Minimally Invasive live donation
LIVER NOT KIDNEY

Steve White

The Freeman Hospital, Newcastle

Disclosures

I have never done a LDLT

OPEN OR WITH MIN INV TECHNIQUES

History-LDLT

1984 Bismuth reduced grafts
1989 Bismuth, Pichymayr split graft
1990-First LDLT Strong Brisbane
1993-First Paediatric in UK
1994-left lobe LDLT Hashikura
1994-Right lobe graft Yamaoka
1997-Right lobe adult to adult
1998-First Rt lobe in USA
2002-Laparoscopic left lateral
2008-Adult to adult Leeds NHS

The NEW ENGLAND JOURNAL of MEDICINE

1990;322:1505

ANNALS OF SURGERY
Vol. 232, No. 6, 753–762

Laparoscopic Liver Resections: A Feasibility Study in 30 Patients

Daniel Cherqui, MD,* Emmanuel Husson, MD,* Renaud Hammoud, MD,* Benoît Malassagne, MD,* François Stéphan, MD,† Said Bensaid, MD,† Nelly Rotman, MD,* and Pierre-Louis Fagniez, MD*

*From the Departments of *General and Digestive Surgery and †Anesthesiology, Hôpital Henri Mondor-Université Paris XII, Créteil, France*

From May 1996 to December 1999, 30 of 159 (19%) liver resections were included. There were 18 benign lesions and 12 malignant tumors, including 8 hepatocellular carcinomas in cirrhotic patients. Mean tumor size was 4.25 cm. There were two conversions to laparotomy (6.6%). The resections included 1 left hepatectomy, 8 bisegmentectomies (2 and 3), 9 segmentectomies, and 11 atypical resections. Mean blood loss was 300 mL. Mean surgical time was 214 minutes. There were no deaths. Complications occurred in six patients (20%). Only one cirrhotic patient developed postoperative ascites. No port-site metastases were observed in patients with malignant disease.

ANNALS OF SURGERY
A Monthly Review of Surgical Science Since 1885

ORIGINAL ARTICLES

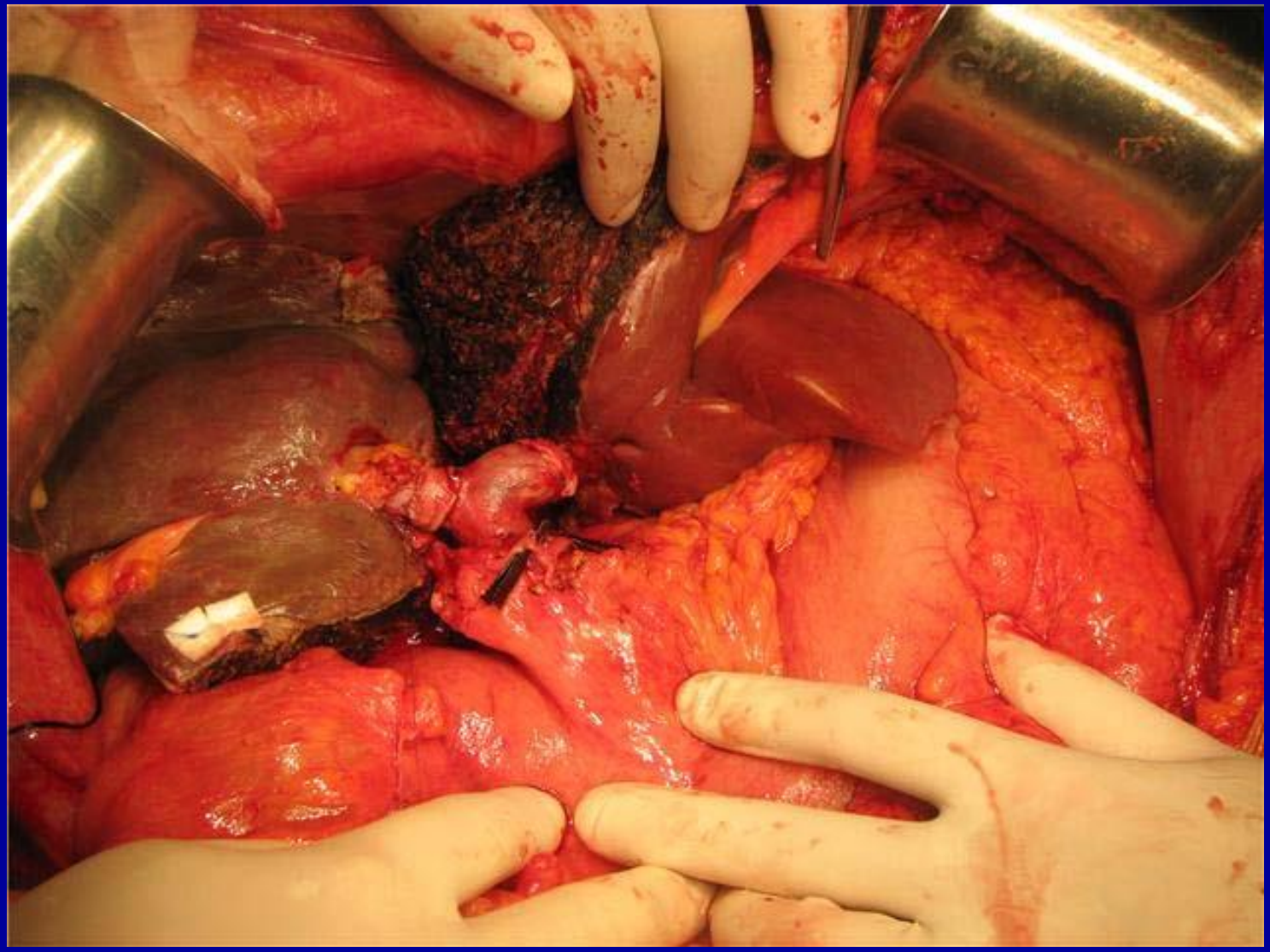
Laparoscopic Left Lateral Sectionectomy in Living Donors

Safety and Reproducibility of the Technique in a Single Center

Olivier Soubrane, MD, Daniel Cherqui, MD,† Olivier Scatton, MD,* Fabien Stenard, MD,* Denis Bernard, MD,‡ Sophie Branchereau, MD,§ Hélène Martelli, MD,§ and Frédéric Gauthier, MD§*

Ann Surg 2006;244(5) 815-820

Dual left lobe living donor grafts



Asan medical centre, Seoul, Korea

JOURNAL OF LAPAROENDOSCOPIC & ADVANCED SURGICAL TECHNIQUES
Volume 19, Number 1, 2009

DOI: 10.1089/lap.2008.0079

Laparoscopic Left Lateral Sectionectomy: Surgical Technique and Our Results from Leeds

Aamir Z. Khan, FRCS (Eng), FRCS (Gen), K. Raj Prasad, MS, FRCS, J. Peter A. Lodge, MD, FRCS, and Giles J. Toogood, MD, FRCS

Abstract

Background: Although laparoscopic left lateral sectionectomy is increasingly becoming the accepted approach for resection of tumors in hepatic segments II and III, the variations in surgical technique exist.
Methods: Our technique relies on mobilization of the left lateral sector followed by extracorporeal control of the portal pedicle allowing intermittent occlusion when needed. The parenchyma is thinned, exposing the inflow and outflow allowing application of endoscopic staplers under direct vision for parenchymal tran-

