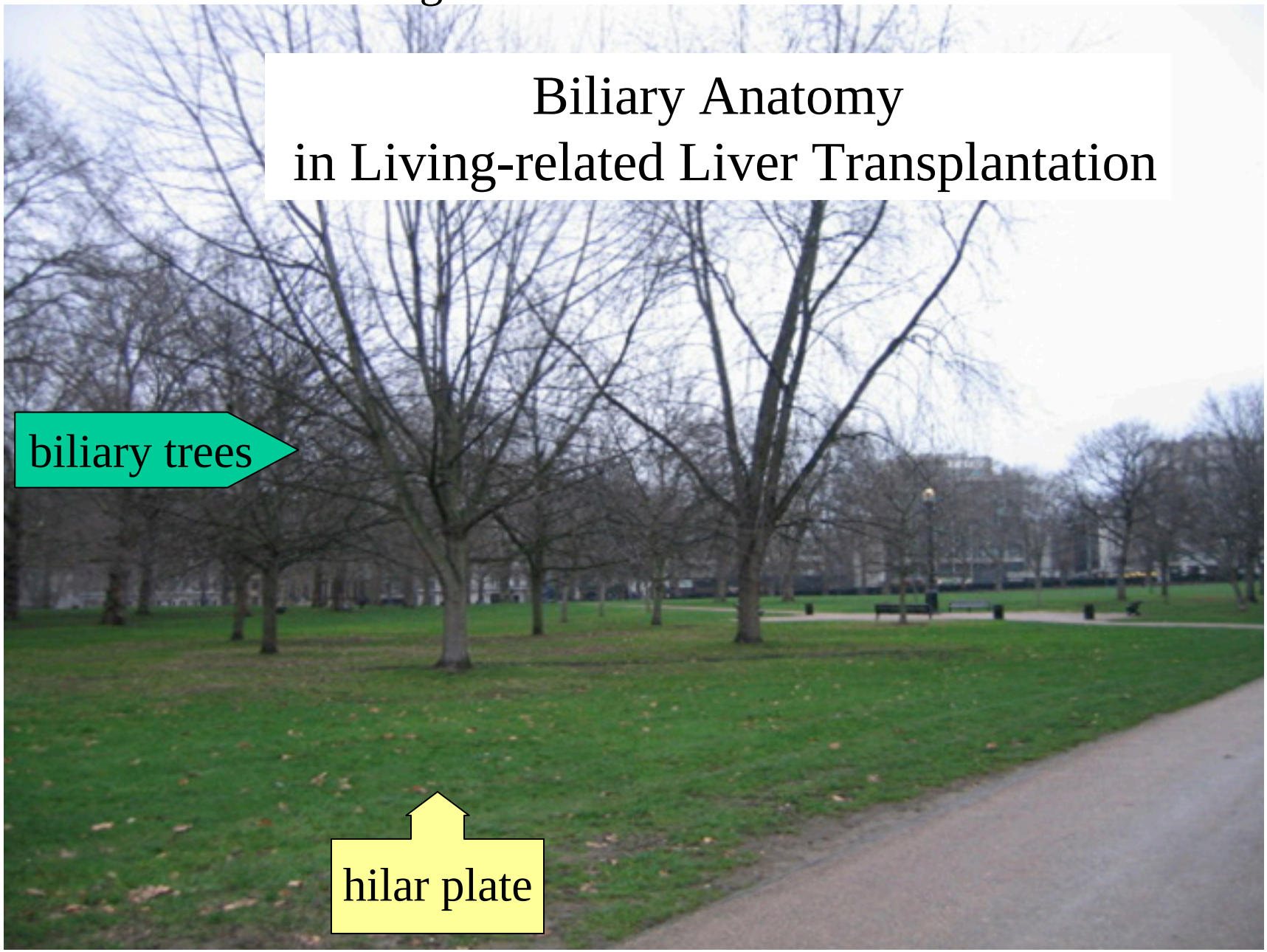
The 5th IHPBA Congress - Istanbul

Biliary Anatomy in Living-related Liver Transplantation



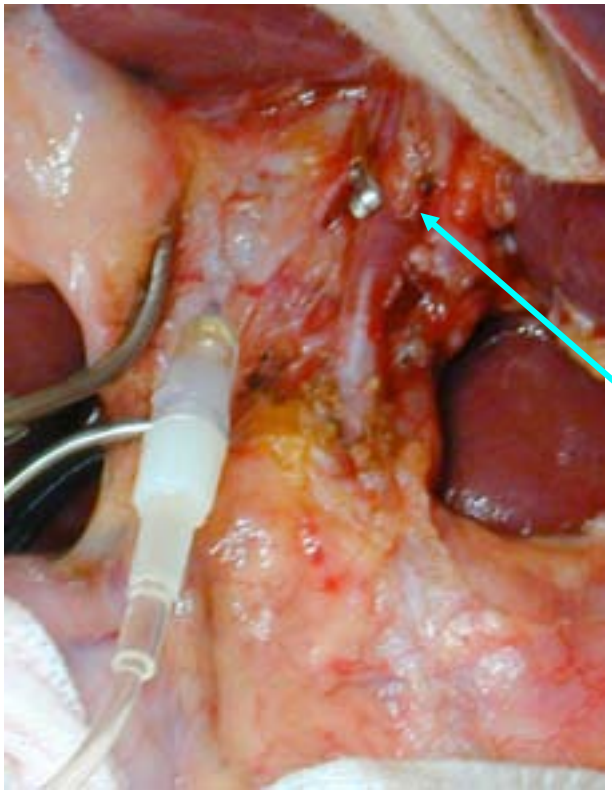
Assessment for Vascular Anatomy

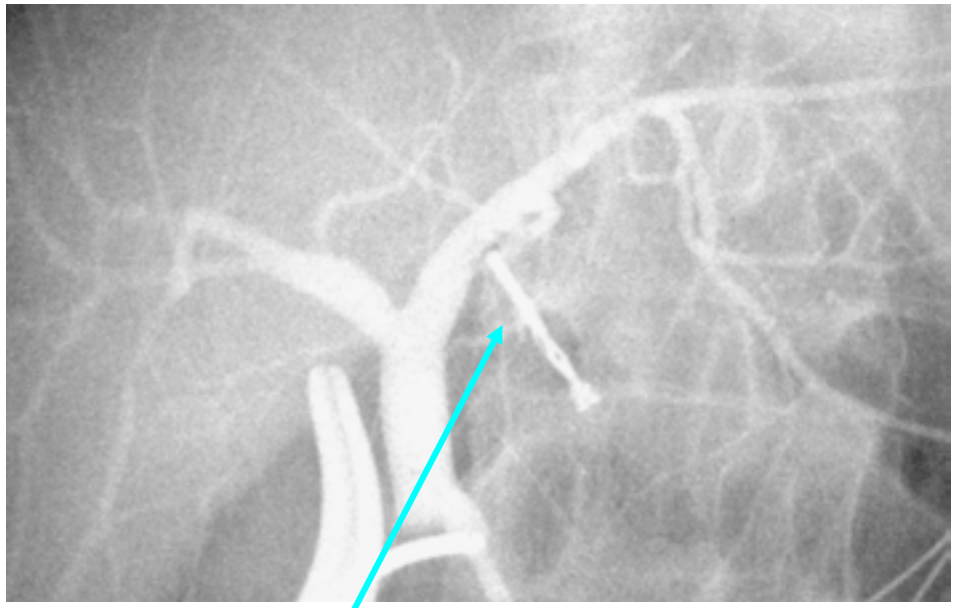
1. 3DCT
   - portal vein
   - hepatic vein
   - hepatic artery
2. No angio

