NEW YORK SOCIETY FOR GASTROENTEROLOGY & ENDOSCOPY
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NEW YORK COURSE
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Update in Liver Transplantation

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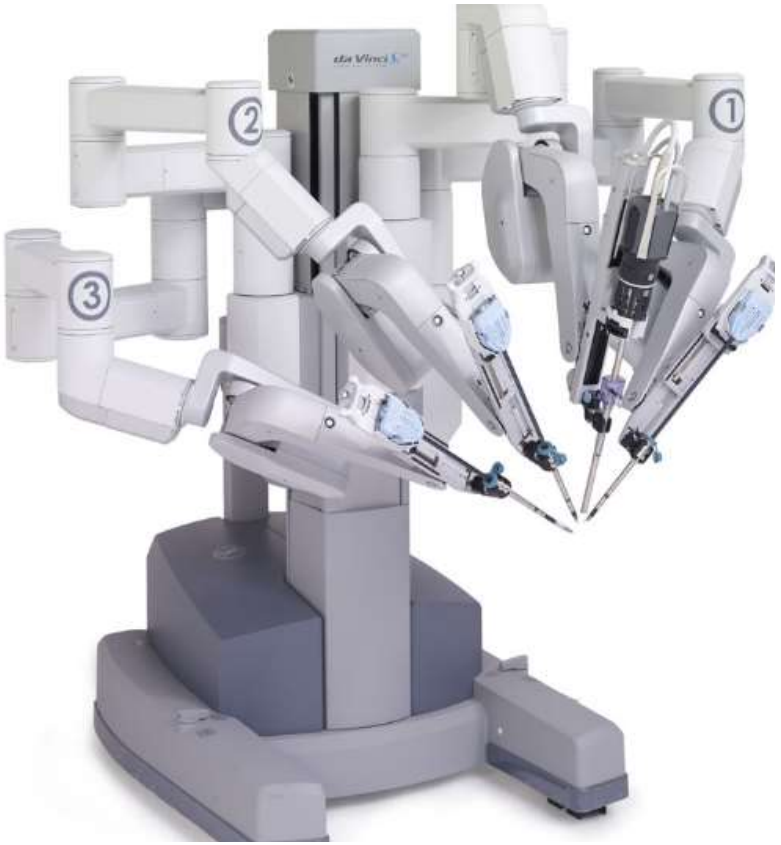
COLUMBIA
COLUMBIA UNIVERSITY
IRVING MEDICAL CENTER

Disclosure Slide

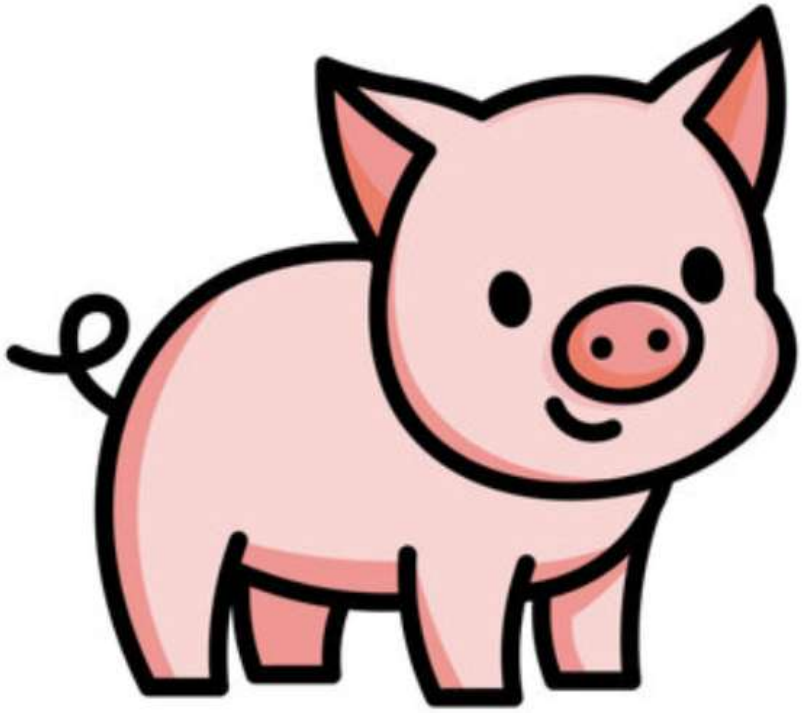
Nothing to disclose

The future is NOW!