ORIGINAL ARTICLE

A cost effective analysis of a laparoscopic versus an open left lateral sectionectomy in a liver transplant unit

Richard Bell, Sanjay Pandanaboyana, Faisal Hanif, Nehal Shah, Ernest Hidalgo, J. Peter A. Lodge, Giles Toogood & K. Raj Prasad

Department of Hepatobiliary and Transplant Surgery, St James University Hospital, Leeds, UK

Results: Forty-three LLLS were performed during the study period. LLLS was a significantly cheaper operation compared with OLLS (P = 0.001, £3594.14 versus £5593.41). The median hospital stay was shorter in the laparoscopic group (P = 0.002, 3 versus 7 days). No difference was found in outcomes between a LLLS performed by a trainee or consultant (operating time, morbidity or R1 resection rate). The procedure length was significantly shorter during the later half of the study period [120 versus 129 min (P = 0.045)].

Oncological Efficiency Analysis of Laparoscopic Liver Resection for Primary and Metastatic Cancer

A Single-Center UK Experience

Mohammed Abu Hilal, MD, PhD, FRCS; Francesco Di Fabio, MD; Mahdi Abu Salameh, MD; Neil William Pearce, DM, FRCS

Patients: One hundred twenty-eight patients undergoing 133 laparoscopic liver resections for malignant diseases.

Arch Surg. 2012;147(1):42-48

Research Article

A Single Centre Experience of First "One Hundred Laparoscopic Liver Resections"

S. Rehman,[1] S. K. P. John,[1] J. J. French,[1] D. M. Manas,[1,2] and S. A. White[1,2]

[1] *Department of Hepatobiliary and Transplantation Surgery, The Freeman Hospital, Newcastle upon Tyne NE7 7DN, UK*
[2] *The Liver Research Group, The University of Newcastle, Leech Building, Framlington Place, Newcastle upon Tyne NE1 7RP, UK*

Correspondence should be addressed to S. Rehman; srkhanswati75@yahoo.com

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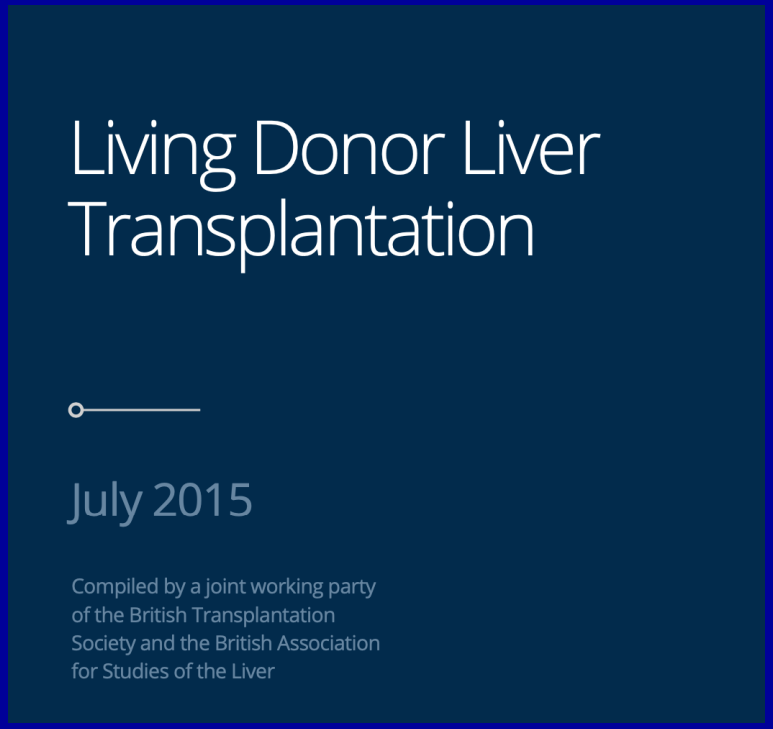
Academic Editor: Guy Maddern

Regulation and oversight



BASL
British Association for the Study of the Liver

BTS
British Transplantation Society

Regulation and oversight

- ***Although good outcomes have been reported from small series using laparoscopic or laparoscopy-assisted donor hepatectomy for the left lateral and left lobe, open donor hepatectomy is recommended in the interests of donor safety. (B1)***

Regulation and oversight

The Southampton Consensus Guidelines for Laparoscopic Liver Surgery

From Indication to Implementation

Mohammad Abu Hilal, MD, PhD, Luca Aldrighetti, MD, PhD,† Ibrahim Dagher, MD, PhD,‡ Bjorn Edwin, MD, PhD,§ Roberto Ivan Troisi, MD, PhD,¶ Ruslan Alikhanov, MD, PhD,|| Somaiah Aroori, MD, PhD,** Giulio Belli, MD, PhD,†† Marc Besselink, MD, PhD,‡‡ Javier Briceno, MD, PhD,§§ Brice Gayet, MD, PhD,¶¶ Mathieu D'Hondt, MD, PhD,|||| Mickael Lesurtel, MD, PhD,*** Krishna Menon, MS,††† Peter Lodge, MD, PhD,‡‡‡ Fernando Rotellar, MD, PhD,§§§ Julio Santoyo, MD, PhD,¶¶¶ Olivier Scatton, MD, PhD,|||||| Olivier Soubrane, MD, PhD,**** Robert Sutcliffe, MD,†††† Ronald Van Dam, MD, PhD,‡‡‡‡ Steve White, MD, PhD,§§§§ Mark Christopher Halls, MBBS,* Federica Cipriani, MD,† Marcel Van der Poel, MD,‡‡ Ruben Ciria, MD, PhD,§§ Leonid Barkhatov, MD,§ Yrene Gomez-Luque, MD,§§ Sira Ocana-Garcia, MD,§§ Andrew Cook, MBBS,¶¶¶¶ Joseph Buell, MD,|||||||| Pierre-Alain Clavien, MD, PhD,***** Christos Dervenis, MD, PhD,††††† Giuseppe Fusai, MS,‡‡‡‡‡ David Geller, MD,§§§§§ Hauke Lang, MD,¶¶¶¶¶ John Primrose, MD, PhD,* Mark Taylor, MD, PhD,|||||||||| Thomas Van Gulik, MD, PhD,‡‡ Go Wakabayashi, MD, PhD,****** Horacio Asbun, MD,†††††† and Daniel Cherqui, MD, PhD‡‡‡‡‡‡*

Regulation and oversight

Topic 4: Living Donor

What is the Role of the Laparoscopic Technique for Living Donor Hepatectomy (LDH)? The evidence suggests that there is an improved quality of life with LLS for LDH that includes a shorter hospital stay and an earlier return to work.[28] The experts discussed the differences between left lateral graft retrieval for pediatric transplantation and full right or full left hepatectomy for adult transplantation. It was highlighted that the evidence for full right and full left hepatectomy is primarily based on laparoscopic-assisted procedures (hybrid) with only limited studies focusing on pure laparoscopic donor hepatectomy and hence minimally invasive donor major hepatectomy has not yet been standardized and should be restricted to expert centers (see R6.1, R6.2, R6.3, and R6.4).

