LIVING DONOR LIVER TRANSPLANT: MANAGING THE DONOR AND RECIPIENT POST TRANSPLANT

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Living Donor Liver Transplant (LDLT) Post-operative Management

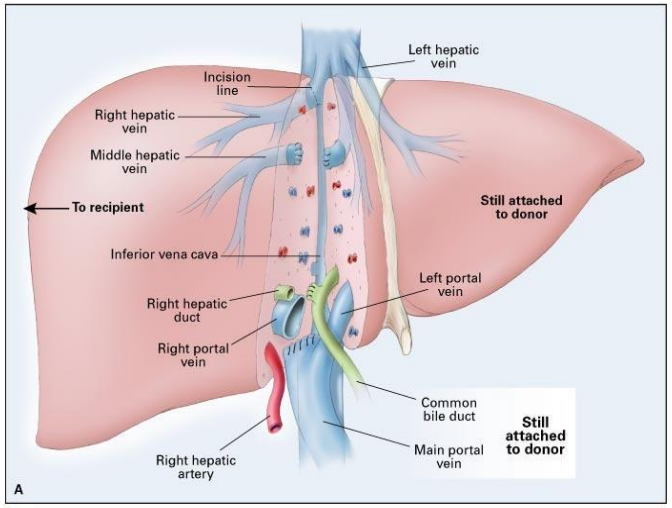
Stents

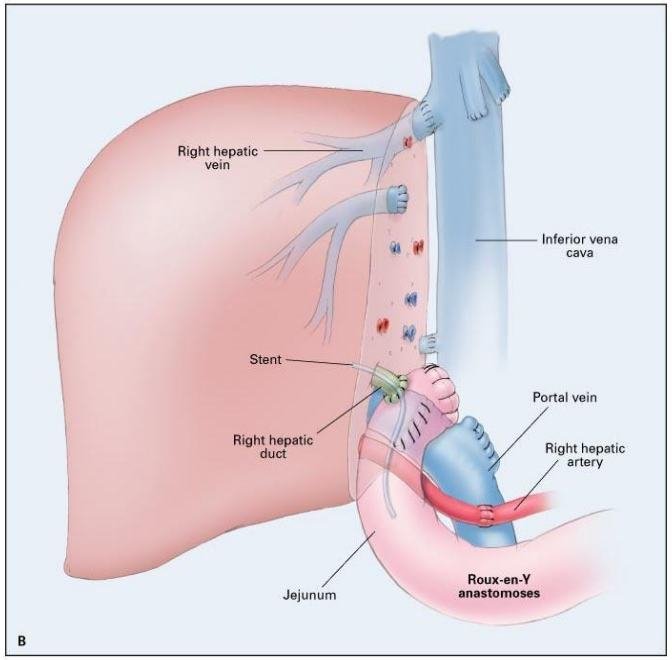
Drains

Donor Complications

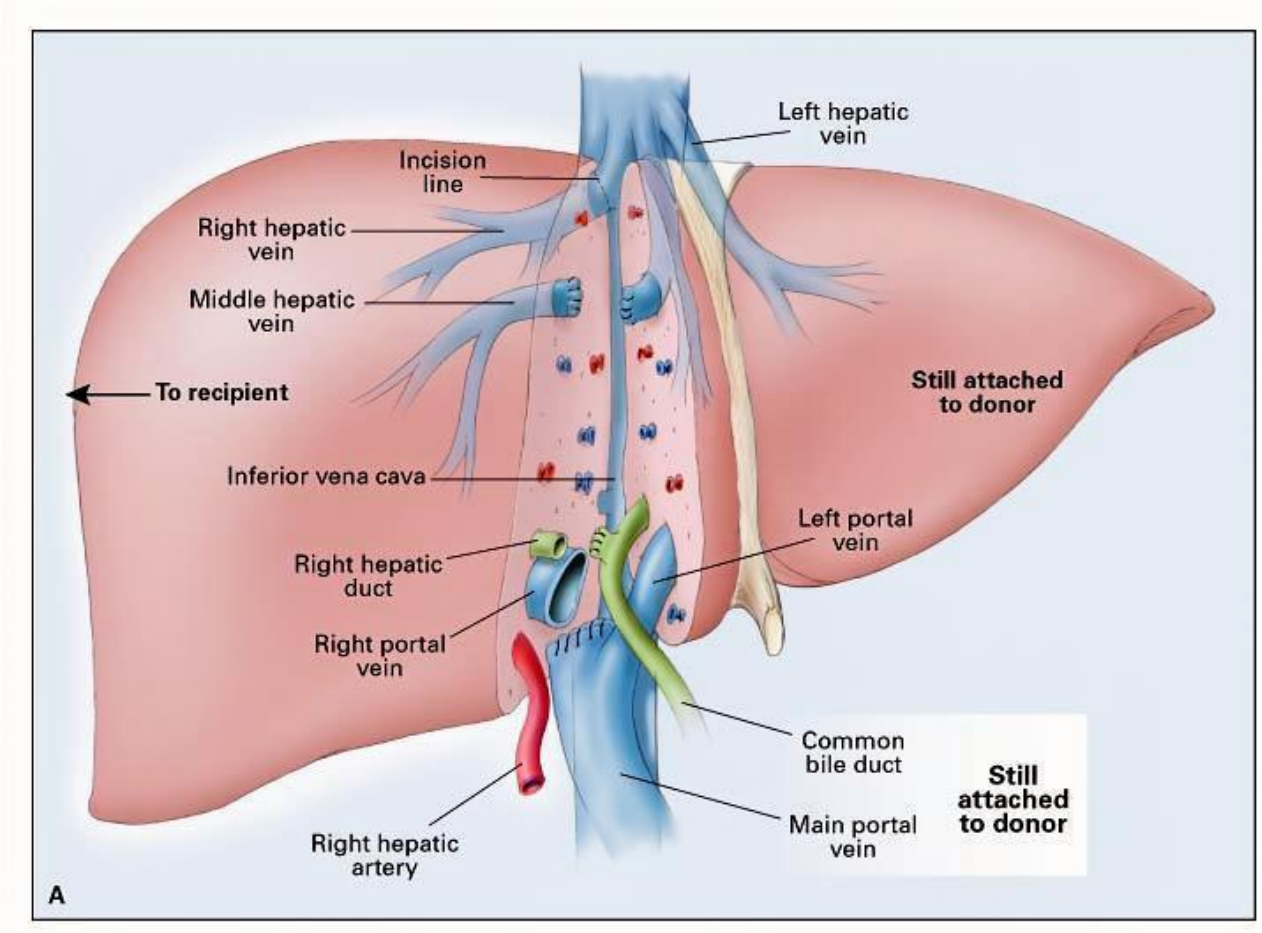
Imaging

Living Donor Liver Transplant



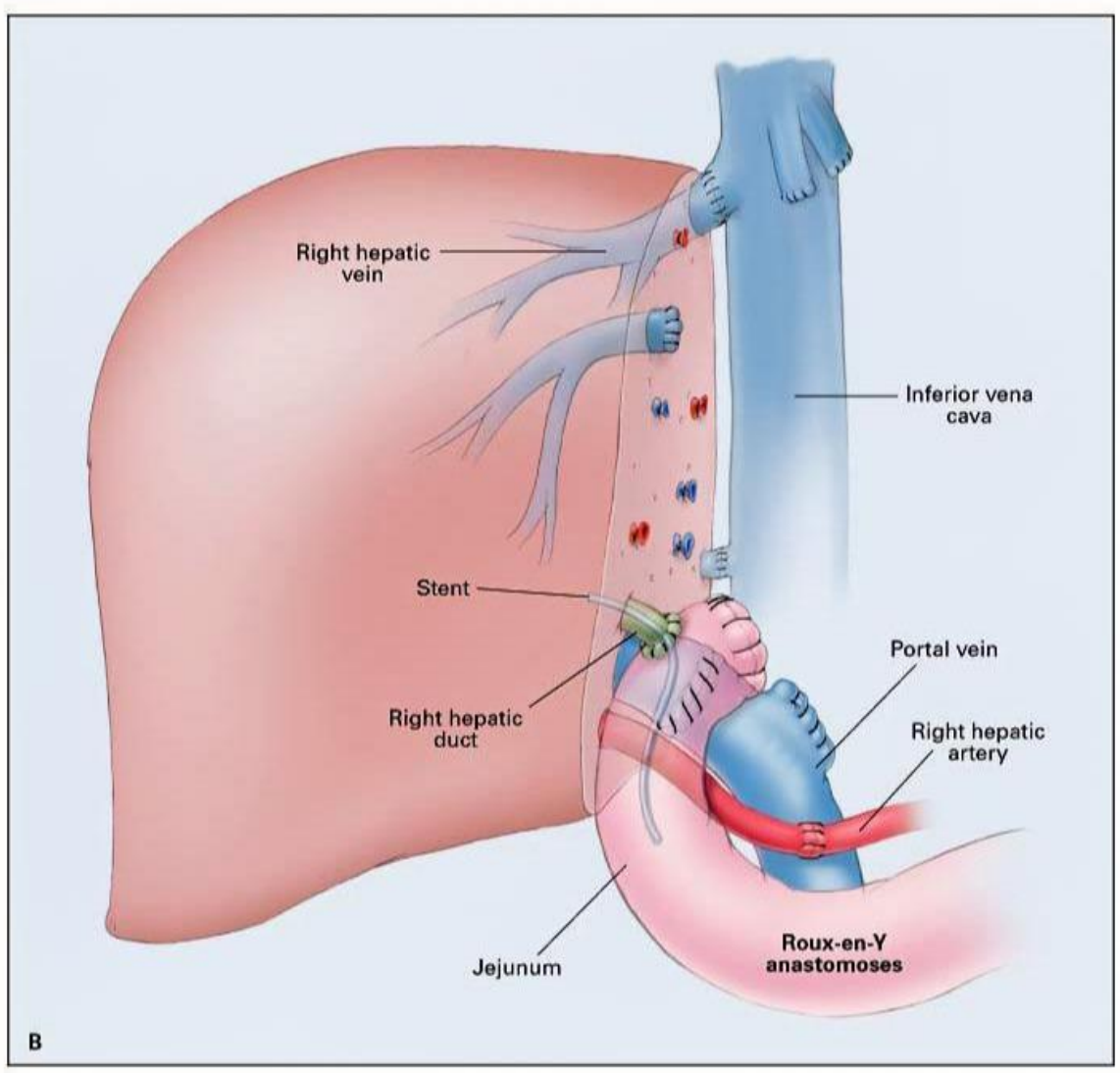


LDLT Donor



- Right, middle, and left hepatic veins draining into the inferior vena cava
- Right and left portal veins
- Right hepatic artery
- Right hepatic duct and common bile duct
