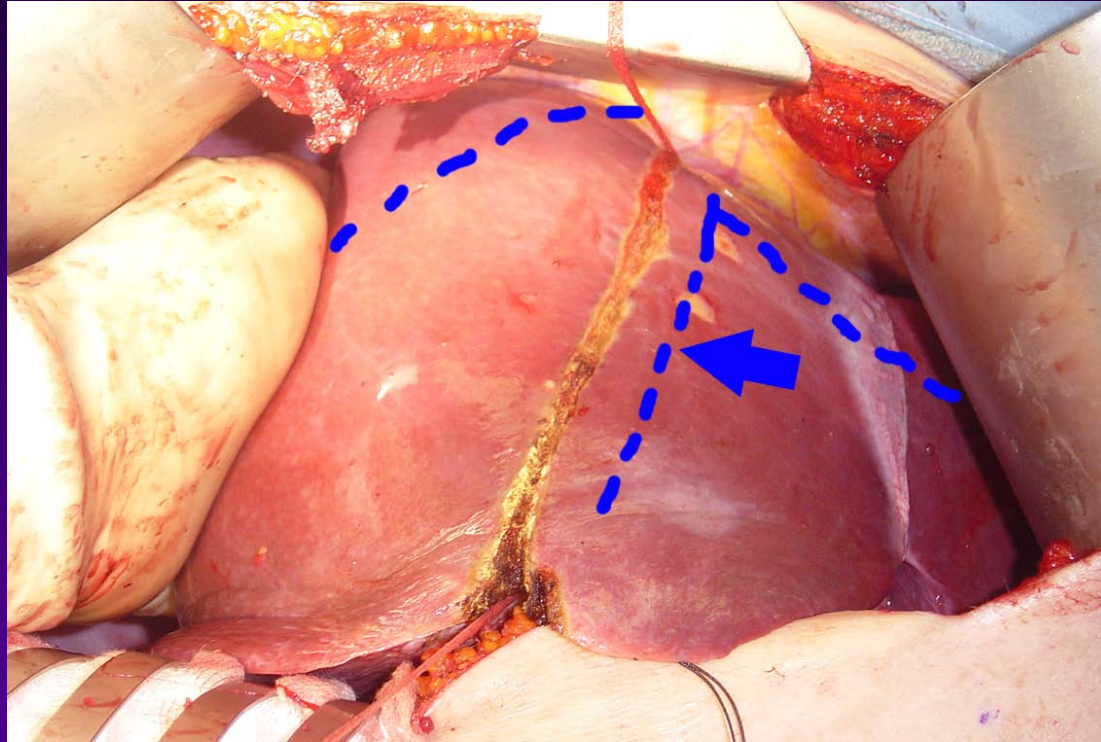


Living Donor Liver Transplant

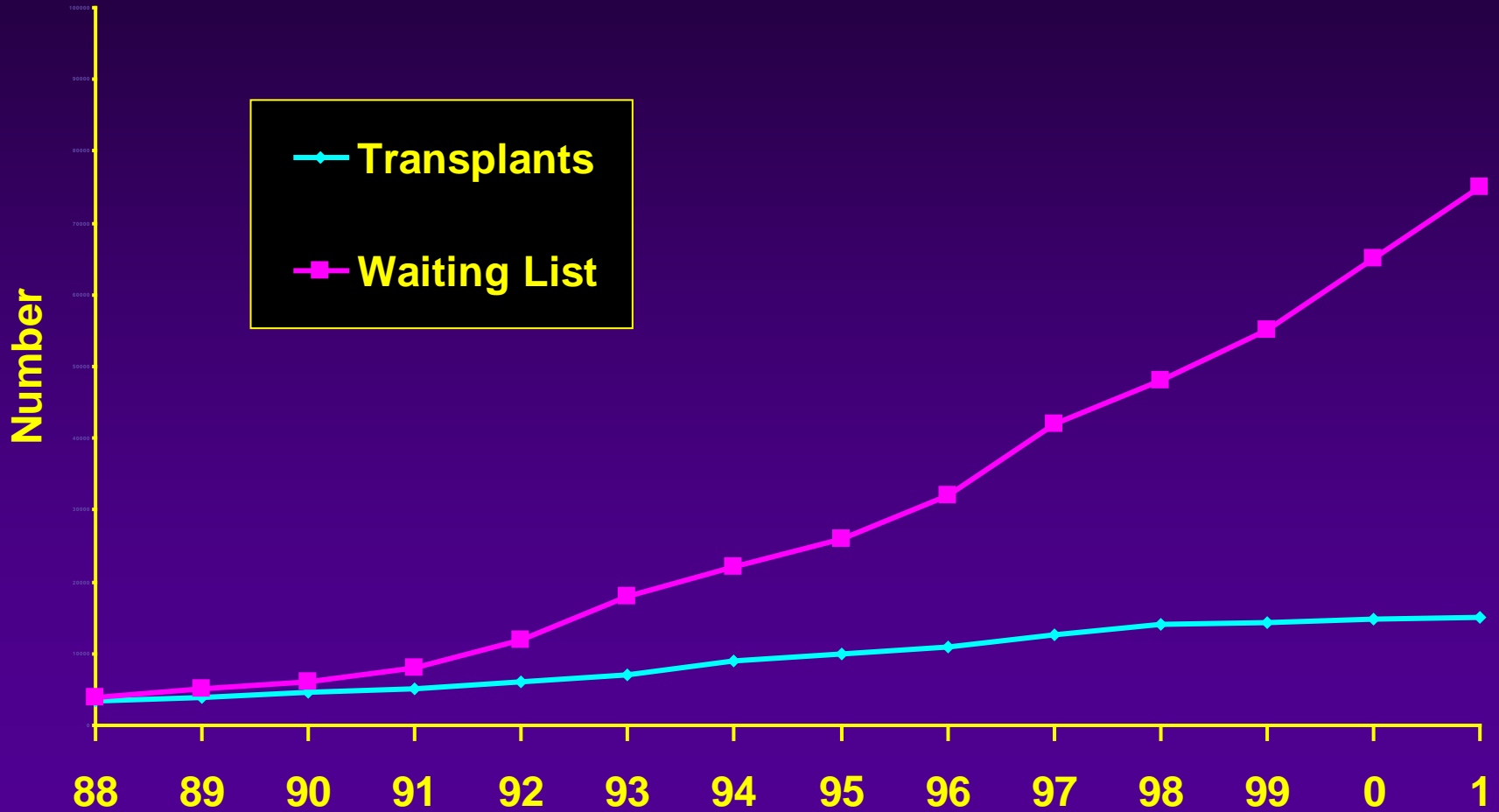


Abhi Humar

Professor of Surgery

Division of Transplant

Transplant Waiting List



Consequences of Waiting List

What does this mean for the individual patient needing a liver transplant:

- About a 15-25% chance of never making it to transplant.
- Longer waiting times before receiving a transplant
- A more debilitated state by the time a transplant is performed
- A longer and more difficult recovery time posttransplant

Methods to Expand Donor Pool

- **Xenotransplants**
- **Non-transplant options for end-stage organ failure**
- **“Marginal donors” or “expanded criteria donors”**
- **Living donor transplants**
- **Split liver transplants from a deceased donor**

Advantages and Disadvantages of LDLTx

Disadvantages

- Short-term risks to donor
- Long-term risks to donor
- Increased incidence of biliary and vascular complications
- Decreased hepatic reserve

Advantages

- Decreased waiting time
- Transplant prior to recipient becoming critically ill
- Elective, non-emergent
- Minimal cold ischemia
- Immunologic advantage
- Adds to cadaver pool

Donor Selection

Prerequisite for Use of Living Donors

The potential donor must :

- **understand the procedure and the risks**
- **Not be coerced**
- **Provide a voluntary answer**
- **Be mentally competent and of legal age.**

Donor Evaluation for LRLTx

- **Medically fit:**
 - ◆ H and P
 - ◆ LFTs
 - ◆ Serological tests
- **Surgically fit**
- **Psychologically fit**