LRLT-Disadvantages

- High risk
- Technically difficult
- Patient or surgical stress-media
- Cost/Personnel/Infrastructure
- Higher rates of donor death than kidney
- Risk to donor and recipient 200% mortality
- Potential to effect organ donation rates in adversity
- A sub-optimal graft
- Higher PNF

Donor Death Jan 2002

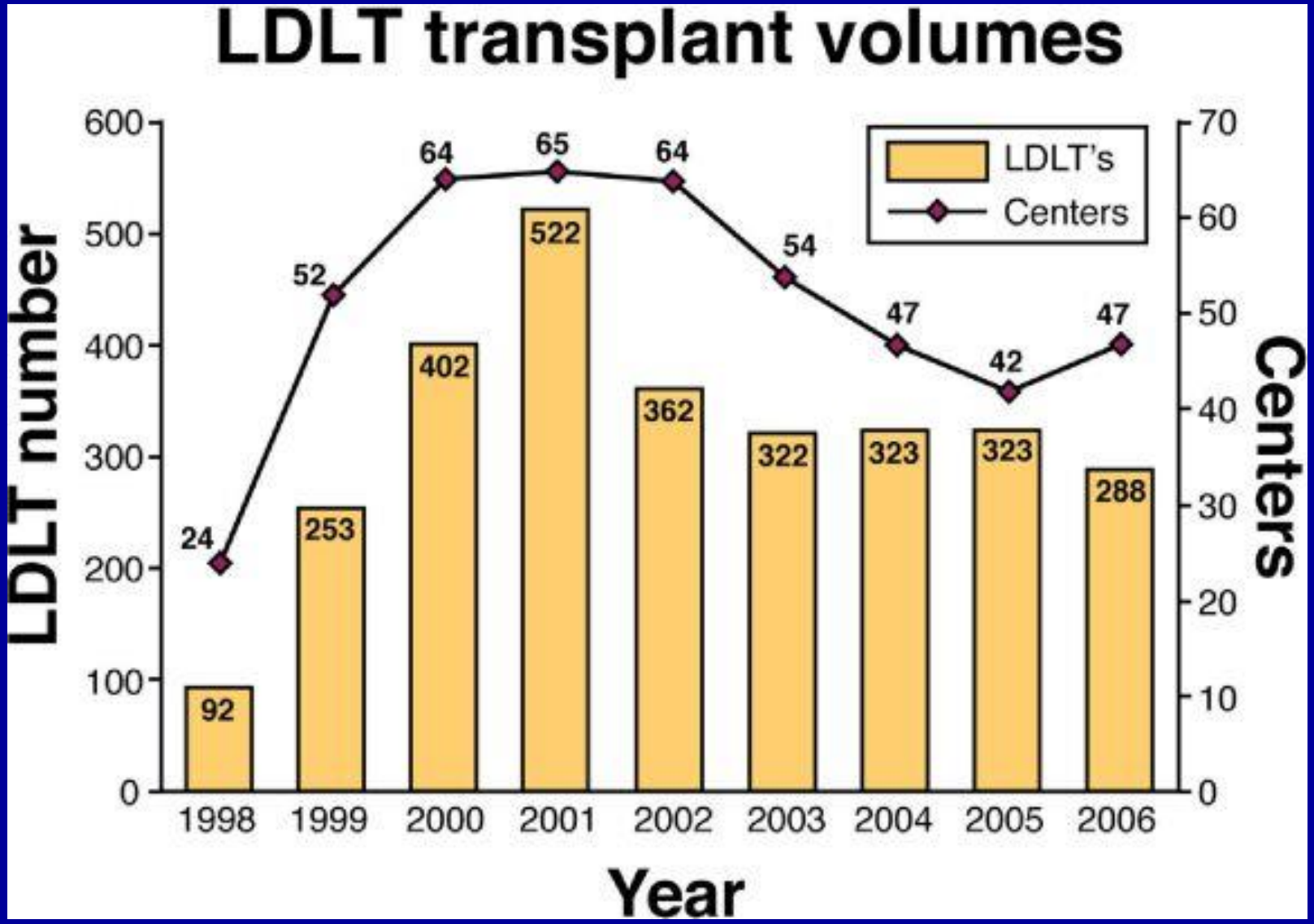
"Donor death halts liver surgery"

The use of live donors has stirred ethical debate
Performing major surgery on someone who doesn't need it violates the dictum "doctors do no harm"

The New York Times ON THE WEB

Mount Sinai New York

LRLT



Brown RS Gastroenterology 08

Regulation and oversight

The dangerous machine here? The man

SPECIAL REPORT
By JOHN NAISH

SURGEONS NEED PROPER TRAINING

FLAILING ROBOT CAUSED PROBLEMS

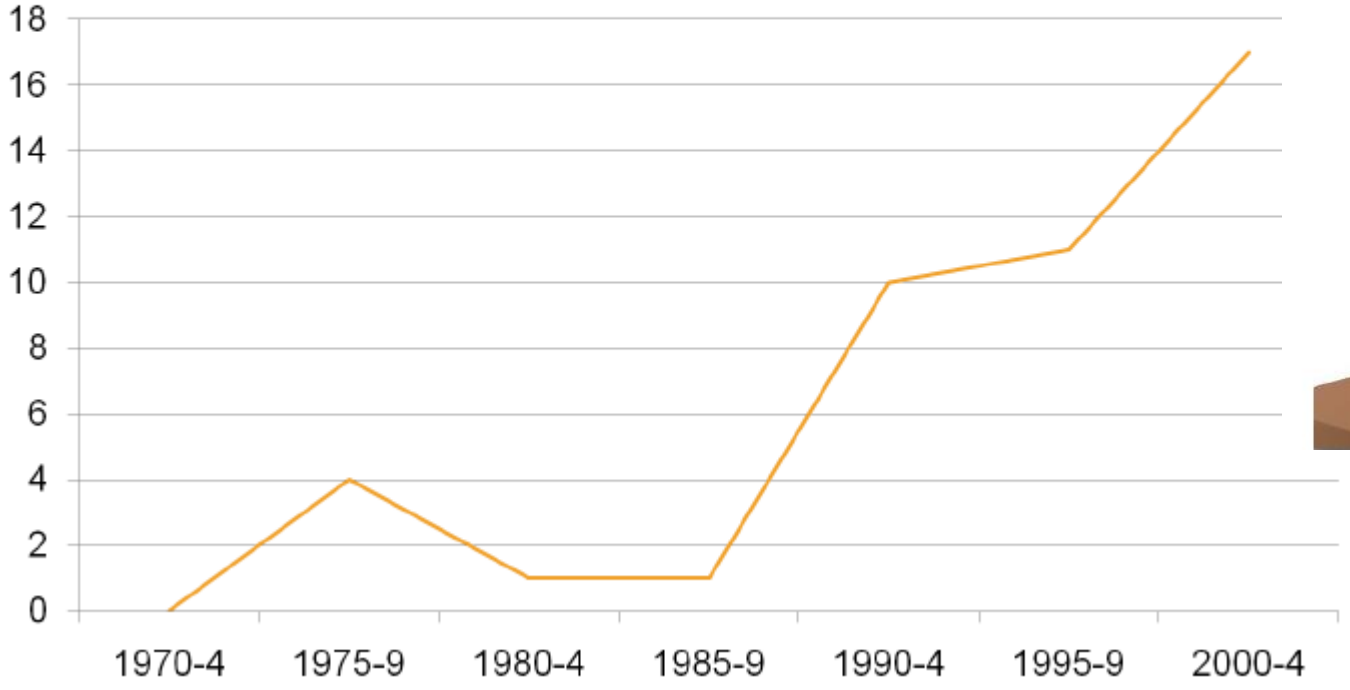
GOOD HEALTH

After the case of a robotic operation that went horribly wrong, here's what you need to know before going under the robo-knife - and it starts with researching the surgeon at the controls

