



ORIGINAL ARTICLE

Perpetuating proficiency in donor right hepatectomy for living donor liver transplantation



See Ching Chan ^{a,b,*}, Albert C.Y. Chan ^a, William W. Sharr ^a,
Kenneth S.H. Chok ^a, Tan To Cheung ^a, Sheung Tat Fan ^{a,b},
Chung Mau Lo ^{a,b}

^a Department of Surgery, The University of Hong Kong, Hong Kong, China

^b State Key Laboratory for Liver Research, The University of Hong Kong, Hong Kong, China

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Summary *Background/Objective:* Donor right hepatectomy (DRH) was developed by master liver surgeons and has been applied in many liver transplant centers as the mainstay for adult living donor liver transplantation. It is a major and complex surgical operation performed on living liver donors for the benefit of liver recipients. The donors deserve the lowest though inevitable morbidity and mortality. In this study, the surgical outcomes of DRH performed by newer surgeons at an established center were studied to assess the transferability of the techniques of this standardized procedure.

Methods: We studied 450 consecutive DRHs performed by 11 surgeons. Three surgeons initiated and developed the transplant program and performed the first 200 DRHs (Era I). The role of chief surgeon in the following 250 DRHs (Era II) was gradually taken up by four newer surgeons with close guidance initially.

Results: Blood loss and operation time at the end of Era I versus the beginning of Era II were 251 vs. 341 mL and 391 vs. 497 minutes. The learning curve effect in Era I did not occur in Era II. The complication rates of the last 50 cases in Era I and Era II were 16% and 24%, respectively. Era I had one donor death whereas Era II had no donor death.

Conflicts of interest: The authors declare that they have no financial or non-financial conflicts of interest related to the subject matter or materials discussed in the manuscript.

* Corresponding author. L456, The University of Hong Kong, 102 Pok Fu Lam Road, Hong Kong, China.

E-mail address: seechingchan@gmail.com (S.C. Chan).

^c Li Shu Fan Medical Foundation Professor in Surgery

Conclusion: At an established center, DRH can be carried out safely by newer surgeons with good outcomes.

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1. Introduction

Living donor liver transplantation (LDLT), when applied to adult recipients, often requires the right liver in order to provide a graft of adequate size. Donor hepatectomy is a very major surgical operation and is performed on healthy volunteers only. Donor left hepatectomy, which can provide a liver graft adequate for a recipient of small body size, carries an estimated mortality rate of 0.1%, whereas donor right hepatectomy (DRH) has an estimated mortality rate of 0.5%.¹ Although donor death has occurred in almost every continent, the contemporary standard of donor hepatectomy globally has yet to be determined and ought to be updated. How reporting of morbidities and mortalities improves the safety of donor hepatectomy has not been examined or proven. Whether accumulation of knowledge of these donor procedures affects the practice of surgery is also unknown. In 2009, encouraging research by the Japanese Liver Transplantation Society reported a donor morbidity of less than 10% and mortality of 0.03%.² However, in 2010, two living liver donors died from the operation in the United States. A total of four living liver donor deaths have occurred in the United States.

In one of our previously published studies, the outcomes in the consecutive first 200 living right liver donors were analyzed and discussed. There was an obvious improvement of donor outcomes with time. A learning curve phenomenon was demonstrable. The operation time and blood loss decreased with time, and the curve was steepest for the first 50 cases. The complication rate also dropped from 34% in the first 50 donors to 16% in the remaining three subgroups, each with 50 donors. Unfortunately, in the fourth subgroup of 50 donors, one donor died 10 weeks after surgery from a duodenal ulcer that had perforated into the inferior vena cava.³ With the wider applicability of right-liver LDLT, there are more DRHs and hence more surgeons are required. This study evaluates the feasibility of this operation being continued by a newer group of surgeons at our center and analyzed the surgical outcomes. To be qualified to be a trainee in LDLT at our center, one must be a qualified specialist surgeon in general surgery, that is, having undertaken a 6-year training in general surgery and passed the required examinations, and must have at least 1-year experience in hepatobiliary and pancreatic surgery.

2. Methods

Four hundred and fifty consecutive living liver donors (case numbers 1–450) who underwent DRH at our hospital were included in the study. DRH has been described previously.⁴ In brief, it is performed via a right subcostal incision with an upper midline extension. Intraoperative cholangiography under fluoroscopy is employed to plan the line of division of the right hepatic duct(s) prior to liver transection.

Temporary right liver inflow control reveals the Cantlie line, which is marked by cautery to guide liver transection using Cavitron Ultrasonic Surgical Aspirator (CUSA; Valleylab, Boulder, CO, USA). The right hepatic ductal stump is closed with 6/0 polydioxanone monofilament suture (Ehticon, Edinburgh, UK). Operative cholangiography is performed to confirm the integrity and patency of the main and left ductal systems. The right hepatic artery and portal vein are divided after the application of vascular clamps. The delivery of the right liver graft is preceded by the application of an endovascular stapler (TA30, Tyco; Healthcare, Norwalk, CT, USA) to the site of the right and middle hepatic veins. These veins are cut flush with the staples. A bile leakage test is performed by instillation of dilute methylene blue into the main and left biliary system. All except three of the 450 cases had the middle hepatic vein included in the graft.⁵ From July 2000, an abdominal drain was not deployed in the donor on completion of DRH.⁶

Prospectively collected data included donor characteristics and peri/postoperative outcomes. Complications were recorded and graded according to the Clavien-Dindo classification.⁷ Data analysis was done with the nonparametric test using the PAW program. The 450 cases were divided into nine groups, each with 50 cases. The first 200 cases were classified as Era I, and the remaining 250 cases were classified as Era II. Such classification was based on the fact that after the first 200 cases, newer surgeons were included as operators in the DRHs. Groups 1–4 belonged to Era I, and Groups 5–9 belonged to Era II. Operative outcomes were compared between the eras as well as the groups. A *p* value less than 0.05 was considered statistically significant.

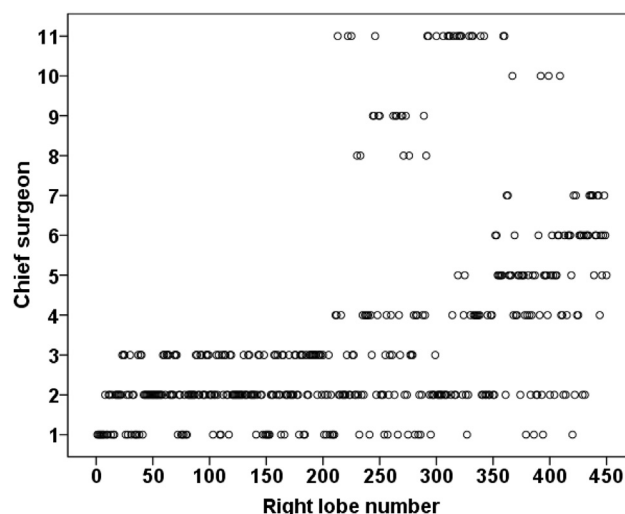


Figure 1 Cases performed by 11 surgeons as chief operators.

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