Pumps



Robots



Pigs

Liver Transplantation 2024

- Remains the only treatment for ESLD
- Steadily increasing rates
- Excellent outcomes

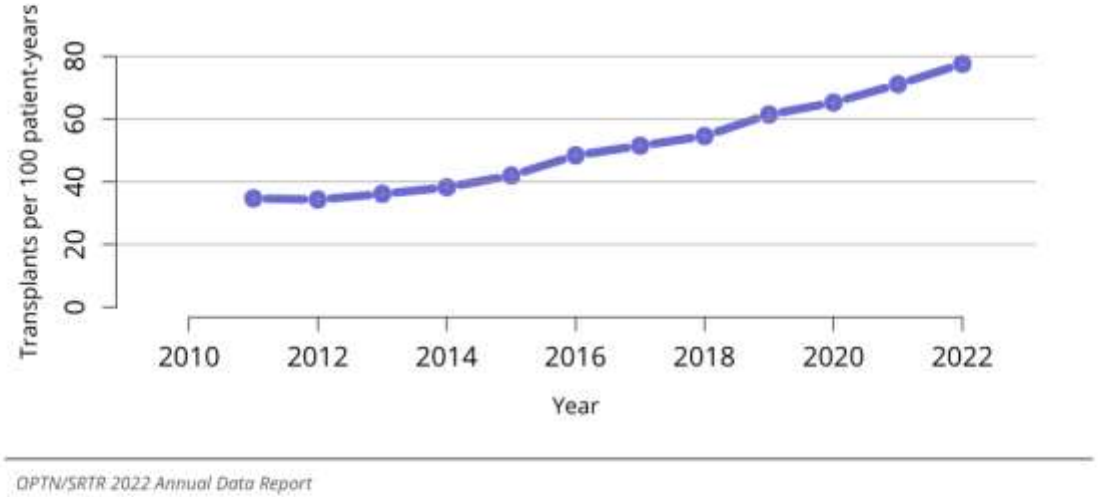


Figure LI 11: Overall deceased donor liver transplant rates among adult waitlist candidates. Transplant rates are computed as the number of deceased donor transplants per 100 patient-years of waiting time in a given year. Individual listings are counted separately.

OPTN/SRTR 2022 Annual Data Report. AJT. 24(2): 1S1-S556

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Organ Shortage remains a problem

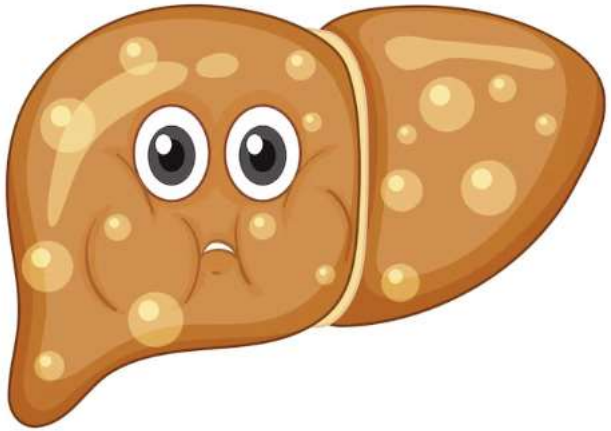
Optimal liver grafts:

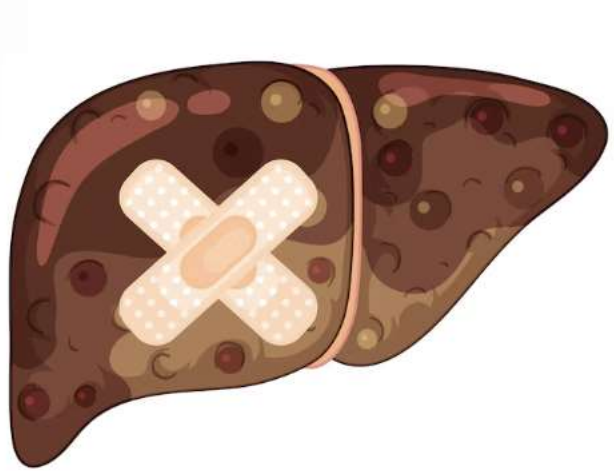
- donated following brainstem death (where warm ischemic time is low)
- from standard criteria donors
- younger than 50 years old
- without hepatic steatosis without viral hepatitis

Expanded criteria donors:

- Elderly
- hepatic steatosis
- Malignancies
- viral hepatitis
- donated following circulatory death (DCD)

Expanding the Donor Pool





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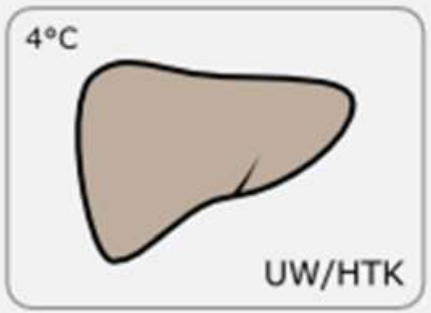
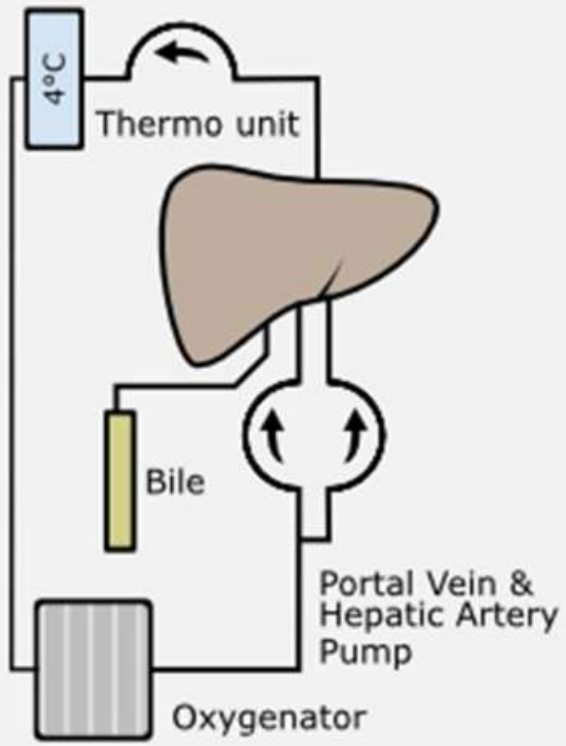
Static Cold Storage (SCS)



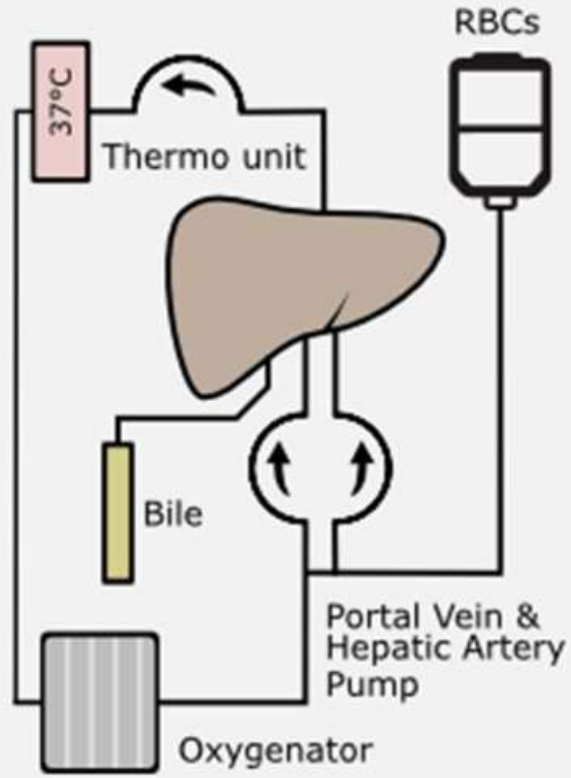
SCS
Standard of Care
Limited Assessment
Cost efficient