Robot op patient had 99% survival chance with regular surgery

MARCH OF THE £1.7m DA VINCI ROBOTS

NUMBER OF DOCTORS PROSECUTED FOR MANSLAUGHTER IN THE UK 1970-2004



- Key cases
  - *Bateman* (1925-successful appeal)
  - Prentice&Sullman (1993/1994-successful appeal)
  - *Adomako* (1995)
  - *Misra, Srivastava* (2004)
  - *Garg* (2012)
  - *Sellu* (2013-successful appeal 2016)
  - Bawa-Garba (2015)
  - Honey-Rose (2016- successful appeal 2017)

  - Rudling (not guilty but key refinement of law 2016)

Digestive Surgery

Dig Surg 2012;29:62–69
DOI: 10.1159/000335737

Published online: March 15, 2012

Laparoscopic Liver Resection: Is There a Learning Curve?

Stuart M. Robinson Kei Y. Hui Aimen Amer Derek M. Manas Steve A. White

Department of Hepatobiliary and Transplant Surgery, The Freeman Hospital, Newcastle upon Tyne, UK

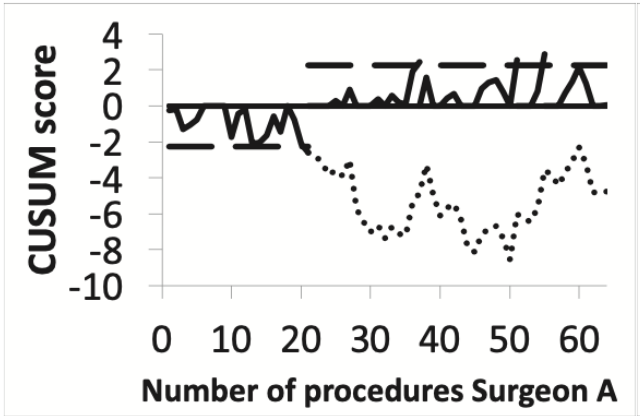
ORIGINAL ARTICLE

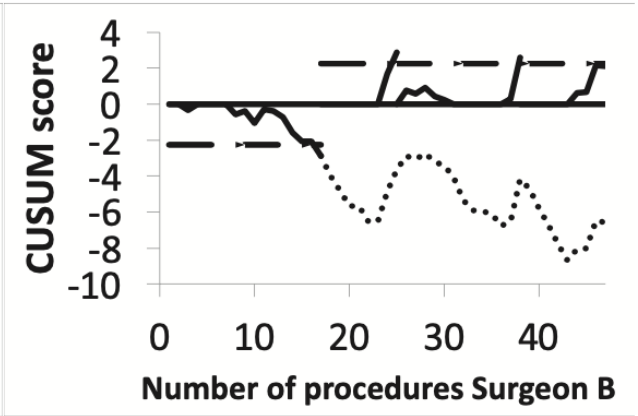
HPB 2019, 21, 1505–1512

Evaluating the learning curve for laparoscopic liver resection: a comparative study between standard and learning curve CUSUM

Asma Sultana[1], Peter Nightingale[2], Ravi Marudanayagam[1] & Robert P. Sutcliffe[1]

[1]Department of HPB Surgery, and [2]Institute of Translational Medicine, University Hospitals Birmingham NHS Foundation Trust,

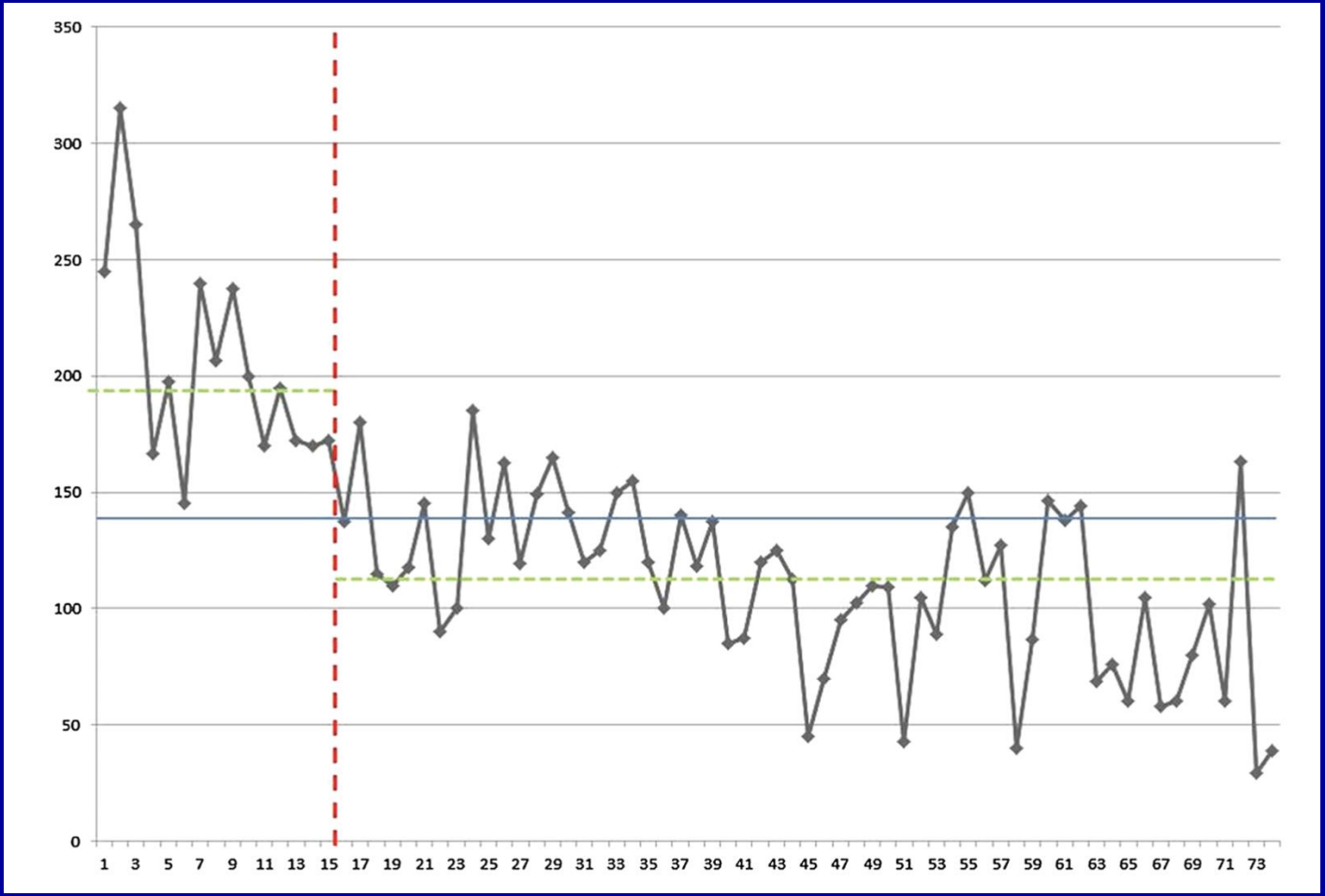




Surg Endosc (2016) 30:3618–3629
DOI 10.1007/s00464-015-4665-0

Learning curve of self-taught laparoscopic liver surgeons in left lateral sectionectomy: results from an international multi-institutional analysis on 245 cases

