



Initiation and Development of Liver Transplantation Program in NTUH

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Organ Transplantation in NTUH

1968/02/27	Living-related kidney transplantation
1969/05/	Cadaveric kidney transplantation
1983/11/09	Bone marrow transplantation
1985/08/	Transplantation Society of R.O.C.
1987/06/19	Transplantation legislation
1987/07/17	Heart transplantation
1987/09/17	“Brain death declaration” legislation
1989/10/13	Liver transplantation
1992/04/05	Pediatric liver transplantation
1994/11/23	Pancreatic transplantation
1995/12/09	Lung transplantation
1997/12/26	Living-related liver transplantation
2000/08/09	Adult-to-adult living-related liver transplantation
2002/03/07	Taiwan Organ Registry and Sharing Center

The Organ Transplantation Registry in Taiwan

Year	Kidney				Liver			
	LRD	CAD	Off Shore	Total	LRD	CAD	Off Shore	Total
1986	39	56	-	95	-	-	-	0
1987	39	52	-	91	-	-	-	0
1988	40	62	-	102	-	1	-	1
1989	20	44	-	64	-	2	-	2
1990	25	72	5	102	-	4	-	4
1991	29	133	102	264	-	11	-	11
1992	10	138	91	239	-	7	-	7
1993	16	135	37	188	-	9	-	9
1994	10	109	26	145	1	6	-	7
1995	8	82	36	126	3	14	-	17
1996	10	90	34	134	7	10	-	17
1997	8	141	45	194	4	18	-	22
1998	13	134	44	191	8	23	-	31
1999	12	87	62	161	11	18	-	29
2000	24	105	139	268	26	25	-	51
2001	27	113	219	359	52	31	8	91
2002	44	92	251	387	59	21	22	102
2003 (1-10M)	38	136	95	269	64	44	7	115
Total	412	1781	1186	3379	235	244	37	516

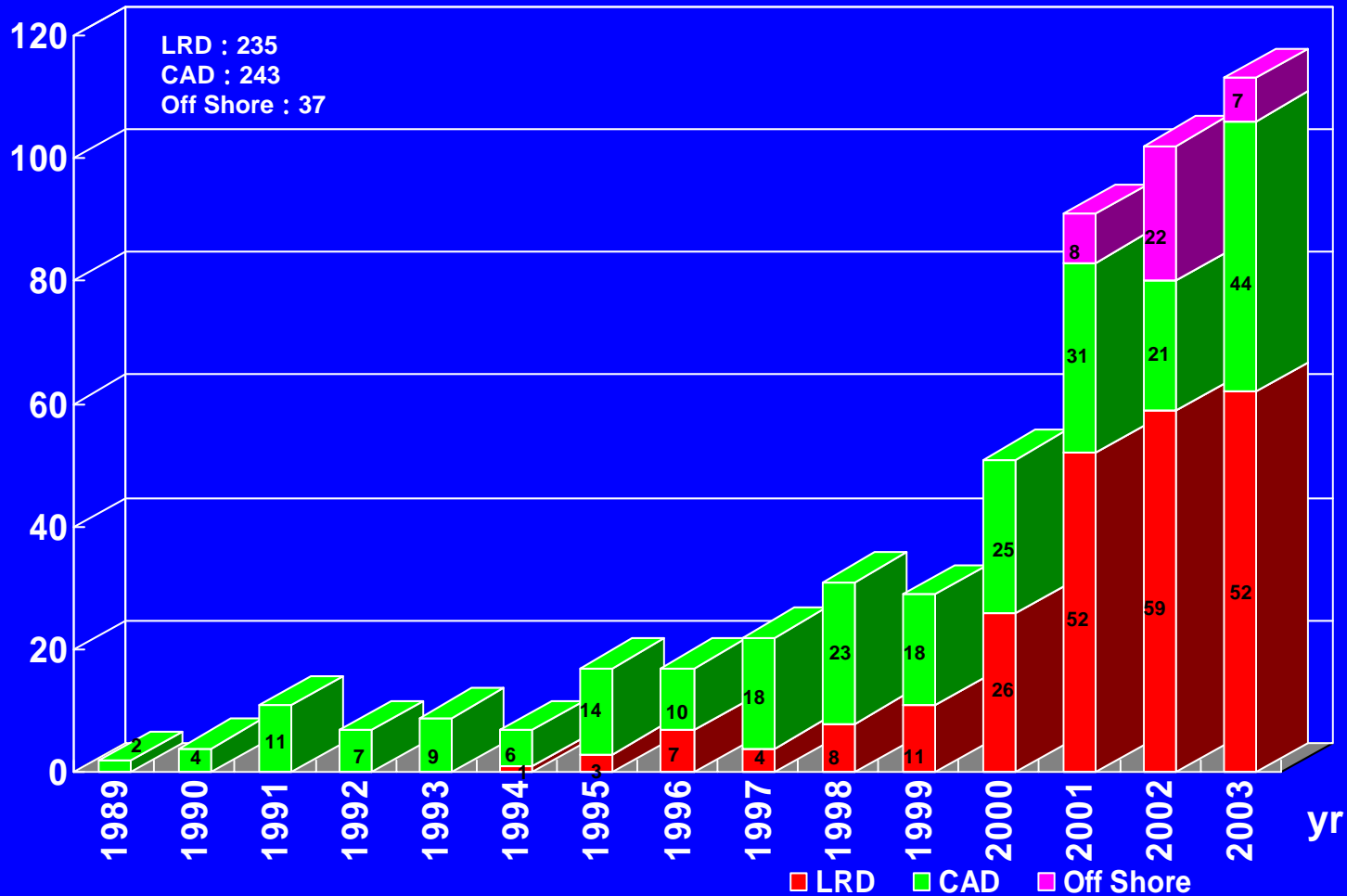
**LRD: Living Related Donor

CAD: Cadaveric Donor

BMT: Bone Marrow Transplantation

Liver Transplantation in Taiwan (1989~Oct.2003)

No



台灣地區器官捐贈和移植人數統計表

中華民國器官捐贈協會91年7月製表

移植和捐贈人數 年份(民國)	器官移植						器官捐贈		
	腎臟(人)	心臟(人)	肝臟(人)	肺臟(人)	胰臟(人)	心肺(人)	年度總人數	年度總人數	佔人口總數比率(pmp)
81年	141	17	11	0	0	0	169	115	5.4
82年	118	32	10	0	0	0	160	108	5.1
83年	109	31	7	0	0	0	147	91	4.3
84年	87	28	17	3	5	0	140	73	3.4
85年	92	43	17	10	1	0	163	91	4.1
86年	138	66	18	10	0	0	232	132	6
87年	135	54	21	4	0	0	214	110	5
88年	99	48	23	10	0	1	181	90	4.1
89年	116	41	28	5	0	3	193	93	4.1
90年	99	54	29	13	0	0	195	120	5.2
91年(1-6月)									

1. 民國76年6月"人體器官移植條例"公布實施
2. 民國80年1月"中華民國器官捐贈中心"成立
3. 民國82年8月"中華民國器官捐贈協會"成立
4. 肺臟、胰臟移植自84年開始統計;心肺移植自88年開始統計
5. 民國86年6月開始實施機車騎士強迫戴安全帽

根據台大醫院加護病房柯文哲主任與林口長庚神經外科張承能主任表示: 機車騎士強迫戴安全帽政策實施以來, 意外死亡人數減少40-50%

6. 截至88年7月啟用網路索卡簽署器官捐贈同意卡人數超過37萬人

行政院衛生署核定器官移植醫院名單

(截至91.2.20止)

器官項目	醫院數	醫院名稱
心臟	10	台北榮總、台大、三總、長庚、高雄榮總、長庚(高雄)、台中榮總、振興、成大、亞東
肝臟	13	台北榮總、台大、三總、長庚(林口)、長庚(高雄)、台中榮總、高醫、慈濟、成大、中國、沙鹿童、佛教慈濟、彰基
肝臟(活體)	3	長庚(高雄)、台大、中國醫藥
肺臟(單側)	8	台大、台北榮總、三總、台中榮總、長庚(林口)、高雄榮總、中國、成大
腎臟	27	三總、長庚(林口)、署立桃園、馬偕、高醫、長庚(高雄)、台大、成大、台中榮總、署立新竹、羅東博愛、國軍台中總醫院、中國、高雄榮總、沙鹿童綜合、新光、國泰、為恭、慈濟、長庚(基隆)、振興、仁愛綜合、台北榮總、奇美、嘉基、彰基、亞東
骨骼	6	長庚(林口)、馬偕、長庚(高雄)、慈濟、台北榮總、台大
骨髓	16	三總、台大、署立桃園、台北榮總、成大、台中榮總、高醫、奇美、長庚、北市仁愛、高雄榮總、中國、和信、彰基、嘉基、慈濟
眼角膜	52	長庚(林口)、台大、署立桃園、馬偕、北醫、長庚(高雄)、國泰、成大、中山、中國、台北榮總、高醫、馬偕(台東)、台中榮總、彰基、聖功、高雄榮總、署立新竹、沙鹿童綜合、北市仁愛、北市陽明、中國(北港)、慈濟、國軍花蓮總醫院、德全、北市中興、高市民生、台南市立醫院、署立屏東、高市婦幼、北市忠孝、國軍台中總醫院、羅東博愛、高市大同、新光、奇美、耕莘、秀傳、高雄基督教信義、北市和平、嘉基、新泰、署立台北、萬芳、恩主公、仁愛綜合、彰基、羅東聖母、署立基隆、生總、長庚(基隆)、長庚(嘉義)

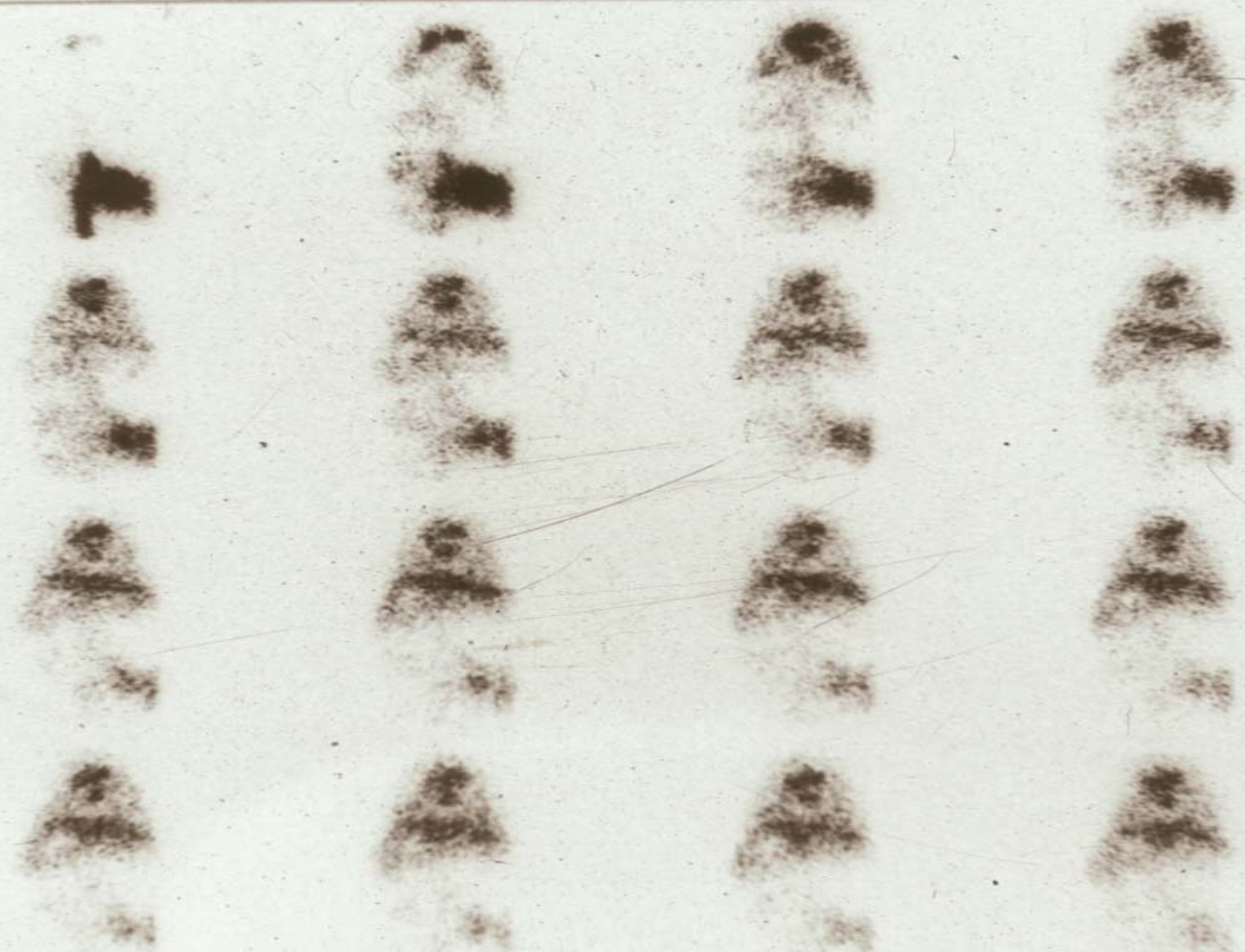
Current Status of Liver and Kidney Transplantation in Taiwan

Hospital	Liver			Kidney		
	CLT	LDLT	Total	CD	LD	Total
NTUH	59	76	135*	335	111	446*
CGMH-Taipei	70	5	75	464	115	579
VGH-Taipei	26	0	26	176	30	206
TSGH	7	0	7	71	3	74
VGH-Taichung	1	0	1	276	15	291
CMU	12	6	18	44	5	49
CHCH	9	0	9	16	0	16
CKUH	13	0	13	89	5	94
CGMH-KS	68	154	222	36	6	42
KSMU	3	0	3	38	0	38
TZUH-HL	4	0	4	14	7	21
TZUH-DL	1	0	1	7	0	7
Total	272	237	509	1562	294	1856

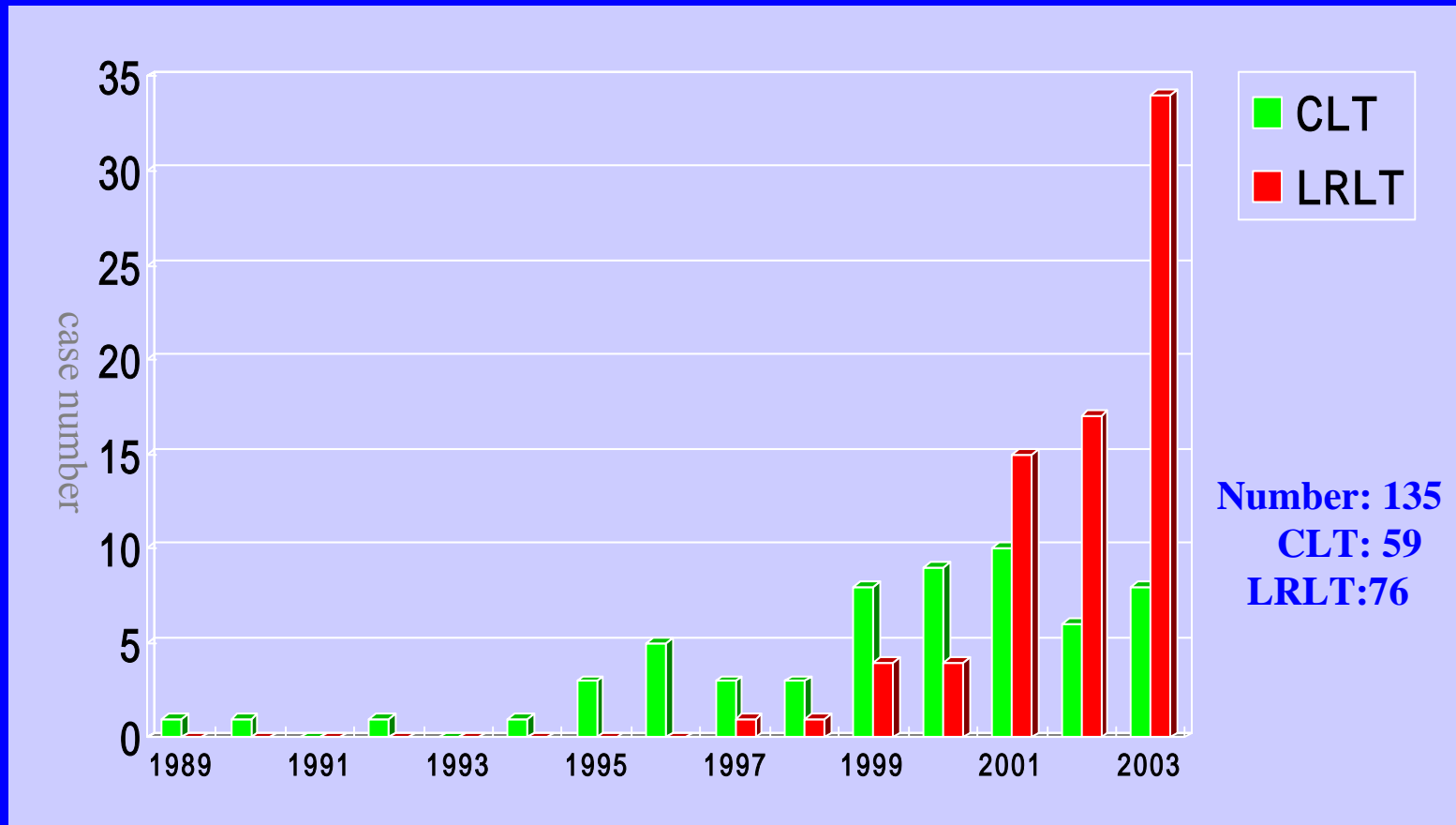
* (Dec,2003)

