

Comprehensive Evaluation of the Potential Liver Donor: Review of Process and Best Practices

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14th Annual Living Donation Conference

Presented by the American Foundation for Donation and Transplantation

Disclosures

- No financial disclosures
- This talk was developed with the help of my amazing transplant team



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Question

How many of you are either starting a liver program or are new to role?



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Objectives

1. Review background of live donor liver transplant (LDLT)
2. Benefits of LDLT
3. Review components of a living donor evaluation
4. Get as excited about living liver donation as I am



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Background

- Introduced to address the shortage of organs available with deceased donor transplant
- Began with pediatric LDLT
- Almost 9,000 of live donor liver transplants have been performed nationwide
- Growing in popularity but only accounts for approximately 5% of transplants performed yearly
- Approximately 50 large and small programs in the country



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OPTN. SRTR. 2022

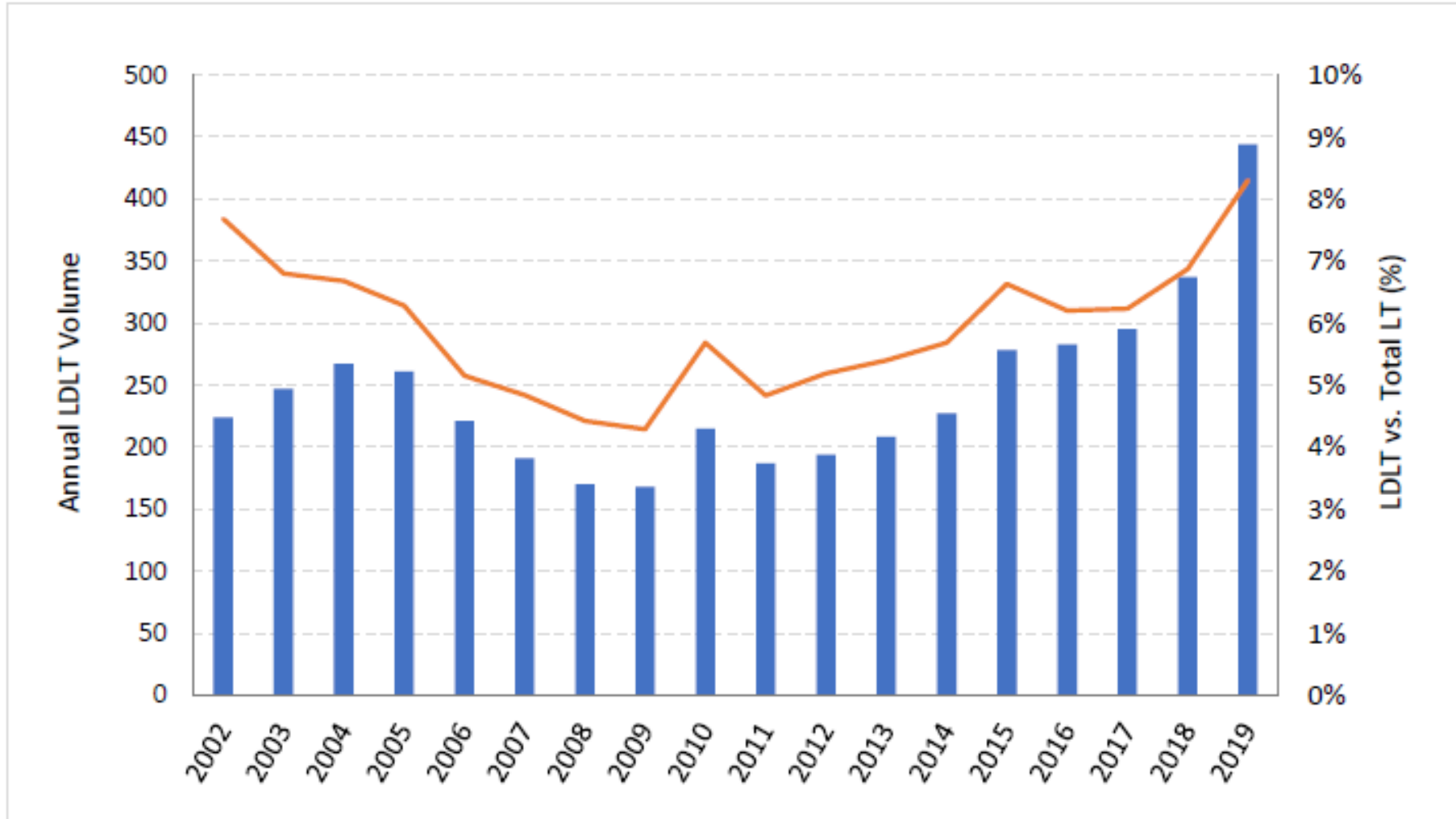


Figure 1. Living donor liver transplants performed annually in the United States (2002–2019)



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Benefits to LDLT

- Offers candidates excellent long-term outcomes
- Transplanted faster
- Those not represented by MELD have access to transplant
- Lower rates of recipient mortality compared to staying on the waitlist
- Optimize recipient for the time of transplant
- Allows for transplantation before additional decompensations occur



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Can LDLT Ever Be Pursued with Acceptable Risk to the Donor?

The Vancouver Forum: established practice principles for LDLT

- LDLT should only be performed if the risk to the donor is justified by the expectation of an acceptable outcome in the recipient.
- Indications for LDLT should be the same as those established for DDLT
- LDLT should offer an overall advantage to the recipient when compared to waiting



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Pruett et al. The Vancouver Forum. Transplantation. 2006.
Barr ML et al. The Vancouver Forum. Transplantation. 2006.

