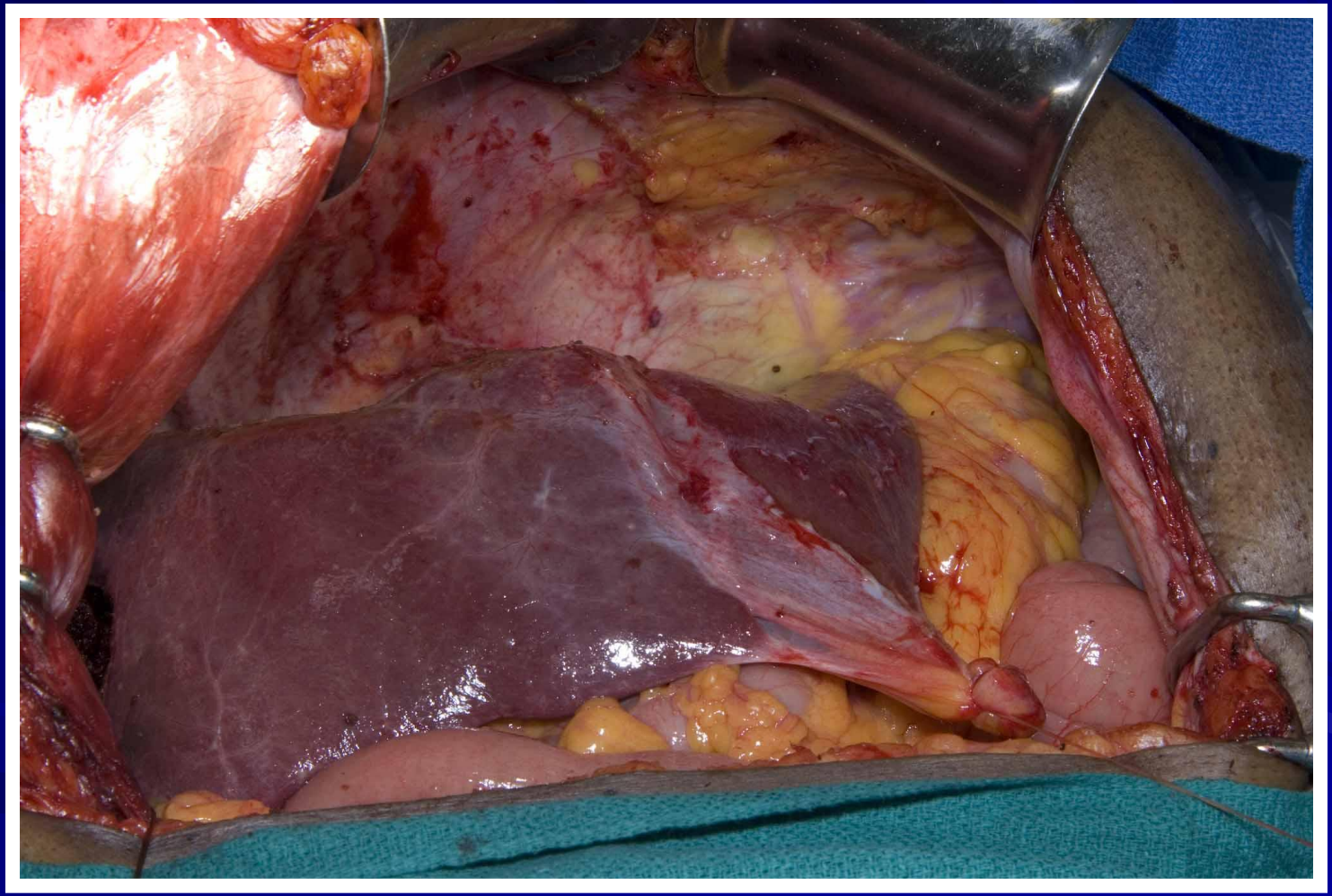


Outline

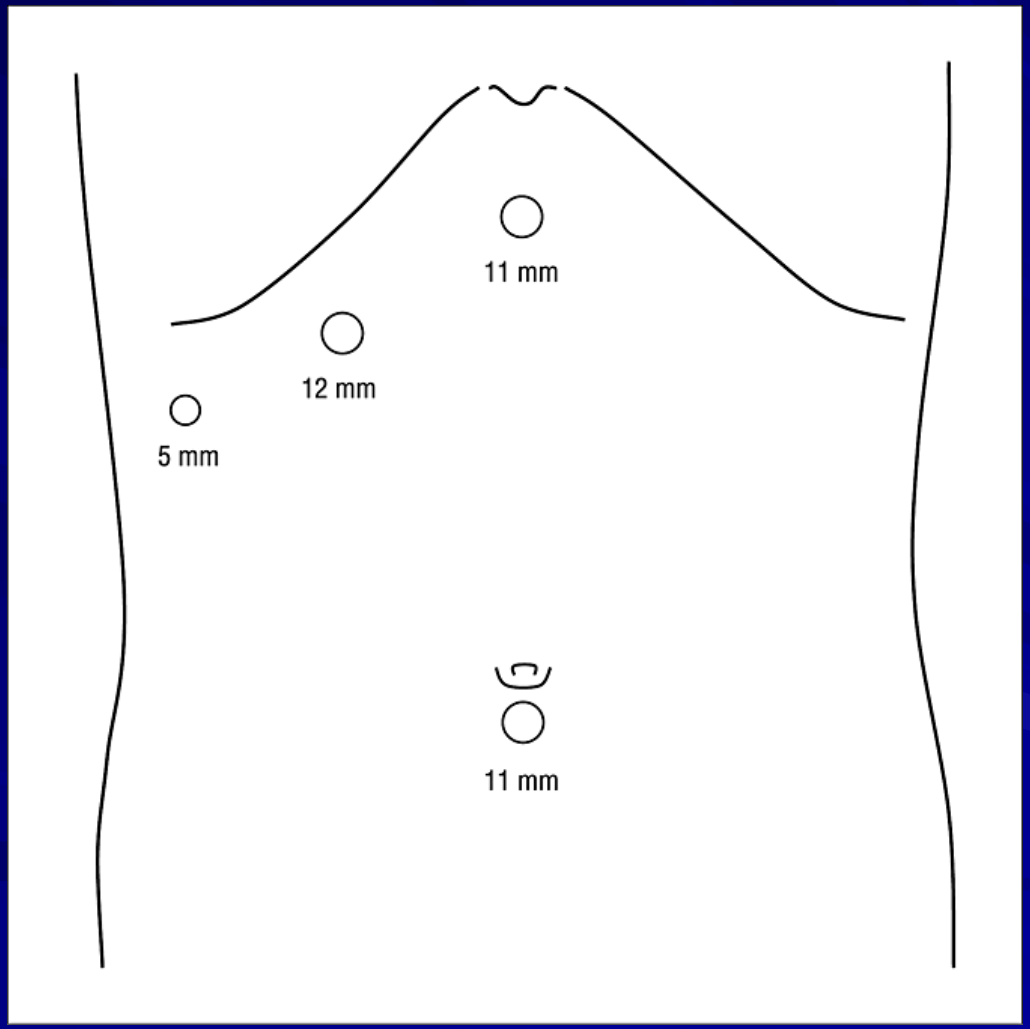
- Laparoscopic liver resections for benign and malignant tumors
  - Benign lesions
  - Hepatoblastoma
  - Hepatocellular carcinoma
  - Metastatic lesions