(Oct, 2003)

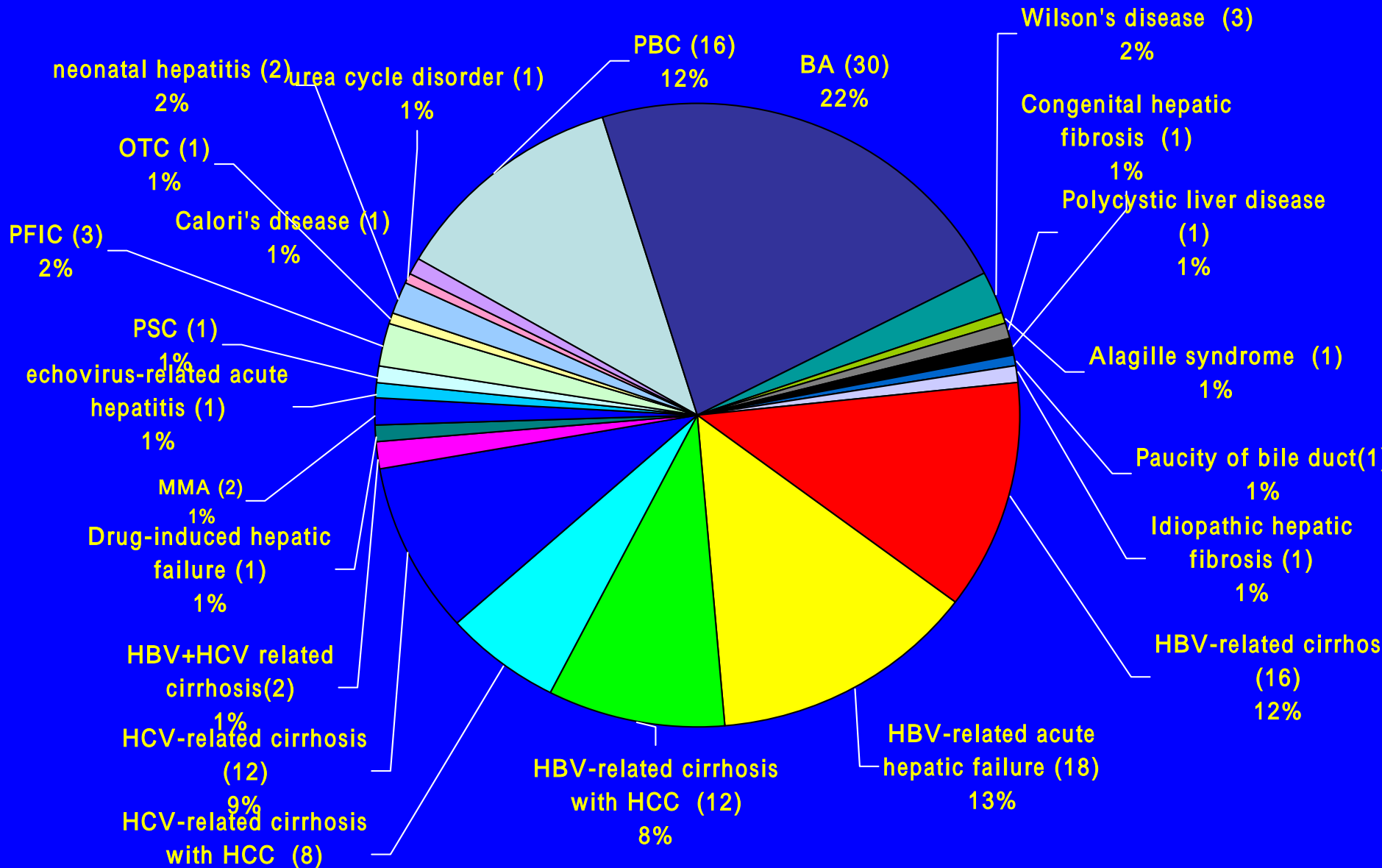




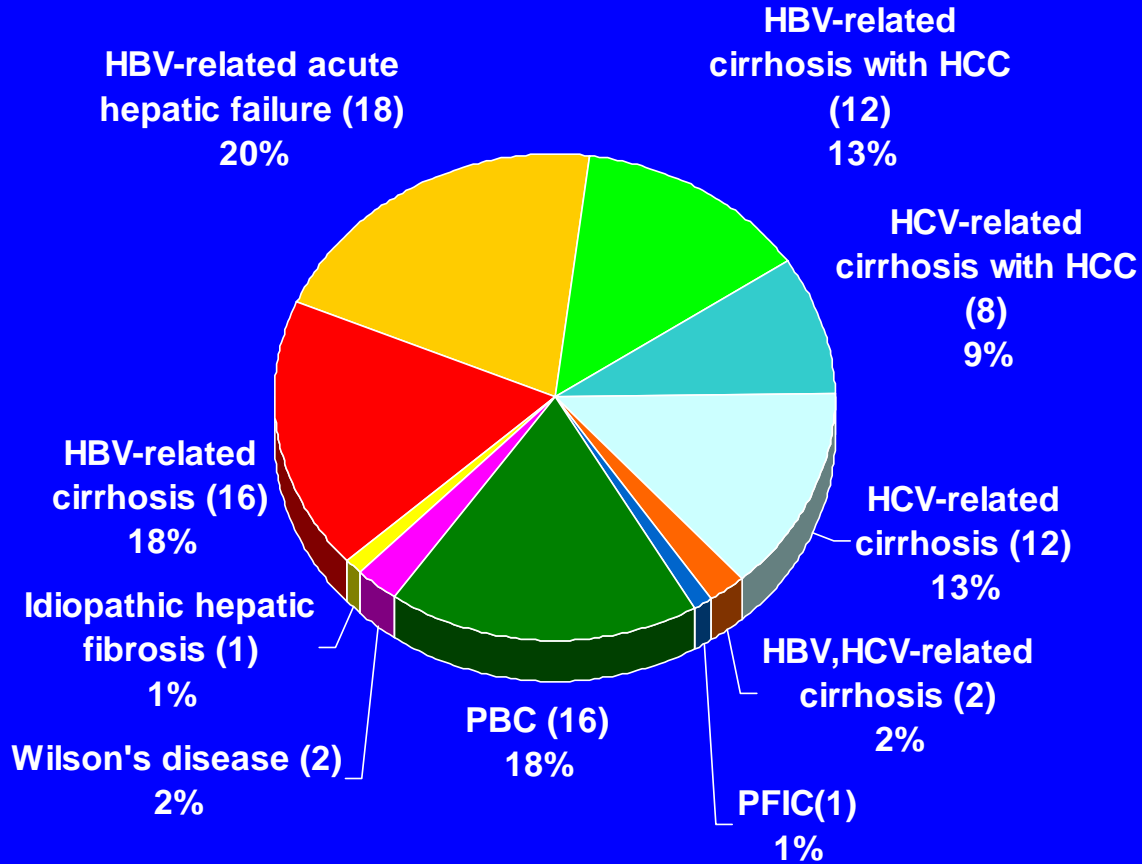
Liver Transplantation in National Taiwan University Hospital (1989 Oct.~ 2003 Dec.)



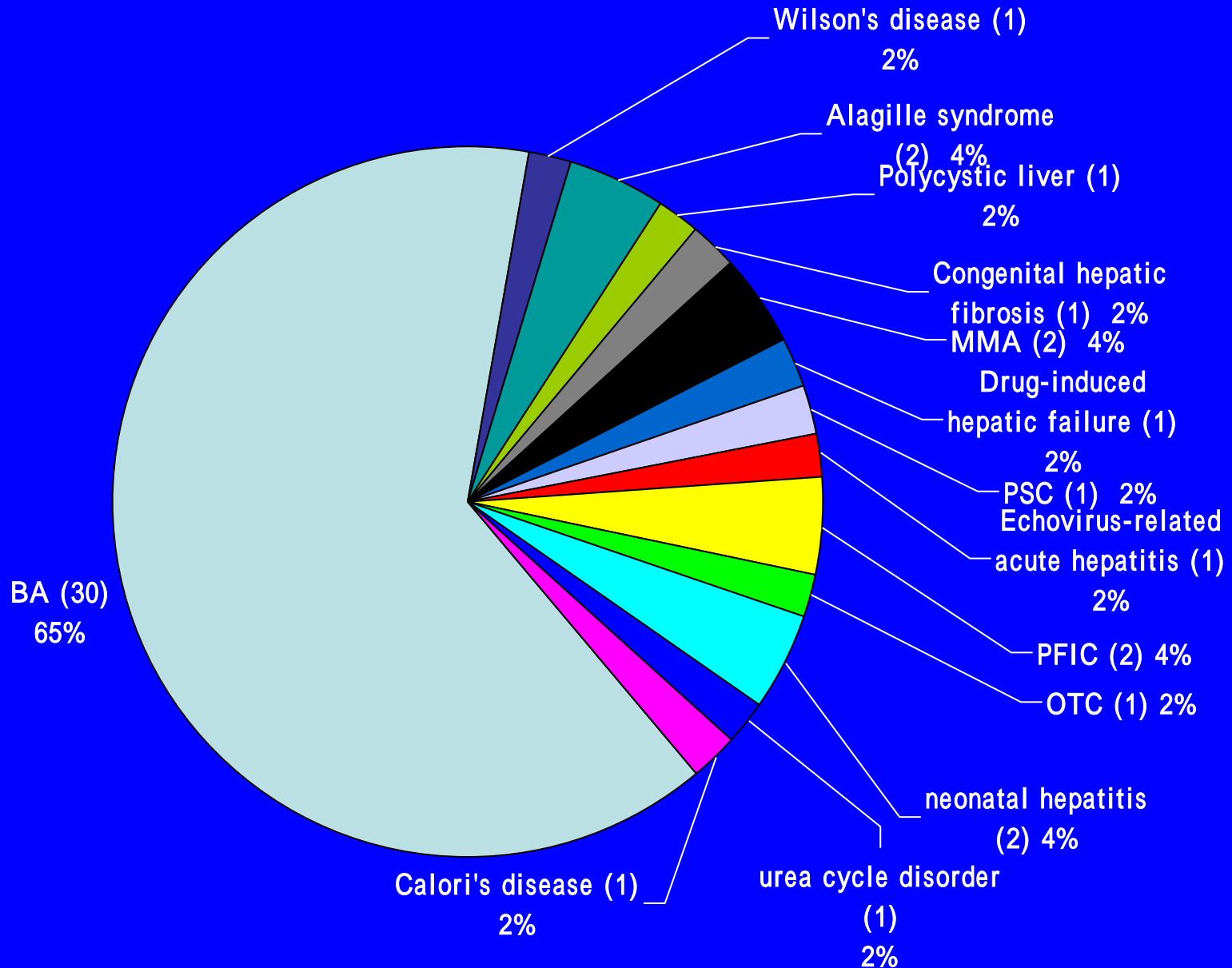
Indications for Liver Transplantation (135 cases)



Indications for Liver Transplantation in Adult (88 cases)



Indications for Liver Transplantation in Child (47 cases)



- **Cadaveric liver transplantation:59**
 - Whole graft 53
 - Reduced-sized 6
 - (3 lateral segmentectomy,
 - 2 extended right lobectomy
 - 1 left lobectomy)
 - Split graft 1 (right lobe)
- **Living-related liver transplantation:76**
 - Right lobe without MHV 39
 - Lateral segment 26
 - S2+S3+partial S4 11

Successful rate of liver transplantation in NTUH (survive over 30 days after operation)

- Cadaveric liver transplantation
53/57 (93%), 55/59(93.2%)
- Living-related liver transplantation
63/69 (91.3%), 70/76(92.1%)

肝臟移植標準()

肝臟移植標準

一、捐贈者標準

- 1、符合捐贈條件
- 2、無癌症病史(顱內腫瘤除外)
- 3、無不能控制的感染
- 4、anti-HIV(-)
- 5、肝功能可接受

二、受贈者適應症

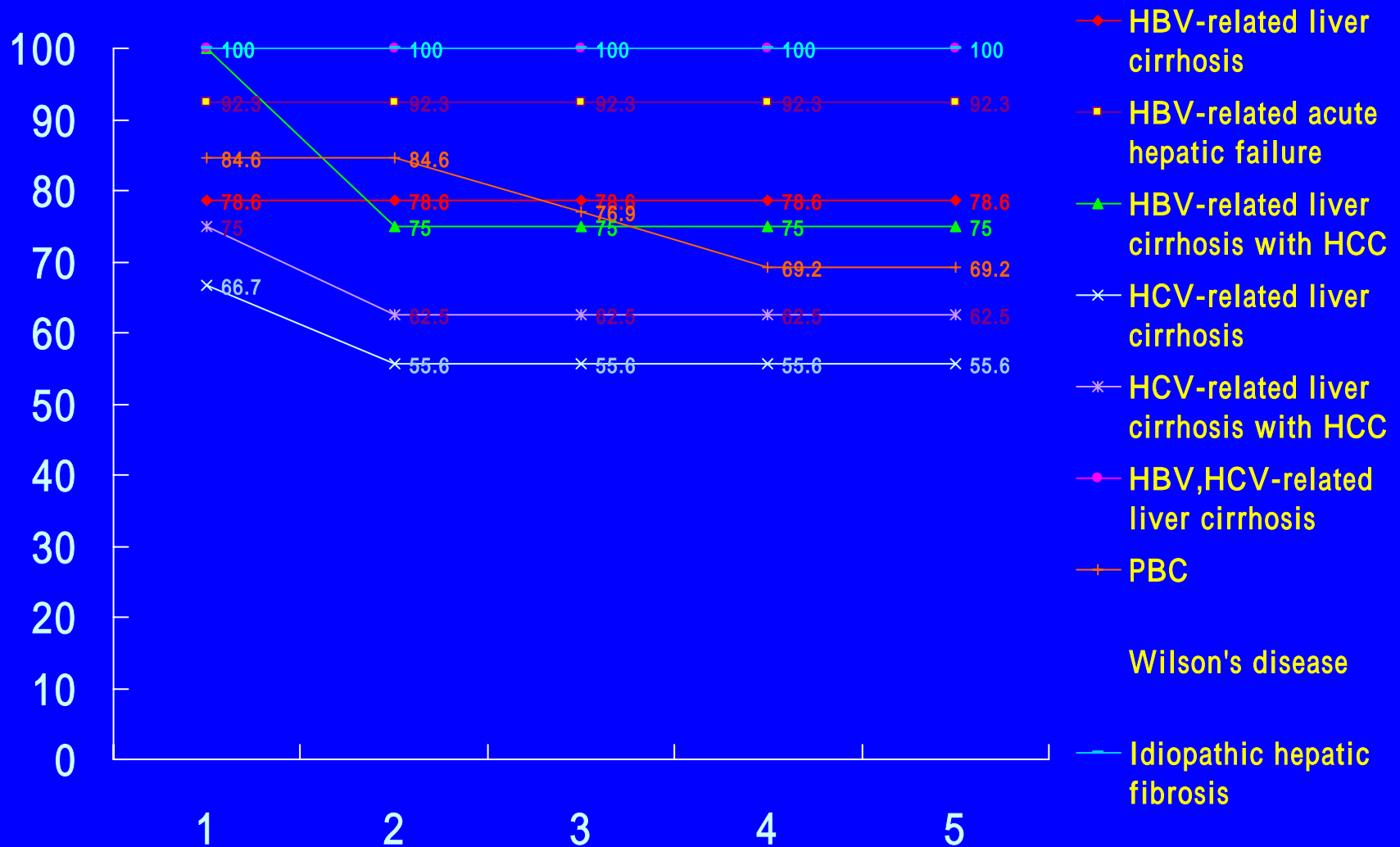
- 1、先天性膽道閉鎖
- 2、先天性肝臟代謝疾病
- 3、失代償性肝硬化
 - (1)病毒性肝炎引起之肝硬化
 - (2)酒精性肝硬化
 - (3)不明原因之肝硬化
- 4、原發性膽汁性肝硬化
- 5、原發性硬化性膽管炎
- 6、原發性肝臟惡性腫瘤，且肝功能不適合腫瘤切除手術(Child's score 7分)
 - (1)肝細胞癌
 - A、屍肝移植：單一腫瘤 5 cm；或多發腫瘤 3個，每一腫瘤直徑 3 cm
 - B、活肝移植：單一腫瘤 6.5cm；或多發腫瘤 3個，最大直徑 4.5cm，全部腫瘤直徑和 8cm
 - (2)其他肝臟腫瘤，例如
 - A、secondary neuroendocrine tumor
 - B、hepatoblastoma
 - C、malignant epitheloid hemangioendothelioma
 - D、其他
- 7、Budd-Chiari症候群
- 8、猛爆性肝炎或藥物引起之急性肝衰竭
- 9、其他末期肝臟疾病，無法以傳統方法治療者

肝臟移植標準()

三、受贈者禁忌症

- 1、年齡65歲以上(年齡超過者需經專案審查)
- 2、有無法控制的感染者
- 3、愛滋病帶原者
- 4、肺結核未完全治療者
- 5、有惡性腫瘤者，不宜肝臟移植
 - (1) incidental renal carcinoma , in situ carcinoma(excluding bladder) , Dukes' A colon cancer , basal cell carcinoma , 以上四者不影響肝臟移植
 - (2) malignant melanoma , breast cancer , GI carcinoma , lung cancer , 完整治療後，無癌症復發，未達五年者(disease-free interval < 5years)
 - (3)其他癌症，完全治療後，無癌症復發未達兩年者(disease-free interval < 2years)
- 6、心智不正常者或無法長期配合藥物治療者
- 7、嚴重心肺功能障礙者
- 8、嚴重腦血管或週邊血管病變，使日常生活無法自理，且無法接受重建手術者
- 9、免疫系統不全或自體免疫疾病，雖經治療仍預後不良者
- 10、藥癮患者
- 11、酒癮戒除未足半年者