Double Equipoise

- Described by the balance between the recipient's survival benefit and the probability of mortality for the donor
- Balance the risk of the donor to the benefit of the recipient
- Careful selection through a thorough donor evaluation

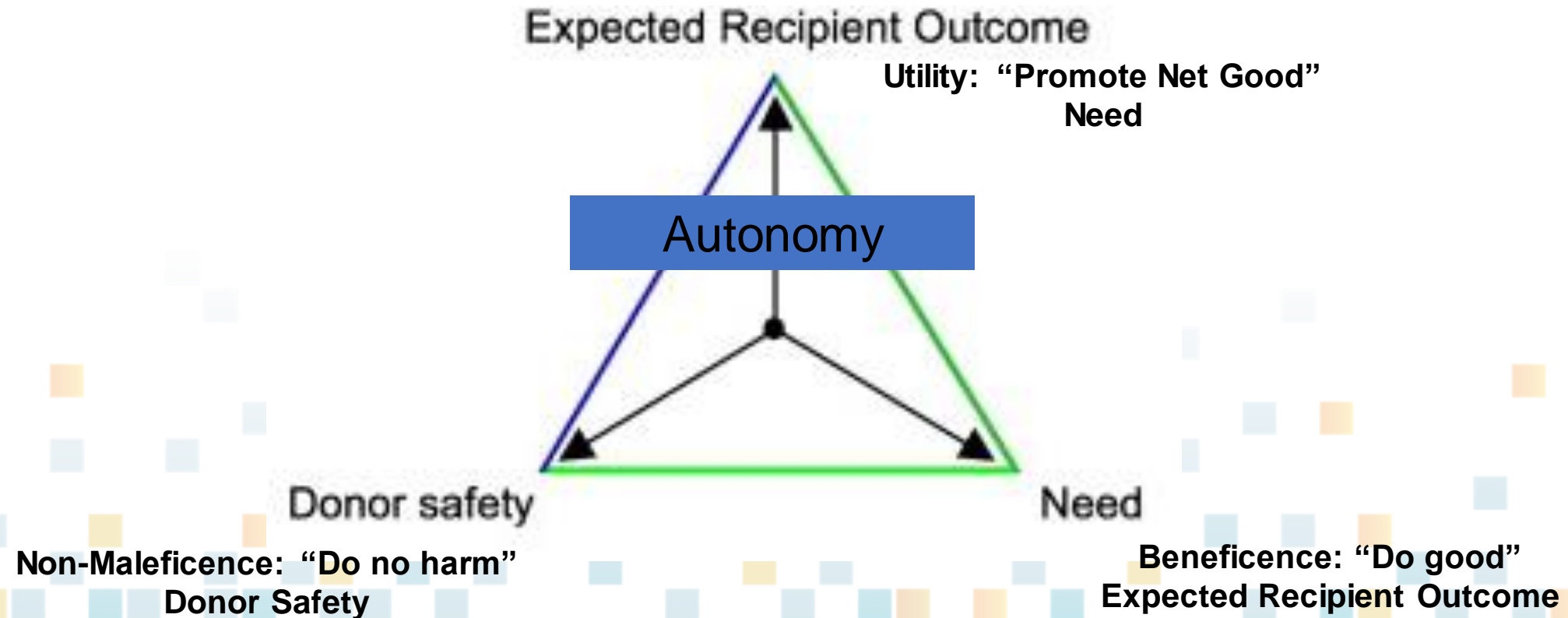


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Pruett et al. The Vancouver Forum. Transplantation. 2006.
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Ethical Principles



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Recipient is Listed for Transplant

Health History Questionnaire

Screening Blood Work

Evaluation: Meet the Team

The donor may withdraw from the evaluation process at any time.

Physical Exam
EKG and Chest X-Ray
Further Laboratory Testing
Imaging of the Liver with CT and MRI
CCTA and Echocardiogram (age/risk)

Living Donor Coordinator
Transplant Surgeon & Hepatologist
Social Worker - Independent Living Donor Advocate
Psychologist
Dietitian

Additional Testing and Consults Depend on Individual Risk Factors

Final decision by the Transplant Team



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Medical Evaluation

- Medical evaluation should:
 - Assess general health of the donor
 - Assess compatibility of the donor to the recipient
 - Screen donor for conditions that increase donor's surgical risk
 - Perform tests to identify potential for transmission of diseases

There is a lack of standardization in this country. Recent survey conducted by University of Colorado team, led by Dr. Whitney Jackson, to evaluate the practice patterns of all active live donor liver transplant programs in the country



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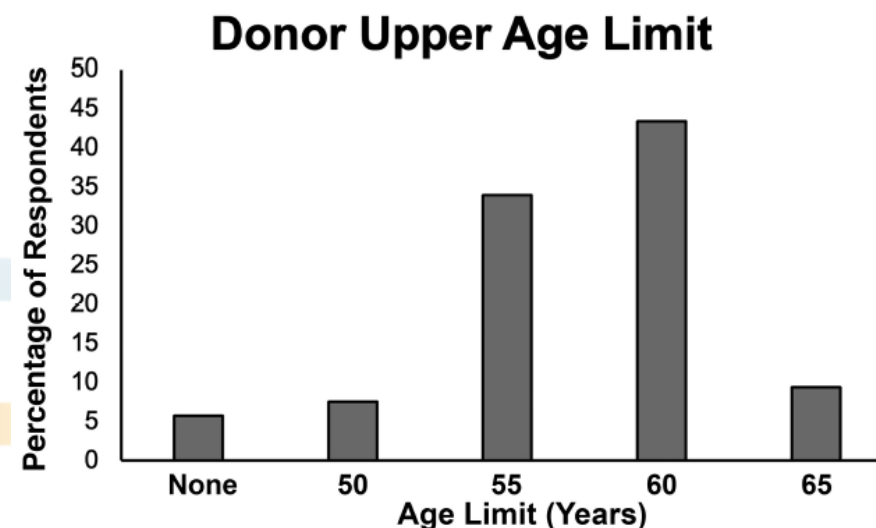
HRSA. OPTN. 2006

Medical Evaluation

Components to Consider

What should be the age cut-off?