Traditional Open “Chevron” Incision

Exposure in an Open Resection

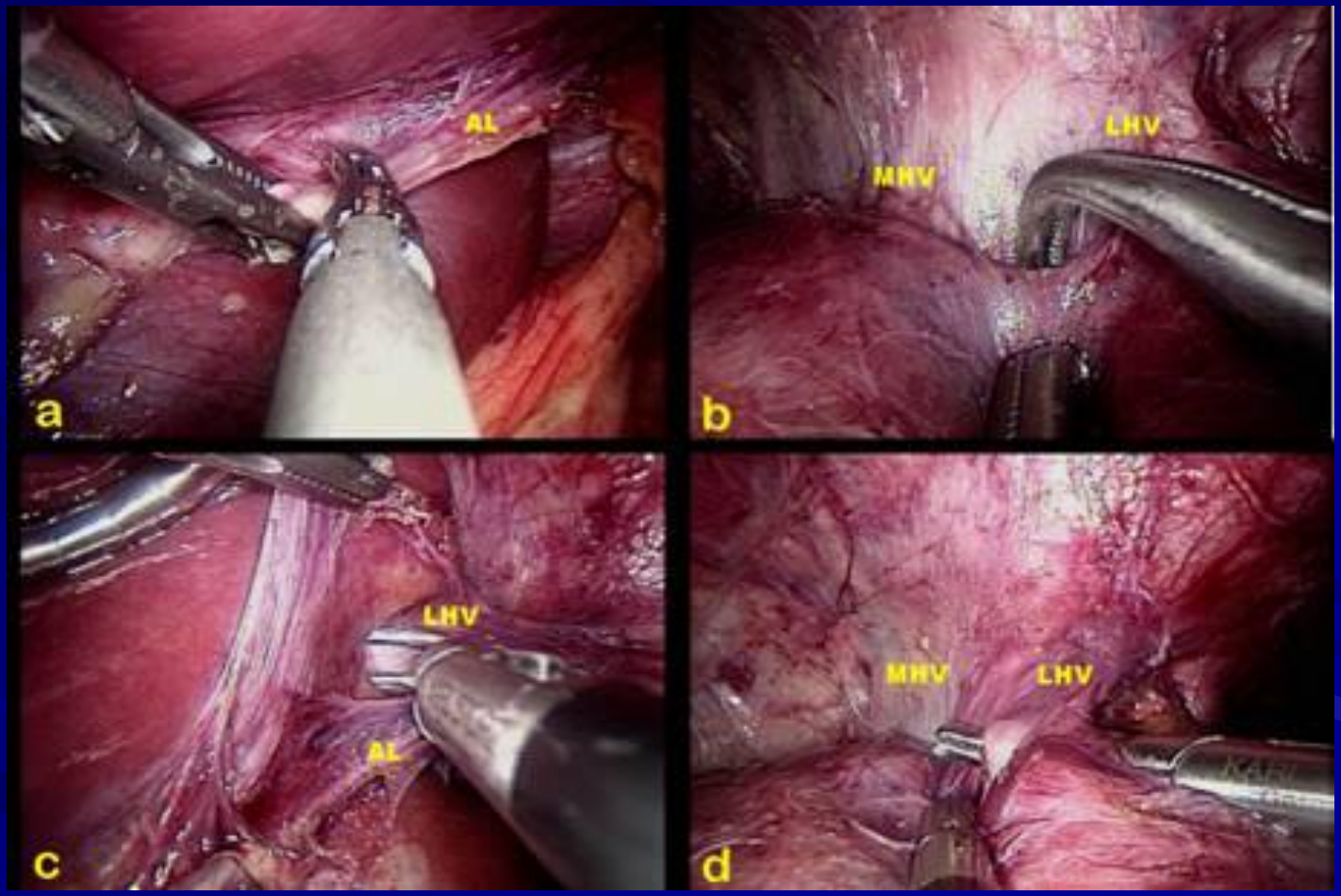


Laparoscopic Port Placement for Right Liver Lesions



Cho JY, *et al.*, Arch Surg 2009; 144(1):25-29.

Laparoscopic View of the Liver



Machado MA, *et al*., Surg Endosc, 2009; 23:2615-2619.