Survival rate of liver transplantation in NTUH (Adult)



Outcome of HBV-infected patients Receiving Liver Transplantation

- Current survival: 42
- Mortality: 5
 - Sepsis 1(23d)
 - Live abscess 1(9m)
 - HCC recurrence 1(21m)
 - HAT 1(11d)
 - Primary graft non-function 1(33d)
- 2 HBV recurrence according to virological tests and liver biopsy

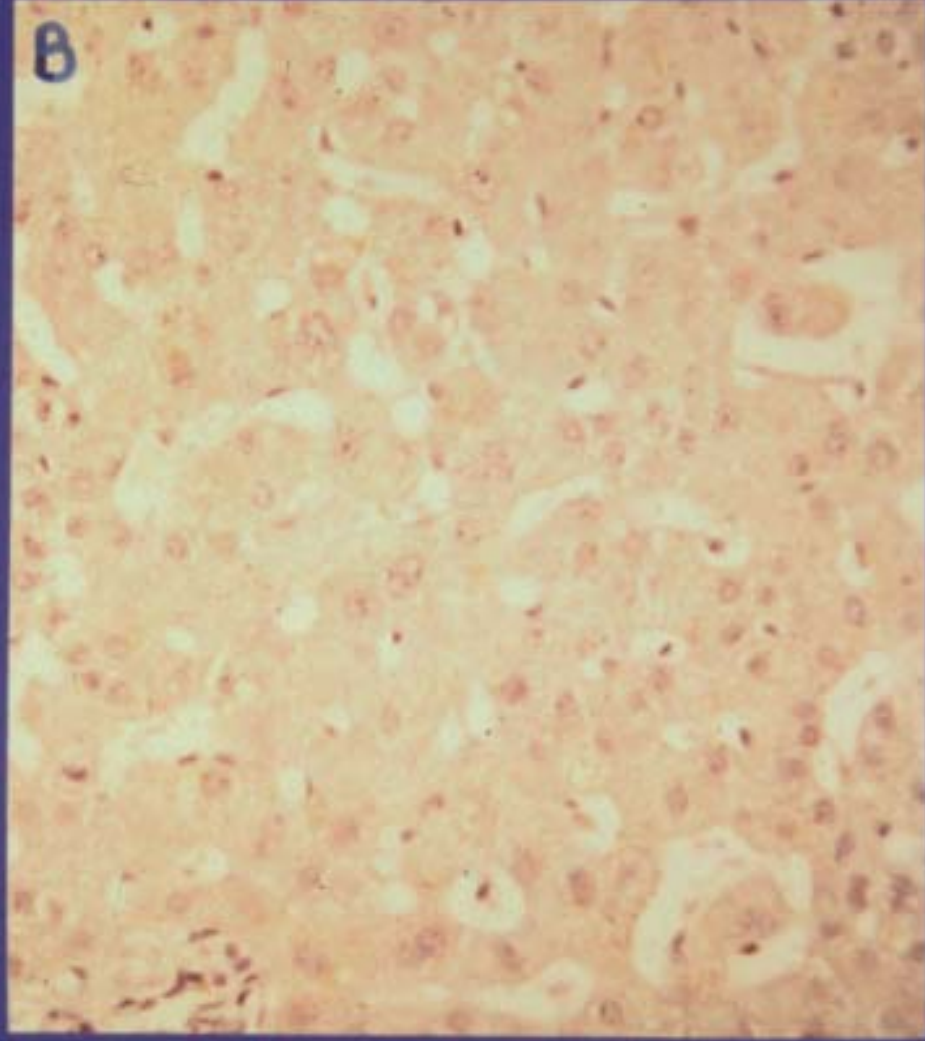
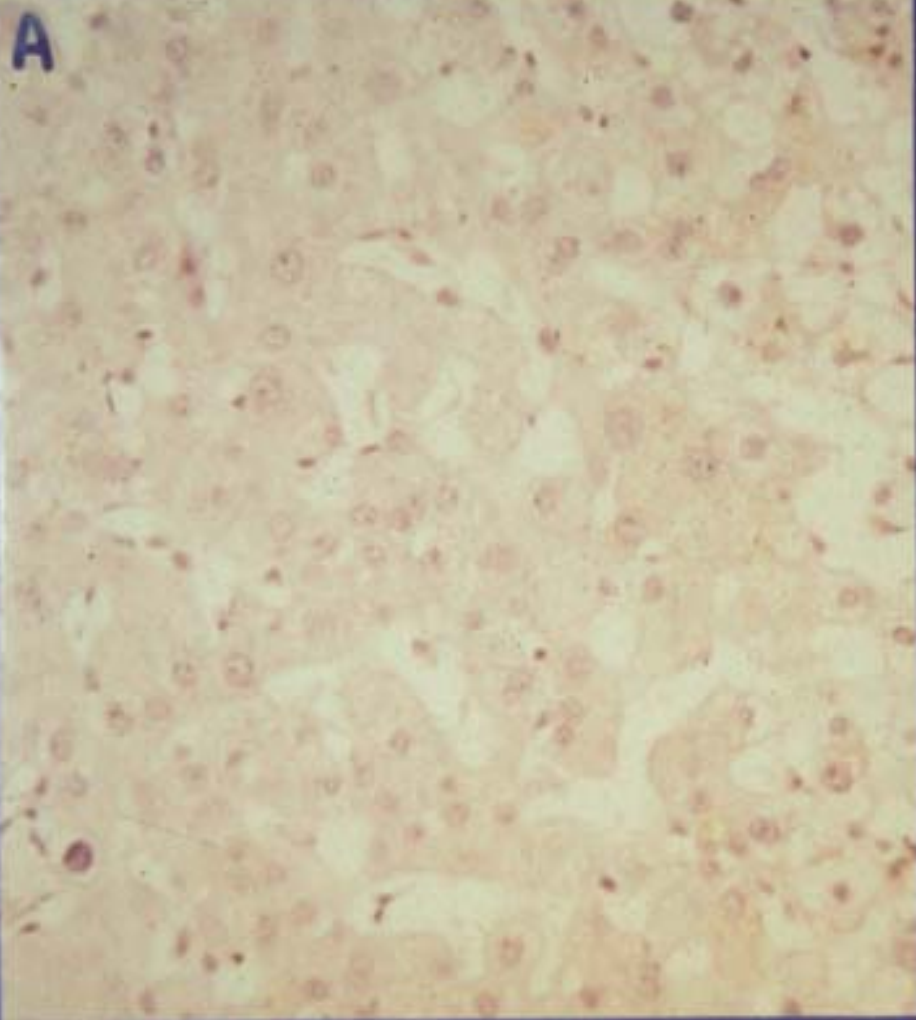
Immunoprophylaxis Regimens

- Usage of HBIG

First Patient	anhepatic phase day 1 to 7	10000 IU (IV) 10000 IU (IV) daily
Second Patient	anhepatic phase later on	2000 IU (IV) 650 IU (IM) monthly for 6 months
The Following Patients	anhepatic phase day 1 to 7 day 8 to 28	10000 IU (IV) 2000 IU (IV) daily 2000 IU (IV) weekly for 3 weeks
	month 2 to 12	2000 IU (IV) monthly
	keep serum anti HBs level >100 mIU/ml	

- Lamivudine 100 mg daily

16 patients started before transplantation
2 patients after transplantation



Patient received HBIG and lamivudine treatment one year after transplantation Immunohistological stain showed hepatocyte are negative for HBsAg(A) and HBcAg(B).

Liver Transplantation for Patients with HBV-Related Fulminant Hepatitis

patient	age	sex	method	Follow up	result	HBV status(postop.)
1	48	M	Cadaveric (liver + kidney)	4Y9M	Alive with good graft function	HBs Ag(-) HBs Ab(-)
2	39	M	Cadaveric	1Y10M	Alive with good graft function	HBs Ag(-) HBs Ab(+)
3	52	M	Cadaveric	1Y2M	Alive with good graft function	HBs Ag(-) HBs Ab(+)
4	52	M	Cadaveric	3M	Alive with good graft function	HBs Ag(-) HBs Ab(+)
5	34	M	Cadaveric	1M	Expire due to primary nonfunction graft from a marginal donor	HBs Ag(-) HBs Ab(+)
6	41	M	Living-related	1M	Alive with good graft function	HBs Ag(-) HBs Ab(+)
7	45	M	Cadaveric	2 weeks	Alive with good graft function	HBs Ag(-) HBs Ab(+)

Liver Transplantation for Patients with Chronic HBV-Related Liver Cirrhosis

patient	age	sex	method	Follow up	result	HBV status(postop.)
1	41	M	Cadaveric	21 days	Expire due to donor-transmitted sepsis	
2	38	F	Cadaveric	2Y5M	Alive with good graft function	HBs Ag(-) HBs Ab(-)
3	56	M	Cadaveric	2Y9M	Alive with good graft function	HBs Ag(-) HBs Ab(+)
4	49	M	Cadaveric	1Y8M	Alive with good graft function	HBs Ag(-) HBs Ab(+)
5	53	M	Living-related	1Y3M	Alive with good graft function	HBs Ag(-) HBs Ab(+)
6	48	M	Cadaveric	1Y1M	Alive with good graft function	HBs Ag(-) HBs Ab(+)
7	46	F	Living-related	9M	Expire due to biliary complication with liver abscess	HBs Ag(-) HBs Ab(+)
8	52	M	Cadaveric	9M	Alive with good graft function	HBs Ag(-) HBs Ab(+)
9	50	F	Cadaveric	8M	Alive with good graft function	HBs Ag(-) HBs Ab(+)
10	49	M	Living-related	10 days	Expire due to hepatic artery thrombosis	

Result of Using Anti-HBc Positive Living-Related Donors

- Thirteen living-related donors and the recipients complete HBV serology data were available
- Donor AntiHBc(+) : AntiHBc(-) = 11 : 2
- Lamivudine were routinely prescribed indefinitely in patients whose donor were AntiHBc(+), except the first patient and the AntiHBs(+) patients

Result of Using Anti-HBc Positive Living-Related Donors

Donor AntiHBc	Recipient			
	HBsAg	AntiHBs	AntiHBc	Post op HBsAg(+)
Negative	Negative	Negative	Negative	0/1
Negative	Positive	Negative	Positive	0/1
Positive	Negative	Positive	Positive	0/3
Positive	Negative	Positive	Negative	0/1
Positive	Negative	Negative	Positive	0/2
Positive	Negative	Negative	Negative	1/3
Positive	Positive	Negative	Positive	0/2

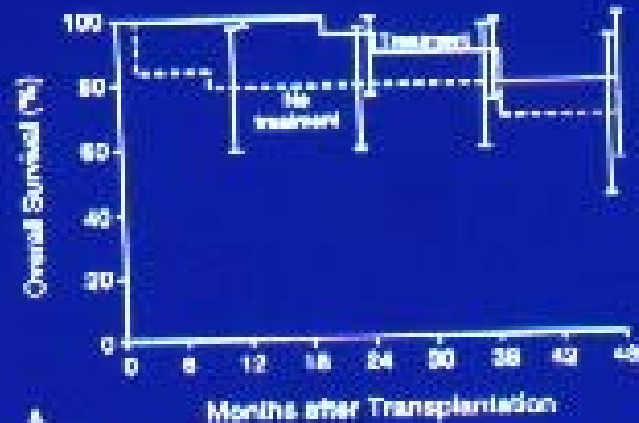
Outcome of patients after OLT for HCC

- Long term prognosis is comparable to those good HCC who received resection
 - OLT patient: low short-term tumor recurrence, but die quickly once recurrence develops
 - Resection patients: high short-term recurrence and patient loss, but low long-term recurrence
- Long term prognosis is the same as those without HCC (incidentally found HCC)

Three-year Survival and Survival without Recurrence Rates (Parentheses) in Relation to Tumor Size and Number

	Resection (N=60)		Transplantation (N=60)
Total Series	52% (27%)	NS p<0.05	49% (46%)
Size (cm)			
<3	39% (18%)	NS p<0.05	60% (56%)
≥3	56% (32%)	NS NS	43% (39%)
No. of nodules			
Single	53% (28%)	NS	46% (20%)
Multiple(>1)	46% (20%)	NS p<0.05	51% (49%)
Size and number			
<3cm + 1 or 2 nodules	41% (18%)	p<0.05 p<0.001	83% (83%)
≥3cm + 3 or more nodules	---		46% p<0.001 (44%)

(Ann. Surg. 1993,218;2:145-51)



Patients at Risk

Treatment	28	28	26	21	17	11	6	4	3
No treatment	20	19	14	11	11	10	8	6	3



Patients at Risk

Treatment	28	27	24	18	16	10	6	6	3
No treatment	20	18	14	10	10	9	6	6	3

Figure 2. Effect of Anticancer Treatment before Transplantation on Overall Survival (Panel A) and Recurrence-free Survival (Panel B) in 48 Patients with Cirrhosis and Hepatocellular Carcinomas.

Data on the three patients who died within one month after transplantation were included in the calculation of recurrence-free survival. Ninety-five percent confidence intervals (bars) are shown at one-year intervals.

Liver Transplantation for Hepatocellular Carcinoma

The best treatment for which patients

- Successful transplantation depends on screening programs to identify early disease
- Liver transplantation is an effective treatment for small unresectable hepatocellular carcinoma in patients with cirrhosis

Liver Transplantation for HCC in NTUH

Incidental	:2 (6.3%)
Solitary	:9 (56.3%)
Multiple	:6 (37.5%)
Cirrhosis	:15 (93.7%)
Non-Cirrhosis	:1 (6.3%)

Liver Transplantation for HCC in NTUH

UICC classification

Stage		5 patients (31.3%)
		5 patients (31.3%)
		4 patients (25%)
	a	1 patient (6.3%)
	b	1 patient (6.3%)

401 0.000
25.1174 400
L1: 1.32 70 1.1
FOV: 25.0
NOISE: 4.0

11.1174 400
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1.0 S/HE 11:25:48/07.69
V:250 L:55

P 179

1.0 S/HE 11
V:250 L:55

HOSP

HiSpeed CT/i SYS:CT01

A 151

NATL TUN UNIV HOSP

HiSpeed CT/:

655 A
18059

Ex: 7220

Se: 3

XY 1104.5

In: 15+C

CHEN J H 655 A

2698059

Ex: 7220

Se: 3

XY 1109.5

In: 16+C

m 01
512

DFOV 34.2cm

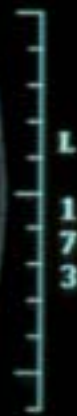
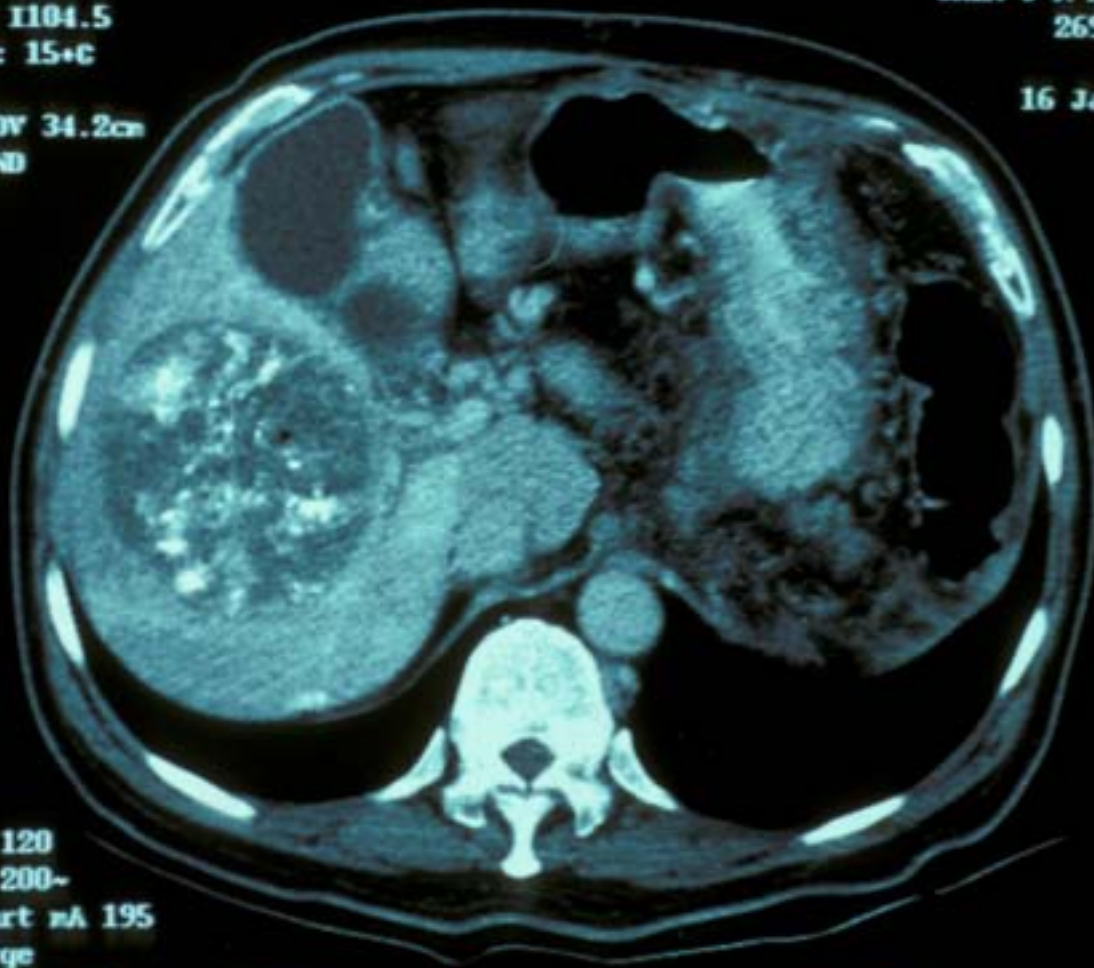
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16 Jan 01