Francesca Ratti[1] · Leonid I. Barkhatov[4,6] · Federico Tomassini[2] · Federica Cipriani[1,3] · Airazat M. Kazaryan[4,7] · Bjørn Edwin[4,5,6] · Mohammad Abu Hilal[3] · Roberto I. Troisi[2] · Luca Aldrighetti[1]



Original Investigation | INNOVATION IN SAFETY: SAFETY IN INNOVATION

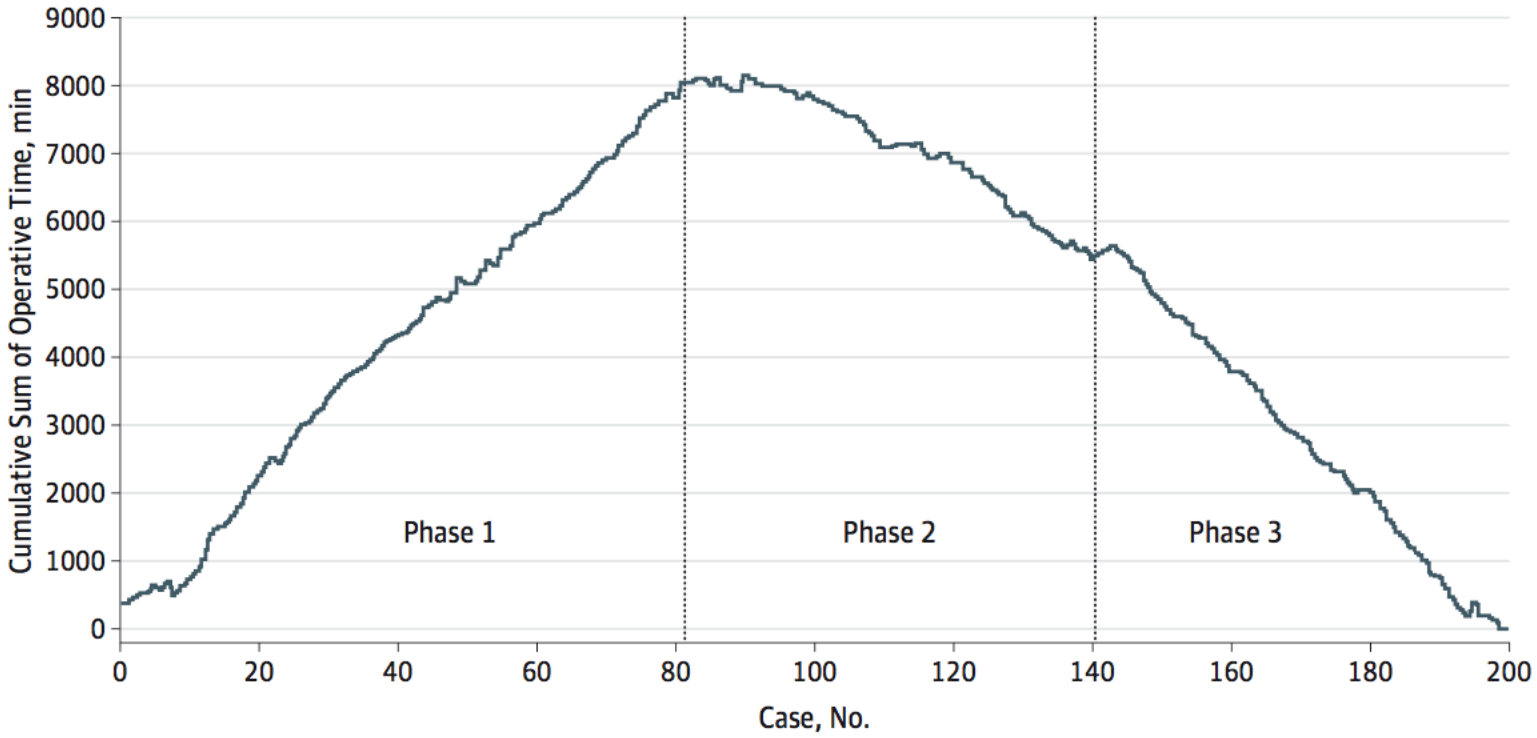
Assessment of Quality Outcomes for Robotic Pancreaticoduodenectomy

Identification of the Learning Curve

Brian A. Boone, MD; Mazen Zenati, MD, PhD; Melissa E. Hogg, MD; Jennifer Steve, BA; Arthur James Moser, MD; David L. Bartlett, MD; Herbert J. Zeh, MD; Amer H. Zureikat, MD

JAMA Surgery May 2015 Volume 150, Number 5

B Cumulative operative time



ANNALS OF SURGERY
A Monthly Review of Surgical Science Since 1885

Outcomes of 385 Adult-to-Adult Living Donor Liver Transplant Recipients

A Report From the A2ALL Consortium

Kim M. Olthoff, MD, Robert M. Merion, MD,†‡ Rafik M. Ghobrial, MD, PhD,§ Michael M. Abecassis, MD,‖ Jeffrey H. Fair, MD,¶ Robert A. Fisher, MD,** Chris E. Freise, MD,†† Igal Kam, MD,‡‡ Timothy L. Pruett, MD,§§ James E. Everhart, MD,‖‖ Tempie E. Hulbert-Shearon, MS,‡‡ Brenda W. Gillespie, PhD,‖‖ Jean C. Emond, MD,¶¶ and the A2ALL Study Group*