Assessment for Biliary Anatomy

1. Intraoperative cholangiography
2. DIC-CT, MRCP
3. No ERCP

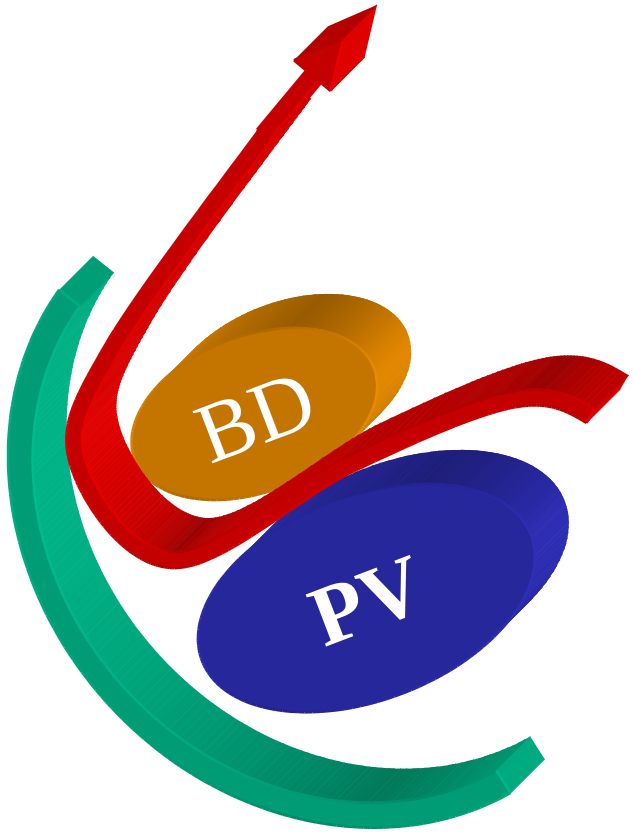
Intra-operative Cholangiography





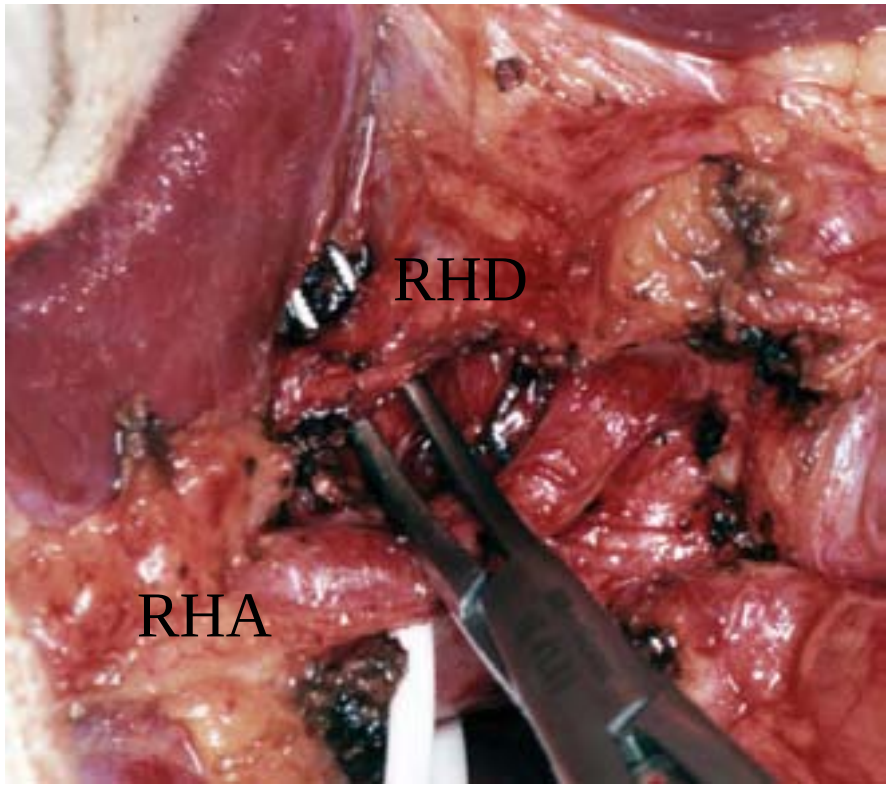
clip for mapping

Encircle the left hepatic duct

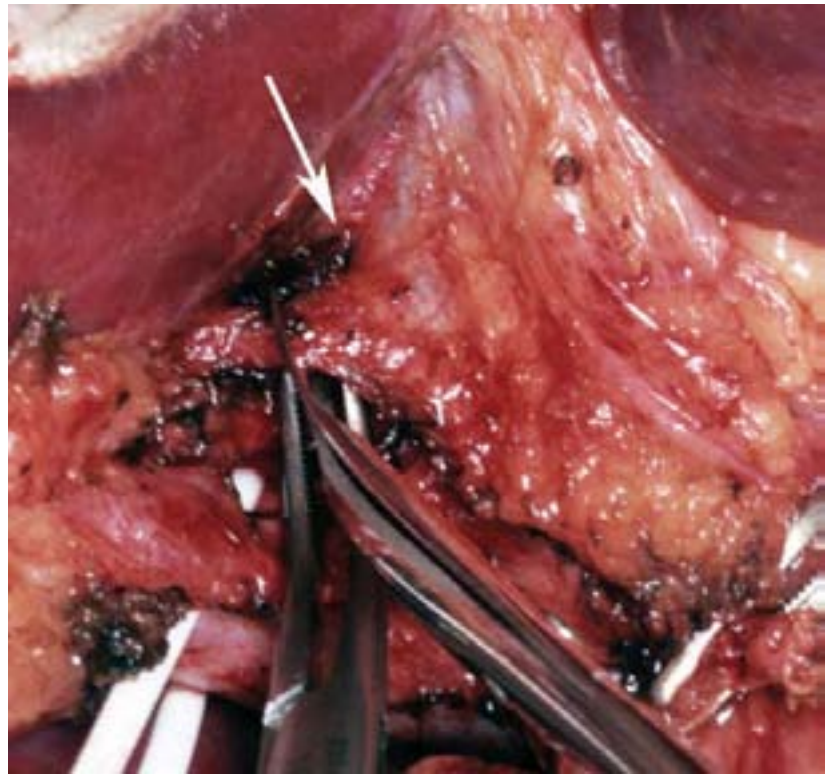


Hilar plate

Dissection of Bile Duct for Right Llobe Graft



RPV



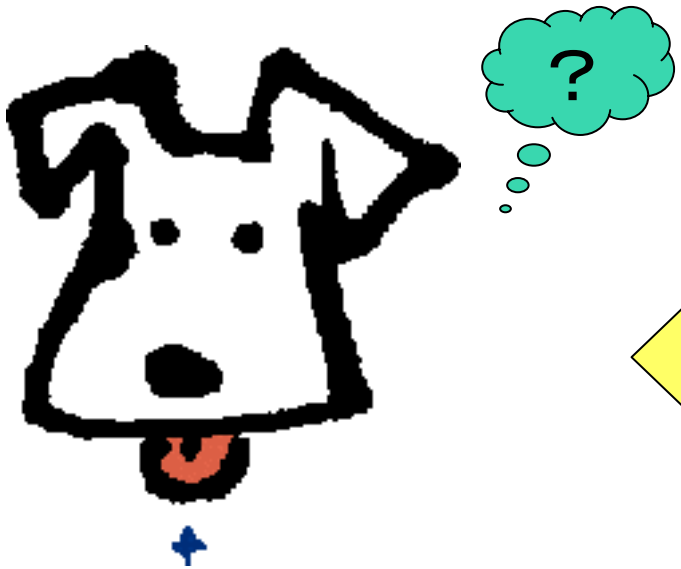
away from bifurcation

Anatomy of Biliary System and Vascular System

The portal vein and the bile duct run together

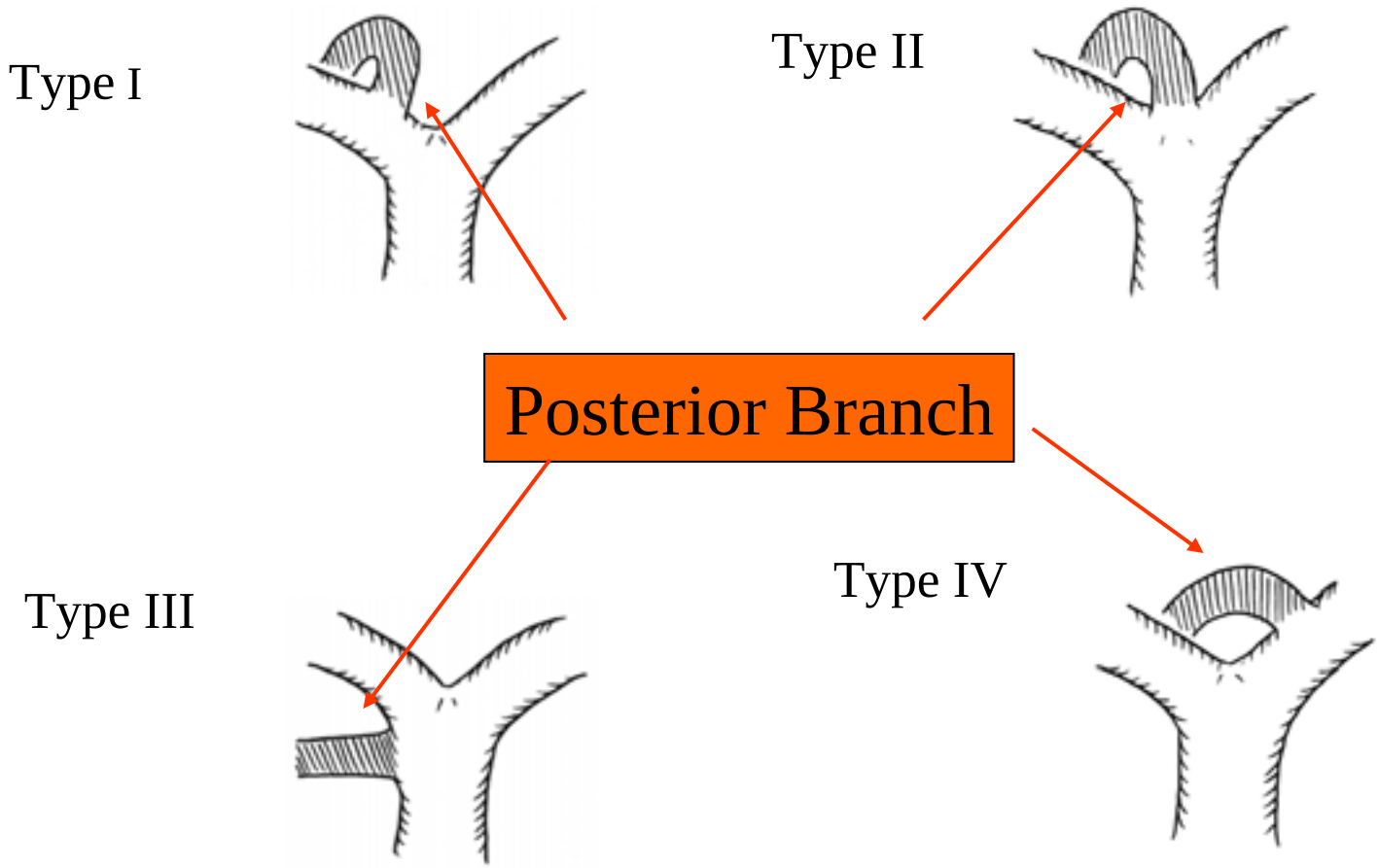
always inside the liver.

not always at the hilum.



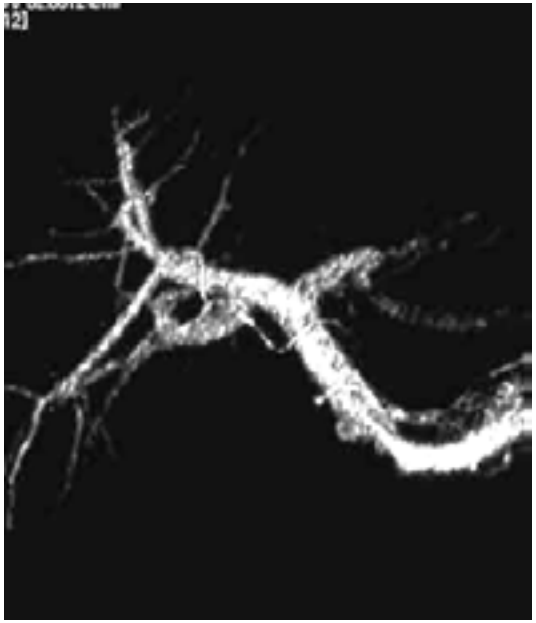
Doc and Dog run together
always in town
not always in mountain

Biliary Anatomy



Normal anatomy of PV

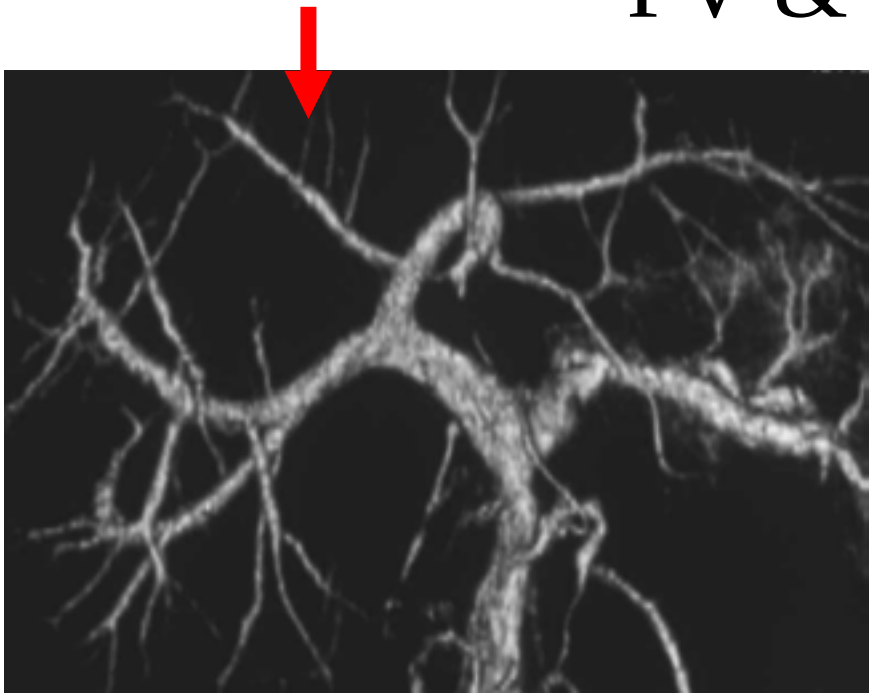
Different anatomy

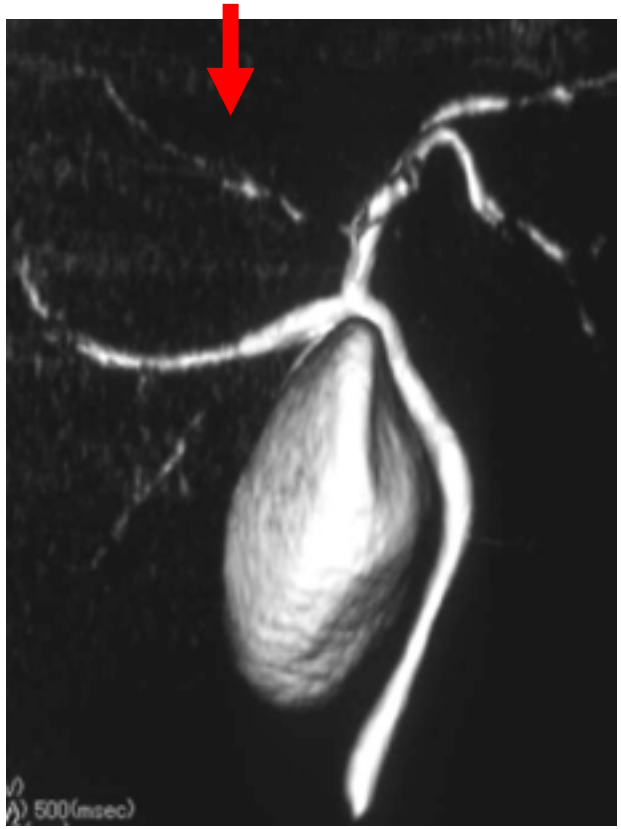


Type III anatomy

Same anatomy

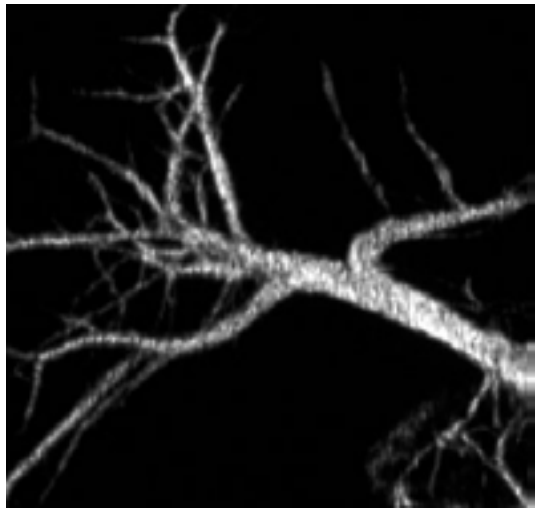
Anterior branch from left branch
PV & BD