512

DFOV 34.2cm

STND



L
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7
3

R
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L
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R
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kV 120
mA 200~
Smart mA 195
Large
5.0 mm/1.3:1

kV 120
mA 200~
Smart mA 19
Large
5.0 mm/1.3:

Liver Transplantation for HCC

Survival According to UICC Classification

Stage	n	Alive	Survival (months)	HCC-related death	Survival (months)	HCC-unrelated death	Survival (months)
	5	5	48,12,6,4,3				
	5	3	45,1,1	1	12 *	1	14
	4	3	72,9,1	1	21*		
	2	1	28			1	25d

* Lung metastasis

Adjuvant Therapy for Hepatoma Patients after Receiving Liver Transplantation

- Preoperative arterial chemoembolization
- Postoperative intravenous 5FU,doxorubicin for 6 months

Patients with HCC Receiving Liver Transplantation in NTUH

N o.	S e x	A g e	Hepatitis status		cirrho sis	Tumor condition					Adjuvant treatment		outcome	Cause of death
			HBs Ag	Anti-HCV		Size (cm)	N o.	Vascular invasion	ca ps ule	UICC-tumor stage	TA CE	C/ T		
1	M	59	—	+	+	3	1	—	—		—	—	Expire 1 year postoperative	Lung metastasis
2	F	56	—	+	—	3	1	+	—		+	+	Alive with good graft function (6Y)	
3	F	58	—	+	+	4	1	—	—		—	+	Expire 14 months postoperative	Sepsis (tumor free)
4	M	47	+	—	+	1.5	1	—	—		—	+	Alive with good graft function (4Y)	
5	M	58	+	—	+	3	1	—	—		+	+	Alive with good graft function (3Y9M)	
6	M	55	+	—	+	10	2	—	—		+	+	Expire 21 months postoperative	Lung metastasis
7	M	52	—	+	+	3	13	—	—	a	+	—	Alive with good graft function (2Y4M)	Graft recurrence, bone metastasis
8	F	58	—	+	+	3.8	3	+	—	b	+	—	Expire 25days postoperative	Primary non-function graft

Patients with HCC Receiving Liver Transplantation in NTUH

N o.	S e x	A g e	Hepatitis status		cirrhosis	Tumor condition					Adjuvant treatment		outcome	Cause of death
			HBs Ag	Anti-HCV		Size (cm)	N o.	Vascular invasion	capsule	UICC-tumor stage	TA CE	C/ T		
9	F	65	—	+	+	0.8	1	—	—		—	—	Alive with good graft function (1Y)	
10	M	53	—	+	+	1.5	2	+	—		—	—	Alive with good graft function (9M)	
11	F	35	+	—	+	0.8	1	—	—		+	—	Alive with good graft function (6M)	
12	M	56	+	—	+	0.8	1	—	+		—	—	Alive with good graft function (4M)	
13	M	51	+	—	+	1	1	—	—		—	—	Alive with good graft function (3M)	
14	M	59	+	—	+	2	4	—	—		+	—	Alive with lung metastasis (1M)	
15	F	65	—	+	+	3.3	2	—	+	a	—	—	Alive with lung metastasis (1M)	

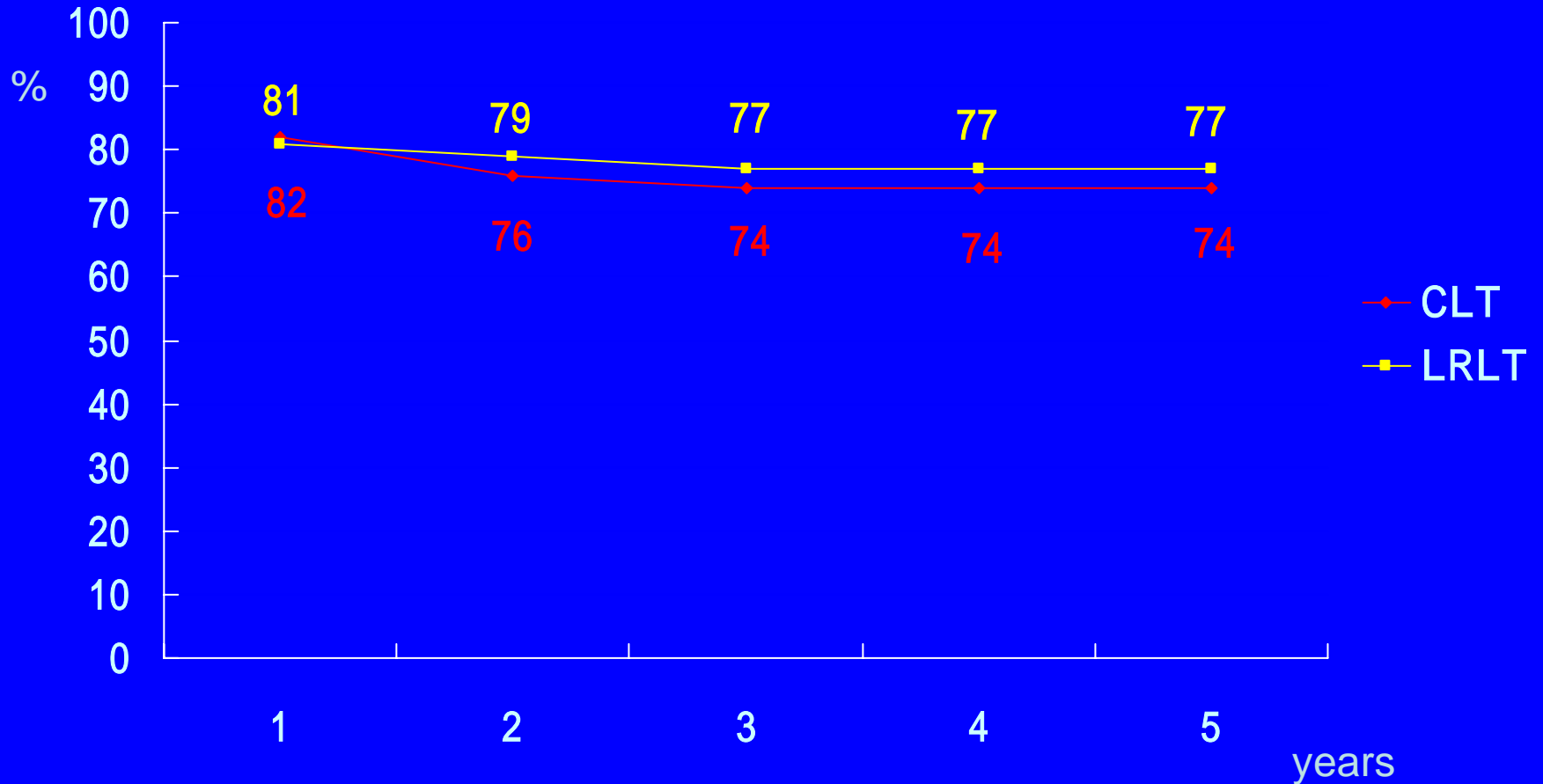
Patients received liver transplantation at Mainland China and follow up at our OPD

name	Age	sex	Preoperative diagnosis	Op. date	Current status
朱x水	61	M	HBV-related liver cirrhosis HCC s/p TACE	2000-9-19	<u>17 months</u> ,alive with good graft function
曾x亮	53	M	HBV-related liver cirrhosis Large HCC with <u>PVT</u>	2000-11-10	<u>12 months</u> , <u>expired</u> due to multiple recurrent HCC
黃寬	54	M	HBV-related liver cirrhosis HCC s/p TACE	2000-12-4	<u>9 months</u> , <u>expired</u> due to multiple recurrent HCC and bone metastasis
謝x祥	47	M	HCV-related liver cirrhosis	2001-3-2	<u>14 months</u> , alive with HCV reactivation
黃x棠	25	M	HBV-related liver cirrhosis HCC, multiple with <u>multiple lung meta.</u>	2001-6-22	<u>5 months</u> , <u>expired</u> due to progression of lung metastasis
劉x雷	38	M	HBV-related liver cirrhosis HCC, multiple with <u>multiple lung meta.</u>	2001-6-11	<u>4 months</u> , <u>expired</u> due to progression of lung metastasis
董x富	46	M	Polycystic liver and kidney	2001-9-26	<u>8 months</u> , alive with good graft function
黃x鶯	66	F	HCV-related liver cirrhosis HCC s/p TACE	2001-11-30	<u>6 months</u> , alive with HCV reactivation
呂x龍	46	M	HBV-related liver cirrhosis with HCC	2002-3-1	<u>4 months</u> , <u>expired</u> due to sepsis
陳x華	37	M	HBV-related liver cirrhosis with acute exacerbation	2002-5-27	1. Hepatic artery thrombosis 2. bile leakage

Patients with Hepatoma Received Liver Transplantation at Mainland China and Follow Up at Our OPD

name	Age	sex	Preoperative diagnosis	Op. date	Current status
朱× 水	61	M	HBV-related liver cirrhosis HCC s/p TACE	2000- 9-19	<u>17 months</u> ,alive with good graft function
曾× 亮	53	M	HBV-related liver cirrhosis Large HCC with <u>PVT</u>	2000- 11-10	<u>12 months</u> , <u>expired</u> due to multiple recurrent HCC
黃竟	54	M	HBV-related liver cirrhosis HCC s/p TACE	2000- 12-4	<u>9 months</u> , <u>expired</u> due to multiple recurrent HCC and bone metastasis
黃× 棠	25	M	HBV-related liver cirrhosis HCC, multiple with <u>multiple lung meta.</u>	2001- 6-22	<u>5 months</u> , <u>expired</u> due to progression of lung metastasis
劉× 宙	38	M	HBV-related liver cirrhosis HCC, multiple with <u>multiple lung meta.</u>	2001- 6-11	<u>4 months</u> , <u>expired</u> due to progression of lung metastasis
黃× 鶯	66	F	HCV-related liver cirrhosis HCC s/p TACE	2001- 11-30	<u>6 months</u> , alive with HCV reactivation
呂× 隆	47	M	HBV-related liver cirrhosis HCC s/p TACE	2002- 3-1	<u>4 months</u> , <u>expired</u> due to sepsis with multiple liver abscess

Survival rate of liver transplantation in NTUH



Recurrence of Original Disease

- HCC: 2/18 (11.1%)

Absolute contraindication:

vascular invasion

extrahepatic metastasis by preoperative evaluation

Postoperative adjuvant chemotherapy:

5- FU 500 mg + Adriamycin 40 mg iv drip/
month for half a year

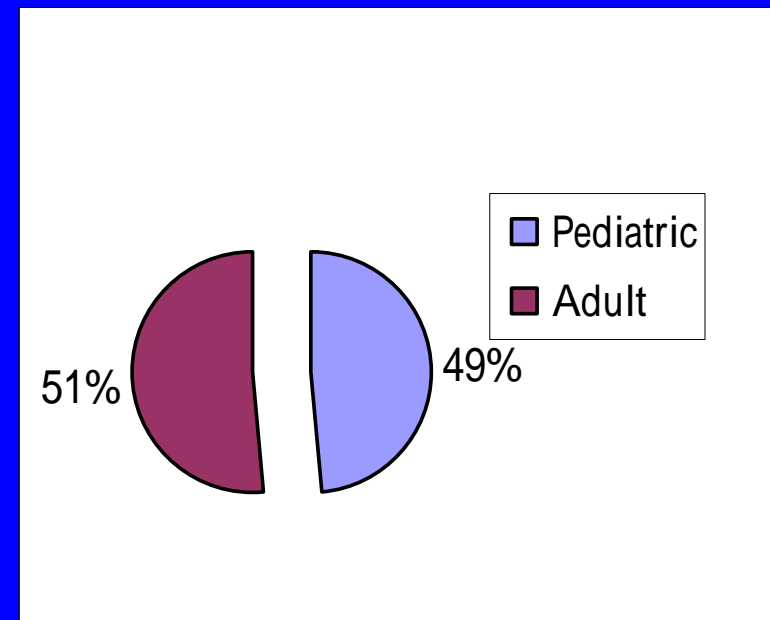
- HBV reactivation: 2/40 (5%)

Occurrence of Neoplasm in Liver Transplantation Recipients

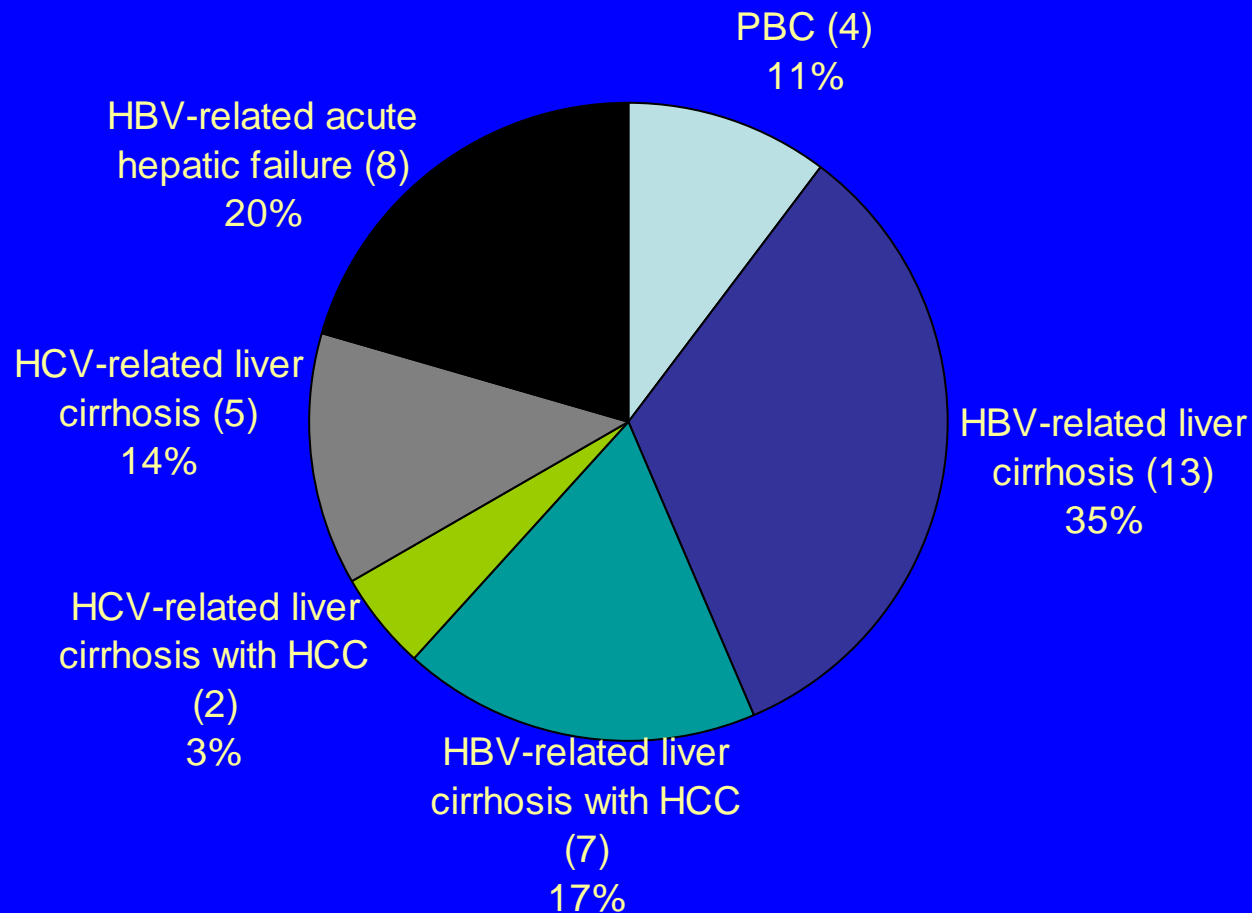
No.	Age	Sex	Dx	Tumor	Interval after LTx	Outcome
1	47		PBC Breast ca s/p 4yr	Breast ca recurrence	14M	Expire, 1Y6M
2	43		PBC	PTLD(B-cell)	1Y9M	Alive, 4Y5M
3	58		HCV cirrhosis HCC	HCC, lung metastasis	10M	Expire, 12M
4	2		BA	PTLD	11M	Alive, 15M
5	2		Neonatal Hepatitis	PTLD	6M	Alive, 7M
6	46		HCV cirrhosis	PTLD	1Y1M	Alive, 1Y5M

Living Related Liver Transplantation in NTUH

- Since 86/12.26~ 92/12/31
- Total cases: 76
- Pediatric/ Adult: 37/39
- : = 45/31



Indications of Adult Living-related Liver Transplantation in NTUH (39 cases)