- Lower age of 18 due to concerns surrounding maturity and ability to give informed consent
- 75% of centers use upper age limit of 55-60



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Jackson et al. Liver Transplantation. 2022.
Gazala et al. Annual Review of Medicine. 2019

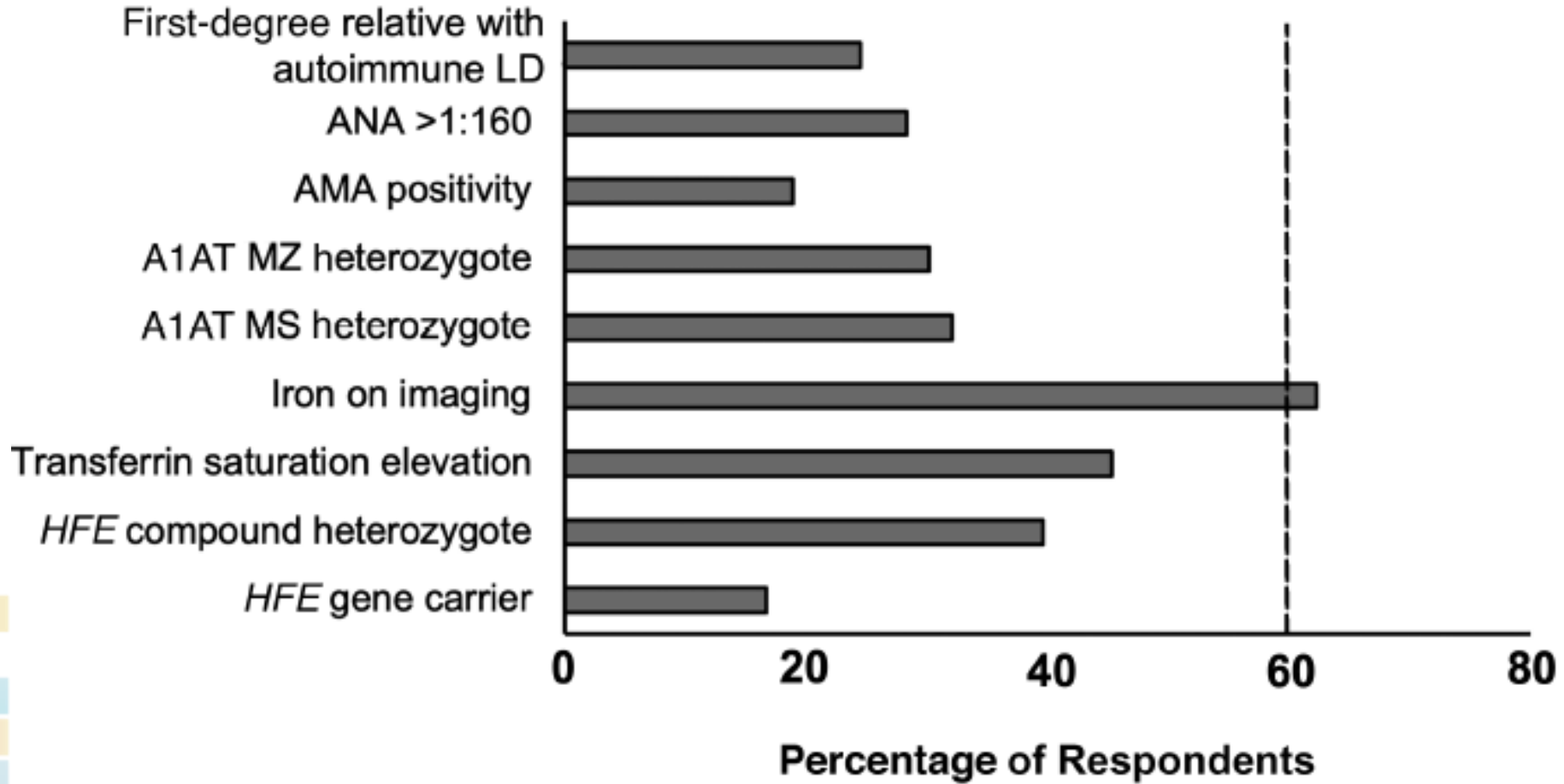
Medical Evaluation

When should a liver biopsy be performed?

- Most centers have a protocol for performing pre donation biopsy
 - Steatosis on imaging (10% often a trigger)
 - Steatosis assessment
 - How much is too much?
 - Elevated LFTs
 - BMI threshold
 - Metabolic risk factors
 - Other indications for biopsy



Other Indications for a Liver Biopsy



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Jackson et al. Liver Transplantation. 2022.

Medical Evaluation

Our Center Experience

		Indications (N=92)
Protocol	BMI \geq 28 kg/m ²	30
	Positive ANA	20
	1° Relative with AILD	14
	A1AT Heterozygote	9
	Abnormal Liver Enzymes	5
	Steatosis on Imaging	8
Misc.	Abnormal Imaging	2
	HBcAb	2
	HFE Heterozygote	1
	Low ceruloplasmin + Abnormal 24 hour urine	1