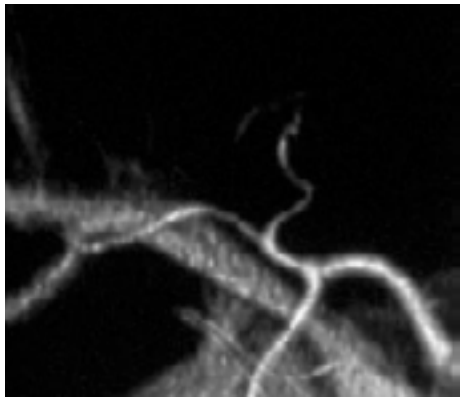




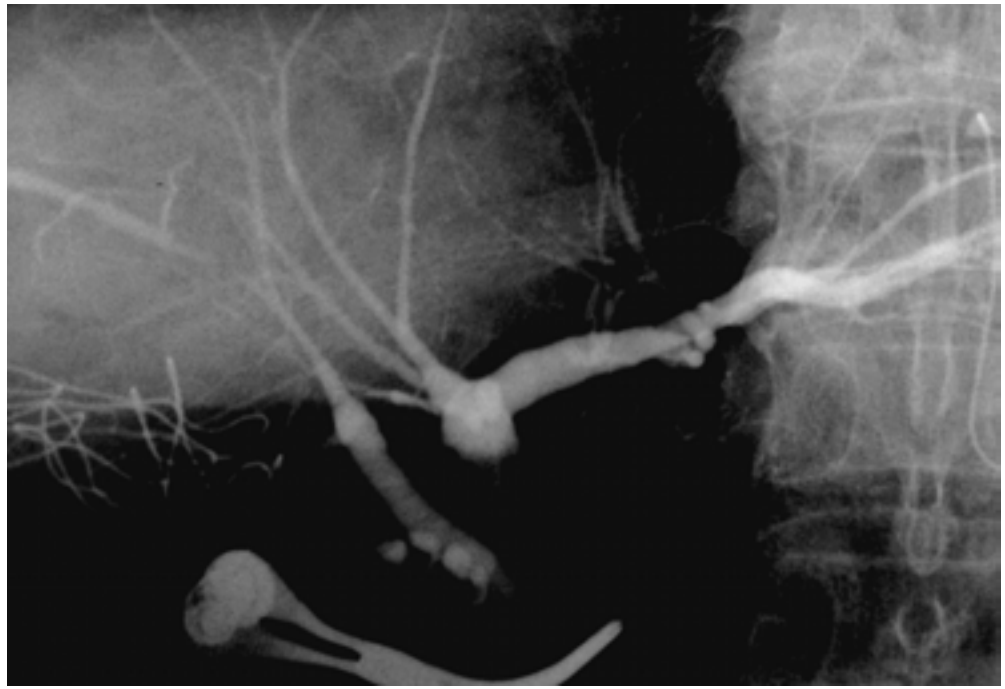
Different anatomy

Normal anatomy of PV



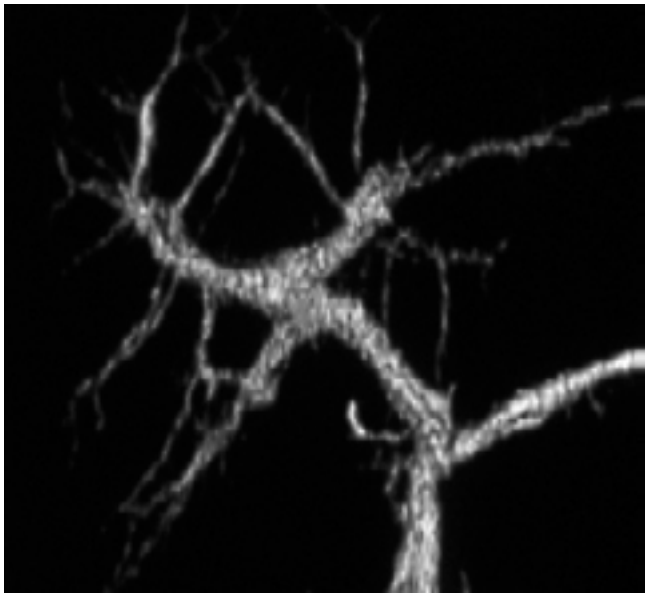


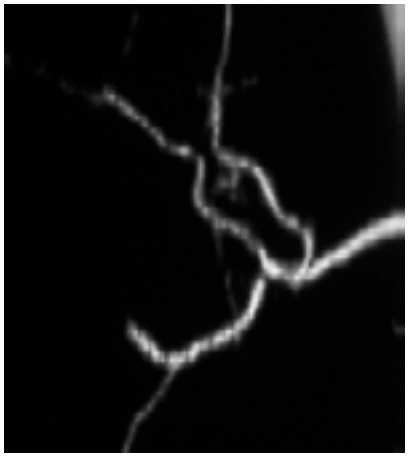
Type III anatomy
3 small anterior branches

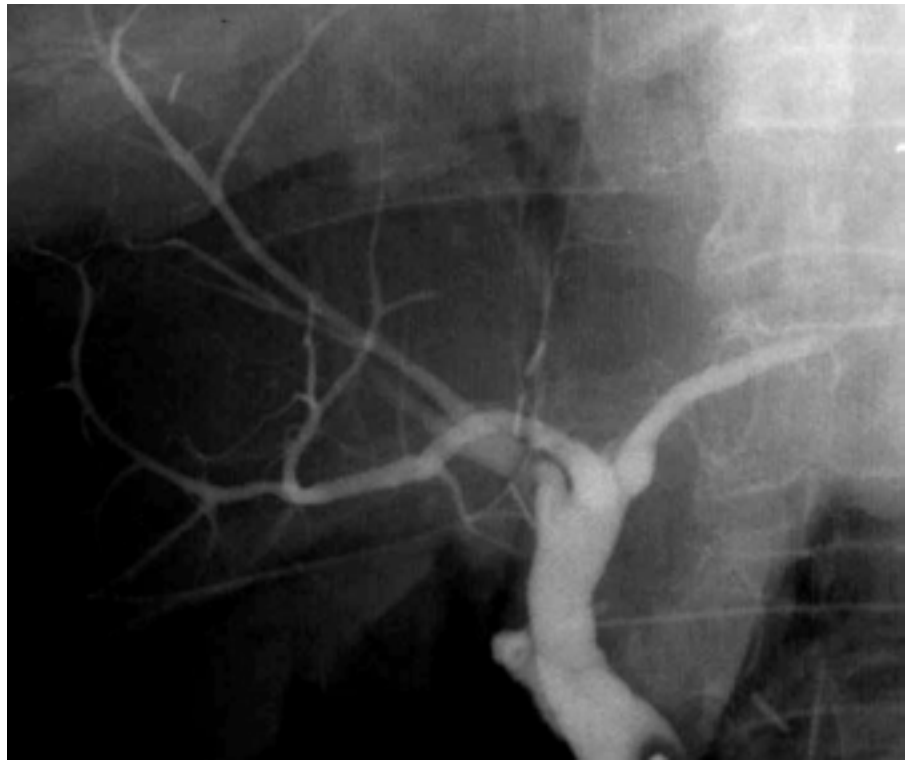


Same anatomy

Trifurcation of PV & Bile duct

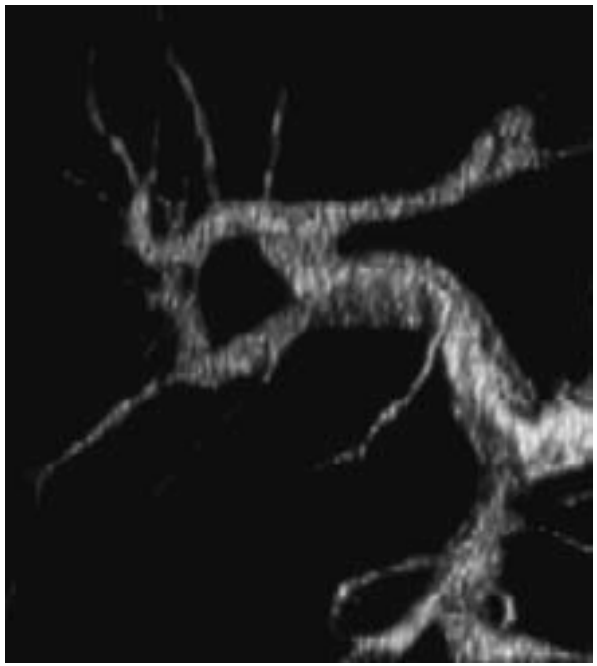




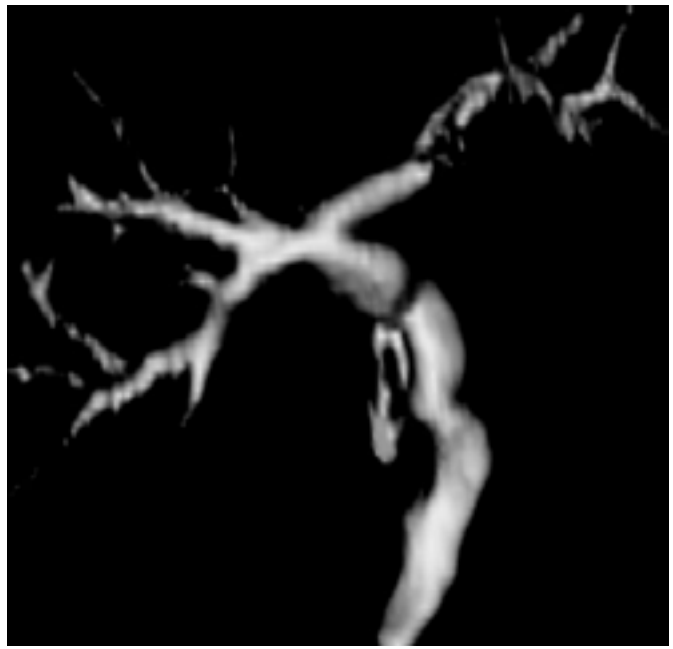


Different anatomy

Extrahepatic branch of post.br.

