

# Orthotopic Liver Transplantation at King Chulalongkorn Memorial Hospital: A Report

Bunthoon Nonthasoot MD\*, Boonchoo Sirichindakul MD\*,  
Jade Suphapol MD\*, Wipusit Taesombat MD\*,  
Methee Sutherasan MD\*, Supanit Nivatvongs MD\*

\*Department of Surgery, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

Orthotopic liver transplantation (LT) is the treatment of choice for various liver diseases including early hepatocellular carcinoma (HCC). After the first successful LT in Thailand at King Chulalongkorn Memorial Hospital (KCMH) in 1987, the number of LT has gradually been increasing in parallel with the improvement in patient survival. The recent outcomes of LT are reported herein.

From January 1, 2002 to June 30, 2013, 120 cases of adult LT and 24 cases of pediatric LT were performed. The most common indication for LT was HCC in the adult whereas biliary atresia was the most common indication for LT in pediatric patients. As for the severity of liver disease, the average model of end stage liver disease (MELD) and pediatric end stage liver disease (PELD) scores were 19 in adult LT and 21.5 in pediatric LT, respectively. The most common perioperative complication in adult LT was acute renal failure (25%). One-, five-year patient survival in adult LT and pediatric LT were 85%, 69% and 96%, 91%, respectively.

In conclusion, the outcomes of LT at KCMH have gradually been improving close to the world standard, especially the patient survival.

**Keywords:** Liver transplantation, Patient survival, Thailand

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At present, orthotopic liver transplantation (LT) has been accepted as the standard treatment for end stage liver disease (ESLD) due to various chronic liver diseases, fulminant hepatic failure, including early hepatocellular carcinoma (HCC) and some kinds of metabolic diseases<sup>(1)</sup>. The clinical feasibility of this procedure was demonstrated by Starzl et al<sup>(2)</sup> in 1963 at the University of Colorado, Denver, USA. However, the result was extremely disappointing, with one-year patient survival of approximately 30%<sup>(3)</sup>. In the early 1980s, the introduction of the immunosuppressive agent, cyclosporine A, resulted in a dramatic improvement in graft and patient survival with one-year patient survival close to 70%<sup>(4)</sup>. After then, the National Institute of Health Consensus Conference declared LT should be considered a therapeutic modality for patients with ESLD in 1983<sup>(5)</sup>.

In Thailand, the first LT was performed at

King Chulalongkorn Memorial Hospital (KCMH) on November 28, 1987 by Dr. Voravit Sriwatanawongsa and colleagues<sup>(6)</sup>. This first patient was hepatitis B virus (HBV)-related cirrhosis Child A with huge unresectable HCC. The perioperative course was uneventful but the patient expired 6 months later due to recurrent HCC.

After the successful beginning, 18 cases of LT were performed by the same surgeon between 1987 and 1995; this was considered the first era. Most patients survived for a short period. However, still few pediatric patients survived until the present. Then Dr. Sriwatanawongsa moved to USA and his position was replaced by Dr. Supanit Nivatvongs. In the second era, Dr. Nivatvongs performed 20 cases of adult LT and 24 cases of pediatric LT. One-year survival was improving from 33% to 72% during 1997 to 2002<sup>(7)</sup> but still could not reach the world standard at that time. The main reason behind this was the lack of medical personnel such as transplant surgeon team, transplant coordinator, anesthesiologist, transplant hepatologist, intensivists, and interventionists. One surgeon had to do every step of organ transplant by himself from identifying potential donor, donor resuscitation, organ procurement to recipient operation including

**Correspondence to:**

Nivatvongs S, Department of Surgery, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand.  
Phone: 0-2256-4117  
E-mail: [supanit.n@chula.ac.th](mailto:supanit.n@chula.ac.th)

postoperative care. After 2002, there was gradual recruitment of the human resources. More medical personnel joined the team, and the system of organ transplant was set up. More surgeons came back from overseas training and having gained more experience; the results were markedly improved. This is considered the third era.

The outcomes of LT at KCMH in the third era from January 1, 2002 to June 30, 2013 were reported herein.