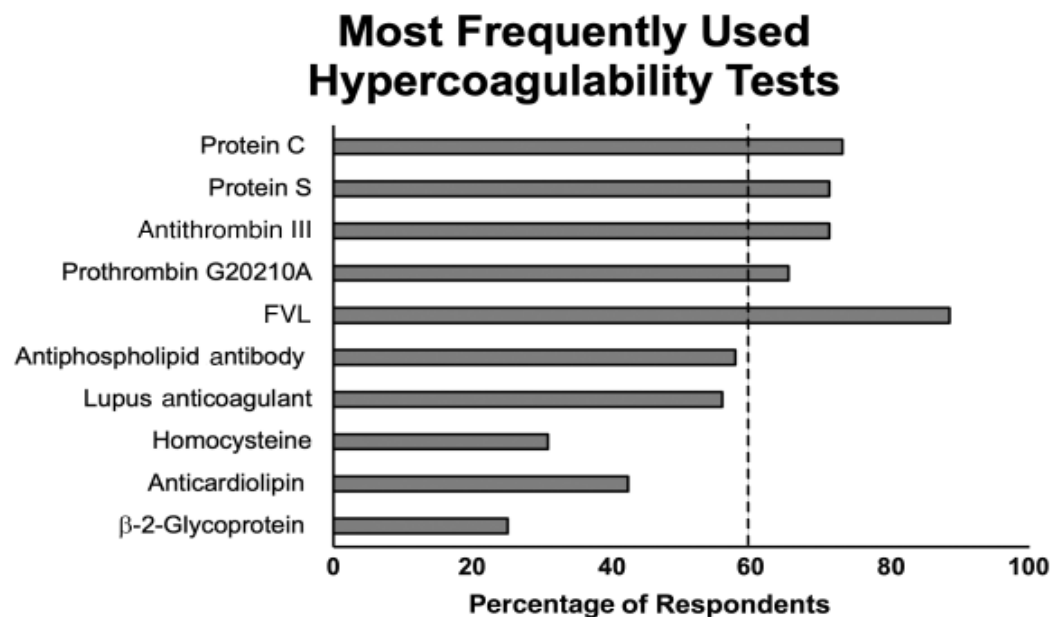
Indication	Frequency of Rule Out	Pathological Finding
BMI	2/21 (9.5%)	Non-specific hepatitis
		Drug induced injury
BMI with Steatosis	1/5 (20%)	Steatohepatitis
BMI with \uparrow LFTs	2/2 (100%)	Steatohepatitis
ANA	3/20 (15%)	Thick walled hepatic arterioles
		Non-specific portal inflammation/periportal hemosiderosis
		Minimally active lobular hepatitis
\uparrow LFTs (normal BMI)	2/3 (66%)	Steatohepatitis Mild acute hepatitis w/focal lymphocytic cholangitis
Steatosis on imaging (normal BMI)	1/3 (33%)	Steatosis (20%)



Medical Evaluation

Should we screen for venous thromboembolism (VTE)?

- Large programs report having protocols for VTE



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Jackson et al. Liver Transplantation. 2022.

Medical Evaluation

How should we assess cardiovascular status?

- Almost all centers have a protocol to evaluate cardiovascular disease risk (CVD)
- Based on risk factors
 1. Ischemic Evaluation
 - Stress test
 - Cardiac computed tomography (CT) angiogram
 2. Structural assessment
 - TTE
 3. Cardiology Consult



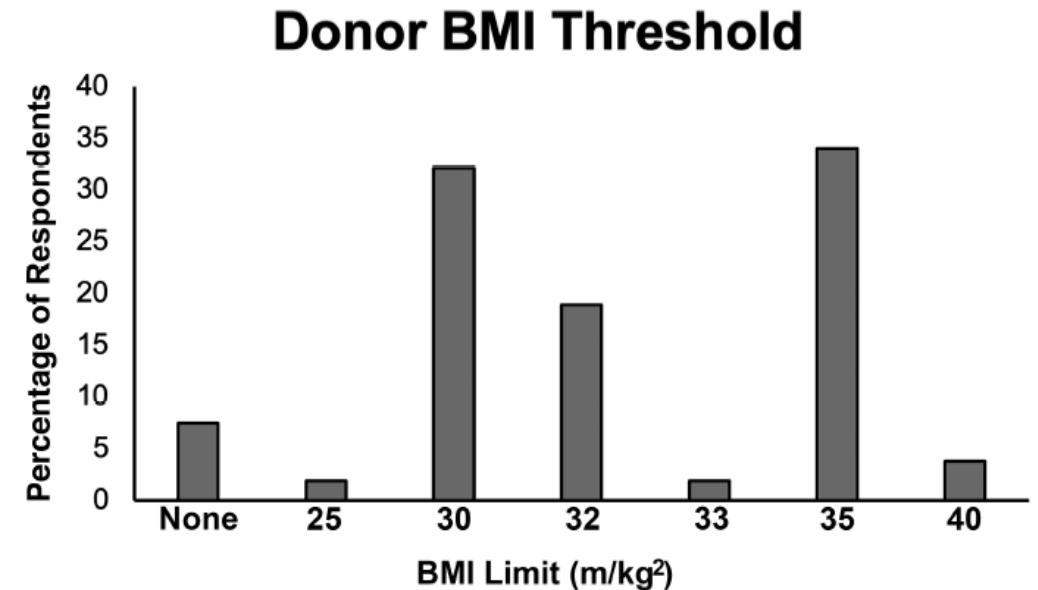
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Medical Evaluation

What should be the maximum allowable BMI?

- 92% of centers had a max BMI
- Median BMI 32
- Why is there a max?



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Medical Evaluation

What else should we screen for?

- Autoimmune Markers
 - Most centers routinely assess for autoimmune diseases
 - ANA
 - AMA
 - SMA
- Hereditary Markers
 - Alpha-1-antitrypsin
 - Hereditary hemochromatosis
 - Wilson's disease



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Medical Evaluation

- Transmissible Diseases
 - CMV
 - HIV
 - Hepatitis B
 - Hepatitis C
 - Syphilis
- Endemic Risk
 - Unique to your region