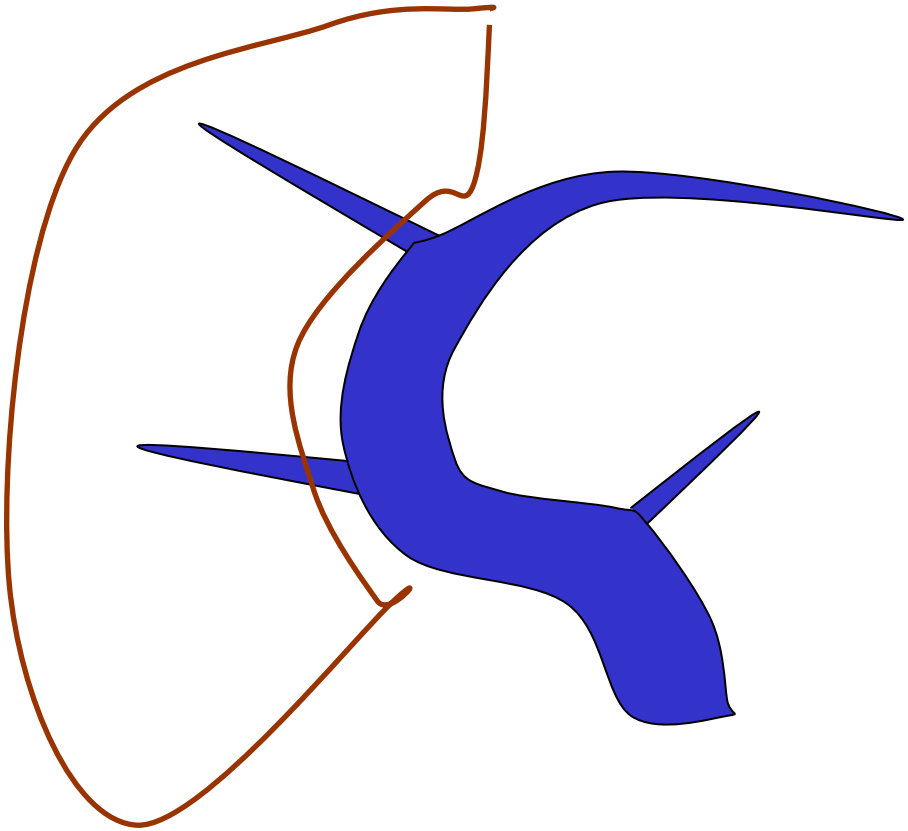


Normal anatomy

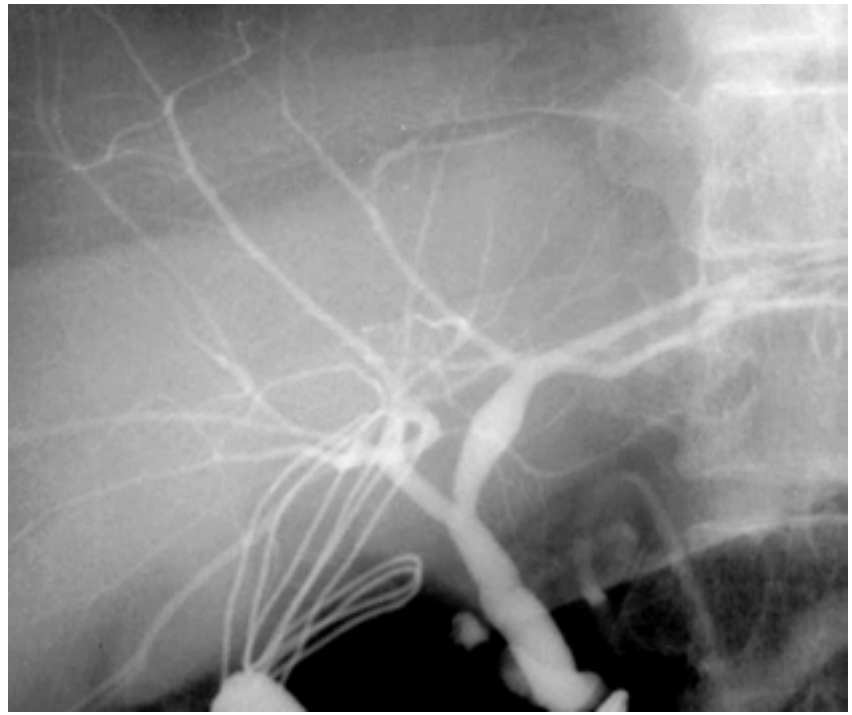


Different anatomy

Single portal vein



Normal anatomy
of bile duct



Type I

Biliary Anatomy in Kyoto

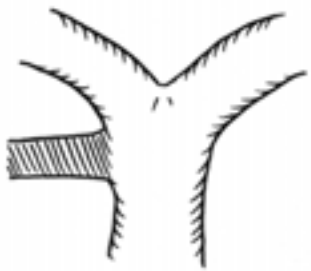
Type I

65.0%

Type II

9.2%

Type III



8.3%

Type IV

15.0%

Nakamura et al. Transplantation 2002;27:1896

Biliary System of Right Lobe

Number of anastomotic holes in each type

Type I

One: 88%
Two:10%
Three:1%

Type II

One:27%
Two:73%

Type III

One:10%
Two:90%

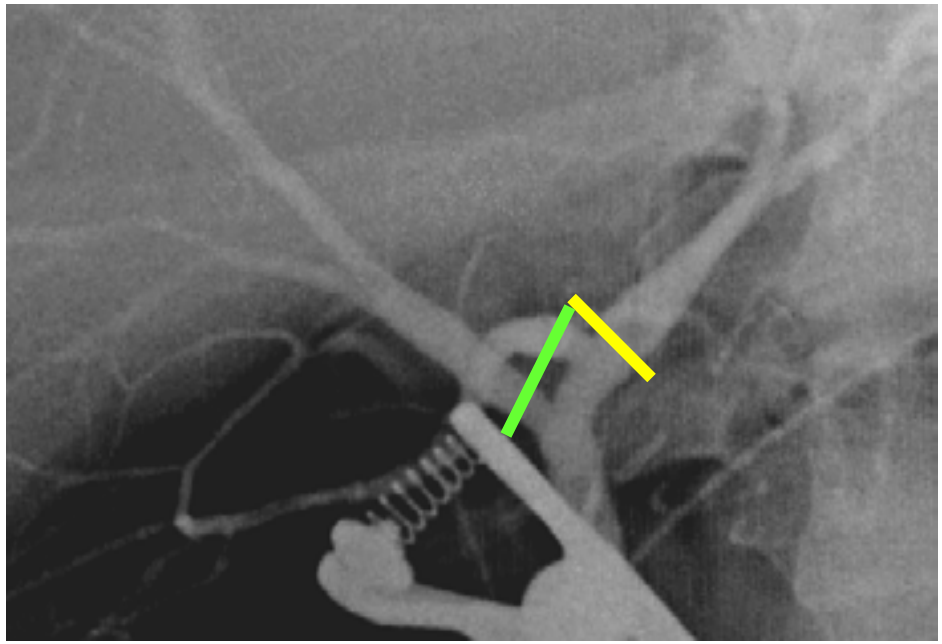
Type IV

Two:95%
Three:5%

Nakamura et al. Transplantation 2002;27:1896

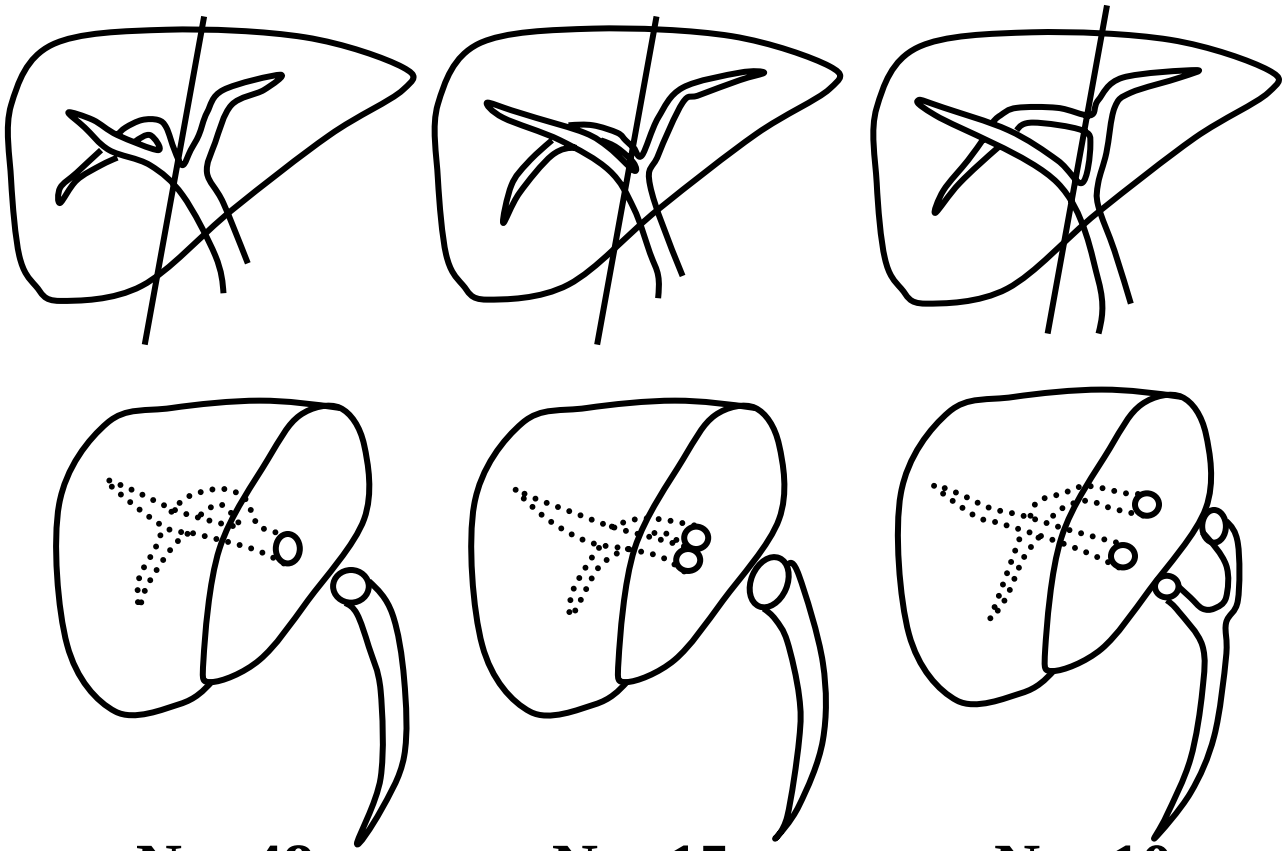
Cutting line of bile duct in type IV

Right lobe graft



Left lobe graft

Biliary Reconstruction for Single or Multiple Holes in Right Lobe Graft

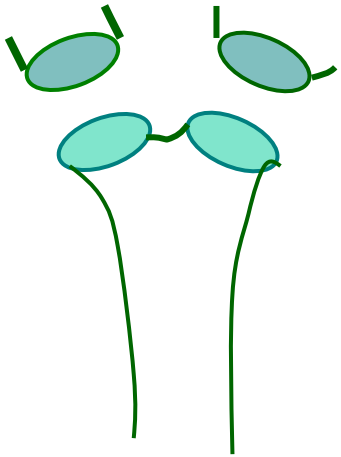


N = 48 **N = 15** **N = 10**

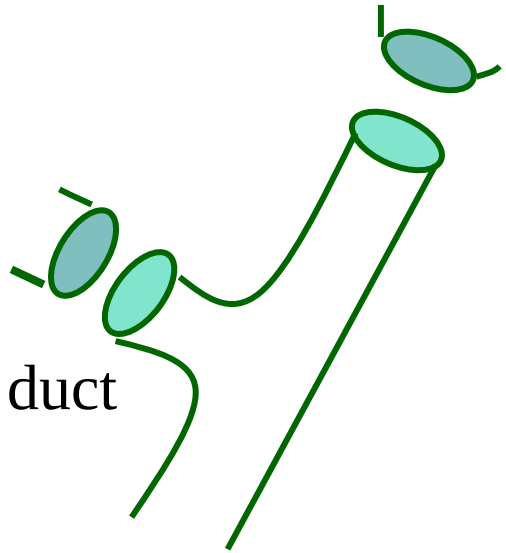
Hisatsune, Yazumi et al. Transplantation (in press)