Ann Surg 2005;242(3) 314-321

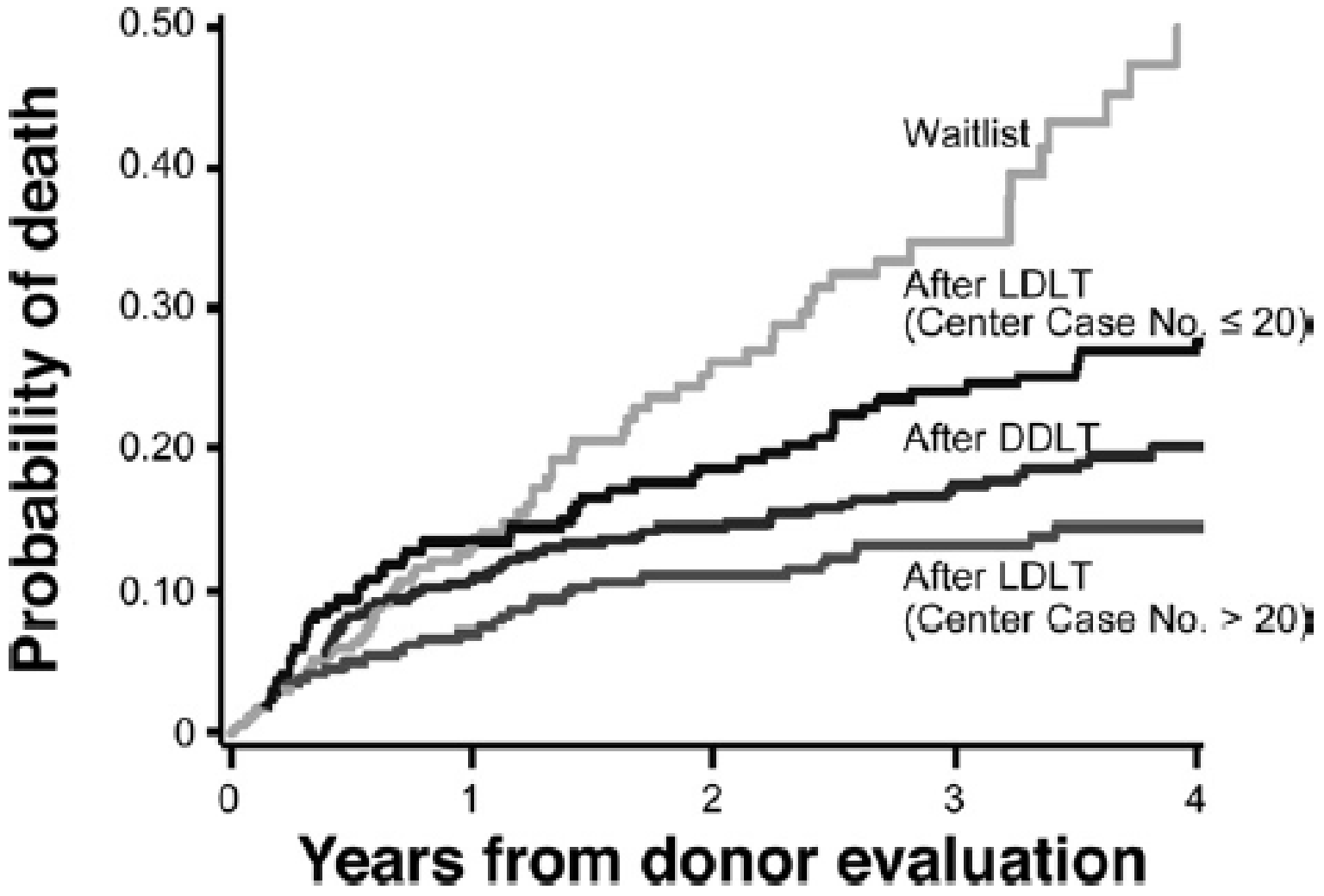
LRLT

Factors influencing survival

TABLE 6. Factors Associated With Graft Failure/Death Based on Cox Regression

Variable	Hazard Ratio	95% Confidence Interval	*P* Value
Recipient age at transplant (per 10 y)	1.41	(1.15–1.73)	0.0008
Donor age at transplant (per 10 y)	1.13	(0.91–1.41)	0.2766
Donor biologically related	0.67	(0.43–1.03)	0.0699
Cold ischemia time (per h)	1.19	(1.06–1.33)	0.0024
Center case number ≤20	1.83	(1.20–2.80)	0.0049