Case: Hepatic Adenoma, Segment 7 Laparoscopic Resection…9 Months Later

Laparoscopic Liver Resection
Theoretical Advantages and Disadvantages

Advantages:

- Less post-operative pain
- Less post-operative morbidity
- Shorter hospital stay
- Improved cosmesis
- Quicker return to normal activity
- Quicker initiation of adjuvant therapies

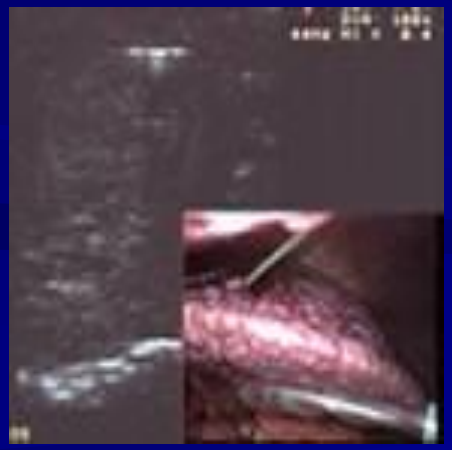
Disadvantages:

- Loss of tactile sense
  - Margins
  - Staging
- Limited access/ instrumentation
  - Exposure
  - Control of major pedicles/hepatic veins
- Time and money

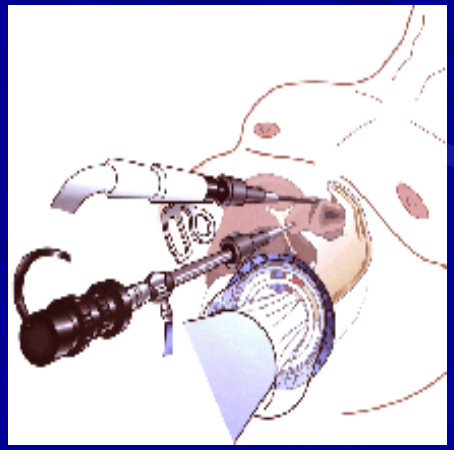
Laparoscopic Liver Resection
Solutions

- Loss of tactile sense
  - Margins
  - Staging

Laparoscopic Ultrasound



Hand-assisted techniques



Laparoscopic Liver Resection

Solutions

- Limited access/instrumentation
  - Exposure
  - Control of major pedicles/hepatic veins
  - Fear of major hemorrhage

- Hand-assisted techniques
- Ligaments intact
- Improved retractors

Harmonic Scalpel

Vascular Stapler

Ligasure Device

Tissuelink

Argon Beam Coagulator

Water Jet

Laparoscopic Hepatectomy - Medical evidences

- 1992, **1st report**, Gagner, focal nodular hyperplasia
- 1995, Ferzli, excision segment IV, hepatic adenoma
- 1996, Azagra, **1st successful laparoscopic anatomical hepatectomy** (benign adenoma of segments II & III)
- 2008, a consensus of experts in both open and laparoscopic liver surgery (45 experts, Louisville, US
- 2009, Nguyen Kevin Tri, World review of laparoscopic liver resection 2,804 patients (127 published articles)
  - Overall mortality: 0.3%; Postoperative bile leak: 1.5%.
  - 3- and 5-year survival rates comparable to open

Laparoscopic Hepatectomy - Medical evidences

Laparoscopic Hepatectomy: A Systematic Review, Meta-Analysis, and Power Analysis

TORU MIZUGUCHI[1], MASAKI KAWAMOTO[1], MAKOTO MEGURO[1], TOSHIHITO SHIBATA[1], YUKIO NAKAMURA[1], YASUTOSHI KIMURA[1], TOMOHISA FURUHATA[1], TOMOKO SONODA[2], and KOICHI HIRATA[1]

Departments of [1] Surgery I and [2] Public Health, Sapporo Medical University Hospital, Sapporo Medical University, S-1, W-16, Chuo-ku, Sapporo, Hokkaido 060-8543, Japan