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Surgical Evaluation

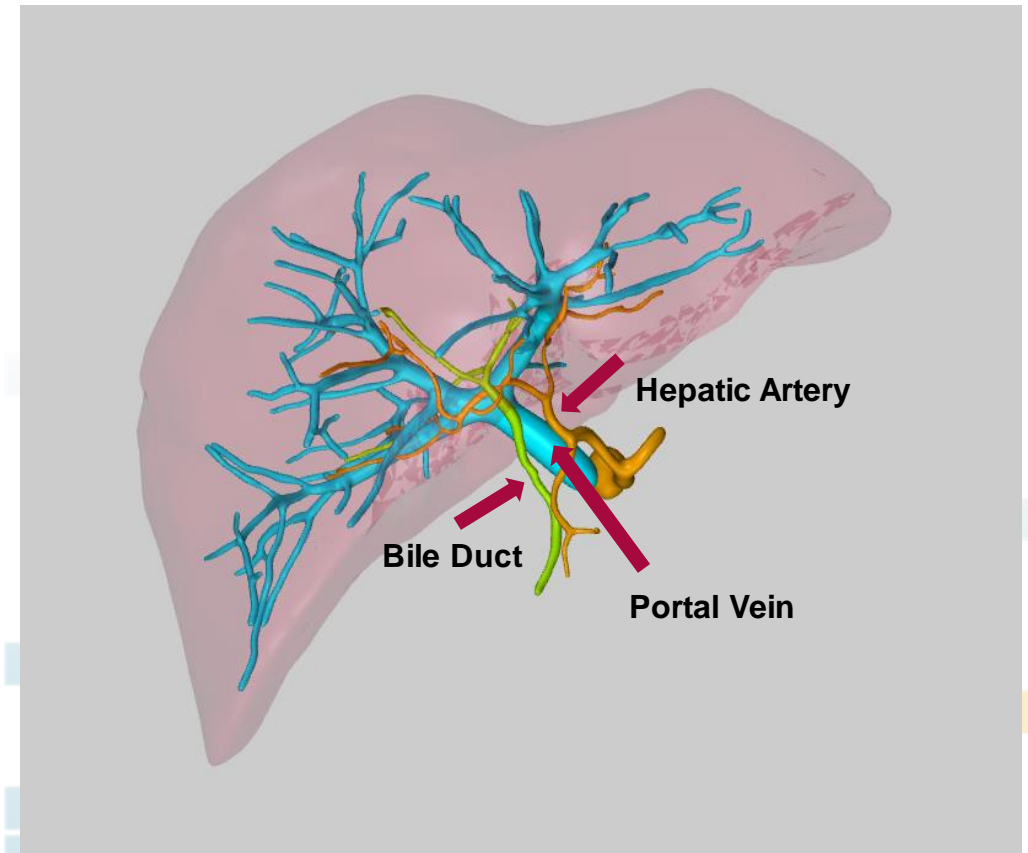
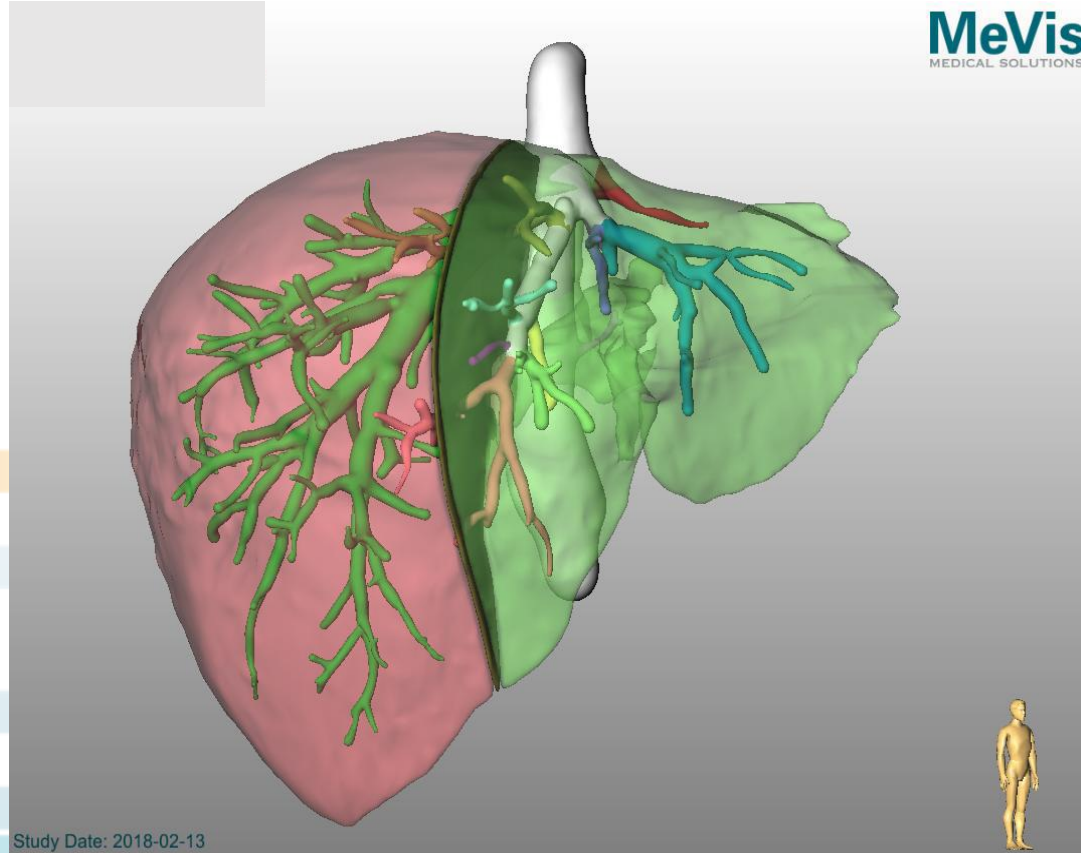
- Surgical history
 - History of abdominal surgeries
- Imaging studies
 - CT scan
 - Liver volumes
 - Blood vessel anatomy
 - MRCP
 - Biliary Anatomy
 - 3D Imaging
 - Mevis



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Anatomical Considerations in Selecting the Donor-Recipient Pair