Biliary Reconstruction for Two Separate Holes using Duct-to-Duct Technique

Close

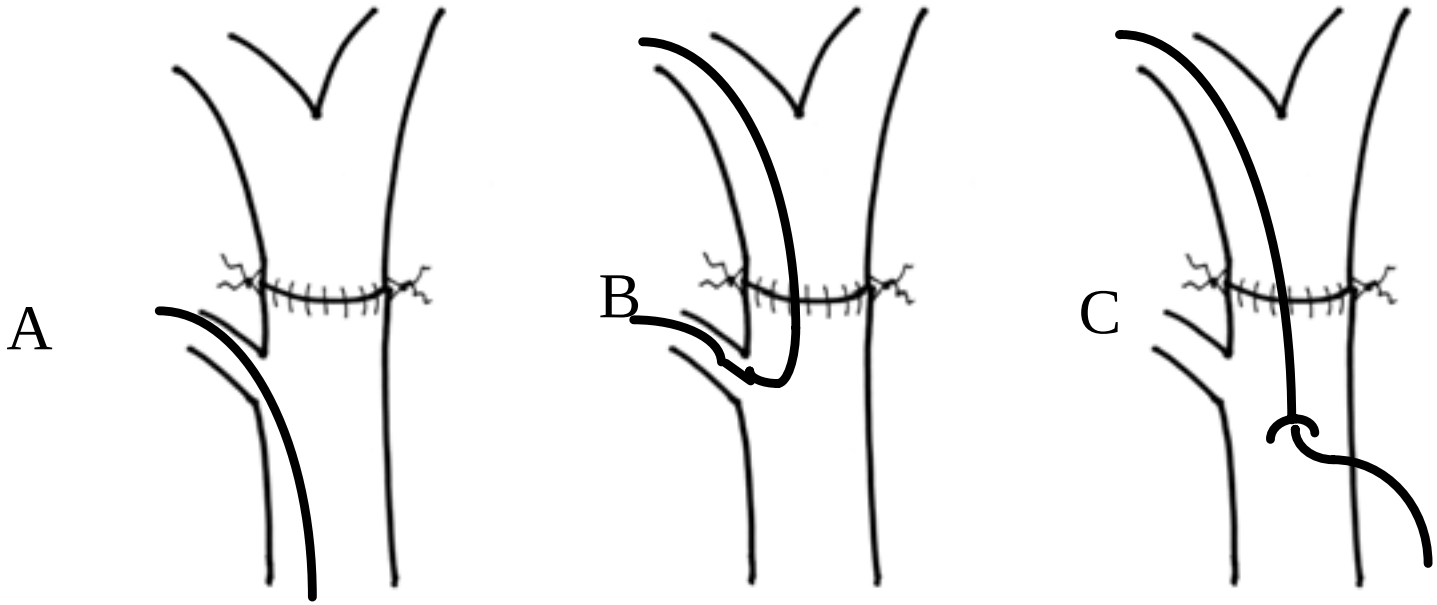


Distant



Cystic duct

Stent Type for Duct-to-Duct Reconstruction

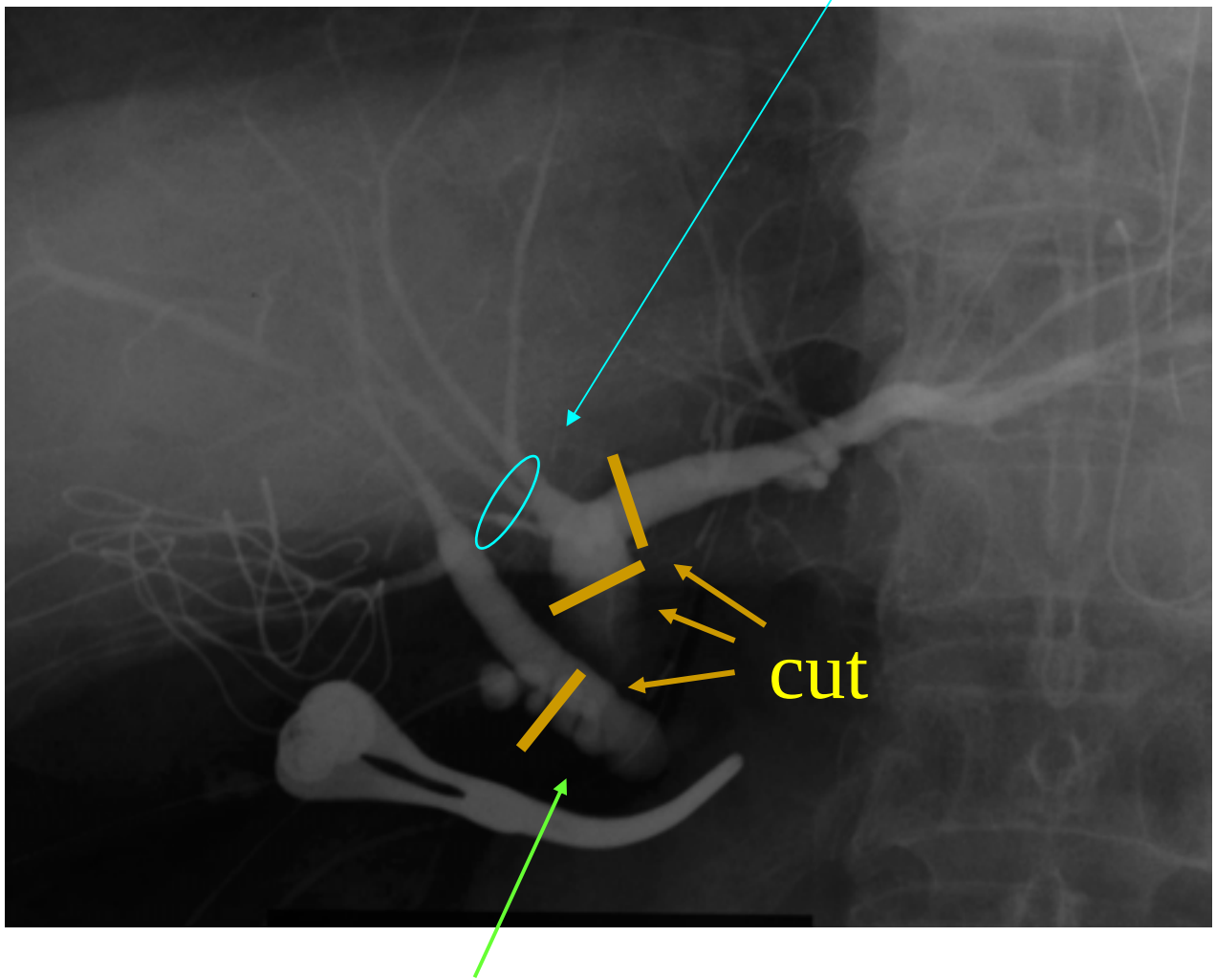


Ishiko et al. Ann Surg 2002;236:235

Type B & C were better than type A in 50 cases

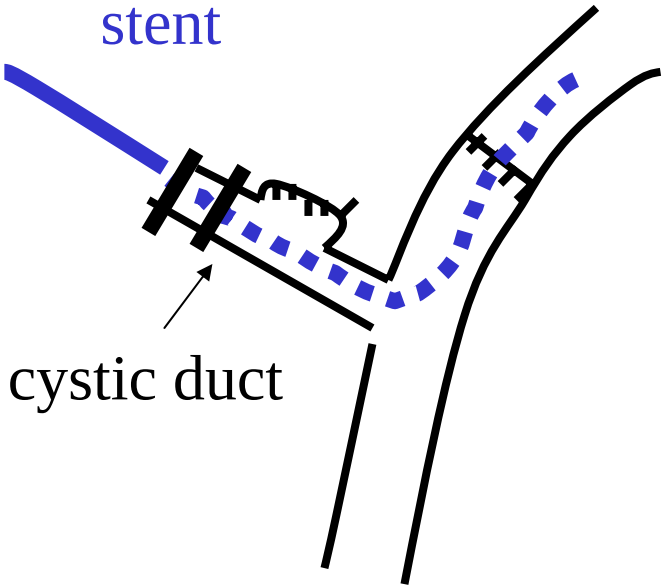
Surgical Innovation for Special Anatomies

Type III anatomy with 3 small anterior branches

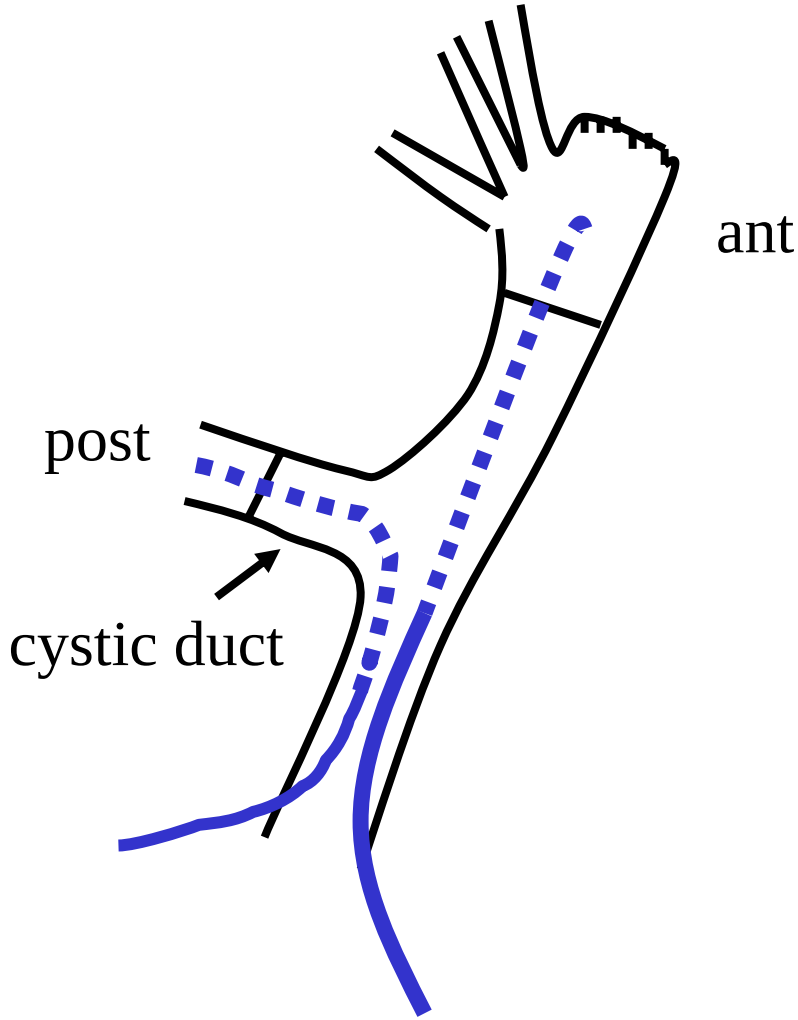


Posterior branch from cystic duct

Donor operation

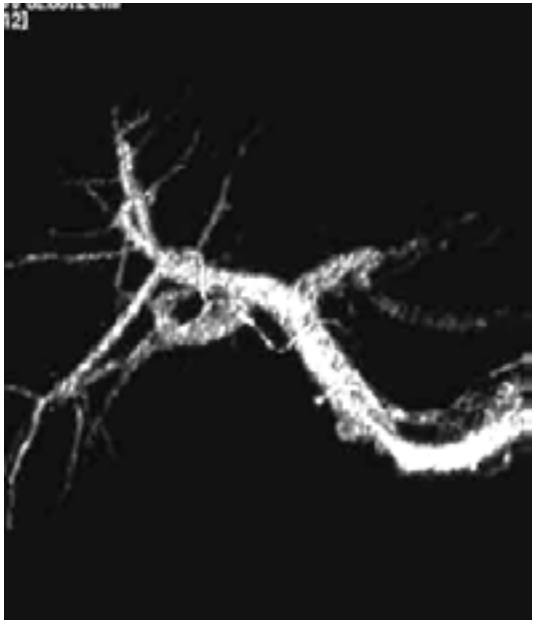


Recipient operation



“ Graft with one PV and two bile ducts. OK!”

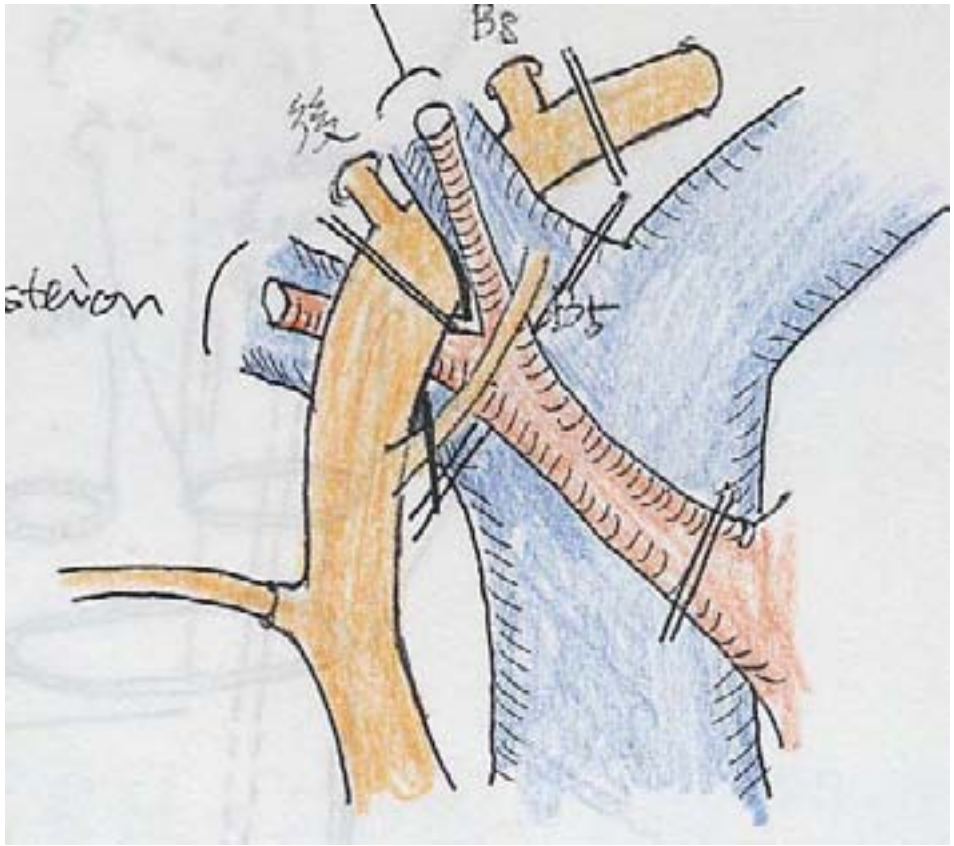
Normal anatomy of PV



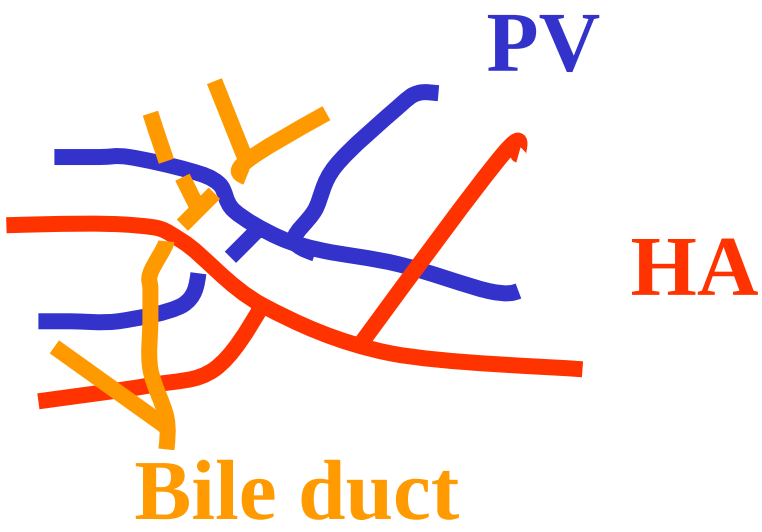
but

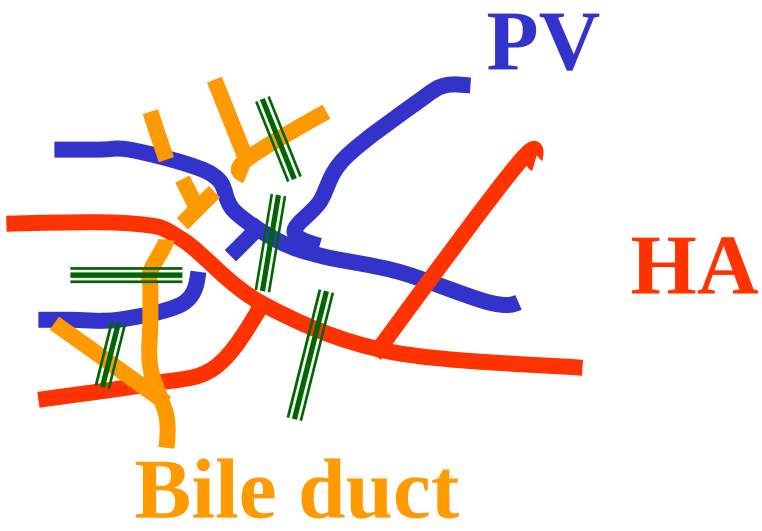
Type III anatomy

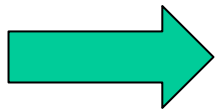
Intraoperative Findings of Complex Anatomy