TORU MIZUGUCH 2011

Operative time: NS

Patient bleeding ↓

Complications ↓

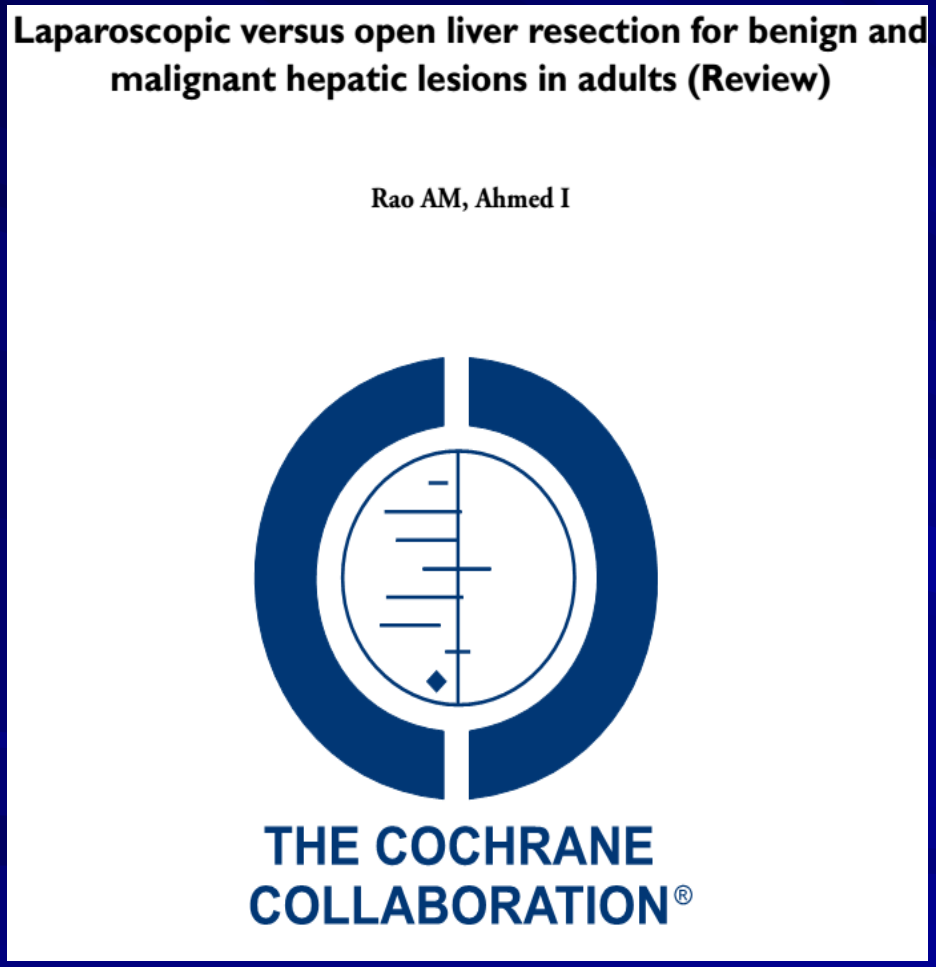
Hospital stay ↓

Table 1. Studies included in this review

No.	First author[Ref.]	Journal	Study design	Year
1	Shimada[28]	Surg Endosc	Retrospective cohort	2001
2	Farges[17]	J HPB Surg	Prospective cohort	2002
3	Mala[16]	Surg Endosc	Retrospective cohort	2002
4	Lesurtel[20]	J Am Coll Surg	Prospective case control	2003
5	Laurent[19]	Arch Surg	Prospective case control	2003
6	Morino[18]	Surg Endosc	Retrospective case control	2003
7	Kaneko[21]	Am J Surg	Retrospective case control	2005
8	Belli[22]	Surg Endosc	Retrospective case control	2007
9	Aldrighetti[24]	J Gastrointest Surg	Prospective case control	2008
10	Troisi[23]	Surg Endosc	Retrospective case control	2008
11	Polignano[14]	Surg Endosc	Prospective case control	2008

Many biases!!