Recipient Selection

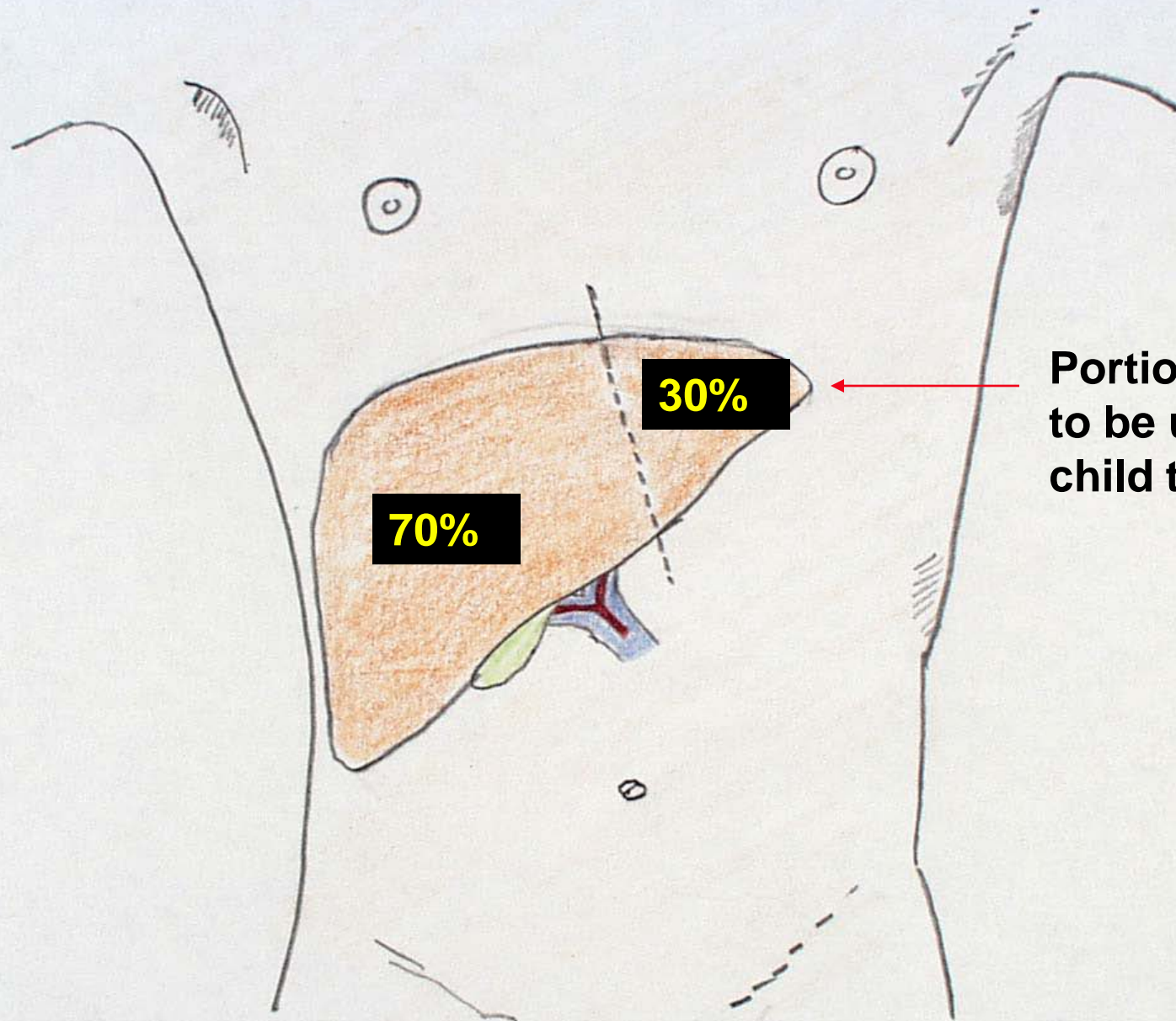
Recipient Selection for LRLTx

Who?:

- Patients considered suitable for cadaveric transplants

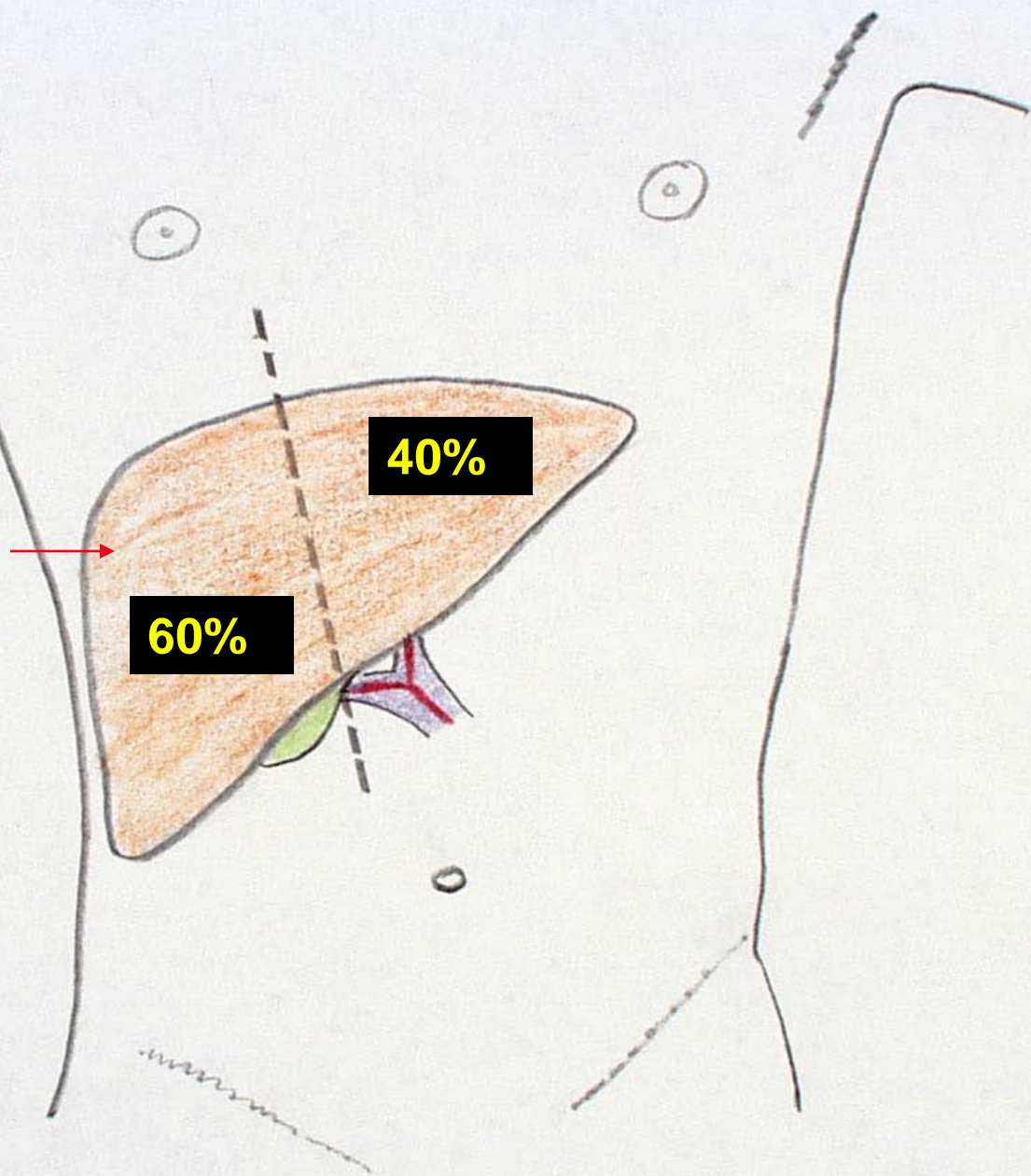
When?