Hypothermic machine perfusion (HMP)



HMP
Improved Storage
Ease of Use
Assessment
by surrogate parameters

Normothermic ex vivo liver machine perfusion (NEVLP)



NEVLP
Mimics in-vivo Situation
Viability Assessment
Metabolic Reconditioning

Langenbecks Arch Surg (2021) 406:39–54

NMP Utilization

- 1-year graft survival was statistically similar
- median length of stay of NMP recipients was shorter compared with that of SCS recipients
- The peak case load shifted from 9 **PM** (N = 2,608, 5.1%) with SCS preservation to 11 **AM** (N = 55, 7.4%) with NMP preservation

Variable	Static cold storage (N = 51,390)	Normothermic machine perfusion (N = 742)	p Value
Donor age, y, mean (SD)	42.2 (15.0)	46.3 (14.0)	<0.001
Male donor, n (%)	31,244 (60.8)	456 (61.5)	0.720
Donor BMI, kg/m ^{2} , mean (SD)	28.3 (6.6)	29.8 (6.9)	<0.001
Macrovesicular fat, %, mean (SD)	8.8 (11.9)	9.0 (11.5)	0.780
Donor risk index, mean (SD)	1.488 (0.382)	1.781 (0.503)	<0.001
Donation after cardiac death donor, n (%)	4,318 (8.4)	274 (36.9)	<0.001

Journal of the American College of Surgeons
May 2024 , Volume 238 (5), p 844 – 852

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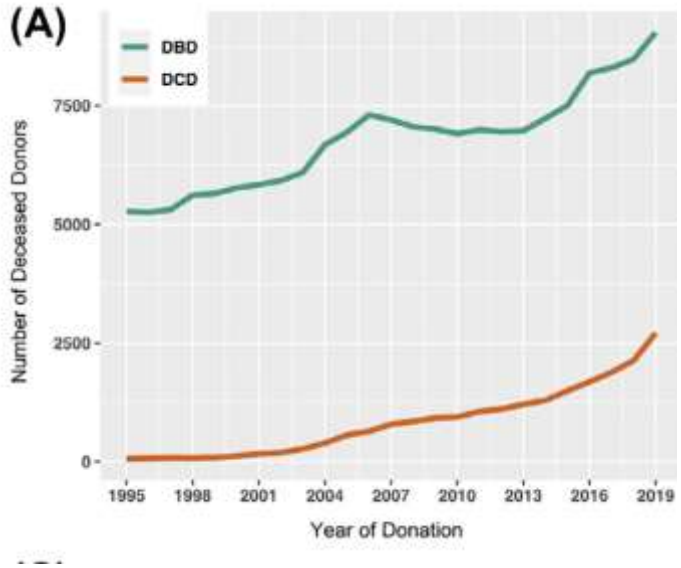
Use of DCD Grafts and Use of NMP



Clinical Transplantation. 2021;35:e14211

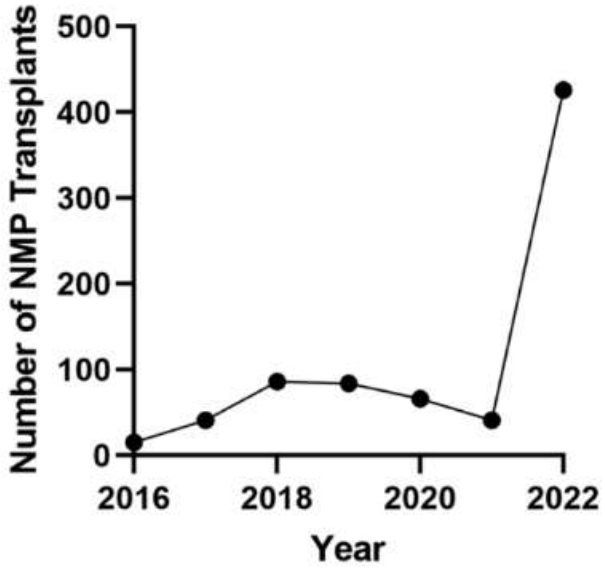


Figure 1. Normothermic machine perfusion (NMP) transplant vo ume in the US since 2016.