Relationship of living-related liver donor in NTUH

父親	6	母親	27
兄	2	弟	2
姊	3	妹	3
丈夫	1	妻子	3
兒子	13	女兒	9
外公	1	叔叔	1
姊夫	1	姨媽	2
表姊	1	堂侄	1

捐贈者術前病情解釋

1. 捐贈者安全為第一優先考慮
2. 捐贈者手術進行方式、手術危險性、術後恢復情形
3. 再度確認捐贈者本身是出於自願並獲得家族內相關成員的認同與支持

活體肝臟捐贈評估流程

1. 確認受贈者已完成評估檢查，並符合接受肝臟移植的適應症
2. 確認活體肝臟捐贈者符合國內活體肝臟捐贈之相關法令規範
3. 病史、理學檢查及初步生化、肝炎病毒抽血檢查以確認活體肝臟捐贈者乃一健康捐贈者
4. 安排住院完成更進一步檢查，包括CT、MRT等
5. 檢查結果送交活體肝臟移植術前討論會
6. 送交倫理委員會

台大醫院活體肝臟捐贈者評估流程

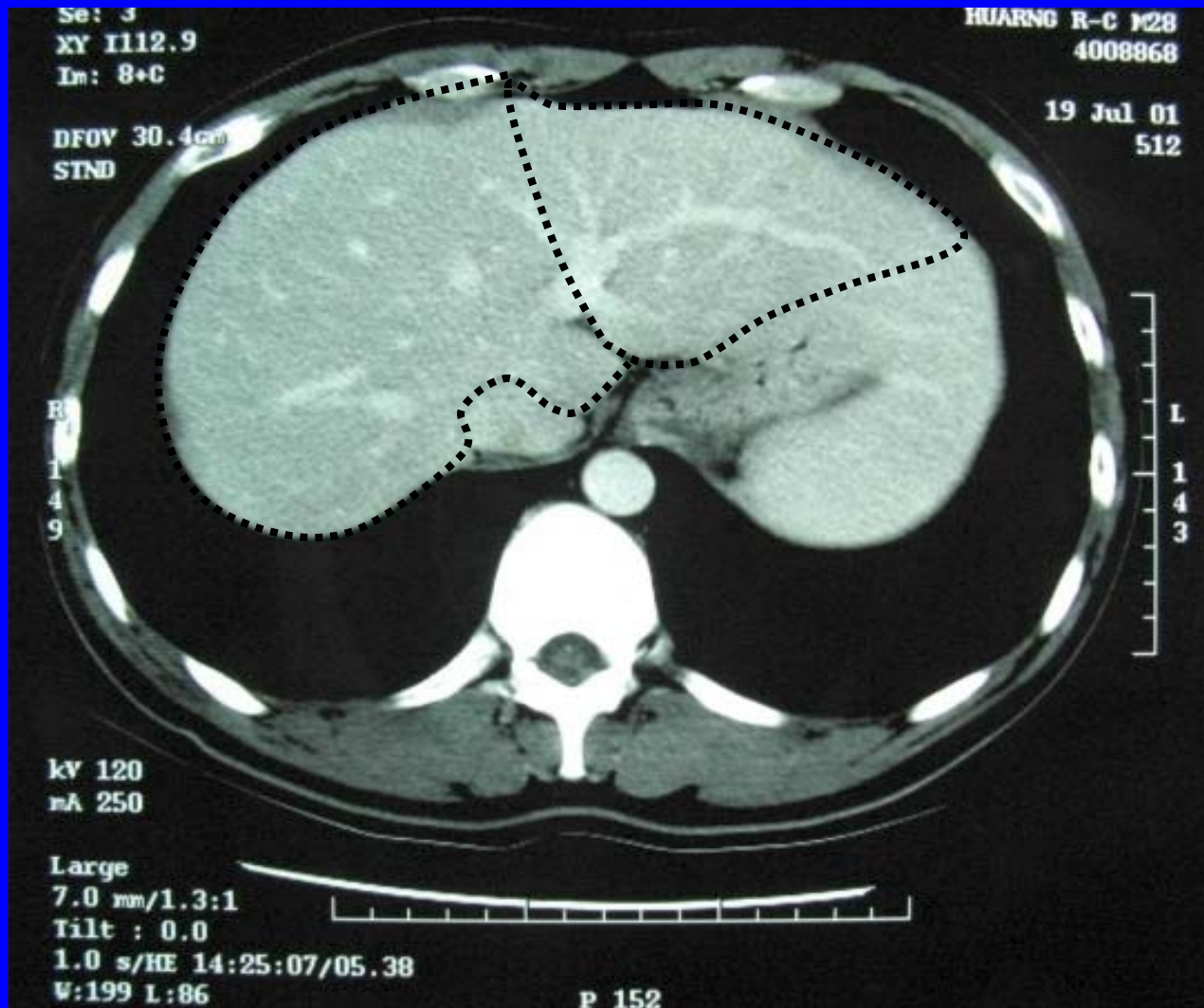
基本要求：
年紀：18-60歲
關係：5等血親或姻親
血型：相同或相符

第一步驟：
· 病史及理學檢查

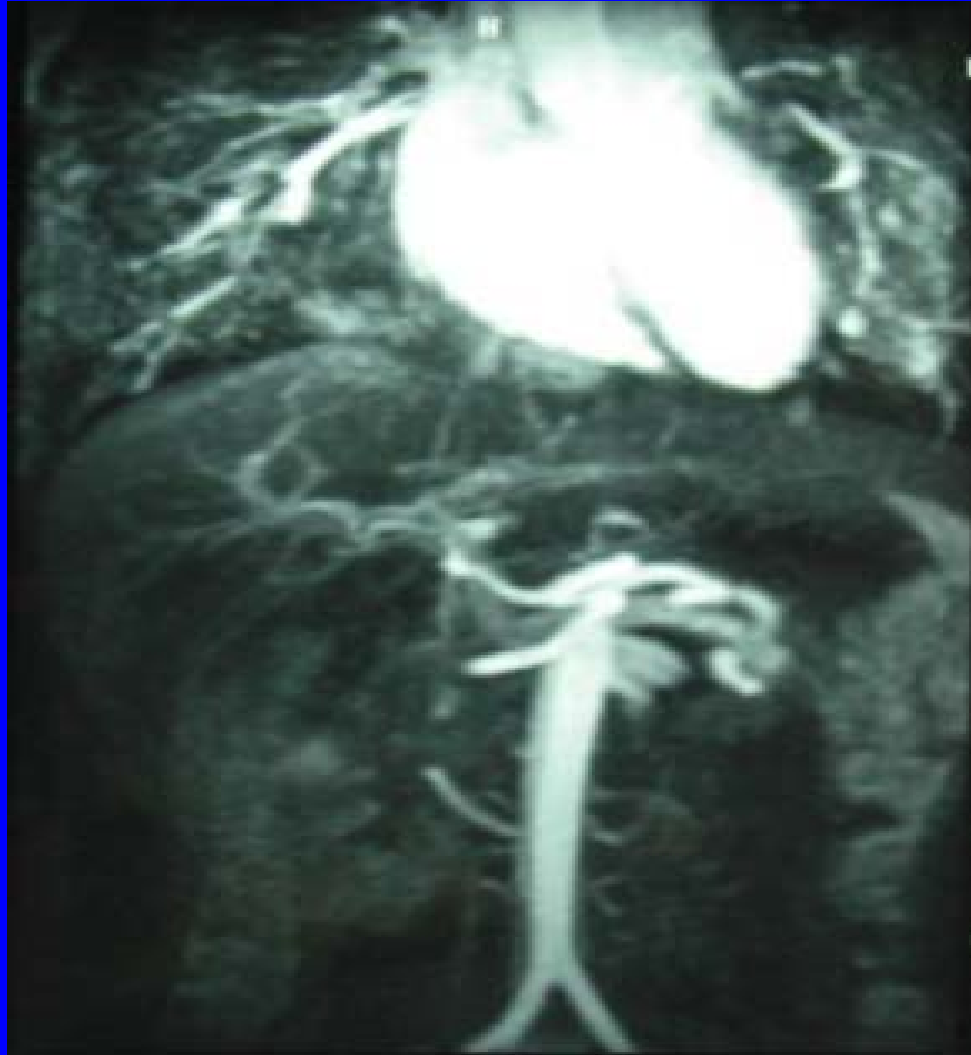
· 抽血檢查(血型、生化功能、肝炎病毒)

第二步驟：
· 抽血檢查：CBC、PT、PTT、Sugar、BCS、
ICG、electrolyte、HLA、cross-matching、
tumor markers (AFP、CEA、CA19-9)、urinalysis
· 病毒血清：CMV、EBV、HSV、HIV
· 影像學檢查：CT volumetry、MR、CP、MRA、MRV
· 胸部X光、心電圖、腹部超音波
· 精神科、牙科、社工人員、照會

Abdominal CT of donor



MR angiography of hepatic artery



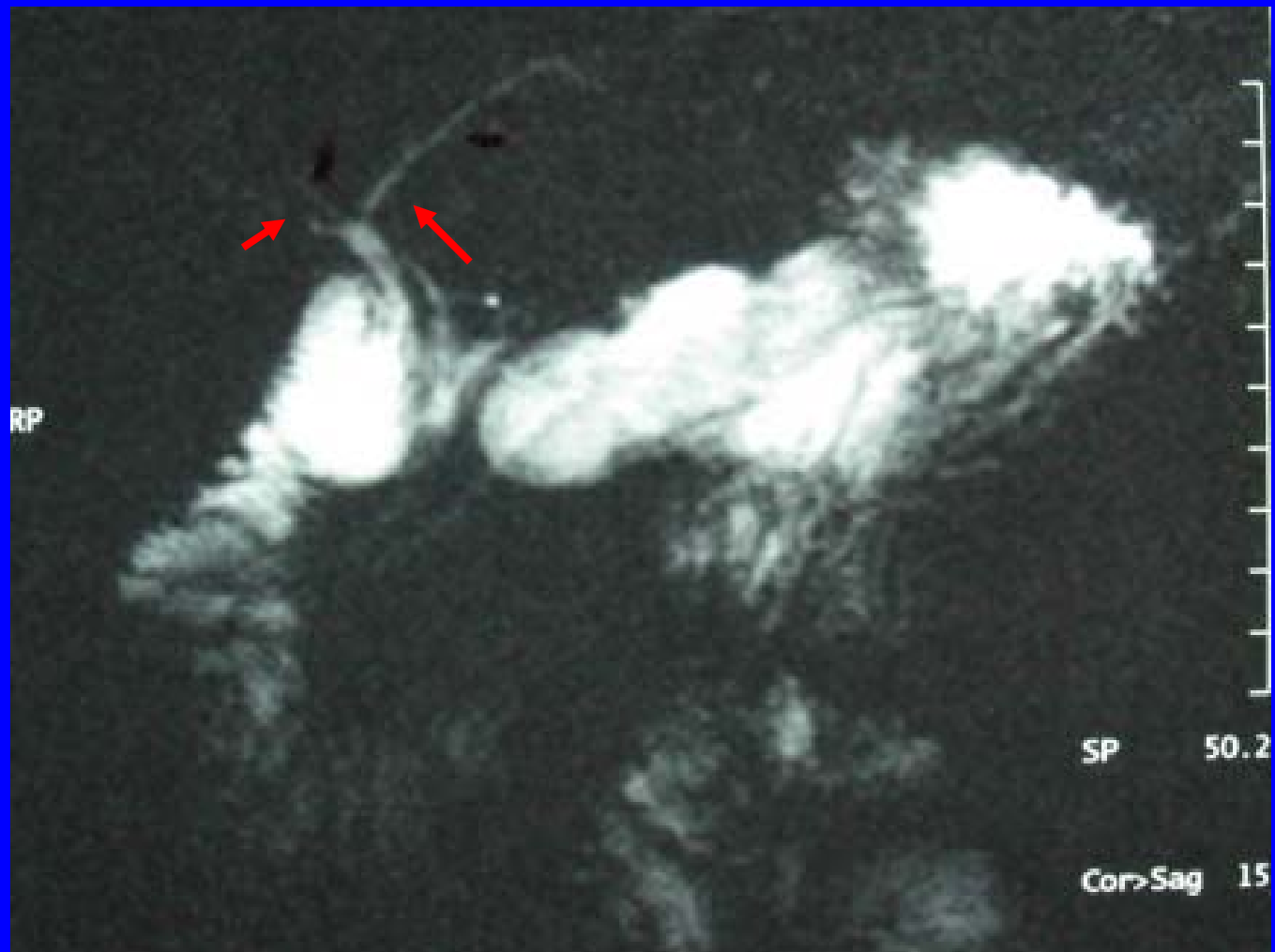
MR angiography of portal vein



MR angiography of hepatic vein

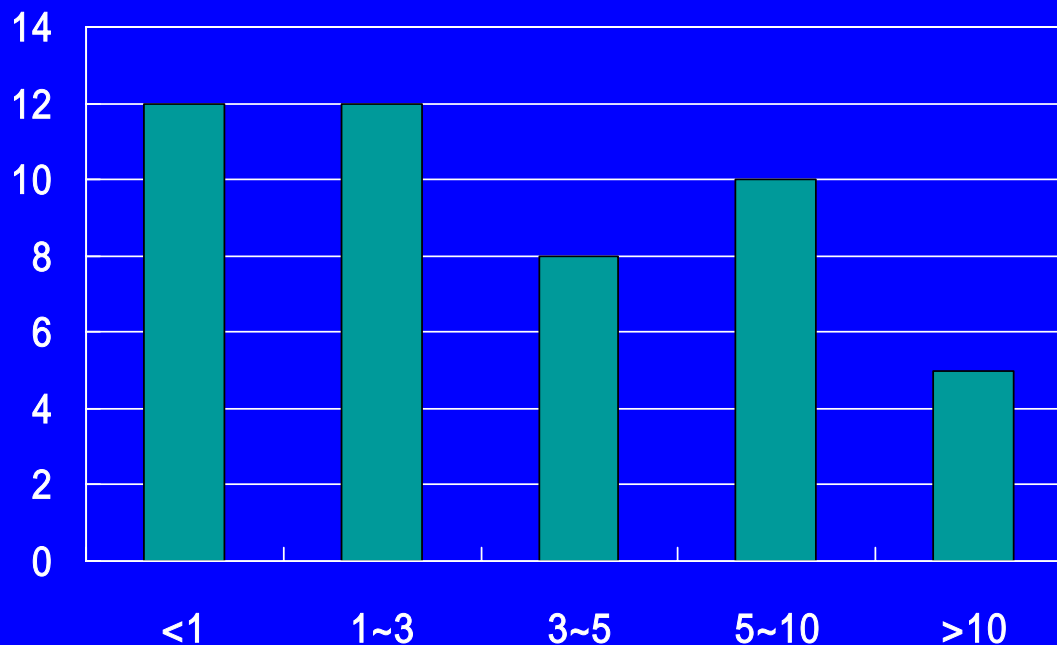


MR cholangiography



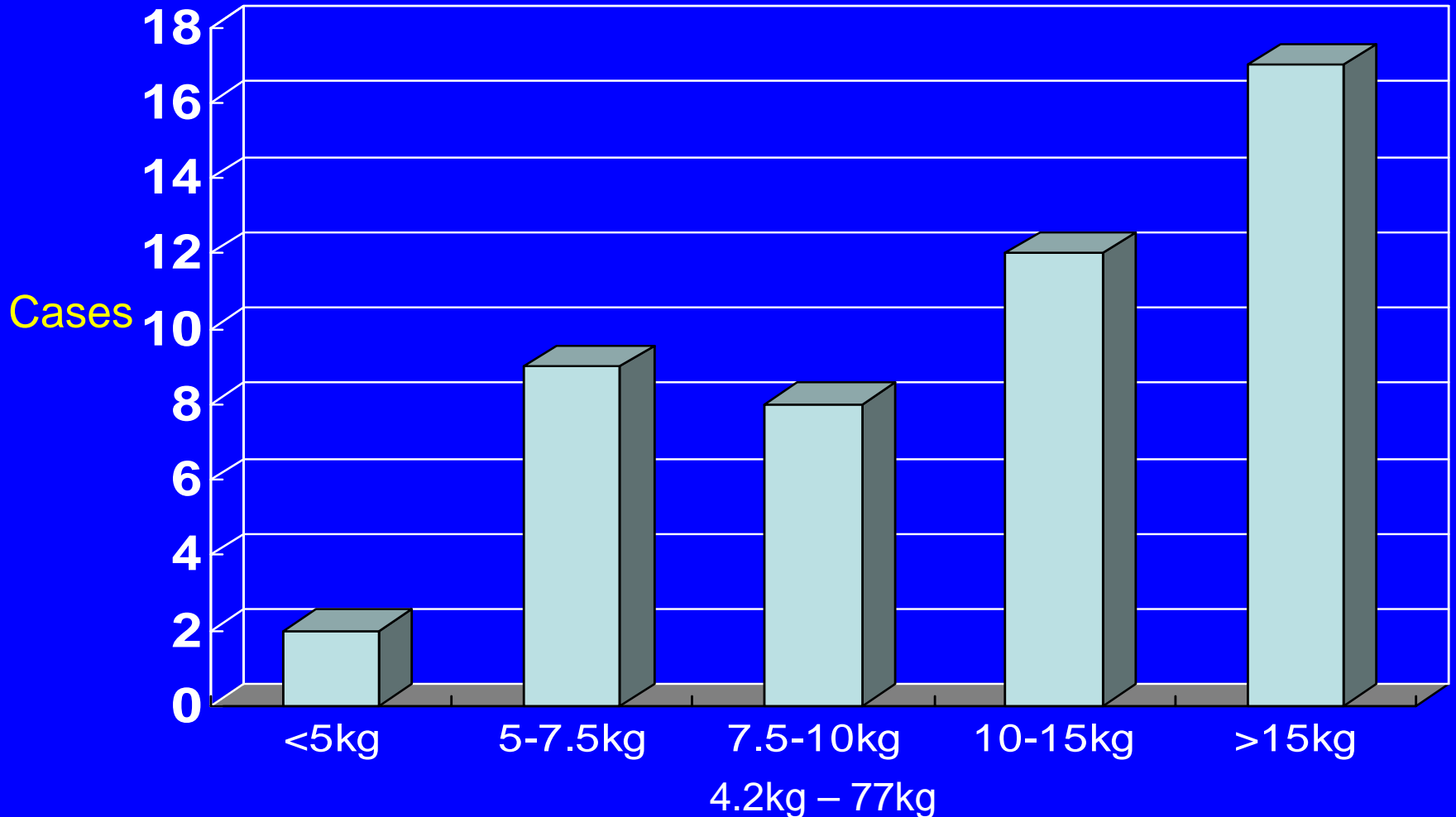
Pediatric Living-related Liver Transplantation in NTUH