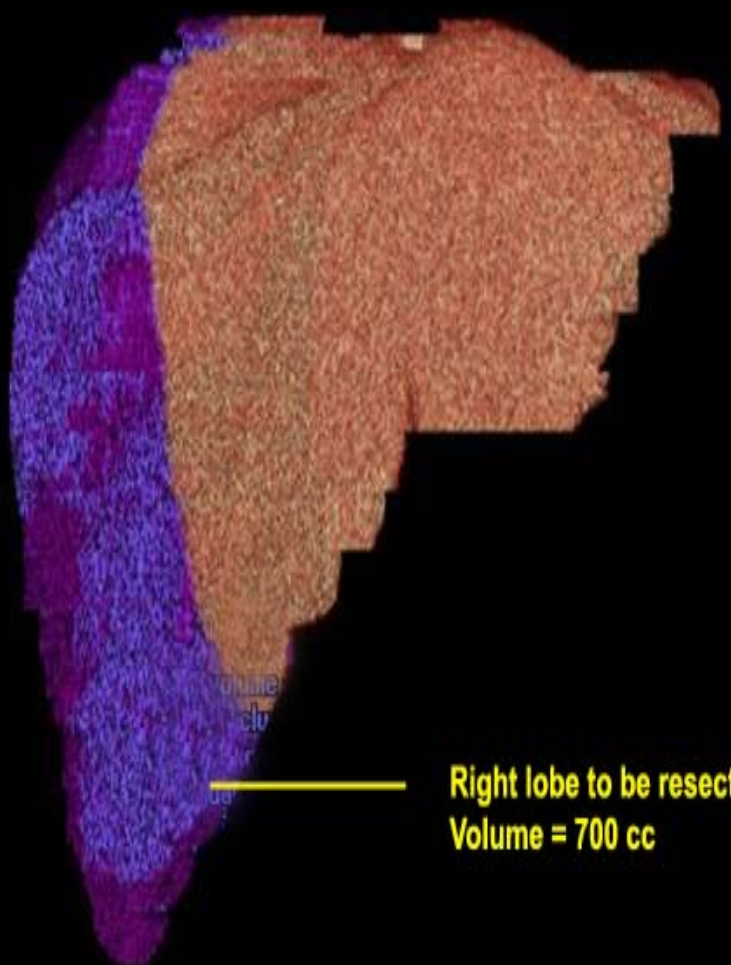
- Circumstances in which there are expectations of recovery for the recipient.
- Ideally patients with MELD >12 and <30



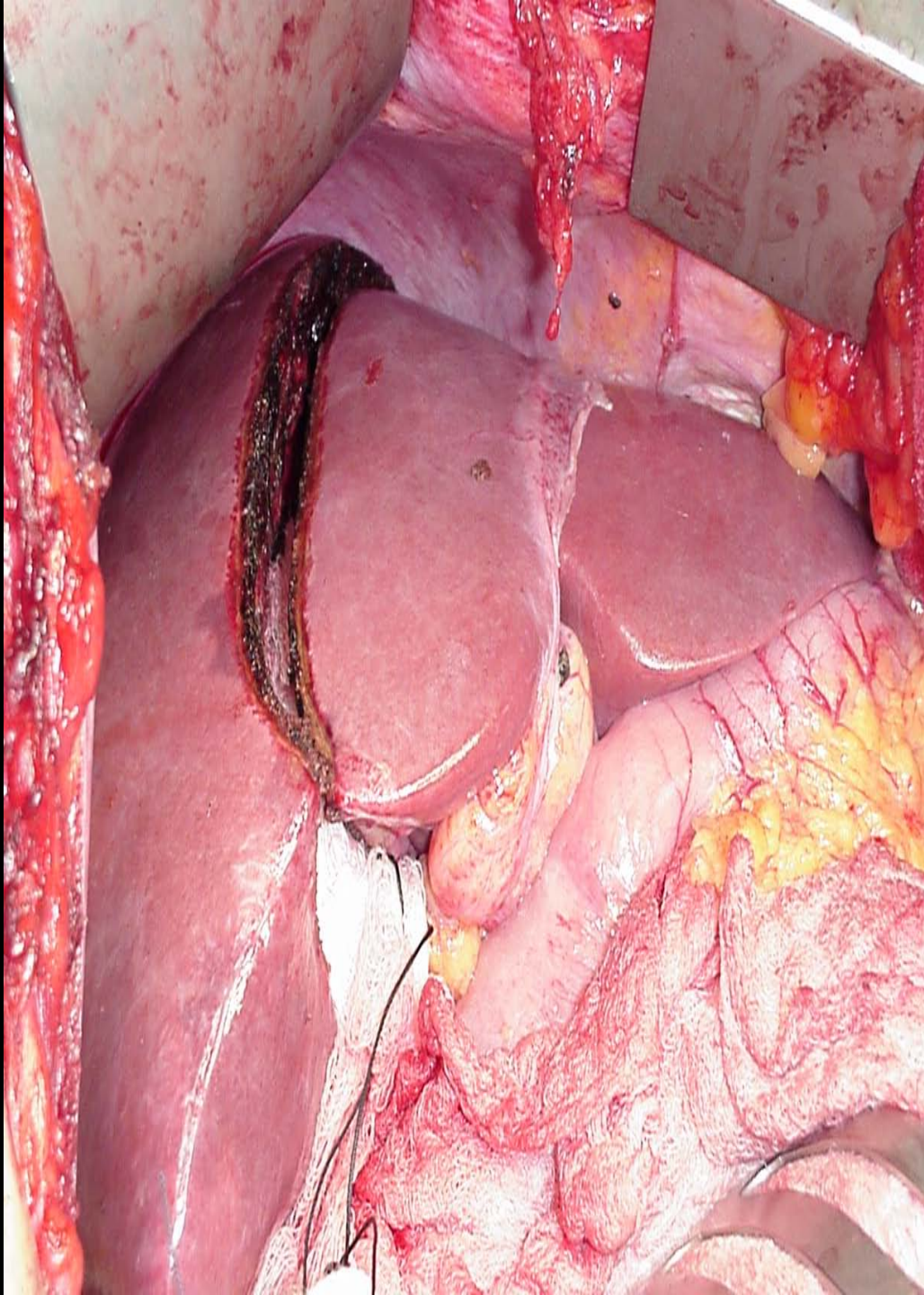
**Portion of liver
to be used for
child transplant**