Surgical Evaluation

- Graft weight-Body Weight Ratio (GWBWR)
 - 0.8% graft minimum
 - 1.0% ideal
 - Example: 80kg recip. We want an 800g right lobe.
- Other factors to consider for graft size:
 - How sick is the recipient (portal hypertension)?
 - Does the graft contain fat?
- Minimize risk for donor. Maximize benefit for recipient
- **Size is always a balance between donor risk and recipient need**

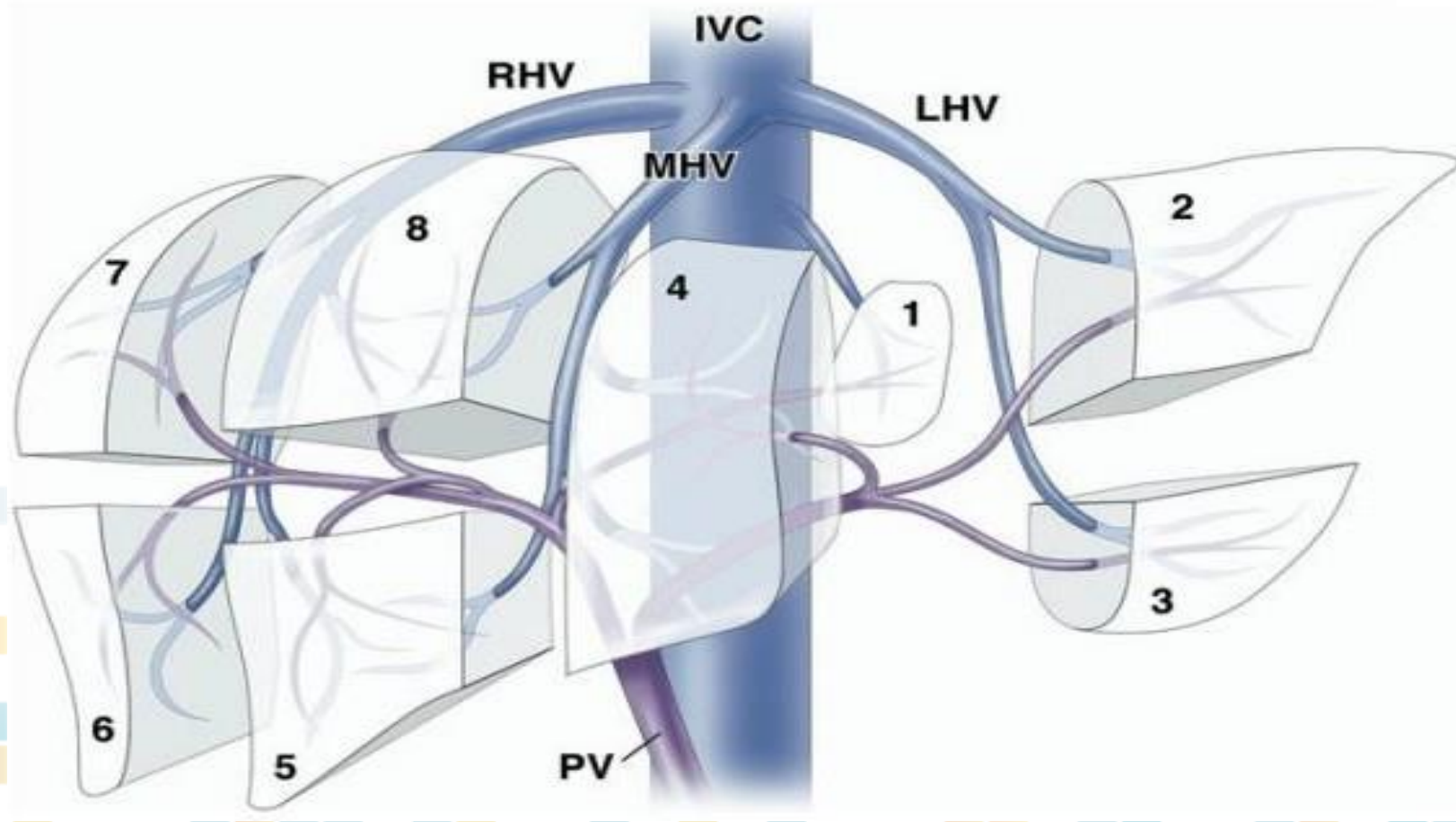


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Kiuchi T et al. Transplantation. 1999.
Ben-Haim et al. Liver Transplantation. 2001.