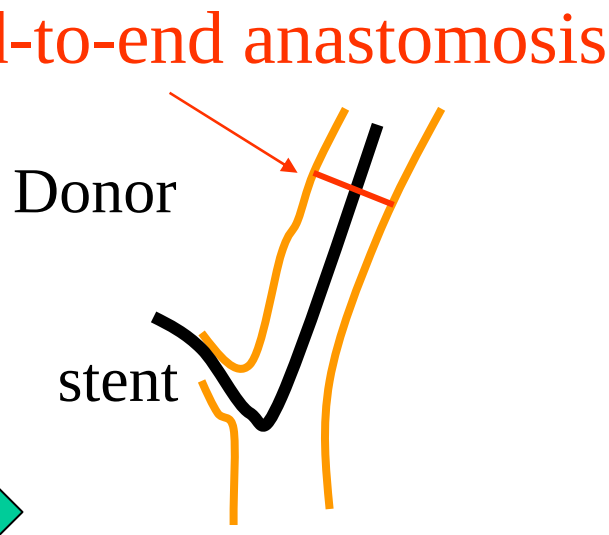


Complex Anatomy and Strategy









Recipient:
single PV
single HA
double BD

Biliary Complications in Right Lobe Donors

ERCP for Biliary Complications in Right Lobe Donors

ENBD for Leakage (n=8)

indication: failed percutaneous drainage

period after surgery: 20-264 days (ave. 77days)

results: 100% success for leakage

period for closure after endoscopic drainage: 7 -18 days

ERBD for Stenosis (n=4)

background: 3 cases after successful treatment for leakage

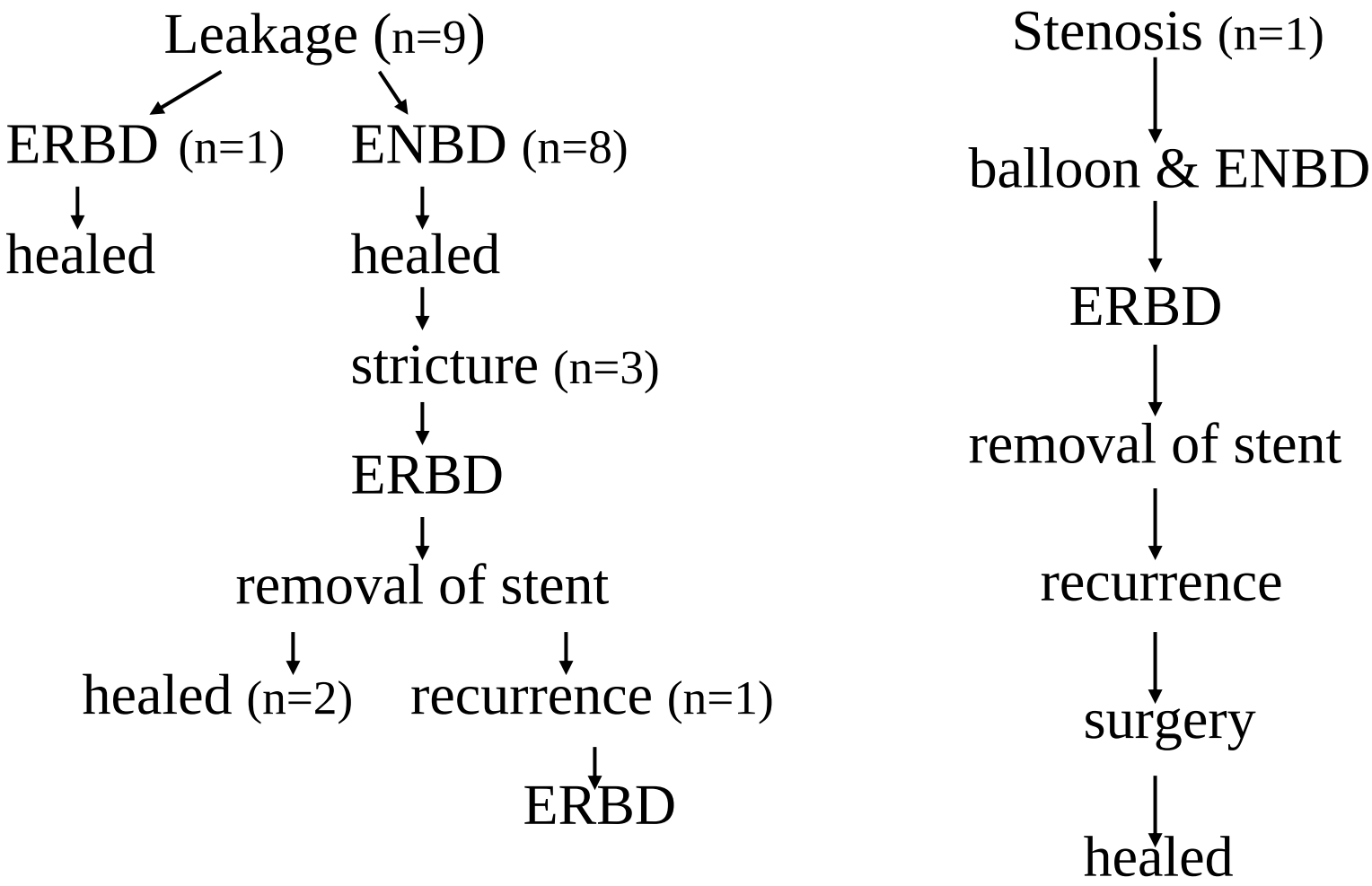
period after surgery or leakage: 1 - 6 months

period of stenting: 70 - 14 7 days

Results: 50% success and 50% recurrence

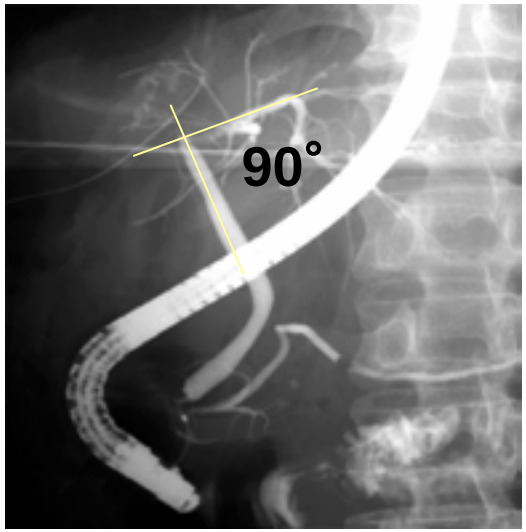
Hasegawa et al. Clinical Gastroenterology and Hepatology (in press)

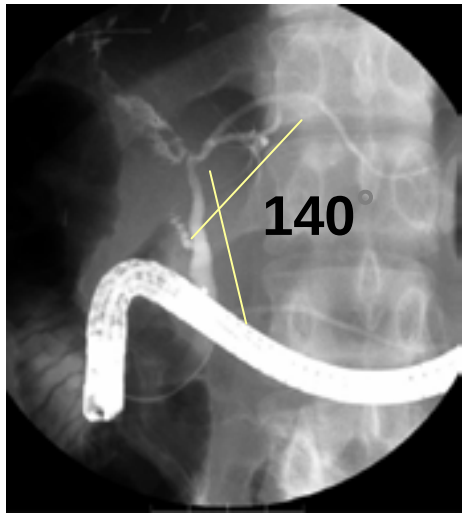
ERCP for Biliary Complication in Right Lobe Donor

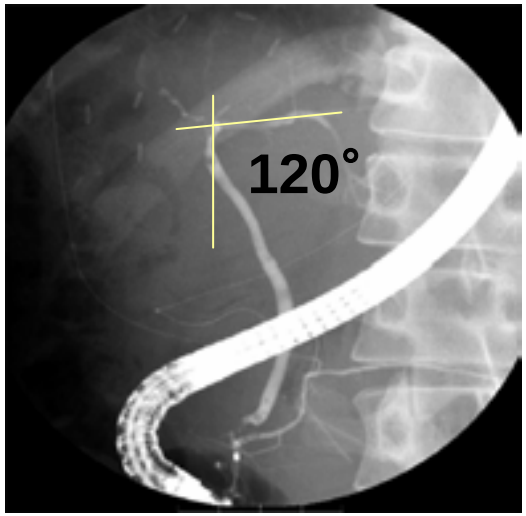


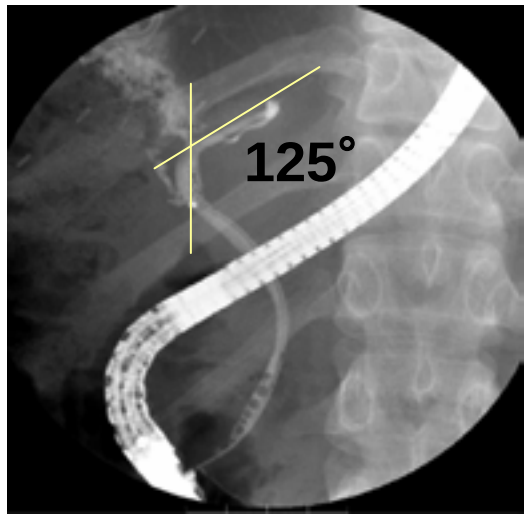
Hasegawa et al. Clinical Gastroenterology and Hepatology (in press)

The Angles Between the Common Hepatic Duct and the Left Hepatic Duct - Cases Without Stricutre









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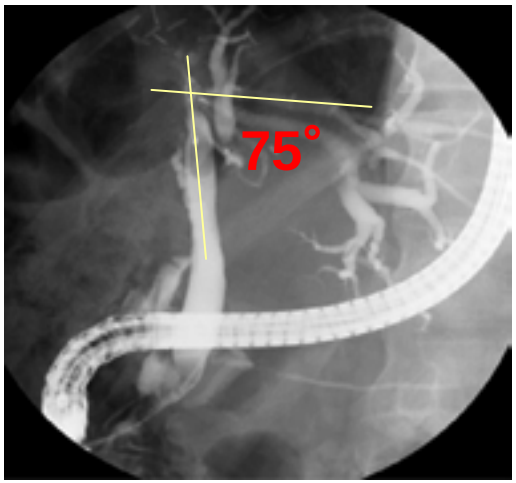
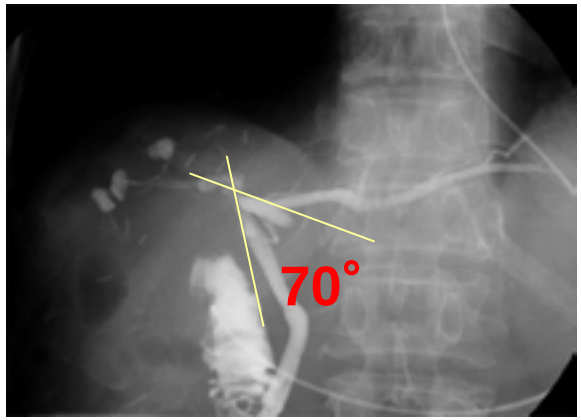
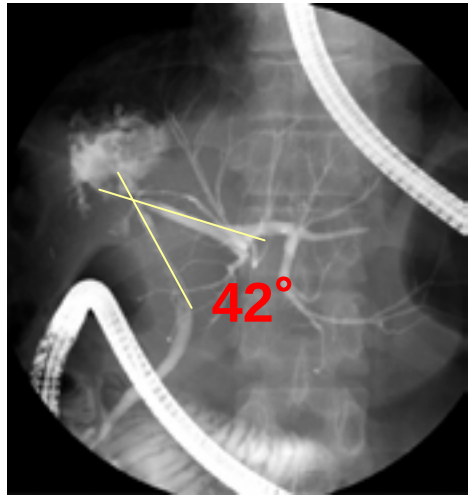
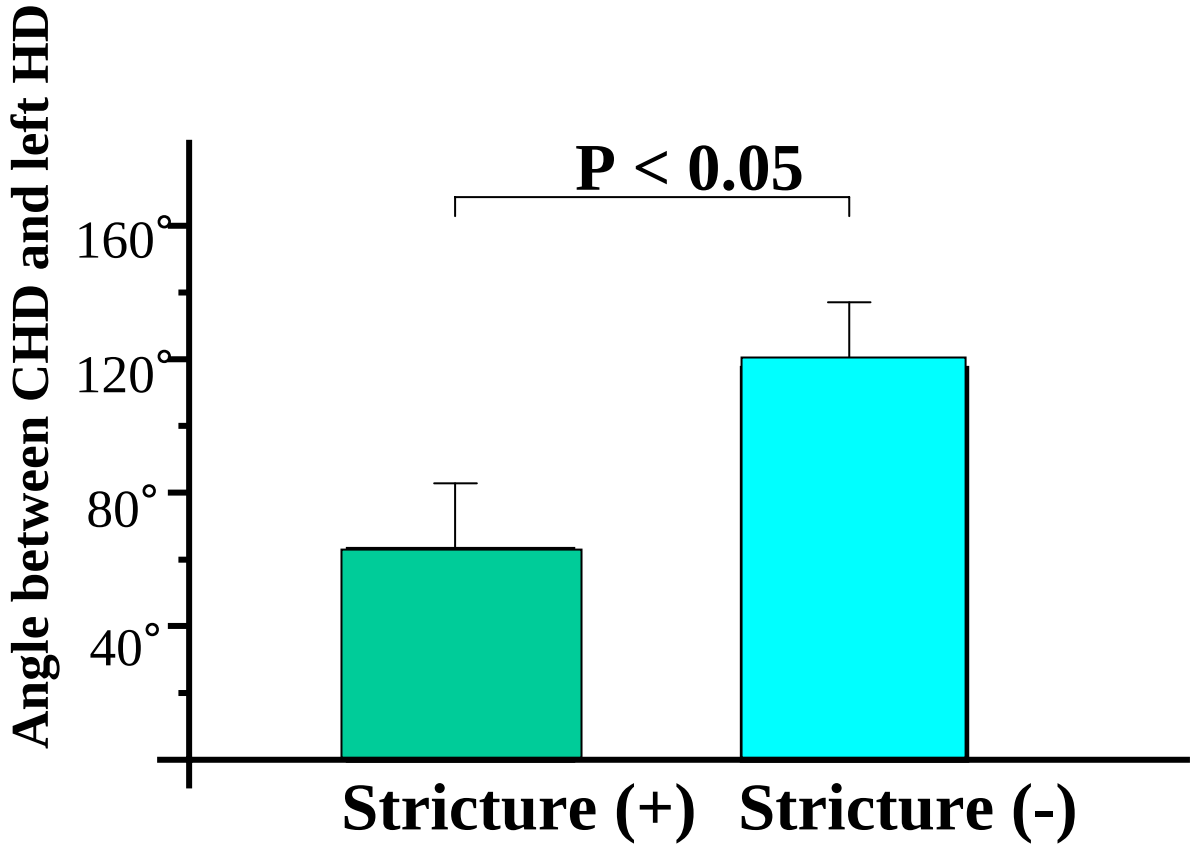