Journal of the American College of Surgeons
May 2024 , Volume 238 (5), p 844 – 852

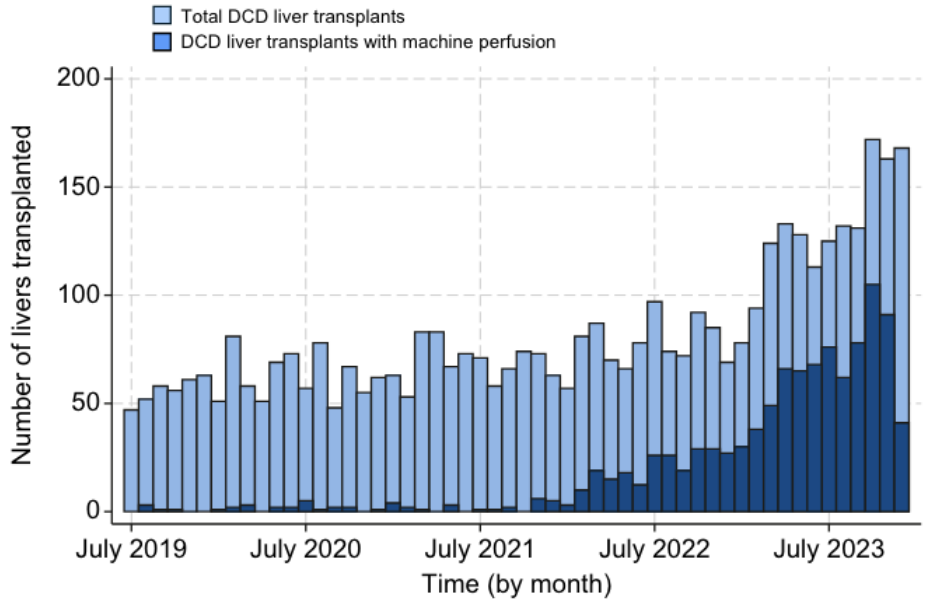


Fig. 1. Utilization of machine perfusion for the preservation of DCD liver grafts in the US. Analysis and graph generated using Stata 18 (StataCorp, College Station, TX). DCD, donation after cardiac death.