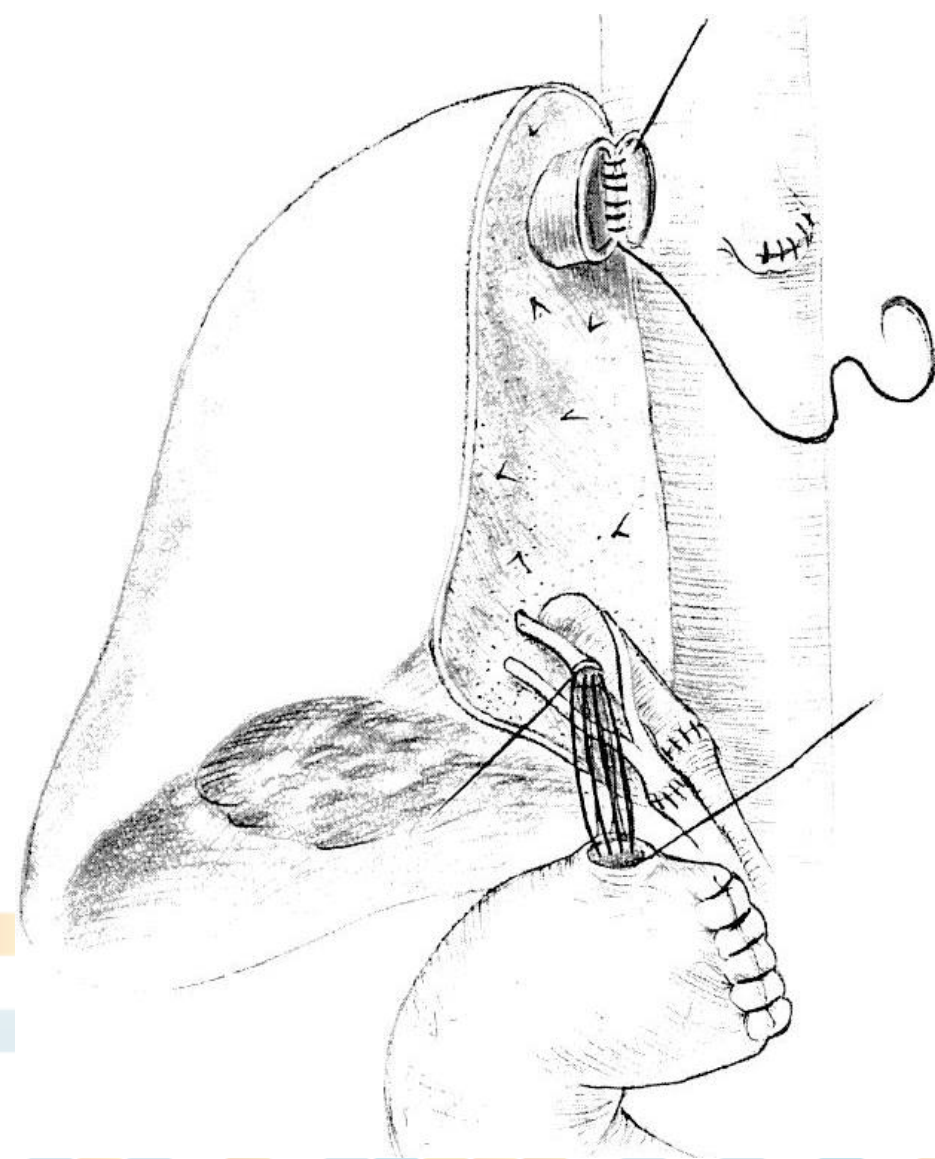
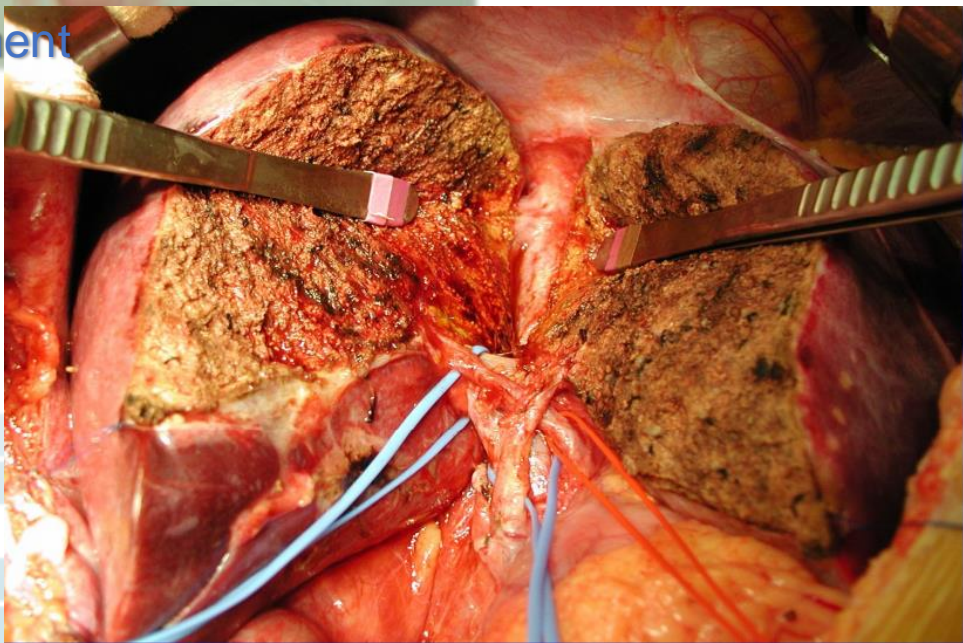
The Surgery



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Right Lobe Procurement



Right Lobe Implantation



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Mortality and Morbidity

The debate revolves around how much risk is acceptable for a donor

Mortality

- A2ALL data (through 2013) reported donor mortality rate of 1 in 200
- SRTR report summarizes 2016-2020
 - Total number of LDLTs: 2128
- Major centers in US broadly quoting mortality risk \approx 1 in 500

Cause	0-30 days	31-90 days	91-365 days
Suicide	0	0	0
Accident/homicide	0	0	0
Medical	1	0	0
Cancer	0	0	0
Unknown	0	0	0
TOTAL	1	0	0



Mortality and Morbidity

Morbidity

- Approximately 30 - 40% of donors will experience an early complication
- Only 10-15% of those complications will require considerable intervention
- Major vs. Minor complications



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Ladner DP et al. J Hepatol. 2015
Olthoff KM et al. Liver Transplantation. 2015
Trotter JF et al. Transplantation. 2007.
Sotiropoulos GC et al. Annals of Surgery. 2011

Psychological Evaluation

- Evaluation by a psychiatrist or psychologist
- Review psychological issues that may complicate a donor's recovery
- Attempt to identify factors that warrant educational or therapeutic intervention prior to donation
- Determine ability to make informed decision



Psychological Evaluation

- Psychological testing
 - Provides objective data
 1. Personality Assessment Inventory (PAI)
 - Screens for psychopathology
 - Measures somatic concerns
 2. Millon Behavioral Health Diagnostic
 - Focuses on coping strategies and orientation to health
 - Used in kidney donors
- Interview with donor and provider to determine risk



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Psychological Evaluation

Case Study

- 25 year old female, works as an ICU RN at a local hospital
- Reports history of anxiety
- Medications included bupropion 75mg daily
- Given PAI testing
- Anxiety-related disorders scale above level of significance (LOS)
- Obsessive-compulsive subscale also above LOS



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Psychological Evaluation

- Psychologist reported she described a number of experiences consistent with and suggestive of obsessive compulsive disorder (OCD)
- She was referred for local psychiatric consultation and exposure therapy
- Recommended she start SSRI therapy with 6 weeks of treatment before proceeding with donation
- Received consult service during the index hospitalization for donation
- Donor reported at all subsequent follow ups that she felt those early interventions was the reason for a successful post donation course.
- Has continued her therapy and has a “much clearer sense of her OCD symptoms” and has been able to manage her compulsions.