Laparoscopic Hepatectomy - Medical evidences



- 32 studies
- No current randomised clinical trial
- 2 double-blinded, prospective, randomised clinical trials are ongoing (ORANGE II - Trial; ORANGE II PLUS - Trial)

Laparoscopic Hepatectomy - Medical evidences in Viet Nam

- December 2004, 1st report in Việt Đức Hospital
- 2006, Đỗ Tuấn Anh, 22 cases (segment 2,3: *54,5%*)
- 2008, Nguyễn Hoàng Bắc, 27 cases (segment 2,3: *59,3%*)
- 2013, Đỗ Mạnh Hùng, 78 cases
- 2013, Nguyễn Cường Thịnh, 21 cases, 108 Hospital
- 2014, Trần Công Duy Long, 173 cases (2008-2012)
- 2015, Trần Công Duy Long, 271 cases, PhD Thesis

Laparoscopic Hepatectomy in children - Medical evidences

Laparoscopic treatment of liver diseases in children

Jia Wei, Jiexiong Feng (✉)

Department of Pediatric Surgery, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan 430030, China

Table 1 Reports on the use of laparoscopic surgery in the treatment of pediatric liver disease

Disease	Author	Year	No. of patients	Location of lesion	Maximum size (cm)	Location of trocars	Sizes of trocars (mm)	Time of surgery
Hydatid cyst of the liver	Maazoun *et al.*	2007	34	–	–	Umbilicus; right and left hypochondrium	5, 5, 10	–
Solitary liver cysts	Saxena *et al.*	2006	1	Right lobe	2.1 × 5	Linea alba; left epigastrium; right hypogastrium	2.7, 2.7, 2.7	90 min
	Jain *et al.*	2008	1	Portal structures	9 × 7	Umbilicus; right hypogastrium	5,3	–
	Rogers *et al.*	2006	1	Right lobe, segments V – VIII	17 × 12.5	–	–	–
Benign tumor	Dutta *et al.*	2007	1	Right hepatic lobe involving V and IVb	11 × 10 × 7	Umbilicus; right midabdomen; left hyperchondrium; and left midabdomen	5, 5, 5, 12	150 min
	Yoon *et al.*	2006	1	Segments II and III	8 × 8	Umbilicus; 2 cm left of the midline; anterior axillary line below the right costal margin; 3 or 4 cm caudal to the third trocar	10, 10, 10, 12	–
	Yeung *et al.*	2006	1	Segments II and III, left lobe	3 × 4	Transumbilicus; right and left upper quadrant.	5, 5, 5, 5	150 min
Blunt liver trauma	Feleppa *et al.*	2009	1	Left lobe, segment II	5–6 (cystic lesion)	–	–	–
Liver abscesses	Ravishankaran *et al.*	2010	1	Segments II and IV of left lobe	3.1, 1.5, 1.8, 0.8	Umbilicus; along the midclavicular line; in line with the umbilicus.	5, 5, 5	–

Laparoscopic Hepatectomy in children - Medical evidences

Experiences of Laparoscopic Liver Resection for Liver Tumors in Pediatric Patients: Initial 11 cases

JM Namgoong, DY Kim, SC Kim, JH Hwang
Division of Pediatric Surgery, Department of Surgery, Asan Medical Center, Seoul, Republic of Korea