Portion of liver to
be removed for
adult transplant



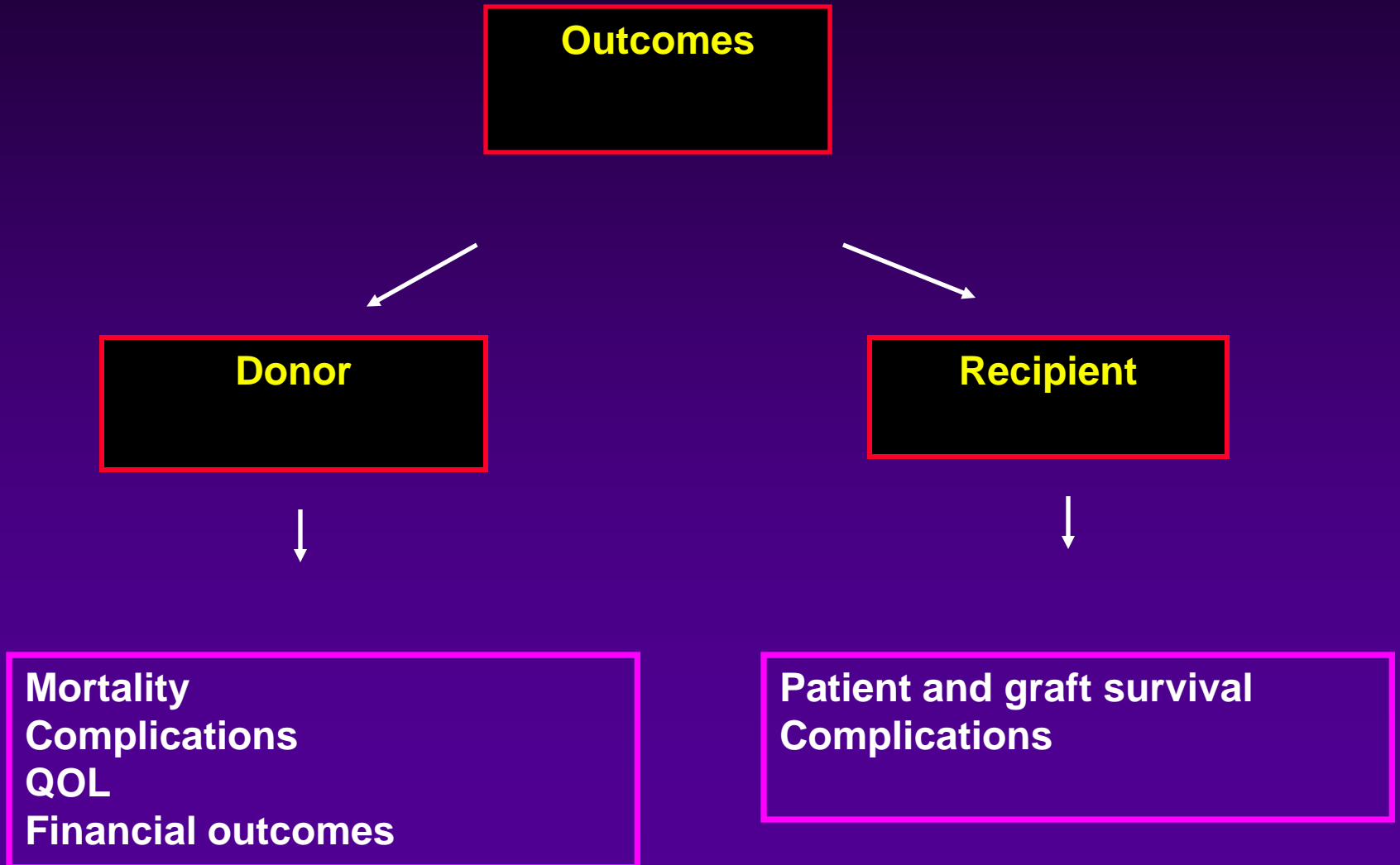


Right lobe to be resected
Volume = 700 cc



Outcomes after ALDLT

Outcomes after LDLT



The Ultimate Sacrifice

A healthy man gives his brother half his liver—and dies. Should this kind of transplant be allowed?

By **CHRISTINE GORMAN**

MIKE AND ADAM HUREWITZ GREW UP together on Long Island, in the suburbs of New York City. They were very close, even for brothers. So when Adam's liver started failing, Mike offered to give him half of his. The operation saved Adam's life. But Mike, who went into the hospital in seemingly excellent health, developed a complication—perhaps a blood clot—and died last week. He was 57.