- The transection line delineating the graft from the remnant liver

LDLT Recipient



Hepatic vein anastomosis: Donor's right hepatic vein to recipient's right-hepatic-vein remnant with caval extension

Portal vein anastomosis: Donor's right portal vein to recipient's portal vein

Arterial anastomosis: Donor's right hepatic artery to recipient's hepatic artery

Biliary reconstruction: Roux-en-Y hepaticojejunostomy (shown with internal stent)

Biliary Stents in LDLT

- Two main purposes
- Reduce biliary complications
- Maintain duct patency

Incidence of Biliary Complications

- Occurs in 15-32% of recipients
- Approximately 4% in donors

Refractory Cases

- Use covered retrievable metal stents

Alternative Drainage

- If EGD not feasible
- Percutaneous transhepatic biliary drainage (PTBD)

Biliary Stent Removal

- 3 months for prophylactically placed stents
- 4-6 months for therapeutic stents treating anastomotic strictures
- External stents may require two step removal
  - Partial withdrawal (several cm) under fluoroscopy to allow bile to begin draining through tract while stent stays partially in place.
  - Complete withdrawal (24-48 hours) to ensure no bile leak or peritonitis
- Internal stents (double-J ureteral stents placed transanastomotic and transsphincteric)
  - 43% pass spontaneously
  - 57% require EGD removal at 4-6 weeks