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Social Evaluation

- Eval usually performed by a licensed clinical social worker (LCSW)
- Special emphasis on:
 - Employment
 - Health insurance status
 - Living arrangements
 - Social instability
 - Motivation for donation
 - Coping strategies



Independent Living Donor Advocate

- Functions Independently from the recipient's transplant team
- Can be physician, chaplain, often times a social worker
- Explains and supports the rights as a donor
- Assure the donor is willing to donate without feeling pressure
- Assess that the donor understands the components of informed consent
- Remind the donor they can decide **not** to donate at any time



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American Society of Transplantation

Summary

- We know there is a shortage of deceased organs in this country. While living donation is increasing, it still only represents a small percentage of transplants performed every year.
- LDLT offers excellent outcomes for recipients while demonstrating justifiable risk to the donor.
- Evaluation of a potential living donor must be a careful consideration from the multi-disciplinary team.

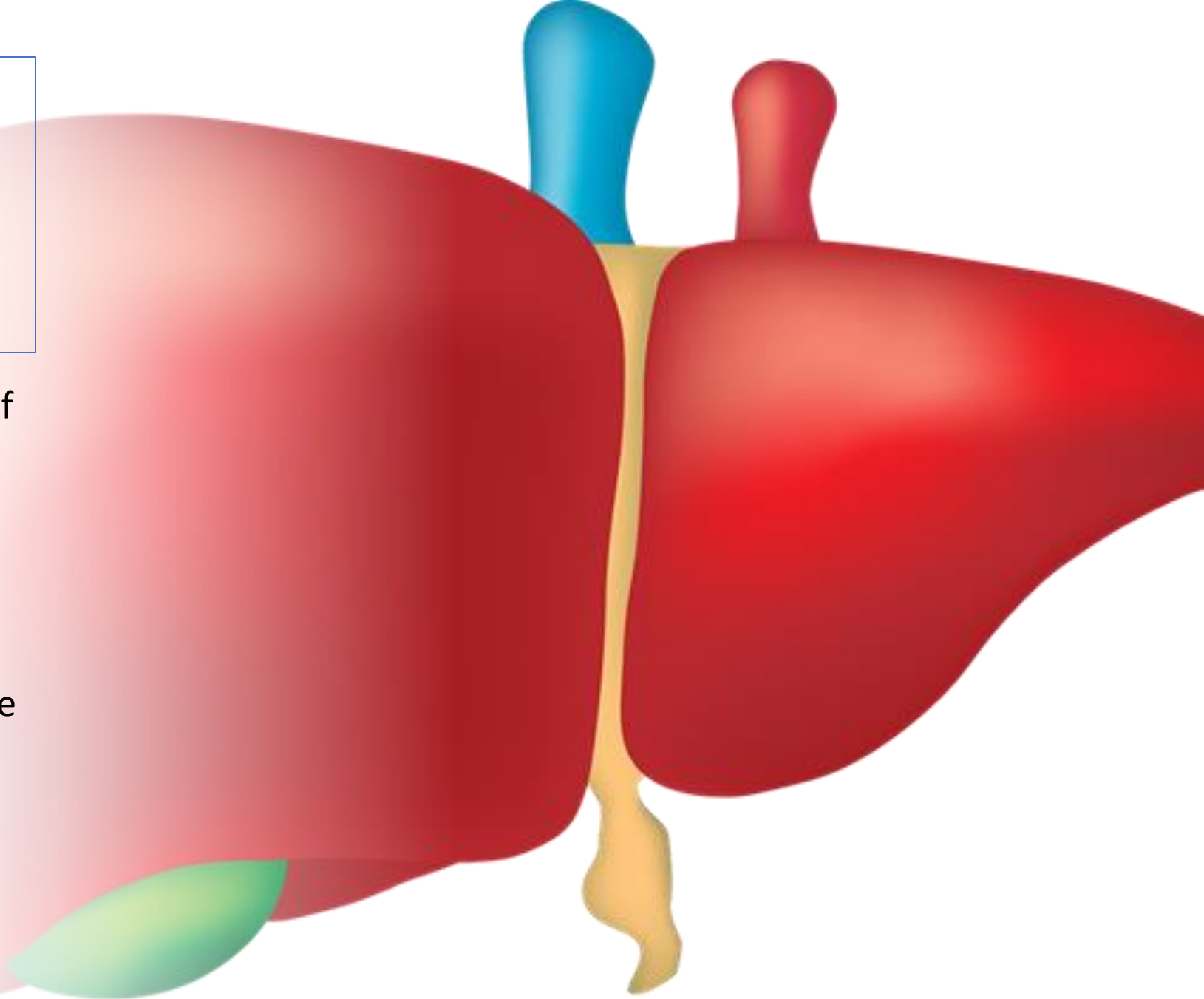


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Conclusion

Living donation helps thousands of recipients get transplanted every year that could otherwise die on the liver transplant list. Through thoughtful and thorough evaluation, we can safely perform these living donor surgeries with outstanding outcomes for both the donor and recipient.



Aaron and Manny



Jeremy and Joel

Claire and Peri



Dr Hillary Yaffe



Lindsay Pratt, PAC

Session Survey

Jaime Cisek, RN, BSN | April 19th 2:00 PM-2:45 PM



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