Mike Hurewitz's death has prompted a

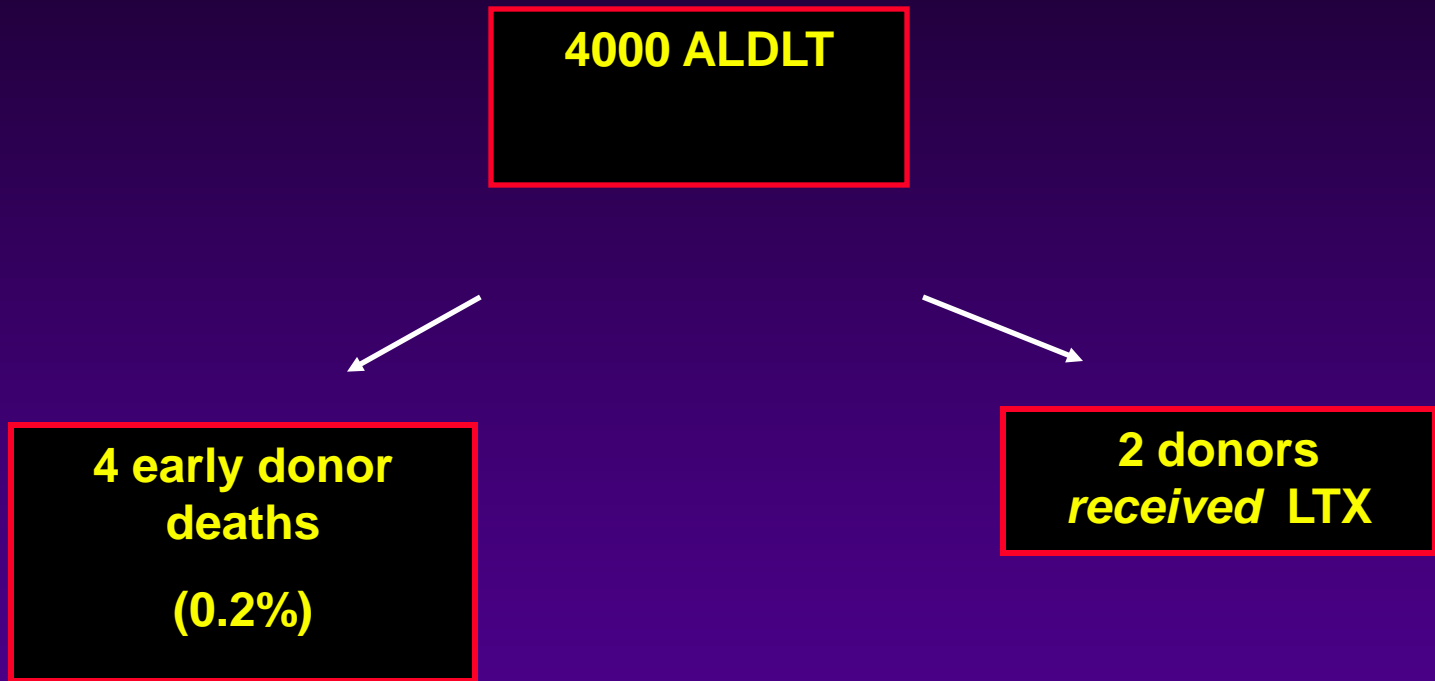
like bad odds, but there's more to this ethical dilemma than a simple ratio. The first and most sacred rule of medicine is to do no harm. "For a normal healthy person, a mortality rate of 1% is hard to justify," says Dr. John Fung, chief of transplantation at the University of Pittsburgh Medical Center. "If the rate stays at 1%, it's just not going to be accepted."

On the other hand, there's an acute shortage of traditional donor organs from people who have died in accidents or suffered fatal heart attacks. If family members fully understand the risks and are willing to

however, is a lot to ask. To plant a kidney. Not just any kidney, but one with blood vessels that have the right proteins that need to be in the right ratios for the recipient's organs from the donor. If the organ used, the surgeon will have to use the donated liver. It's a big take as much of it as possible. If it goes well, a healthy person can take whatever portion of the liver, sometimes within

A living-donor transplant is usually well when a portion of the liver is removed. The left lobe of the liver is going to a mortality rate of 1% in the neighborhood. But when the recipient's liver is removed, as much as 60% of the liver is removed. "There's a lot of room for error," says Dr.

Donor Mortality- U.S.



- Estimated risk of mortality or transplant = 0.5%

Donor Mortality- other organs

Kidney:

- 1999-2001- 15,162 donor nephrectomy
- 2 deaths, 1 persistent vegetative state (0.02%)

Donor Morbidity in 449 ALDLT donors

A survey of liver transplantation from living adult donors in the United States. Brown RS et al. NEJM 2003; 248:818-25.

Type of complication	Number	%
Death	1	0.2
Need for rehospitalization	38	8.5
Bile stricture or leak	27	6.0
Need for reoperation	20	4.5
Major postoperative infection	5	1.1
Nonautologous blood transfusion	22	4.9
Other	10	2.2
Total	65	14.5

Donor Morbidity in 1841 LDLT donors

- Japanese Liver Transplant Society Database. Lancet 2003.

Graft Type	Morbidity	Biliary Fistula	Reoperation
Left Lateral	8.2	1.9	1.2
Left	12.0	1.9	0.4
Left lobe plus caudate	15.7	3.6	2.9
Right	19.0	10.2	1.8
Total	12.4	4.0	1.2



The Vancouver Forum: Care of the Live Organ Donor

	Europe 2004	USA 2003	Asia 2003
	1287	449	1508

Left liver:	445	-	939	
mortality	1	-	0	0.07%
morbidity	9 %		9%	9%
Right Liver:	385	449	561	
mortality	3	1	1	0.3%
morbidity	21%	14%	28%	21%

Current overall right lobe donor morbidity: ~35%

Long-term outcomes

- **What is the possible impact 10, 20, 30, 40, 50 years down the road?**
- **What is the incidence of late biliary strictures?**
- **What is the impact of hepatic regeneration on donor liver issues**