Journal of Hepatology, October 2024. vol. 81 j e187–e188

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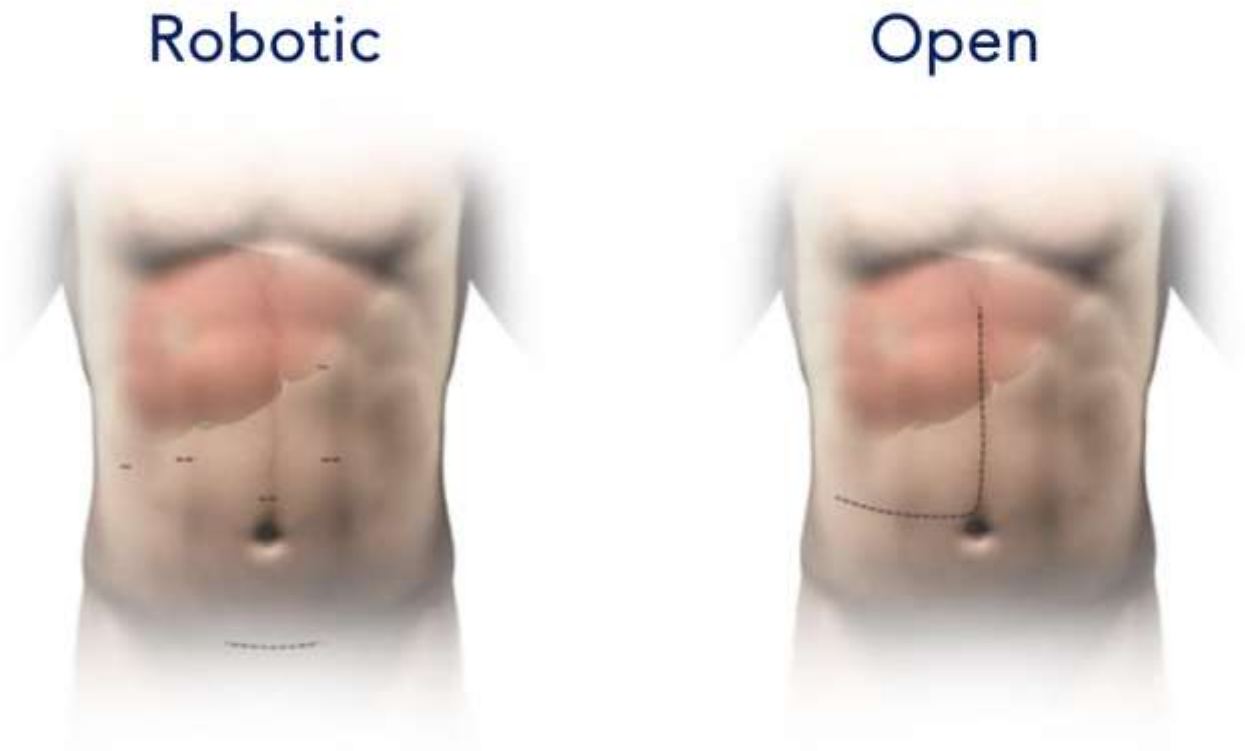
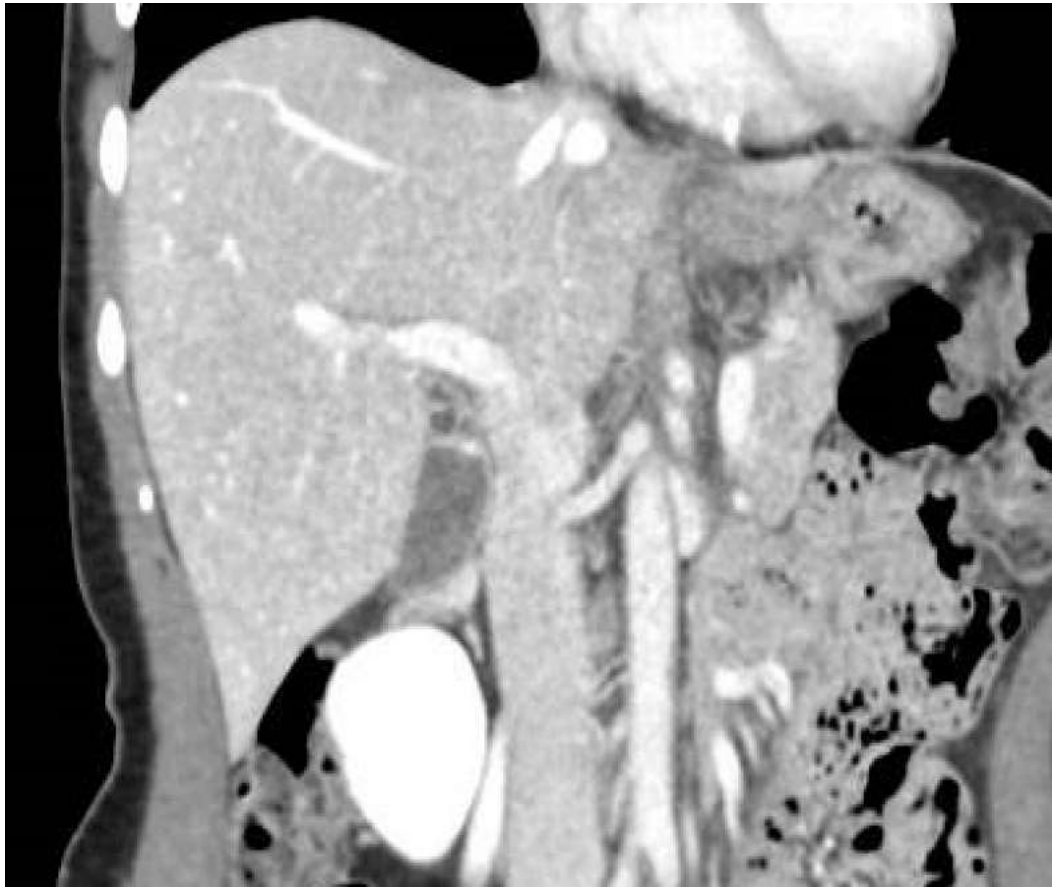
Advances in Live Donation