Centre Volume



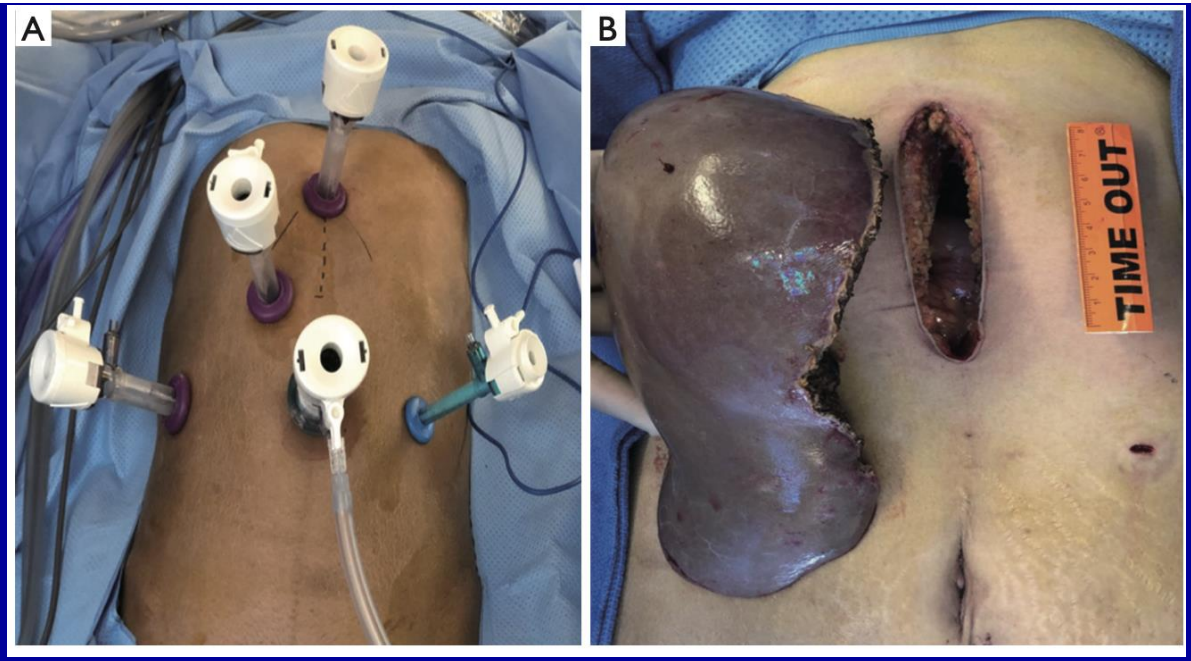
Berg et al. Gastroenterology 08

Review Article

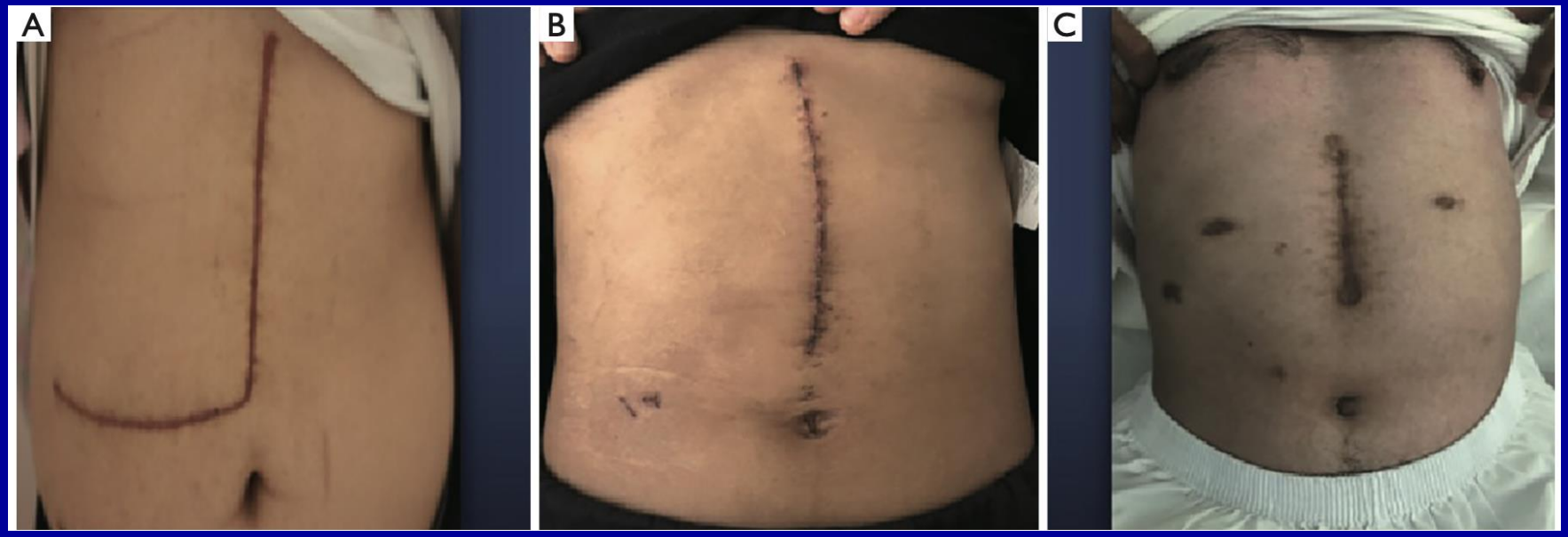
Minimally-invasive donor hepatectomy at the dawn of a decade: can we pick up the pace?

Mark L. Sturdevant[1,2], Ahmed Zidan[1], Dieter Broering[1]

[1]Organ Transplant Center, King Faisal Specialist Hospital and Research Center, Riyadh, Saudi Arabia; [2]Department of Surgery, Division of Transplant, University of Washington Medical Center, Seattle, WA, USA

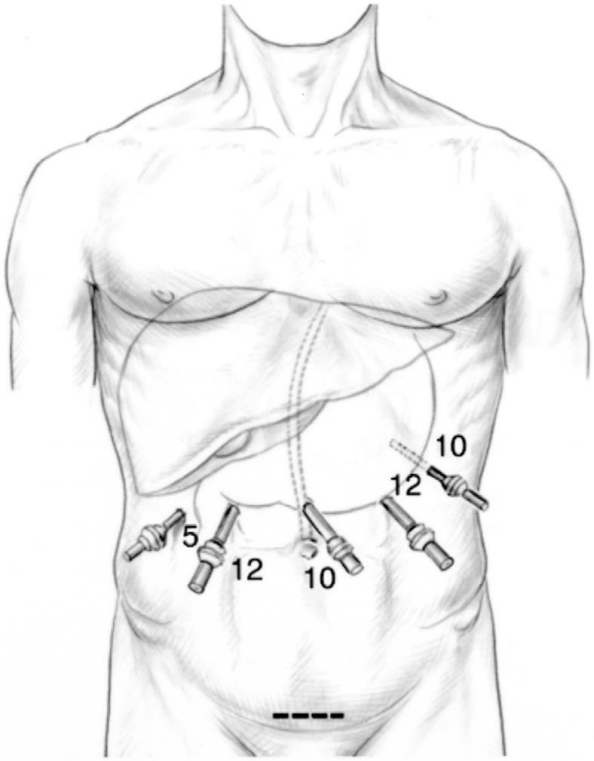


Dig Med Res 2020;3:58 | http://dx.doi.org/10.21037/dmr-20-92


A
B
C

Laparoscopic living donor hepatectomy for liver transplantation in children

Daniel Cherqui, Olivier Soubrane, Emmanuel Husson, Eric Barshasz, Olivier Vignaux, Mourad Ghimouz, Sophie Branchereau, Christophe Chardot, Frédéric Gauthier, Pierre-Louis Fagniez, Didier Houssin



Original article

Living related liver transplantation in children

N. Heaton, W. Faraj, H. Vilca Melendez, W. Jassem, P. Muiesan, G. Mieli-Vergani, A. Dhawan and M. Rela

Institute of Liver Studies, King's College London School of Medicine at King's College Hospital, Denmark Hill, London SE5 9RS, UK
Correspondence to: Professor N. Heaton (e-mail: nigel.heaton@kingsch.nhs.uk)

50 patients
5 yr patient survival 96%
5 yr graft survival 93%
No donor mortality
14% biliary complications

BJS July 2008

THE EVIDENCE

LIVER TRANSPLANTATION 21:768–773, 2015

ORIGINAL ARTICLE

Fully Laparoscopic Left-Sided Donor Hepatectomy Is Safe and Associated With Shorter Hospital Stay and Earlier Return To Work: A Comparative Study

Benjamin Samstein,[1] Adam Griesemer,[1] Daniel Cherqui,[3] Tarek Mansour,[1] Joseph Pisa,[1] Anna Yegiants,[1] Alyson N. Fox,[2] James V. Guarrera,[1] Tomoaki Kato,[1] Karim J. Halazun,[4] and Jean Emond[1]

[1]Department of Surgery and [2]Center for Liver Disease and Transplantation, Columbia University, New York, NY; [3]Centre Hépato-Biliaire, AP-HP, Hôpital Paul Brousse, Villejuif, France; and [4]Emory Transplant Center, Emory University, Atlanta, GA

TABLE 1. Summary of Donor Demographics

	Open, n = 20	Full Laparoscopic, n = 22
Age at donation, mean ± SD, years	31.1 ± 8.6	37.2 ± 8.6
Weight, mean ± SD, kg	72.0 ± 14.3	71.4 ± 17.2
BMI, mean ± SD, kg/m^2	25.6 ± 4.3	25.3 ± 4.9
Female sex, %	60	45.5
Graft type, %		
Left lobe	30	22.7
LLS	70	77.3
Donor relationship, %		
Mother	35	22.7
Father	30	50
Other	35	27.3

TABLE 3. Donor Outcomes

	Open, n = 20	Full Laparoscopic, n = 22	*P* Value
Length of stay, mean ± SD, days	5.95 ± 1.5	4.27 ± 1.5	0.001
Back to work, mean ± SD, days	63.07 ± 38.2	33.66 ± 7.0	0.01
Blood loss, mean ± SD, cc	375.3 ± 190.9	177.3 ± 100.6	0.001
Surgery duration, mean ± SD	6 hours 38 minutes ± 42 minutes	7 hours 58 minutes ± 1 hour 8 minutes	0.001
Hernia, n (%)	3 (15)	1 (4.5)	0.25
Bile leak, n (%)	2 (10)	1 (4.5)	0.49
Reoperation, n (%)	4 (20)	1 (4.5)	0.12

Pure Laparoscopic Donor Hepatectomies

Ready for Widespread Adoption?