Age Distribution



Range: 4 months~13.1 years old (medium:2.30 years old)

Body Weight of Paediatric Living-related Liver Transplantation Recipients in NTUH



Recipient Outcome in Child Living-related Liver Transplantation in NTUH

- Follow up: 23 days ~ 6 years
- Alive with good graft function: 31 cases
- Hospital Mortality: 3 (5, 10, 10 days)
- Causes of hospital mortality: sepsis, intracranial hemorrhage, hepatic artery thrombosis
- Success rate: 91.9% (34/37)
- Late Mortality: 3 (4 months, 7 months, 2 years 5 months)
- Causes of late mortality: sepsis, disseminated tuberculosis, crisis of pulmonary hypertension during ENT surgery

Problems Encountered in Pediatric Living-related Liver Transplant

- *Problems associated with underlying liver disease*
 - Pulmonary Hypertention or Intrapulmonary Shunting (2/37)
 - Congenital Metabolic disturbance (Inherited Methylmalonic Acidemia) (2/37)

Problems Encountered in Pediatric Living-related Liver Transplant

- *Graft*
 - Big graft size
 - Wide separated left hepatic vein
 - More than one supplying artery (left + left medial or left + accessory left from the left gastric artery)
 - PV size mismatch

Delayed Closure of Abdominal Wound

- Covered the wound with silicon membrane
- Closed the wound 3 days after the operation
- Two patients survived without complications
- One patient caused increased intraperitoneal pressure (CVP increased 4 cm-H₂O), and elevated Liver enzyme, though the flow is patent. The patient died of duodenal ulcer bleeding



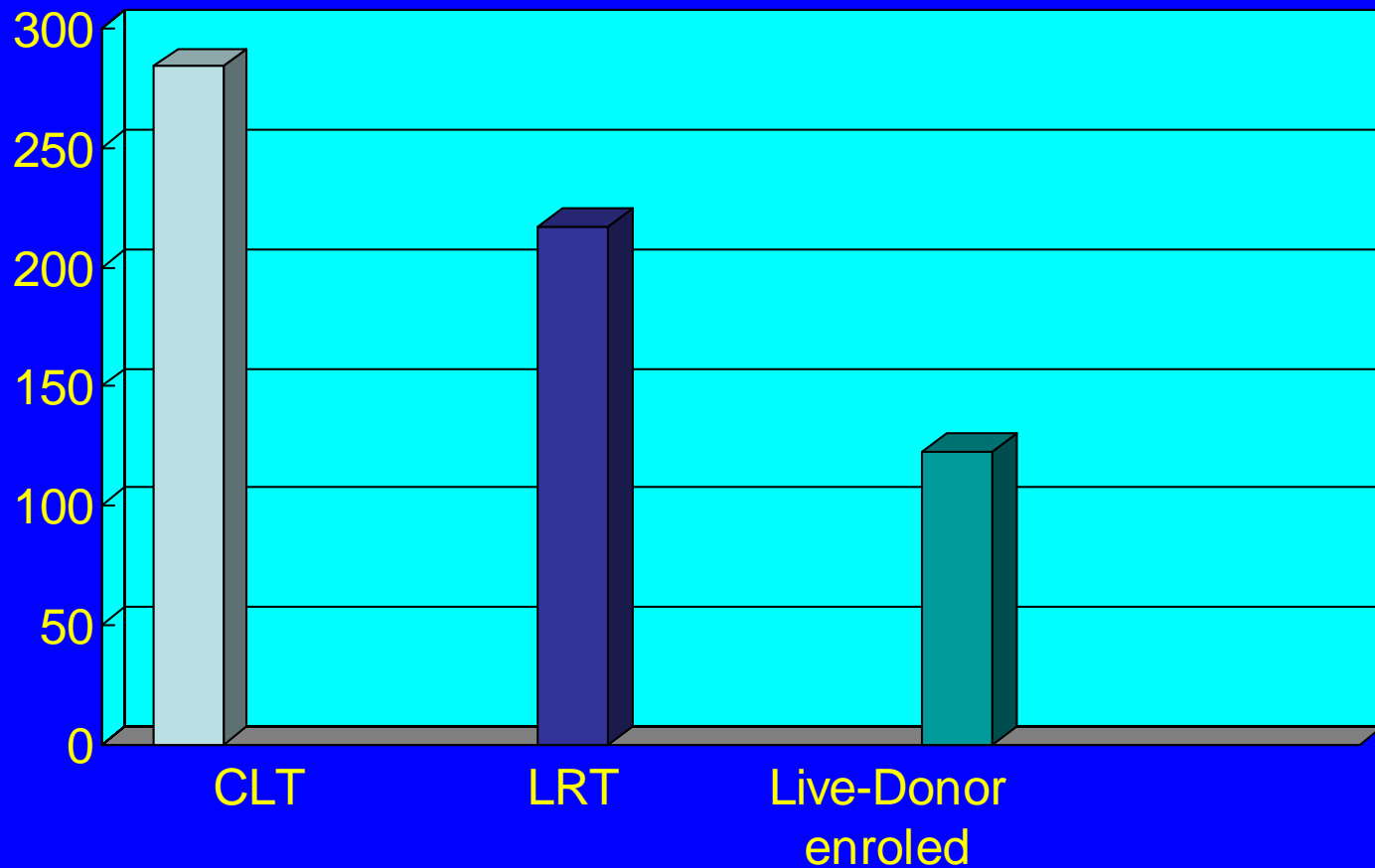
Delayed Closure of Abdominal Wound

Patient No.	Age (month)	Recipient BW (kg)	Donor BW(kg)	Graft/ Recipient	Day of closure(day)	outcome
30	11	5.5	45	4.9%	3	Survive
71	8	6	42.2	4.0%	3	Survive
81	4	6	60	4.2%	5	Expire

Outcome of Adult Recipients Receiving Living-related Liver Transplantation in NTUH

- Hospital mortality: 3/39(7.7%)
 - causes of death: SDH 1 (POD 9)
 - HAT 1 (POD 10)
 - sepsis 1 (POD 21)
- Late mortality: 2
 - HCC recurrence 1(21m)
 - Liver abscess 1(9m)
- Alive with good graft function: 34/39(87.2%)
- Follow up: 9d ~ 3y 4m

Waiting Time in Patients Receiving Cadaveric or Living-related Liver Transplantation



JANG Y-P M51YS
3880142

R.H.V
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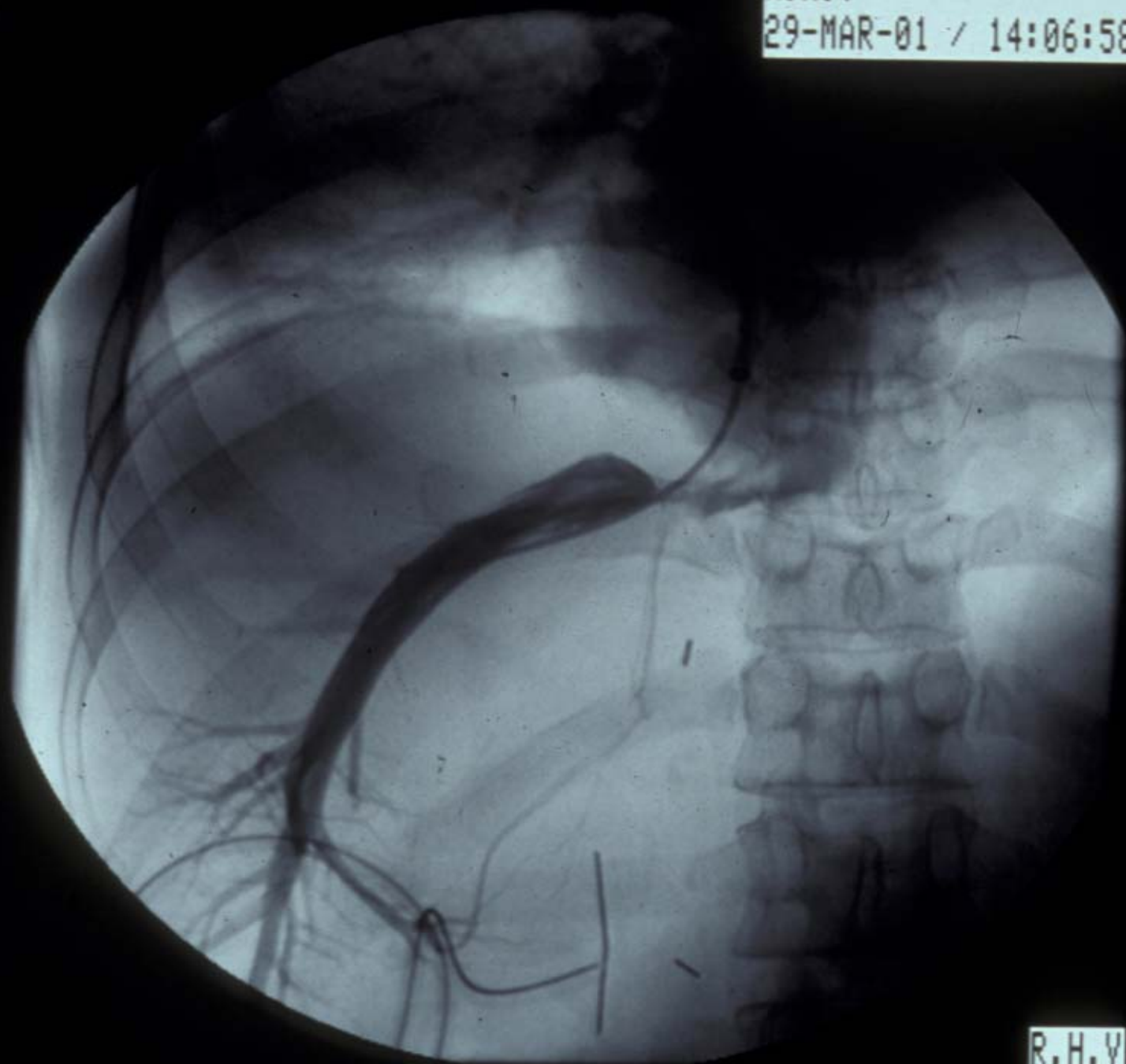
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NS: 1A

IMAGE
12

50

DR: HJH/PCL
NTUH



R.H.V

JANG Y-P M51YS

3880142

R.H.V.-2+STENT

29-MAR-01 / 15:02:26

280

NS: 1A

IMAGE

10

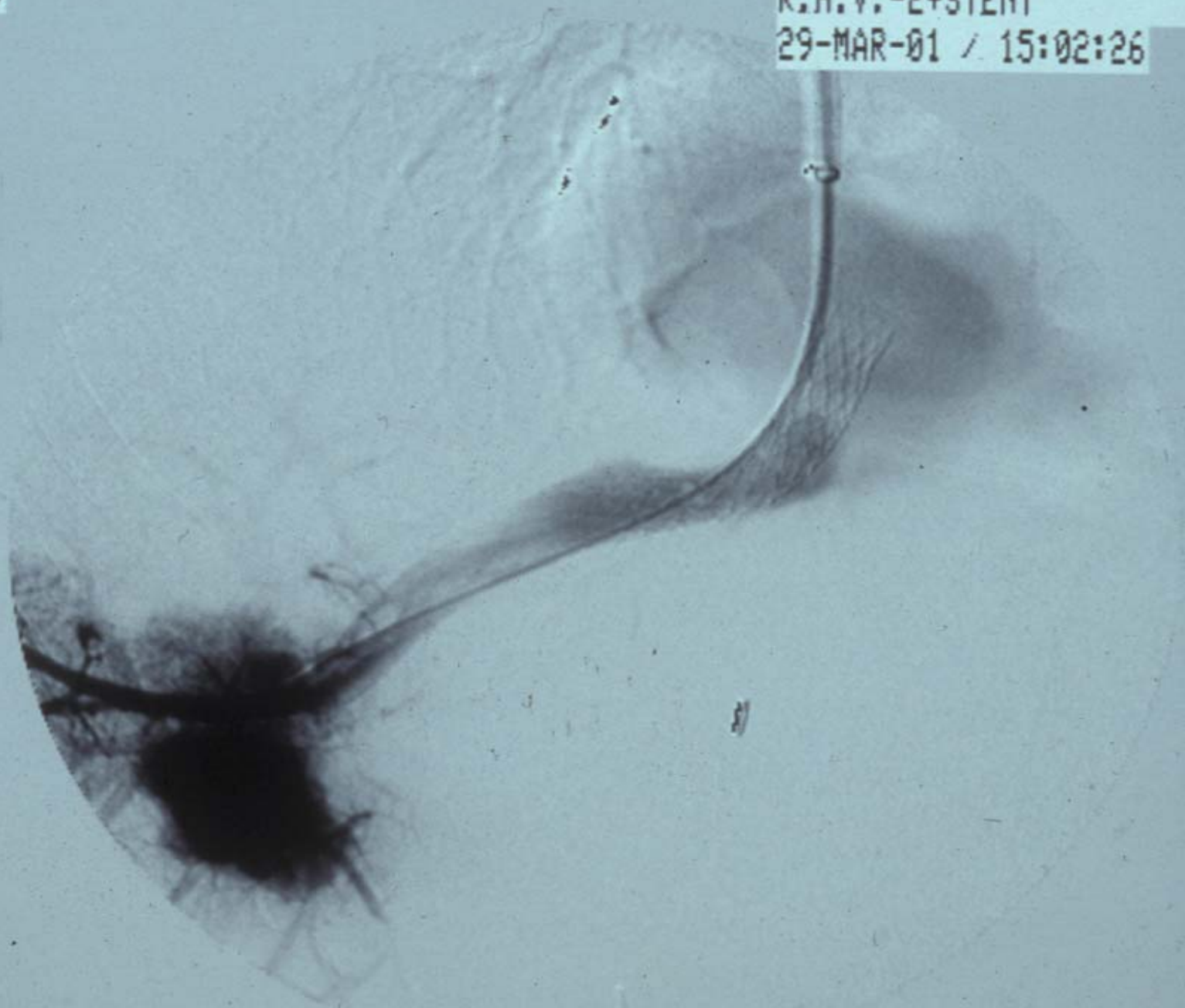
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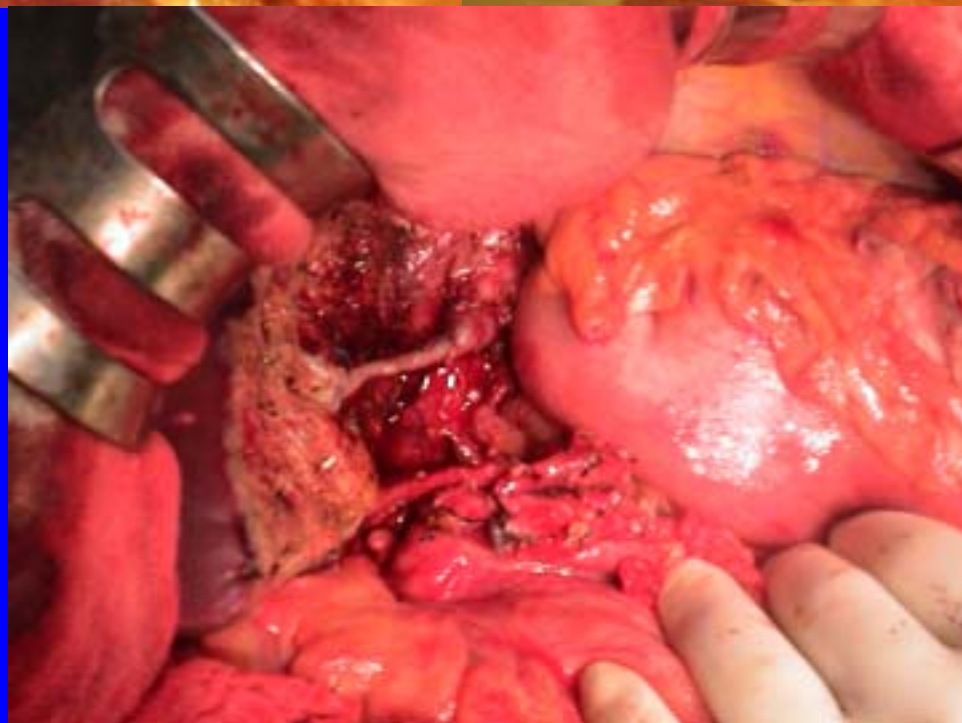
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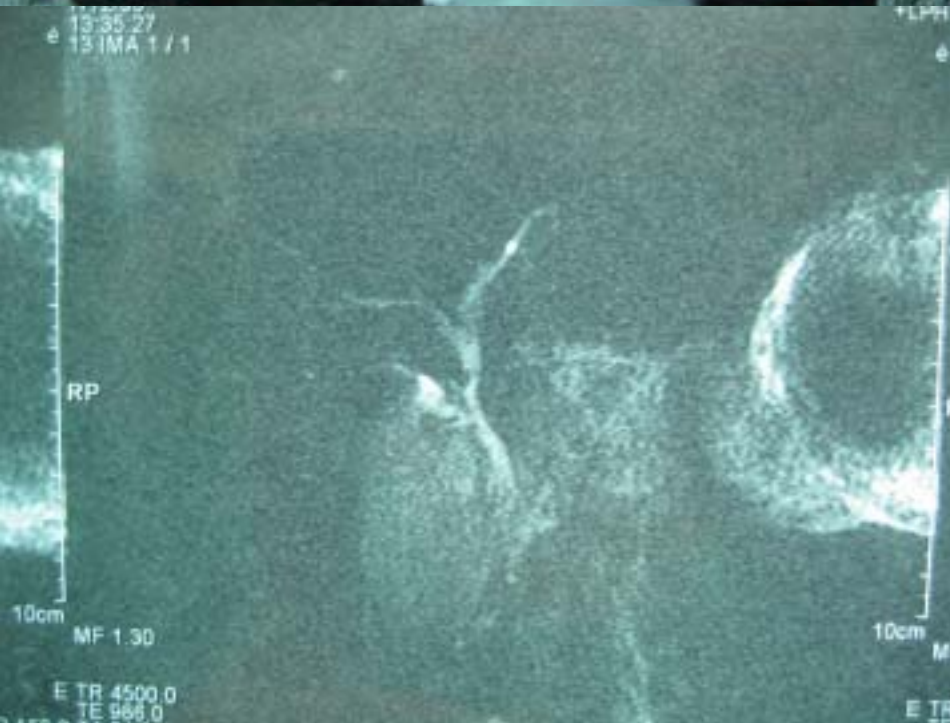
DR: HJH/PCL