### Recipient selection

All patients with ESLD were evaluated for LT regardless of their age and causes of underlying liver disease. The guideline of the American Association for the Study of Liver Diseases (AASLD)<sup>(8)</sup> for evaluation of liver transplant patient was followed. As for the HCC patients, Milan's criteria<sup>(9)</sup> was also strictly followed. In the pediatric patient, the reduced size LT was considered first before July 7, 2008. After then, living donor liver transplantation (LDLT) was considered.

### Donor selection

Absolute contraindications for donor organs included positivity of human immuno-deficiency virus (HIV), hepatitis B surface antigen, >30% macrovesicularsteatosis, or presence of extracranial malignancies. All other donors were considered; liver quality was evaluated by a surgeon and biopsied when needed during the donor operation before exclusion.

### Organ allocation

Organ allocation rules<sup>(10)</sup> regulated by the Organ Donation Center, the Thai Red Cross Society was followed. Briefly, it was center-based rotation system, liver graft was allocated to the center. Each center has its allocation policy, mostly based on the model for end-stage liver disease (MELD) score to stratify the severity of the liver disease. At KCMH, MELD score has been used for organ allocation. As for HCC, Milan's criteria were followed. The extent of the tumor, the severity of liver disease and the possibility of receiving bridging treatment were considered for organ allocation.

### Immunosuppression

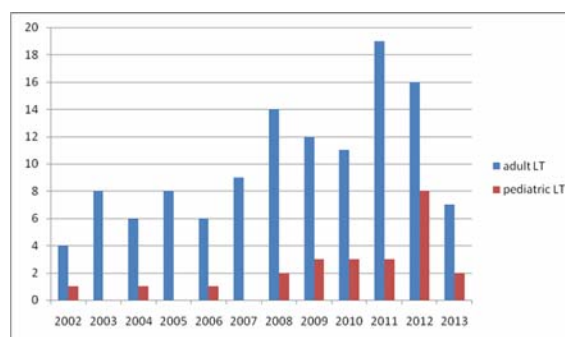
Maintenance immunosuppression regimens consisted of a triple regimen of cyclosporine A or tacrolimus, mycophenolate, and prednisolone. The induction with an interleukin 2 receptor antagonist (basiliximab) was considered for patients who had

underlying chronic kidney disease stage 3 and 4, or patients who expected to suffer from postoperative acute renal failure for delayed administration of calcineurin inhibitor. Steroid was rapidly tapered and discontinued around three months postoperatively.

### Results

From January 1, 2002 to June 30, 2013 there were 120 cases of adult LT and 24 cases of pediatric LT. The number of LT performed in each year is shown in Fig. 1. Sixteen cases of LDLT were performed; all of them were pediatric patients. The average age, genders, blood groups of adult LT are demonstrated in Table 1. The most common indication was HCC followed by HBV and HCV cirrhosis, as shown in Table 2. The average MELD score was 19, and average waiting time was 315 days with 47% waiting list mortality (MR). The most common perioperative complication was acute renal failure, shown in Table 3. The perioperative MR was 6.7%. 1-, 3-, and 5-year patient survival were 85%, 77% and 69%, respectively.

As for pediatric patients, 24 cases were



**Fig. 1** The number of LT performed between 1/1/2002 and 30/6/2013 at KCMH.

**Table 1.** Age, gender, blood group of adult LT

Age (year)	
Mean	51.5
Median	53
Range	15-70
Gender (%)	
Male	79 (65.8)
Female	41 (34.2)
Blood group (%)	
A	23 (19.2)
B	51 (42.5)
O	39 (32.5)
AB	7 (5.8)

performed. Sixteen cases were LDLT, and eight cases were cadaveric LT. The average age, gender, blood group, indication, PELD score and graft type are shown

**Table 2.** Indications of adult LT

HCC	58 (48.3%)
HBV cirrhosis	15 (40*)
HCV cirrhosis	13 (37*)
Alcoholic cirrhosis	8 (13*)
Cryptogenic cirrhosis	5 (9*)
Primary biliary cirrhosis	2
Fulminant hepatic failure	7
Miscellaneous	12

\* Include HCC patients

**Table 3.** Perioperative complications of adult LT

Acute renal failure *	30 (25%)
Primary nonfunction	4 (3.3%)
Bile duct complication	7 (5.8%)
Bleeding	5 (4.2%)
Vascular complications	2 (1.7%)