Early Removal Criteria

- At approximately 3 months if:
  - No complications
  - Normal cholangiogram findings

Therapeutic Stenting Protocol

- Stent exchanges performed every 3 months
- Continue up to 1 year depending on clinical course

Vascular Stents

- Portal vein stents (7-10 mm) used for:
  - Portal vein stenosis
  - Portal vein occlusion

Outcomes of Vascular Stenting

- Metallic stents demonstrate
  - High technical success (~100%)
  - Excellent long-term patency

Prophylactic Drain Placement

- Jackson-Pratt (JP) drains commonly placed
- Positioned near graft cut surface

Drain Removal

- Typically removed on postoperative day 5 in adult patients

Common Donor Complications

- Bacterial infections: 12%
- Biliary leaks: 3-9%
- Bleeding: 6%
- Incisional hernia: 6%
- Pleural effusion requiring intervention: 5%
- Wound infections: 3%
- Portal vein thrombosis (PVT): 2 %
- Intraabdominal abscess: 2%

Specific Surgical Complications

- Bile leakage occur in 9-14% donors
  - Overall biliary complications ≥ IIIa or higher (requires procedural intervention, intensive care, or resulting in death
  - Bile leak requiring intervention 1.3-3.3%
  - Biliary stricture 0.28-1.6%
  - Combined leak and stricture 0.24%

Specific Donor Surgical Complications…

- Bleeding 6%
  - Requiring intraabdominal reoperation 2-3%
- Portal vein thrombosis and inferior vena cava thrombosis are rare, but very serious complications
- Wound related complications 5.2%
  - Hernias 6%
  - Wound infection 3%

Specific Donor Surgical Complications…

- Respiratory complications 4.9%
  - Pleural effusions requiring intervention 5%
    - Atelectasis, pleural effusion, acute respiratory insufficiency, pneumonia, pneumothorax, pulmonary embolism
- Reoperation 2.2-4%
  - Hospital readmission rates 5.2-13%

Risk Factors for Bile Leaks

- Complex hilar anatomy
  - e.g., multiple hepatic arteries in graft
- Division margin < 5mm from main bile duct
- Increased intraoperative blood loss

Donor Postoperative Symptoms

- Incisional discomfort
- Intolerance to fatty meals
  - Cholecystectomy results in limited bile availability at time of meal

Imaging for Evaluation of Donor Abdominal Pain

- Doppler ultrasound
  - Used for routine surveillance, not problem solving
  - Operator-dependent; comparison studies may be limited
- CT abdomen and pelvis with IV contrast
  - Preferred initial study

Indications for CT Imaging

- Abnormal or inconclusive ultrasound
- Clinical signs
  - Pain
  - Fever
  - Abnormal laboratory findings
- Suspicion of serious complications:
  - Bile leak
  - Abscess
  - Pseudoaneurysm

Importance of IV Contrast

- IV contrast enhances detection of
  - Vascular complications
  - Active bleeding or hematoma
  - Abscesses and infected fluid collections (rim enhancement)
  - Hepatic perfusion abnormalities and ischemia
  - Biliary complications (especially with oral contrast)

CT Imaging Considerations

- Non-contrast CT is ~ 30% less accurate
- Dual-phase CT is not routinely necessary
- Additional non-contrast images provide minimal added value

Role of Oral Contrast

- Not routinely required
- May be useful when evaluating
  - Anastomotic leaks
  - Biliary-enteric fistula

Total & Living Liver Donor Transplants in US

Year	Total Transplants	Deceased Donor	Living Donor	LDLT %	References
2023	10,659	~10,050	~609 (5.7% adults, 14.6% pediatric)	~5.7%	[1]
2022	9,527	8,924 (93.7%)	603 (6.3%)	6.3%	[2]
2021	9,234	8,665 (93.8%)	569 (6.2%)	6.2%	[3]
2020	8,906	~8,400	~500	~5.6%	[4]
2019	8,896	8,372	524	5.9%	[5]

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