Recipients: Risks and Outcomes

**Risks and
Outcomes**

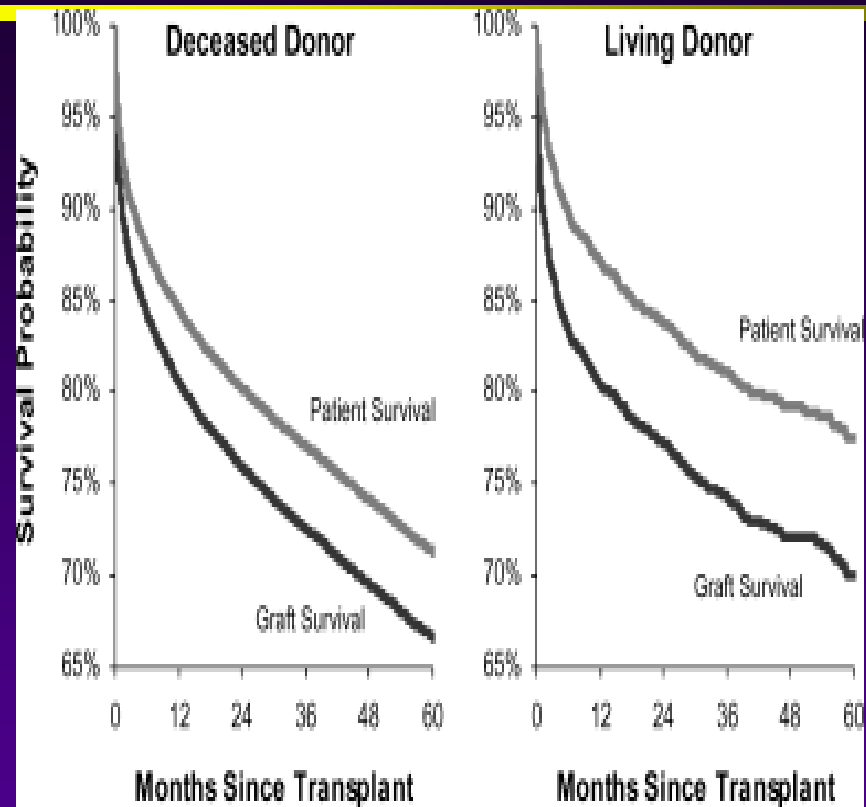
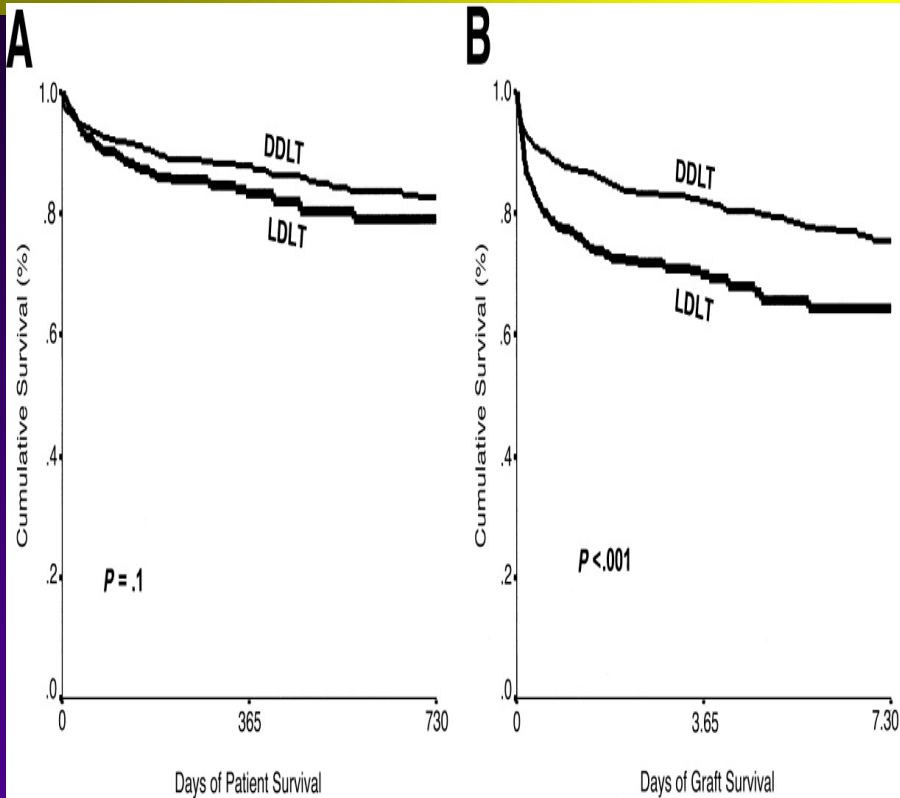
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graph TD; A[Risks and Outcomes] --> B[LDLT]; A --> C[Deceased donor LT]; B --> D[• Lower donor age<br>• Decreased CIT<br>• Lower MELD];
```

LDLT

Deceased donor

LT

- Lower donor age
- Decreased CIT
- Lower MELD



Thuluvath, Liver transplantation, 2004

Pomfret, AJT, 2007

Outcomes of 385 Adult-to-Adult Living Donor Liver Transplant Recipients: A Report From the A2ALL Consortium

Olthoff K et al. Ann. Surg. 2005; 242:314-325.

Biliary complications (First Year):

Leak 32%

Stricture 17%

Vascular Complications (First Year)

HAT 6%

PVT 3%

Reoperation Rate (First Year) 25%

Sepsis Rate (First Year) 41%

- 13.2% of grafts fail within the first 90 days



Outcomes of 385 Adult-to-Adult Living Donor Liver Transplant Recipients: A Report From the A2ALL Consortium

- Center experience > 20 LDALT associated with a lower risk of graft failure.
 - Centers with < 20 associated with 83% higher risk of graft failure ($p < 0.0045$)
- Recipient MELD score and graft size were not significant predictors of graft loss.

**Adequate
Graft Volume**

**Secure BD
Anastomosis**

Technically Successful LDLT

**Sufficient
Inflow**

**Good
Outflow**

PV

HA

HV

“Small-for-Size” Syndrome