\* Criteria for acute renal failure: increment of postoperative creatinine >1.5 times of preoperative creatinine or dialysis is needed

**Table 4.** Age, Gender, Blood group, Indication, PELD score and graft type of pediatric LT

Age (year)	
Mean	3.9
Median	2
Range	0.58-13
Gender (%)	
Male	9 (37.5)
Female	15 (62.5)
Blood group (%)	
A	5 (20.8)
B	7 (29.2)
O	11 (45.8)
AB	1 (4.2)
Indication	
Biliary atresia	20 (83.3%)
Acute liver failure	2
Others	2
PELD score	
Mean	21.5
Median	22.5
Range	1-43
Graft type	
Living donor	16
Cadaveric donor	8

in Table 4. There was only one death in cadaveric group from fungal infection. The rest 23 patients have survived at the time of study. 1- and 5-year patient survival were 96% and 91%, respectively.

## Conclusion

With the fulfillment of medical personnel and the better-organized transplant system, the results of LT at KCMH has been improving and reaching the world standard<sup>(11)</sup> with 1- and 5-year patient survival (including adult and pediatric patients) 86% and 72%, respectively. Better outcomes and more variability of LT including split LT, adult LDLT are expected in the near future.

## Potential conflicts of interest

None.

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## รายงานผลการผ่าตัดปลูกถ่ายตับในโรงพยาบาลจุฬาลงกรณ์

บัณฑูร นนทสูติ, บุญชู ศิริจินดากุล, เจษฎ์ ศุภผล, วิภูษิต แต่สมบัติ, เมธี สุธีรสานต์, สุภนิติ นิวัตวงศ์

การปลูกถ่ายตับเป็นการรักษาที่ดีที่สุดสำหรับโรคตับหลายๆ ประเภทรวมไปถึงมะเร็งตับในระยะแรก ในประเทศไทยได้มีการผ่าตัดปลูกถ่ายตับสำเร็จเป็นครั้งแรกในปี พ.ศ. 2530 ที่โรงพยาบาลจุฬาลงกรณ์ หลังจากนั้นจำนวนการผ่าตัดค่อยๆ เพิ่มขึ้นเรื่อยๆ เช่นเดียวกับผลการปลูกถ่ายตับในแง่ของอัตราการรอดชีวิตของผู้ป่วยก็ดีขึ้นตามลำดับ รายงานฉบับนี้เป็นการรายงานผลการปลูกถ่ายตับในโรงพยาบาลจุฬาลงกรณ์ตั้งแต่วันที่ 1 มกราคม พ.ศ. 2545 ถึงวันที่ 30 มิถุนายน พ.ศ. 2556

ในช่วงเวลานี้มีการปลูกถ่ายตับทั้งสิ้น 144 รายแบ่งเป็นผู้ป่วยผู้ใหญ่ 120 รายและผู้ป่วยเด็ก 24 ราย ข้อบ่งชี้ของการผ่าตัดที่พบมากที่สุดได้แก่ มะเร็งตับในผู้ใหญ่และท่อน้ำดีอุดตันแต่กำเนิดในเด็ก ค่าเฉลี่ยของเมลด์สกออร์ในผู้ใหญ่และเพลด์สกออร์ในเด็กซึ่งบอกความรุนแรงของโรคตับมีค่าเท่ากับ 19 และ 21.5 ตามลำดับ ภาวะแทรกซ้อนภายหลังการผ่าตัดในระยะแรกที่สุดที่พบมากที่สุดในผู้ป่วยผู้ใหญ่ได้แก่ ภาวะไตวายเฉียบพลันคิดเป็น 25% อัตราการรอดชีวิตที่ 1 และ 5 ปี ในผู้ป่วยผู้ใหญ่และผู้ป่วยเด็กมีค่าเท่ากับ 85%, 69% และ 96%, 91% ตามลำดับ

กล่าวโดยสรุปผลของการผ่าตัดปลูกถ่ายตับในโรงพยาบาลจุฬาลงกรณ์ดีขึ้นเป็นลำดับ โดยมีอัตราการรอดชีวิตที่ใกล้เคียงกับมาตรฐานโลก

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