Hasegawa et al. Clinical Gastroenterology and Hepatology (in press)

Comparison of the Angles between the Donors with and without the Stricture



median angle: 62° vs 119° , p < 0.05

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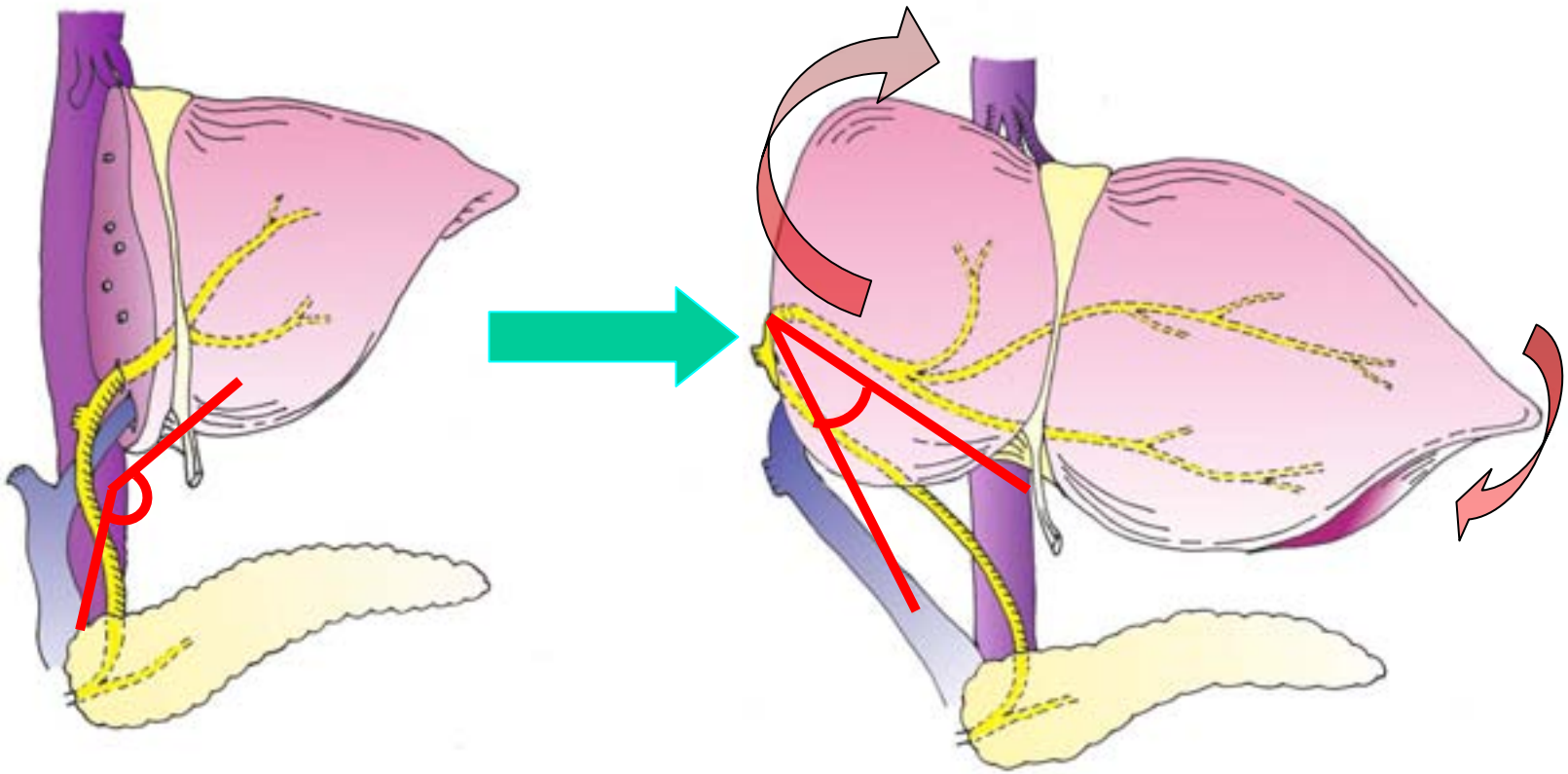
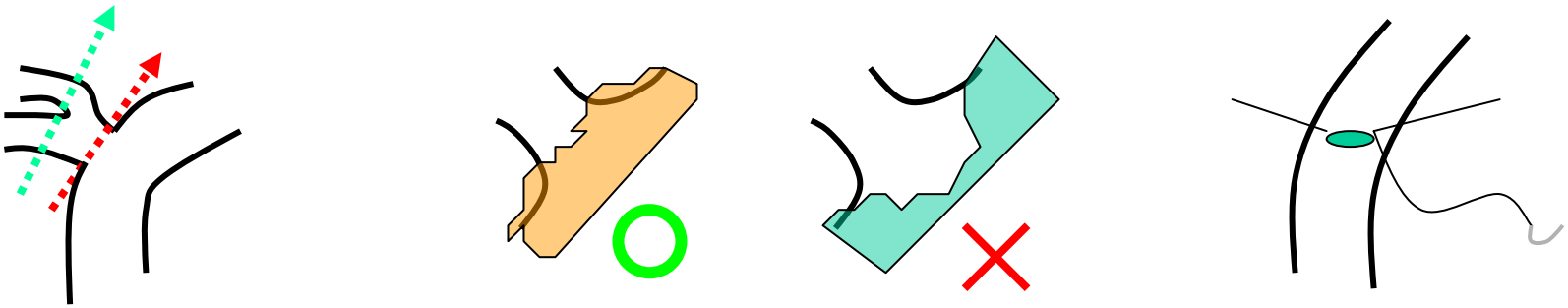
Anatomical Change of the Biliary System after Right Lobectomy



Hasegawa et al. Clinical Gastroenterology and Hepatology (in press)

Prevention of Biliary Complication in Right Lobe donor

- Keep enough length of the right hepatic duct for closure
- Do not skeltonize bifurcation
- Close the right hepatic duct horizontally
- Check leakage and stricture
  by cholangiography before abdominal closure



Prevention of Biliary Complication in Right Lobe donor

Incidence of leakage

Learning Curve

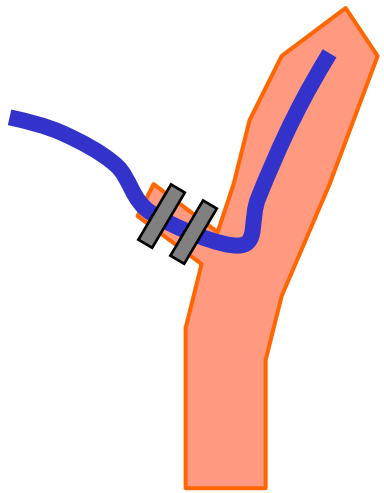
~ 2000: 2 - 3 / 10 donors

2001: 1 / 10 - 20 donors

2002: 1 / 20 - 30 donors

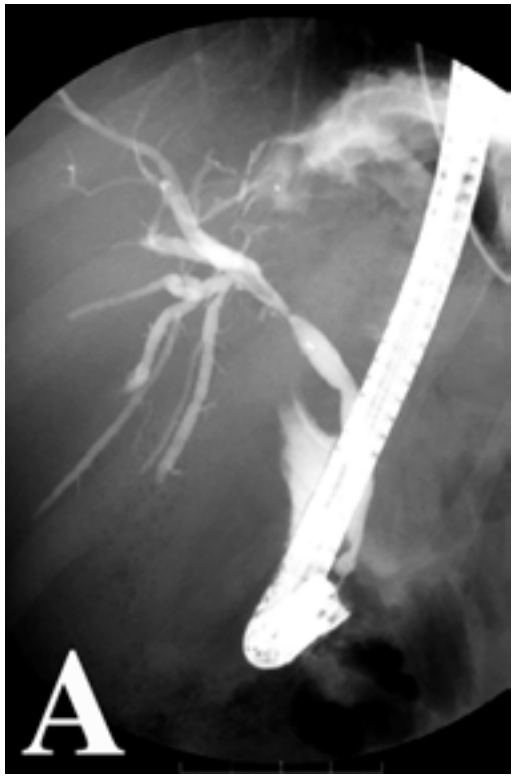
C drain for the hepatic duct

2002 May ~: 0 / 50 donors

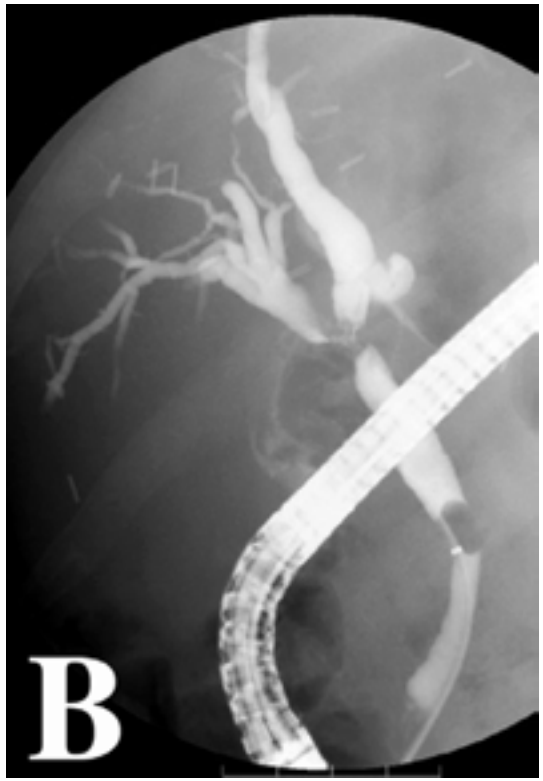



Biliary Complications
after Right Lobe Transplantation

Types of Cholangiogram of Biliary Stricture in Duct-to-Duct Anastomosis



Single type (5%)

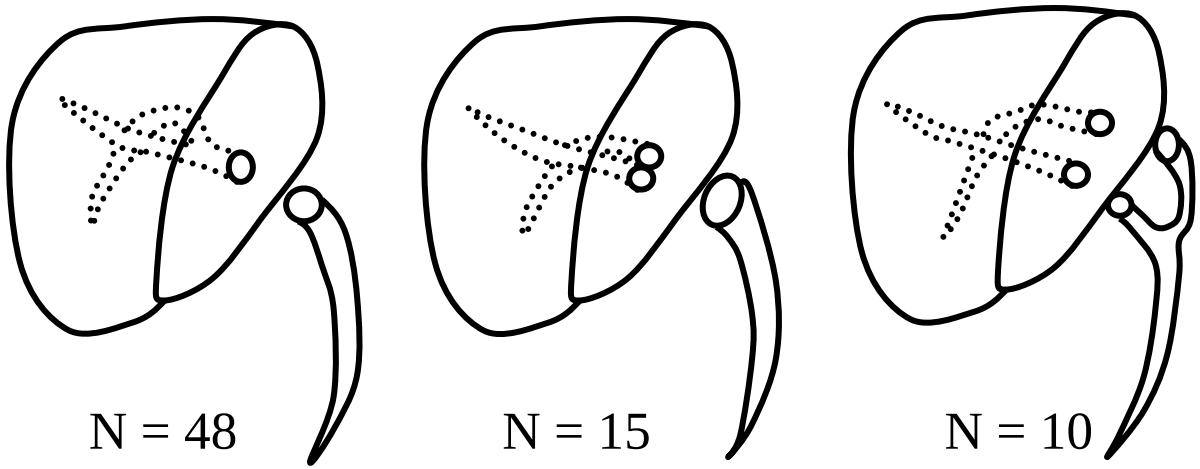


Forked type (90%)

Trident type (5%)

Hisatsune, Yazumi et al. Transplantation (in press)