Partial liver graft unable to meet the functional demands of the recipient resulting in poor early graft function without evidence of ischemic injury

- Poor bile production
- Prolonged cholestasis
- Significant ascites
- Coagulopathy



In the context of LT, ~ 50% of recipients with SFSS will die of sepsis within 4-6 weeks

Recipient Related Factors

➤ Recipient factors that predict poor outcome and SFSS:

- Graft mass
- Poor metabolic and physical condition
- Advanced chronic liver disease and severe portal hypertension
- Impaired venous inflow and/or outflow

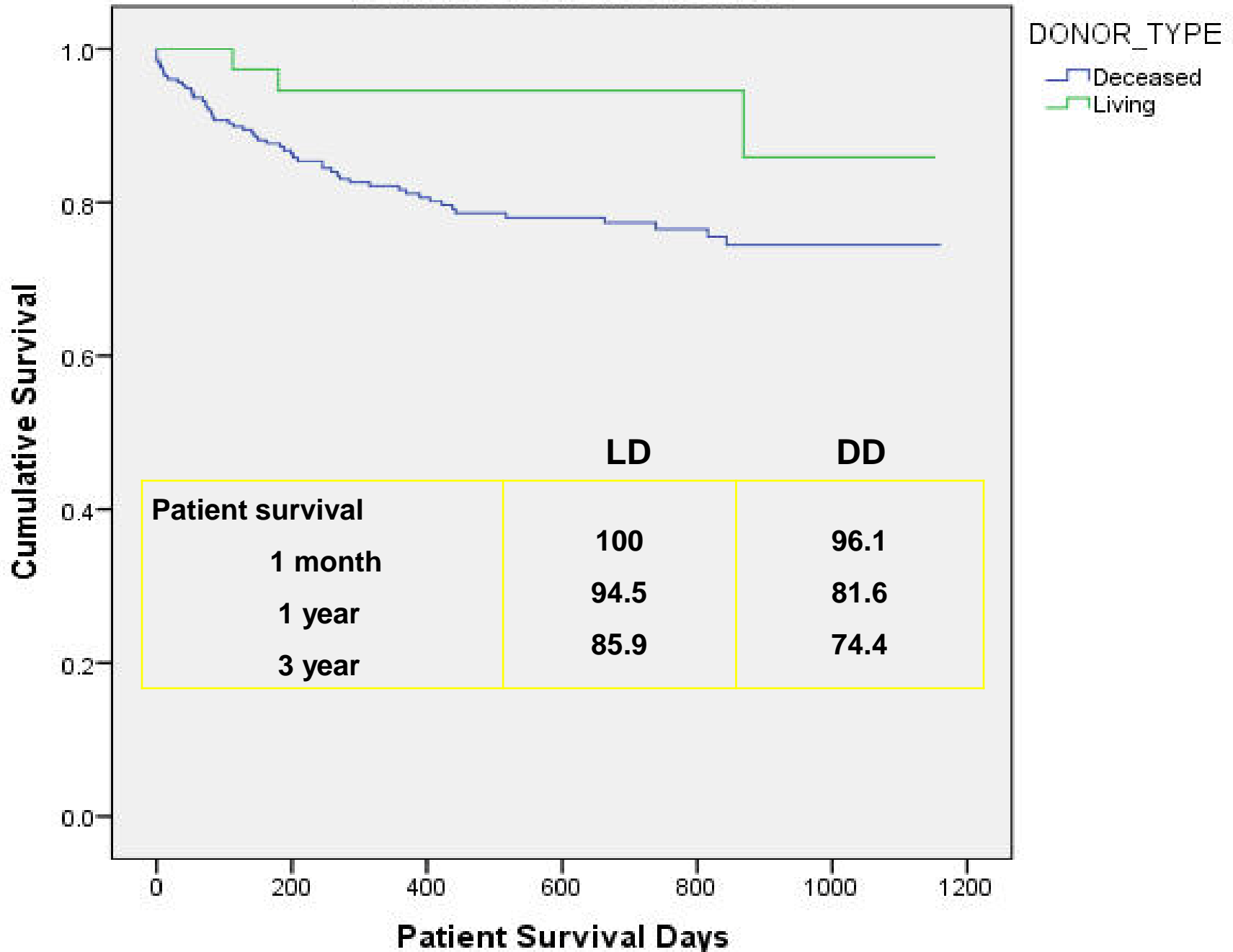
Avoidance of Portal Hyperperfusion Syndrome

- **Reconstruction of accessory hepatic veins**
 - **Accessory RHV**
 - **Segment 5/8 drainage to MHV**
- **Reducing portal venous inflow**
 - **Biochemical: prostaglandin E1 (vasodilator and hepatoprotective) and somatostatin**
 - **Splenic artery ligation**
 - **Meso-caval shunt**
 - **Porto-caval shunt**

Multivariate Analysis of Risk Factors for patient survival

Risk Factor	Characteristic	Hazard ratio Patient Survival	p
Donor Source	Cad vs LD	4.88	0.04
Graft Type	Partial vs whole	0.77	0.53
MELD score	≥25 vs <25	1.11	0.71
Donor Age	≥50 vs <50	1.38	0.25
Recipient Age	≥50 vs <50	1.19	0.52
Transplant number	Retransplant vs primary	2.71	0.02
Hep C	Yes vs no	1.57	0.09
HCC	Yes vs no	2.48	0.003

Patient Survival Functions



Graft Survival Functions