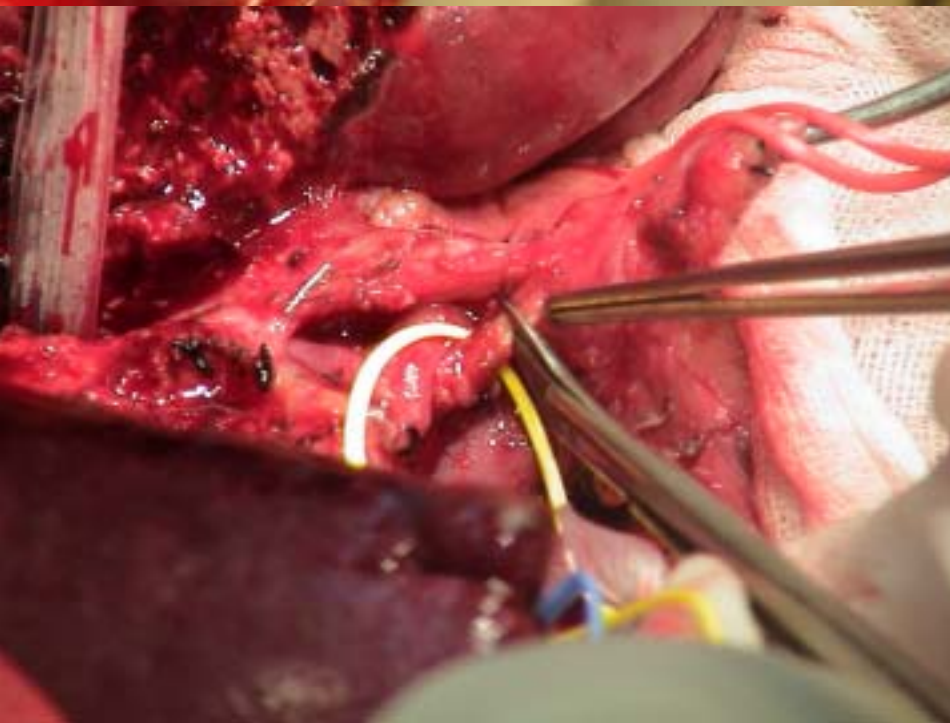
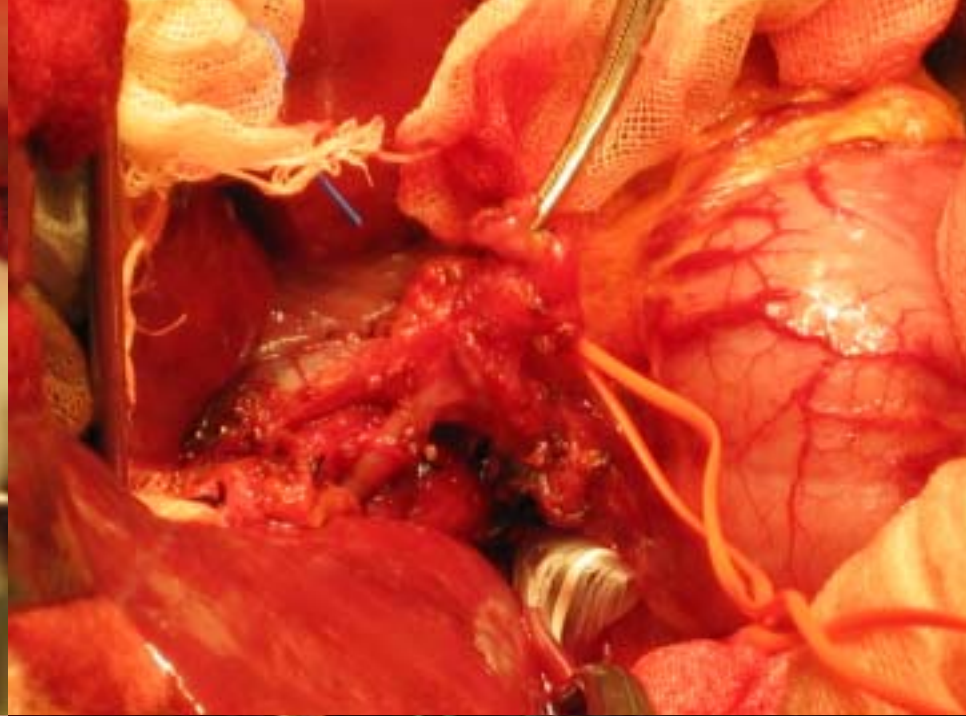
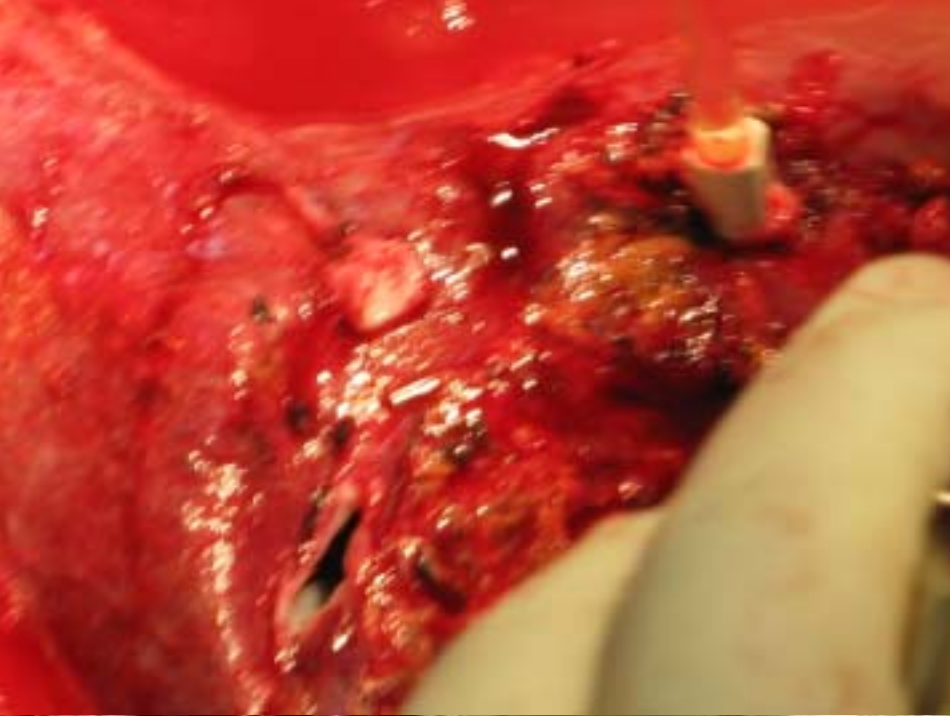
NTUH

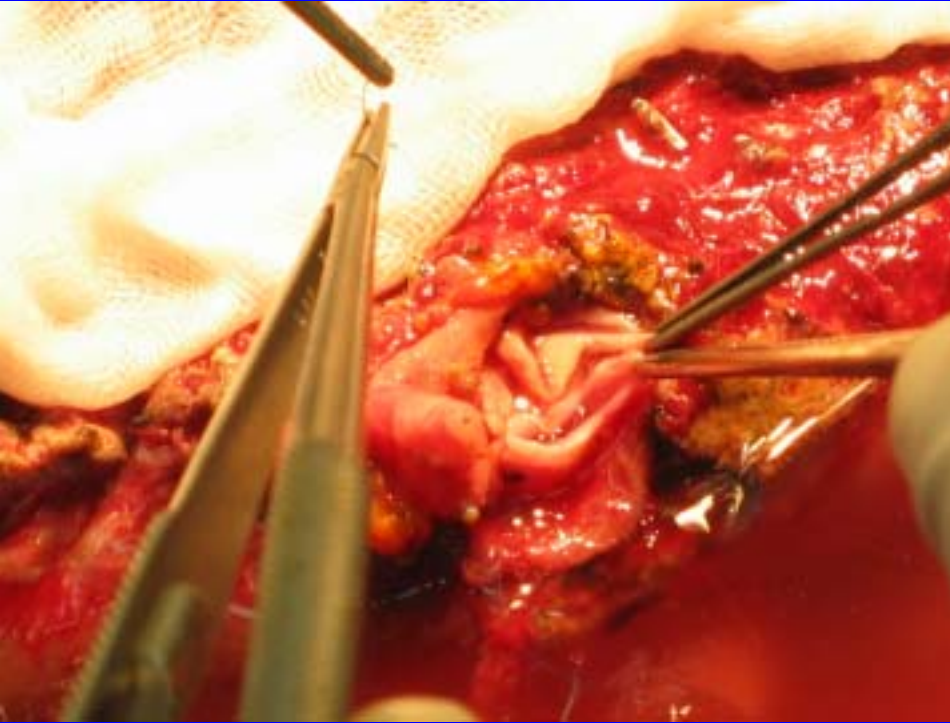


R.H.V.-2+STENT















活體肝臟捐贈者評估後不適合做捐贈手術的原因

1. 不符合國內活體肝臟捐贈之相關法令規範
2. 初步抽血檢查有異常情形
3. 進一步影像學檢查有變異情形、脂肪肝、解剖結構變異(肝靜脈、門靜脈、肝動脈、膽管)、捐贈或剩餘肝臟體積不足
4. 受贈者病情惡化

人體器官移植條例

第八條 醫院自活體摘取器官施行移植手術，應合於下列規定：

- 一. 捐贈器官者須為成年人，並應出具書面同意及其最近親屬二人以上之書面證明。
- 二. 摘取器官須注意捐贈者之生命安全，並以移植於其五親等以內之血親或配偶為限。

前項第二款所稱之配偶，應與捐贈器官者生有子女或結婚二年以上。但結婚滿一年後始經醫師診斷罹患移植適應症者，不在此限。

成年人捐贈部分肝臟移植於其五親等以內之姻親，或滿十八歲之未成年人捐贈部分肝臟移植於其五親等以內之親屬，不受第一項第一款須為成年人及第二款移植對象之限制。滿十八歲之未成年人捐贈肝臟，並應經其法定代理人出具書面同意。

醫院自活體摘取器官施行移植手術，應對捐贈者予以詳細完整之心理、社會、醫學評估，經評估結果適合捐贈，且在無壓力下及無任何金錢或對價之交易行為，自願捐贈器官，並提經其醫學倫委員會審查通過，始得為之。

第三項之肝臟捐贈移植，醫院除應依前項規定辦理外，並應報經中央衛生主管機關許可，始得為之。

前項許可，中央衛生主管機關得邀請專家、學者組成委員會審議；委託經中央衛生主管機關指定之機構為之時，亦同；其許可辦法，由中央衛生主管機關定之。

活體肝臟捐贈移植許可辦法 (1)

- 第一條 本辦法依人體器官移植條例(以下簡稱本條例)第八條第六項規定訂定之。
- 第二條 本辦法所稱活體肝臟捐贈移植，指依本條例第八條第三項所定，成年人捐贈部分肝臟移植於其五親等以內姻親，或滿十八歲之未成年捐贈部分肝臟移植於其五親等以內親屬之肝臟捐贈移植
- 第三條 醫院施行活體肝臟捐贈移植手術，應提經其醫學倫理委員會審查通過，並依本條例第八條第五項及第六項規定，報經中央衛生主管機關或其指定之機構許可，始得為之。前項所稱醫學倫理委員會及其應行審查事項，依本條例施行細則第八條之規定。
- 第四條 醫院施行活體肝臟捐贈移植手術，依前條規定報請許可，應檢具下列條件：
- 一. 捐贈肝臟者與受贈者之姓名、出生年月日、性別與親屬關係等資料表，及其親屬關係之戶籍謄本資料。
 - 二. 受贈者之移植適應症與禁忌症之評估資料表。
 - 三. 捐贈肝臟者之心理、社會、醫學評估資料表。
 - 四. 捐贈肝臟者之書面同意及其最近親屬二人以上之書面證明。
 - 五. 捐贈肝臟者為滿十八歲之未成年人時，其法定代理人之書面同意。
 - 六. 醫院醫學倫理委員會審查通過之證明文件。
 - 七. 其他經中央衛生主管機關指定之文件。

活體肝臟捐贈移植許可辦法 (2)