A retrospective clinical study

Results

Table 1. Characteristics of patients with laparoscopic hepatectomy

Patient	Sex/ Age (month)	Weight (kg)	Disease	Location	Size (cm)	Resected hepatic area	Surgical Procedure	Resection Margin (mm)
1	F/20	9.8	NBL, recurred	S 5	2.1	S p5	Nonanatomical resection	12
2	F/24	10.2	HBL	S 6	3.5	S p5 and p6	Nonanatomical resection	10
3	F/9	7.3	HBL	S 5	2.5	S p5 and p6	Nonanatomical resection	8
4	M/11	9.1	HBL	S 6	3.5	S p5 and p6	Nonanatomical resection	38
5	F/144	30.2	FNH	S 2	1.3	S 2 and 3	Left lateral segmentectomy	10
					7.3	S p4 and p5	Nonanatomical resection	10
					2	S p6	Nonanatomical resection	
					4.5	S p4, 5, 6, p7 and p8	Nonanatomical resection	8
					3.7	S p6 and p7	Nonanatomical resection	1
					2.5	S 4b and 5	Segmentectomy	5
					6.4	Whole right lobe	Right hepatic lobectomy	5

dular hyperplasia, *6* segment, *p* partial resection of liver

Table 3. Chemotherapy regimen and recurrence

Patient	Sex/ Age (month)	Diagnosis	Preoperative chemotherapy (no. of course)	Postoperative chemotherapy (no. of course)	Recurrence	DFS (months)
1	F/20	NBL, recurred	CDDP/VP/DOXO/CPM (4)	CDDP/VP/CPM (3)	Recurrence	6
2	F/24	HBL	CDDP/VCR/5-FU (4)	CDDP/VCR/5-FU (4)	Not recurred	62
3	F/9	HBL	CDDP/VCR/5-FU (4)	CDDP/VCR/5-FU (4)	Not recurred	53
4	M/11	HBL	CDDP/VCR/5-FU (4)	CDDP/VCR/5-FU (2)	Not recurred	40
5	F/144	FNH	–	–	Not recurred	35
6	M/84	HBL	CDDP/VCR/5-FU (4)	CDDP/VCR/5-FU (2)	Not recurred	29
7	F/180	Liver abscess	–	–	–	24
8	M/30	HBL	CDDP/VCR/5-FU/DOXO (2)	CDDP/VCR/5-FU/DOXO (2)	Not recurred	10
9	F/0.3	FNH	–	–	Not recurred	9
10	M/12	FNH	–	–	Not recurred	8
11	M/26	HBL	CDDP/VCR/5-FU/DOXO (4)	CDDP/VCR/5-FU/DOXO (4)	Not recurred	5

NBL neuroblastoma, *HBL* hepatoblastoma, *FNH* focal nodular hyperplasia, *DFS* disease free survival, *CDDP* cisplatin, *VCR* vincristine, *5-FU* 5-fluorouracil, *DOXO* doxorubicin

Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea

Laparoscopic Hepatectomy - Medical evidences

Comparison of open and laparoscopic live donor left lateral sectionectomy

K. H. Kim[1,4], D. H. Jung[1,4], K. M. Park[2,4], Y. J. Lee[2,4], D. Y. Kim[3,4], K. M. Kim[5] and S. G. Lee[1,4]

A retrospective study; May 2008 and October 2009

Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea

- 11 laparoscopic and 11 open live donor left lateral sectionectomy.
- The LLS group**: shorter hospital stay** (6.9 vs 9.8 days; P=0,001**); time to oral diet** (2.1 vs 2.7 days; P=0.012).
  Duration of operation, blood loss ….. comparable
  No death in either donor group and only **1 complication**, a wound seroma, in the OLS group.