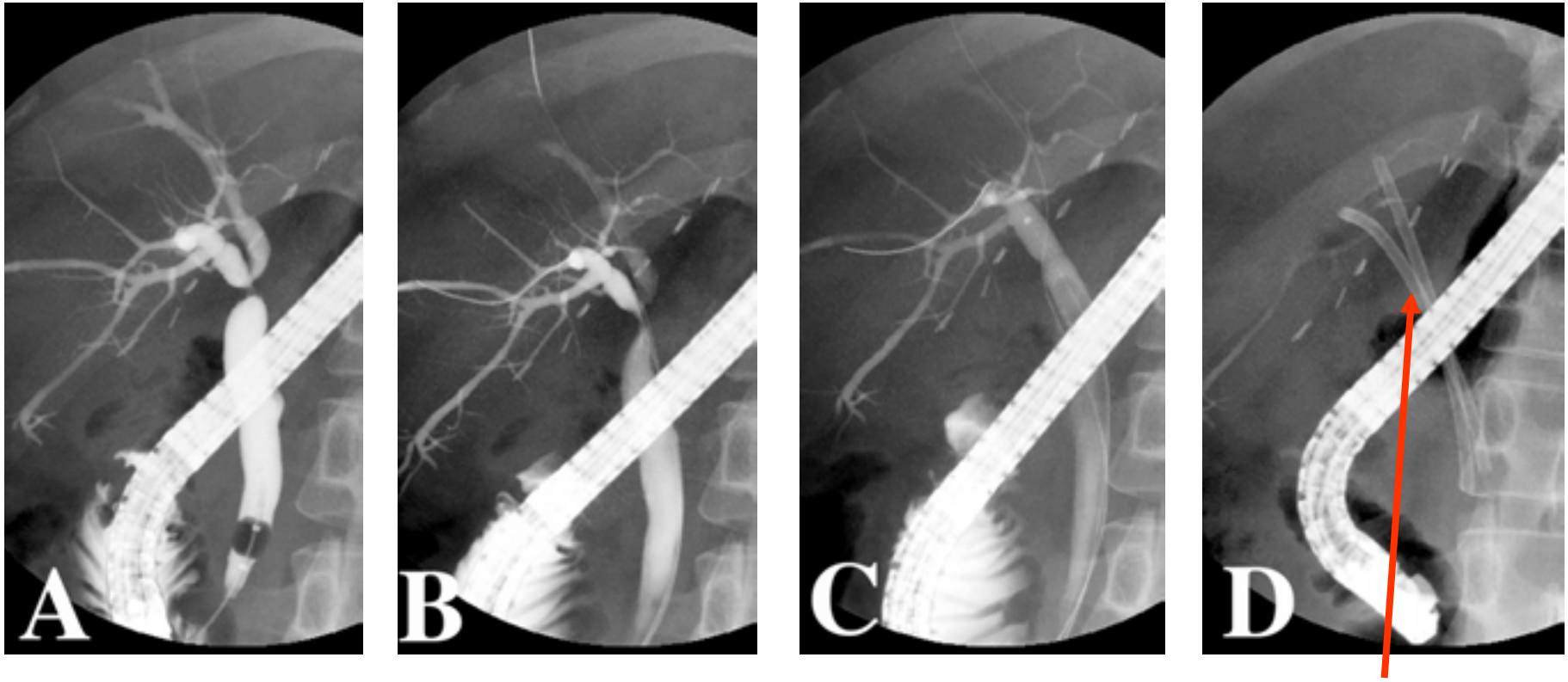
Relation between Anatomy and Stenosis



incidence	27%	27%	20%
Single type	1	0	0
Forked type	11	4	1
Trident type	1	0	0

Biliary Complications

Stent Insertion

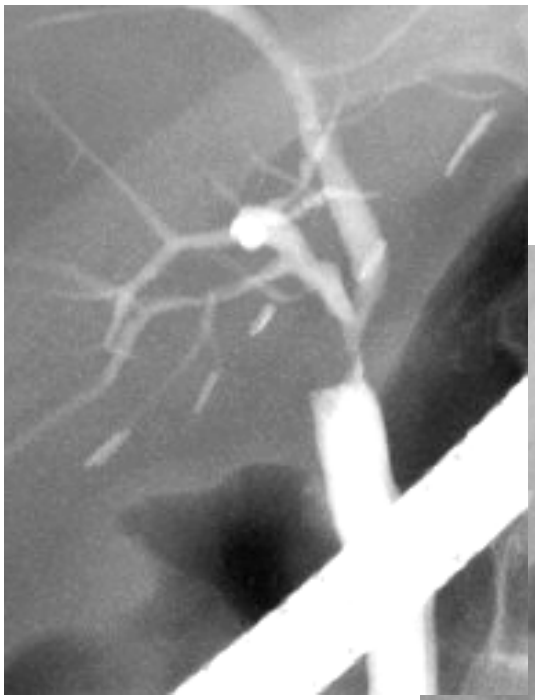


Balloon dilatation

stents

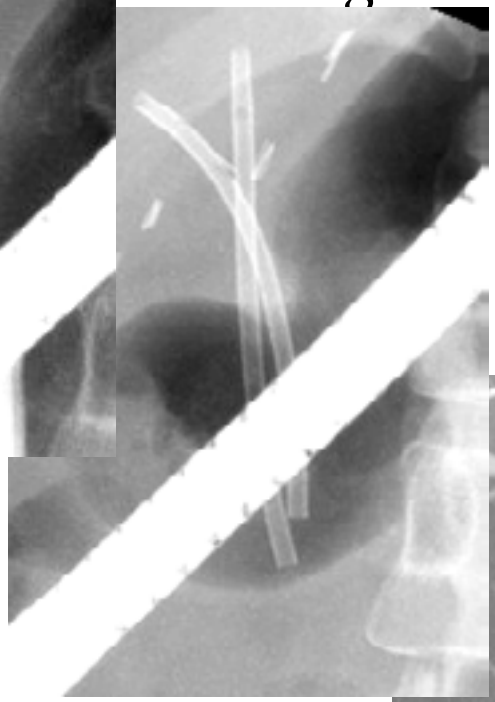
Hisatsune, Yazumi et al. Transplantation (in press)

Stents for Biliary Stenosis



stenosis

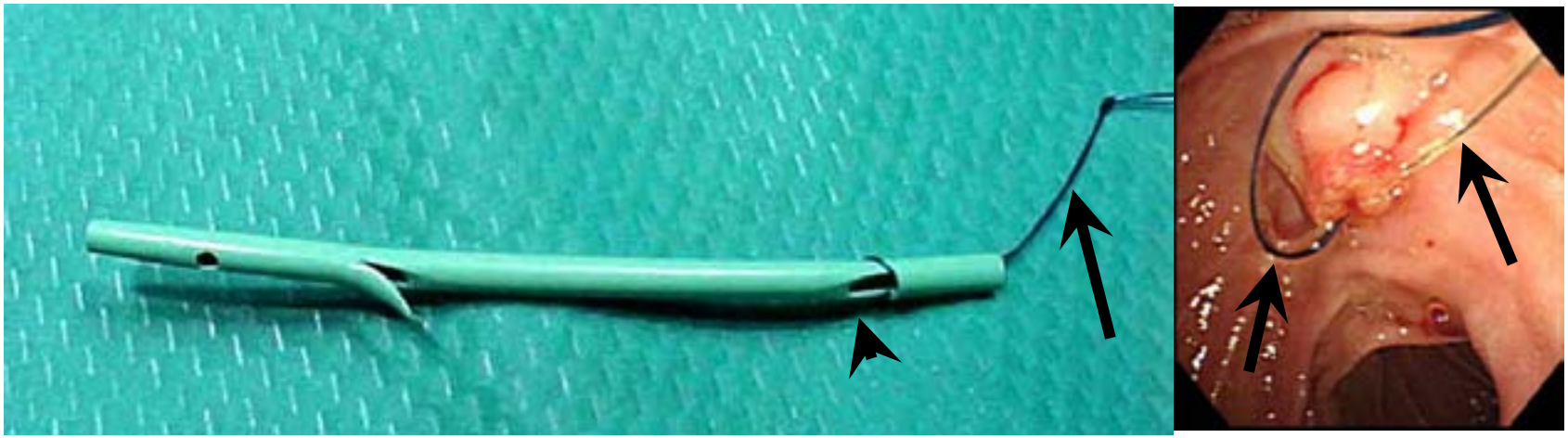
stenting



Stent dislocation
& re-stenting

Removal of stents
after 1-year-stenting

Inside-stent



7-10 Fr conventional plastic stent

- A stent stays above the sphinctor.
- A nylon thread is attached to distal side-hole (arrows) to aid removal of the stent.

Hisatsune, Yazumi et al. Transplantation (in press)

Biliary Anastomotic Complications in Hepatico-Jejunostomy

Egawa e al. World J Surg 2001;25:1300

- Over all incidence of biliary complication in 400 cases: 18%

- Risks for leaks
  - manner of stent usage
  - intra-pulmonary shunt
  - recipient gender

- Risks for stenosis
  - leaks
  - CMV diseases
  - hepatic artery complication
  - gender
  - Blood type incompatible transplantation >2y.o.

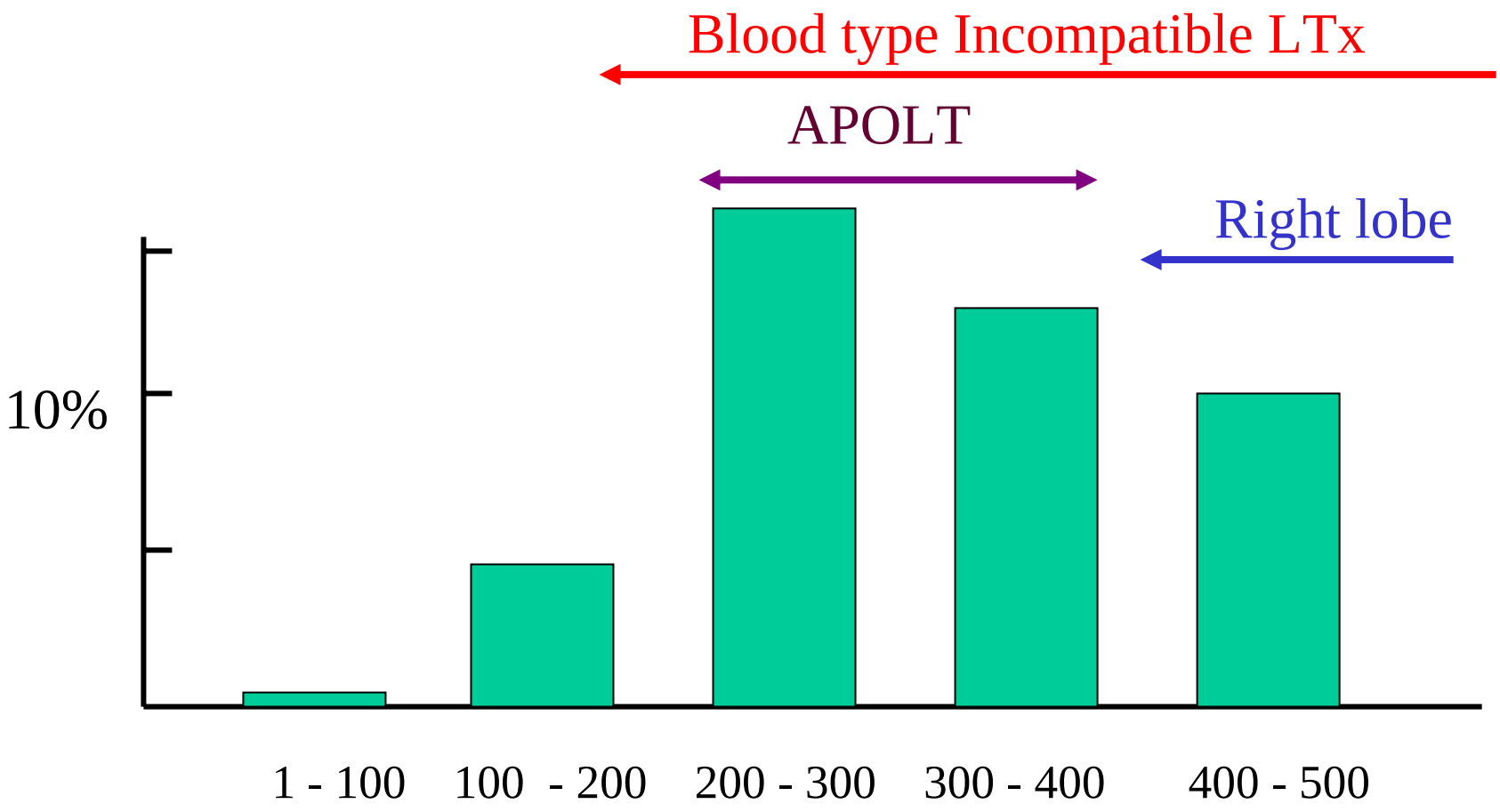
Biliary Anastomotic Complications in Hepatico-Jejunostomy

Graft type and Incidence in 500 cases (not published)
using intermittent suture with/without stents

	Right (52)	left (89)	lateral (29)	ext. lateral (35)	APOLT (28)
Leak	18%	17%	7 %	5 %	29 %
Stenosis	6 %	8 %	6 %	0 %	30 %

Biliary Anastomotic Complications in Hepatico-Jejunostomy

Learning curve : incidence of each 100 cases



Conclusions

- Anatomy of biliary system is often different from portal system at the hilum.
- We encountered special anatomies which we could not expect before operations and conquered them with surgical innovation.
- Secure donor safety first and cut the bile duct.