第五條 中央衛生主管機關或其指定機構為許可活體肝臟捐贈移植手術，得邀請專家、學者組成活體肝臟捐贈移植審議委員會審議。

前項委員會置召集一人，委員八人，其中至少應有三分之一以上委員為法律專家學者及社會人士。

委員會召開審議會會議，由召集人為主席，招集人未能出席時，由出席委員推定一人為主席。

委員會召開審議會會議之決議事項，應有委員過半數之出席，出席委員過半數之同意行之。

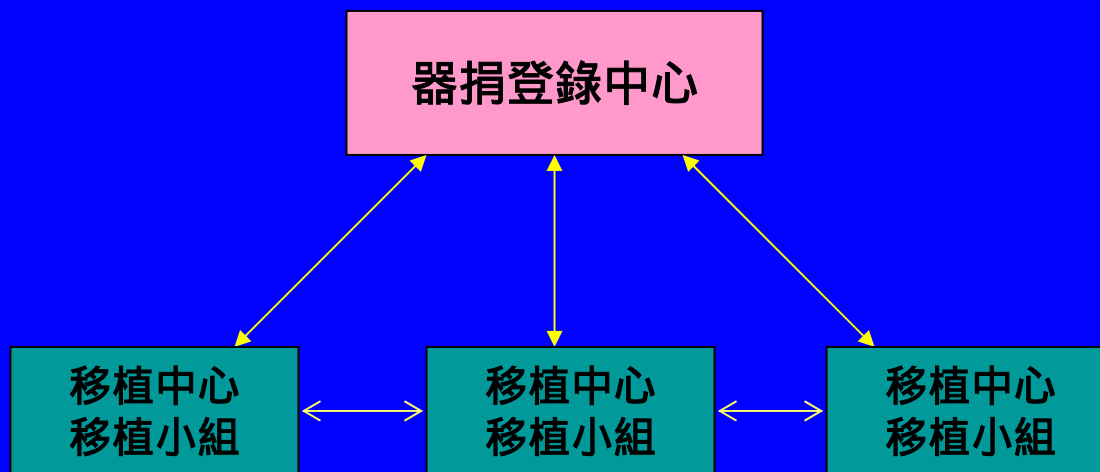
委員會召開審議會會議時，得邀請有關專家學者列席諮詢。

委員會召集人及委員，均為無給職，但得依規定支給出席費及交通費。

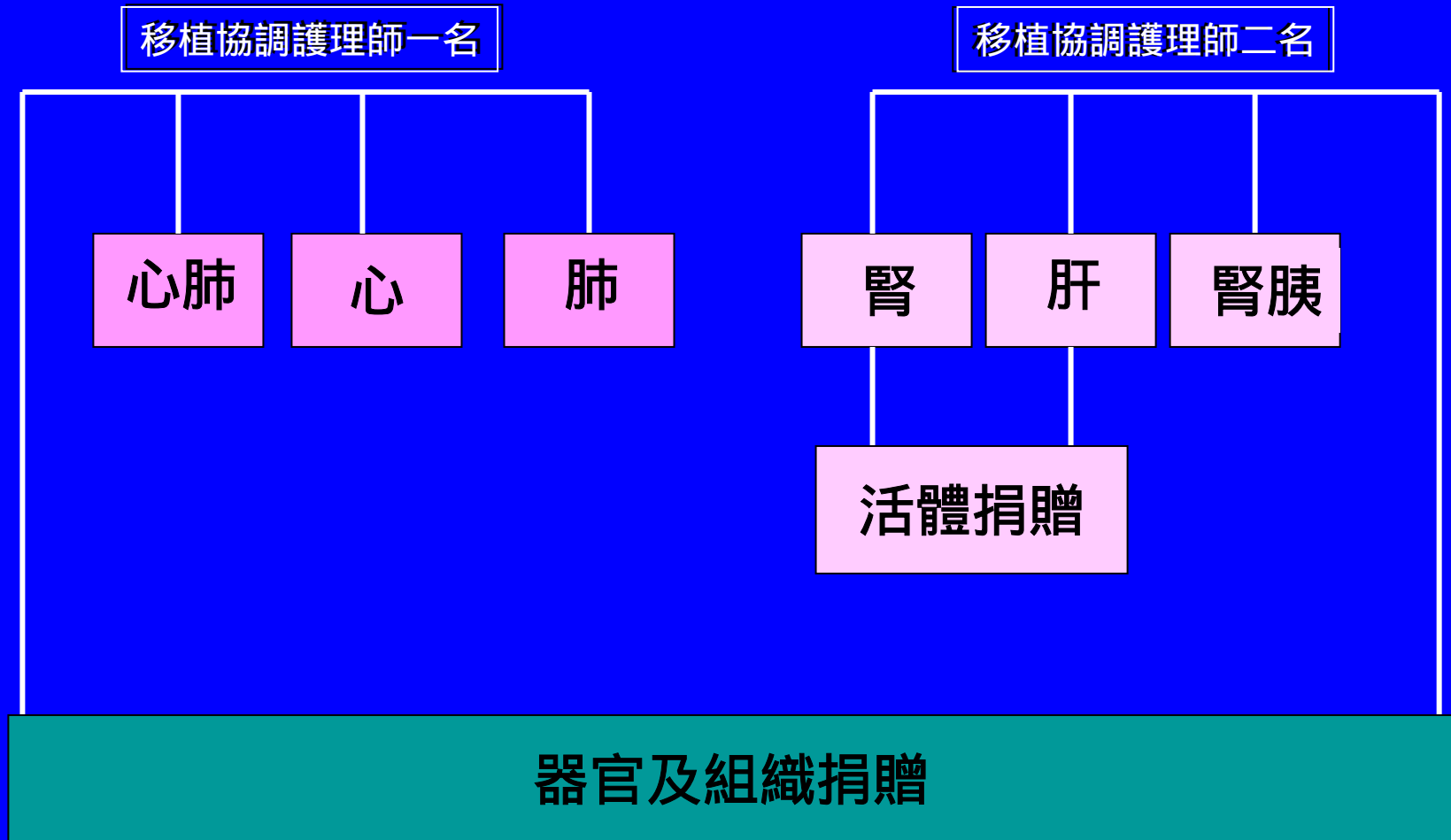
第六條 本辦法自發佈日施行。

台灣移植網

- 中華民國器官捐贈協會
- 衛生署財團法人器官捐贈登錄中心
- 醫學中心移植小組



移植小組工作分配圖



器官移植管理委員

(88年9月成立)

醫務副院長

```
graph TD; A[醫務副院長] --- B[秘書]; A --- C[幹事]; A --- D[心外]; A --- E[消外]; A --- F[胸外]; A --- G[內科]; A --- H[眼科]; A --- I[小兒]; A --- J[骨科]; A --- K[泌尿];
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秘書

幹事

心外

消外

胸外

內科

眼科

小兒

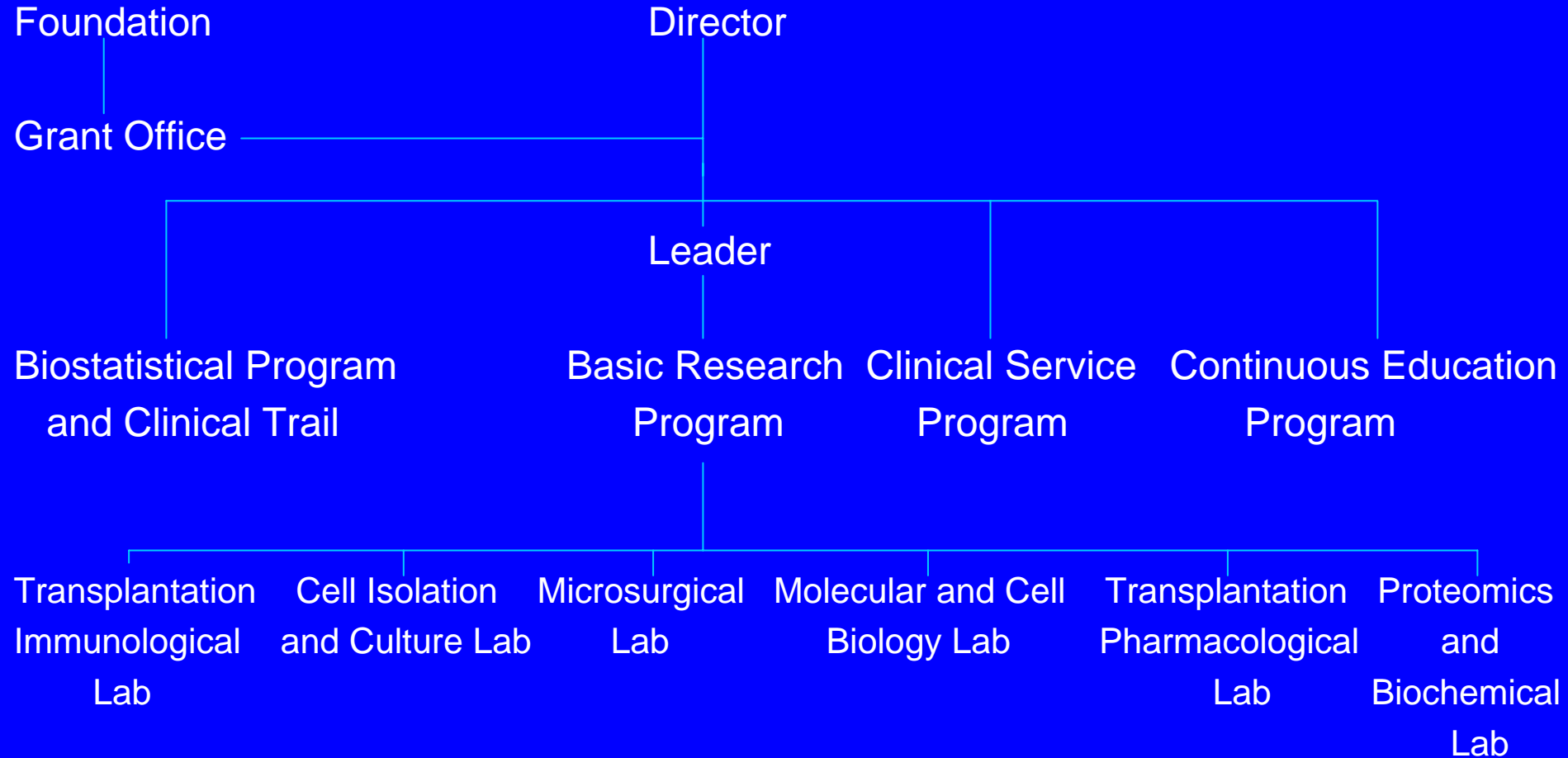
骨科

泌尿

臨床肝臟移植小組

單位	姓名	職稱	負責工作
外科	李伯皇	教授	外科臨床治療
	胡瑞恒	助理教授	外科臨床治療
	何明志	主治醫師	外科臨床治療
	吳耀銘	主治醫師	外科臨床治療
	賴鴻緒	教授	營養監測
	戴浩志	主治醫師	顯微手術
	蔡孟昆	主治醫師	免疫監測
	柯文哲	助理教授	加護病房照護
	曾珮瑄	研究助理	檢體收集、肝炎檢測
	賴佩柔	臨床試驗助理	臨床資料收集
	張怡貞	研究助理	資料電腦建檔
	賴允婷	研究助理	基礎研究操作
	內科	賴明陽	教授
楊培銘		教授	肝解剖學超音波檢查
小兒科	張美惠	教授	小兒肝臟病患照護
	倪衍玄	副教授	小兒肝臟病患照護
	陳慧玲	主治醫師	小兒肝臟病患照護
影像醫學科	彭信達	主治醫師	小兒影像檢查判讀
	梁博欽	主治醫師	成人影像檢查判讀
麻醉科	詹光政	主治醫師	臨床麻醉
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護理科	林明慧	護理師	病人全程監測、檢查、追蹤及連繫
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Liver Surgery and Transplantation Program



The optimal condition of AFLP technique to analyze liver regeneration in rat had been published: template 20ng, MgCl₂ 2mM, primers 1000nM, annealing temperature 59 , Taq 2 unit/reaction and 0.5 fold of Q-solution for rat liver regeneration analysis. We use eight pairs primers which have sixty-four primers combination to amplify polymorphism fragments by this technique. Different fragments were eluted for sequencing and comparing with the genebank, hoping we can find the genes that control liver regeneration.

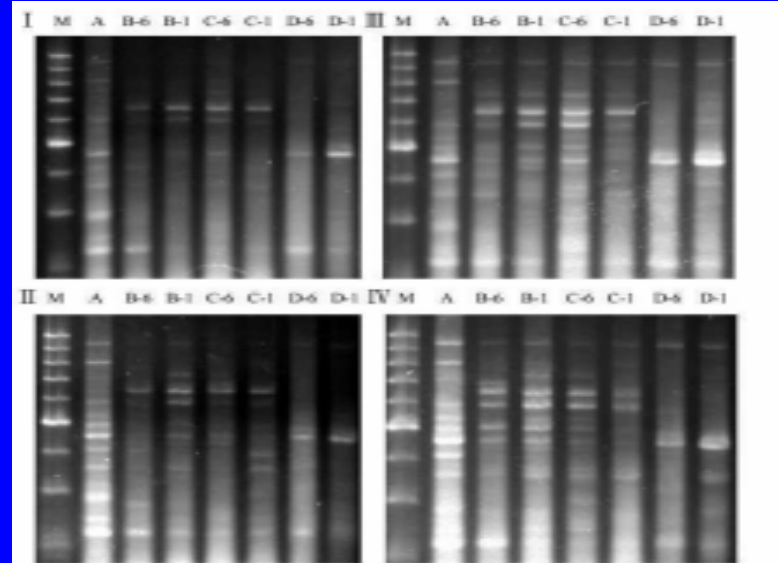


FIG. 3. Results of AFLP-PCR at 57(A), 58(B), 59(C) and 60 °C (D) annealing temperatures of electrophoresed PCR products. M-molecular size standard(100-bp ladder). A, B, C and D present rat group. The numbers after dash are postoperative time: 6hours(6) and one day(1).

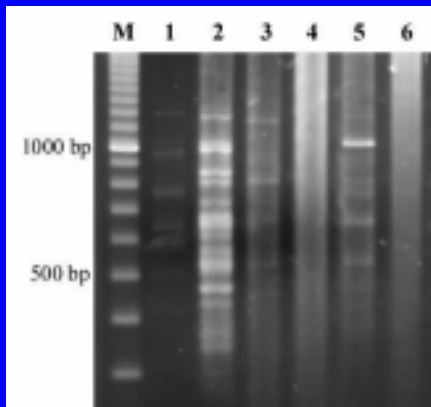


FIG. 1. cDNA-AFLP patterns of different concentration template. Normal rat digested cDNA to be AFLP template. M is 100 base pair ladder marker. Lanes 1-6 present the PCR products of 10, 20, 50, 100, 250 and 500ng templates.

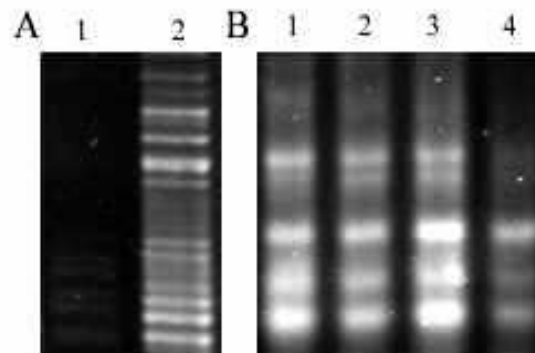


FIG. 2.cDNA-AFLP patterns of different Q-solution concentration.A: Q-solution concentration of lane 2 is fold and none in lane 1. B: Lanes 1-4 present the PCR products of 0, 0.25, 0.5 and 1 fold Q-solution.

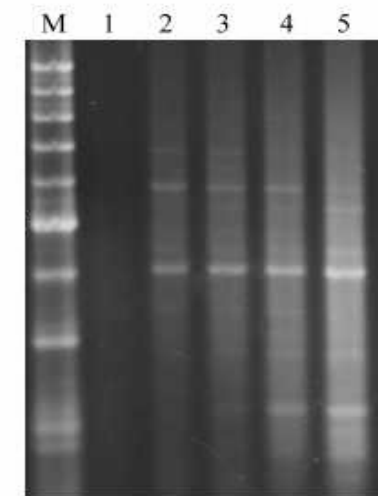
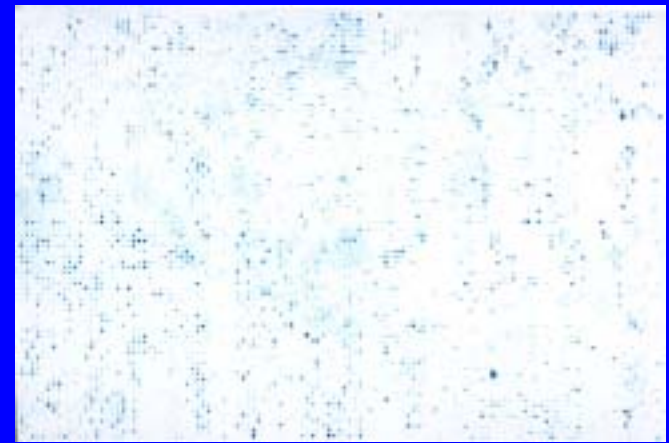


FIG. 4 Amplification fragments with different primer concentration.M=molecular size standard (100-bp ladder). Concentration of primers are 0, 250, 500, 1000 and 2000 nM(Lane 1-5).

Microarray results



No.	Gene name	Expression
1	Human mRNA for KIAA0029 gene, partial cds	↓
2	Human voltage-gated calcium channel beta subunit mRNA	↑
3	Human TBP-associated factor TAFII80 mRNA	↑
4	Cytochrome c oxidase subunit X (heme A: farnesyltransferase	↑
5	Homo sapiens mRNA for putative ABC transporter, partial	↑
6	Cytosolic acetoacetyl-coenzyme A thiolase	↑
7	Highly similar to DOLICHYL-PHOSPHATE BETA-GLUCOSYLTRA	↑
8	G1/S-SPECIFIC CYCLIN C	↑
9	Replication factor C, 37-kD subunit	↑
10	D component of complement (adipsin)	↑
11	Homologue of mouse tumor rejection antigen gp96	↑
12	Glycerol-3-phosphate dehydrogenase 2 (mitochondrial)	↑
13	Glutathione synthetase	↑
14	CORTICOSTEROID 11-BETA-DEHYDROGENASE, ISOZYME 1	↑
15	Homo sapiens embryonic ectoderm development protein mRNA	↑
16	early growth response 3	↑
17	mal, T-cell differentiation protein	↑
18	myelin associated glycoprotein	↑
19	Homo sapiens clone 24527 mRNA sequence	↓
20	angiotensinogen	↑
21	carnitine acetyltransferase	↓
22	Human calcineurin A1 mRNA, complete cds	↑
23	solute carrier family 2 (facilitated glucose transporter)	↑
24	pyrroline-5-carboxylate synthetase	↑
25	nuclear factor I/X (CCAAT-binding transcription factor)	↑
26	splicing factor, arginine/serine-rich 11	↑
27	fibrillarlin	↑
28	estrogen receptor-binding fragment-associated gene 9	↑
29	orphan G protein-coupled receptor HG38	↑

No.	Gene name	Expression
30	procollagen-lysine, 2-oxoglutarate 5-dioxygenase 3	↑
31	KIAA0683 gene product	↑
32	Ewing sarcoma breakpoint region 1	↑
33	vaccinia related kinase 1	↓
34	Homo sapiens mRNA for KIAA0627 protein, partial cds	↑
35	trophinin-assisting protein (tastin)	↑
36	myristoylated alanine-rich protein kinase C substrate (MARCKS, 80K-L)	↑
37	ATP synthase, H+ transporting, mitochondrial F0 complex	↑
38	Human RNA polymerase II elongation factor ELL2	↑
39	thioredoxin-like, 32kD	↑
40	Human DNA sequence from clone 1163J1 on chromosome 22q13.2-13.33	↑
41	glycine receptor, alpha 2	↑
42	Homo sapiens Chromosome 16 BAC clone CIT987SK-A-575C2	↑
43	zinc finger protein 8 (clone HF.18)	↑
44	Human clone iota unknown protein mRNA, complete cds	↑
45	stromal cell-derived factor 1	↑
46	growth arrest specific 11	↑
47	Homo sapiens HSTRAD-d8 mRNA, partial cds	↑
48	glucose-6-phosphatase, transport (glucose-6-phosphate) protein 1	↑
49	sialyltransferase 8 (alpha-2, 8-polysialyltransferase) D	↑

Prospectives in Organ Transplantation

- Immunosuppression
- Expanding the organ donors
- Cell transplantation
- Artificial organs

Organ transplantation research center

Organ registry and sharing center

Organ donation promotion team

Expanding Donor Liver

Hepatitis donor

Elderly donor

Micro and macrosteatosis

Split liver transplantation

Living donor liver transplantation

Domino liver transplantation

Non-heart beating donor – age < 64 yrs

Artificial and bioartificial organ

Xenotransplantation