Laparoscopic Hepatectomy - Medical evidences

Laparoscopic living donor hepatectomy: a review of current status

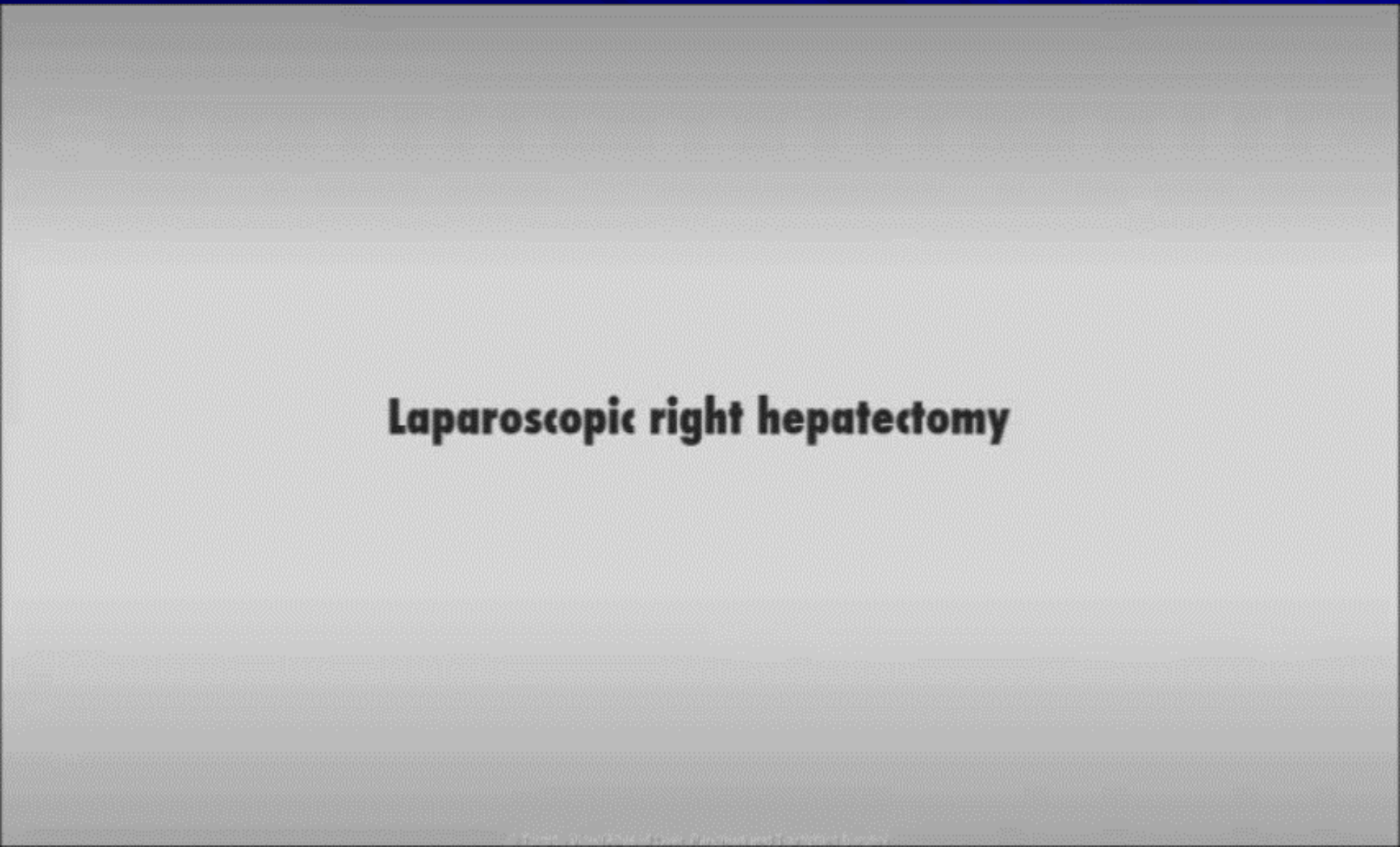
Jeong-Ik Park · Ki-Hun Kim · Sung-Gyu Lee

Published online: 8 October 2015

34 articles; 22 centers; 480 cases worldwide
Most data case series or case–control studies

- **Laparoscopic left lateral sectionectomy in living donors**
- Laparoscopic left hepatectomy in living donors
- Laparoscopic right hepatectomy in living donors

Laparoscopic Right Hepatectomy (tumor of segment VII)



CONCLUSION

- Laparoscopic liver surgery is a safe and effective approach for the management of surgical liver disease in the hands of trained surgeons with experience in hepatobiliary and laparoscopic surgery

THANK YOU FOR YOUR ATTENTION