Benjamin Samstein, MD, Adam Griesemer, MD,† Karim Halazun, MD,* Tomoaki Kato, MD,†*
James V. Guarrera, MD,† Daniel Cherqui, MD,‡ and Jean C. Emond, MD†

TABLE 1. Donor Cases of 20 Full Lobe Laparoscopic Donor Hepatectomy Grafts Matched to 20 Open Donor Hepatectomy

Donor	Pure Laparoscopic	Open	*P*
Age	39.8	37.6	
Female	85%	55%	0.038
BMI	24.3 + 2.6	27.3 +4.2	0.008
Weight	67.3 ± 10.5	77.8 ± 16.3	0.29
Operative time (min)	429 ± 60	389 ± 45.8	0.023
Right lobe cases	60% (12/20)	60% (12/20)	
Whole liver volume	1379 ± 199	1590 ± 340	0.049
Allograft weight (g)	601 ± 150	723 ± 268	0.084

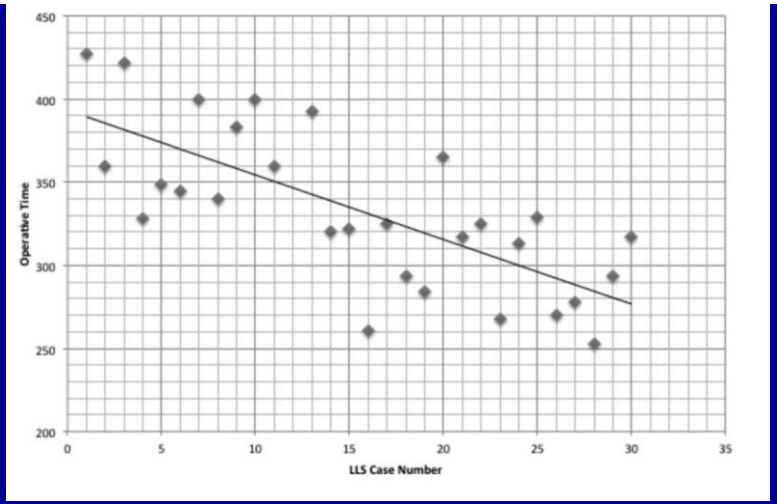


TABLE 2. Outcomes of 51 Laparoscopic Hepatectomy and 51 Matched Open Donor Hepatectomy

Donor Outcomes	Pure Laparoscopic	Open	*P*
LOS	4.6 ± 1.5	6.09 ± 2.0	<0.0001
Readmission in 90 days	8%	8%	0.0275
Complications ≥CD grade 3	12%	21%	0.155
Bile leak	4%	6%	0.888
Average EBL	236 cm^3	405 cm^3	0.001
Transfusion	4%	0	0.153
Abdominal wall complications	4% Ventral hernia, 1 at port site; 1 in converted case	16% Ventral hernias	0.138

CD, clavien-dindo; EBL, estimated blood loss.

SCIENTIFIC REPORTS
nature research

OPEN

Comparison of perioperative outcomes between pure laparoscopic surgery and open right hepatectomy in living donor hepatectomy: Propensity score matching analysis

Ji Seon Jeong[1,4], Wongook Wi[1,4], Yoon Joo Chung[1], Jong Man Kim[2], Gyu-Seong Choi[2], Choon Hyuck David Kwon[3], Sangbin Han[1], Mi Sook Gwak[1], Gaab Soo Kim[1] & Justin Sangwook Ko[1*]

	ODRH (n = 123)	PLDRH (n = 123)	*P*-value
Hospital stay (days)	10 (8–12)	9 (8–11)	0.003
Time to first meal (days)	3 (2–3)	1 (1–2)	<0.001
Time to JP removal (days)	6 (5–8)	6 (4–8)	0.031
NPRS in the PACU	6 (3–7)	5 (3–6)	0.573
OMED over the first 7 days (mg)	686 ± 253	568 ± 126	<0.001
Operation time, min	330 ± 68	335 ± 95	0.649
Anesthetic time, min	389 ± 70	404 ± 99	0.165
Ventilation			
Highest peak inspiratory pressure, cm H_2O	17 (16–19)	24 (22–25)	<0.001
Highest plateau airway pressure, cm H_2O	15 (14–17)	21 (19–22)	<0.001
Tidal volume, mL	478 ± 90	453 ± 85	0.027
Driving pressure, cm H_2O	11 (10–13)	16 (15–17)	<0.001
Lung compliance, mL cm H_2O^{-1}	43 ± 9	30 ± 6	<0.001
Pressure-controlled ventilation, n	0 (0)	2 (1.9)	0.498
Postoperative pulmonary complications			
Pleural effusion	41 (33.3)	29 (23.6)	0.090
Atelectasis	23 (18.7)	9 (7.3)	0.009
Pneumonia	2 (1.6)	1 (0.8)	1.000
Overall	67 (54.5)	39 (31.7)	<0.001

EDITORIAL

Living Donor Robotic Right Hepatectomy Is the Future: Or Is It?

It will not be possible to navigate this transition without risk. The question is, can a favorable milieu for such transition be created in other parts of the world other than Asia? In the complex, media driven, and legalistic environment found in the US, it would take only one serious sentinel adverse event to set back this transition and evolution significantly.

Giuseppe Iuppa, M.D.[1]
Federico Aucejo, M.D.[1]
Charles Miller, M.D.[2]
[1]**Liver Transplant Center and**
[2]**Department of General Surgery**
Cleveland Clinic
Cleveland, OH

Advanced Research in Gastroenterology & Hepatology
ISSN: 2472-6400

Juniper Publishers
key to the Researchers

Research Article
Volume 10 Issue 2 - August 2018
DOI: 10.19080/ARGH.2018.10.555781

Adv Res Gastroentero Hepatol

Techniques of Hepatic Transection in Robotic Surgery – Is there Still Scope for Improvement?

Thakkar R*, Kanwar A, Alessandri G, Sen G, French J, Manas D and White SA

Department of Hepatobiliary and transplant surgery, Freeman hospital, United Kingdom

Submission: June 26, 2018; **Published:** August 20, 2018

***Corresponding author:** Thakkar R, Department of Hepatobiliary and transplant surgery, Freeman hospital, Newcastle upon Tyne, United Kingdom; Email: rohan.thakkar@nuth.nhs.uk

Is it better ?

Systematic Reviews and Meta-analyses

SJS SCANDINAVIAN JOURNAL OF SURGERY

Robotic versus conventional laparoscopic liver resections: A systematic review and meta-analysis

Scandinavian Journal of Surgery
2021, Vol. 110(3) 290–300

DOI: 10.1177/1457496920925637
journals.sagepub.com/home/sjs
SAGE

Sivesh Kathir Kamarajah, James Bundred, Derek Manas, Long Jiao, Mohammad Abu Hilal and S. A. White

Conclusions: Robotic liver resection appears to offer some advantages compared to conventional laparoscopic surgery, although both techniques appear equivalent. Importantly, the quality of evidence is generally limited to cohort studies and a high-quality randomized trial comparing both techniques is needed.

Conclusions

Innovation should be applauded

We have the capability to develop this in the UK

It has not persuaded other teams to follow

Poor evidence base

Why should experienced teams with good results change

Numbers make it hard to justify

Guidelines do not support change