Advanced Imaging



Robotic Donor Hepatectomy: Highlights

- Longer operative time
- Less biliary complications
- Similar overall complications
- Less analgesia
- Decreased ICU stay
- Decreased LOS
- Decreased cost

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Xenotransplantation: The next frontier?

- In September 2021-first genetically engineered pig kidney xenotransplant to a brain-dead human (NYU)
- In March 2024- a genetically engineered pig kidney(MGH)
- In January 2022- a heart transplant from a genetically modified pig (U Maryland)

In a First, Man Receives a Heart From a Genetically Altered Pig

The breakthrough may lead one day to new supplies of animal

The New York Times

Surgeons Transplant Pig Kidney Into a Patient, a Medical Milestone

The man continues to improve, doctors said. Organs from genetically engineered pigs one day may make dialysis obsolete.

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Xenotransplantation: The next frontier?

FIRST TRANSPLANT OF PIG LIVER INTO A PERSON

Porcine organs could provide temporary detox for people who are awaiting human donors.

Nature. 2024-03, Vol.627 (8005), p.710-711

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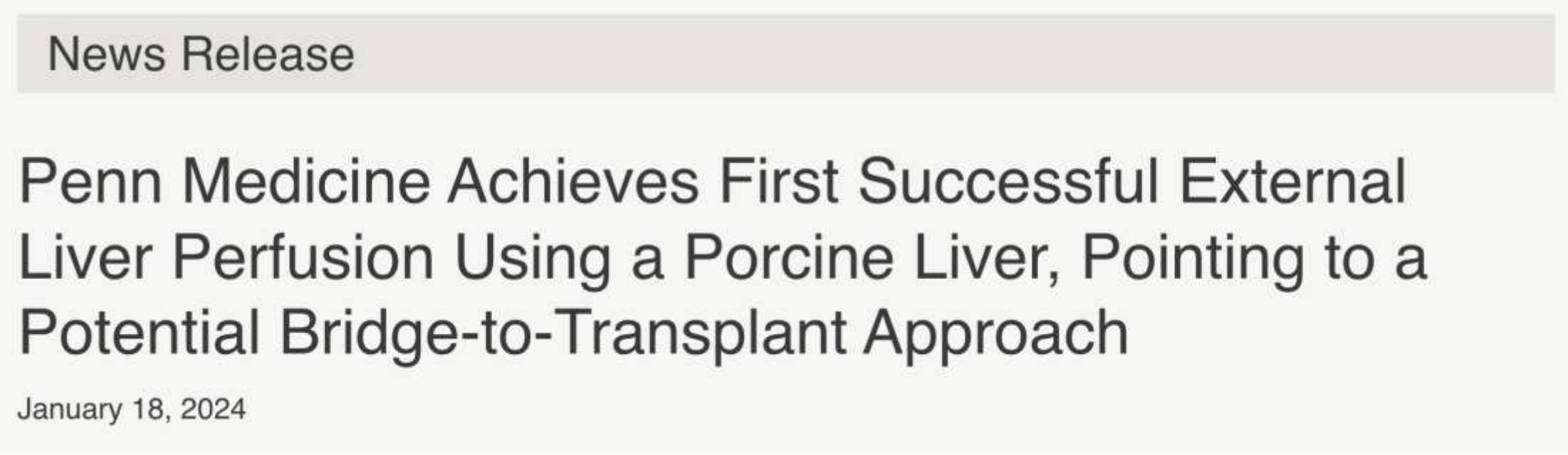
Xenotransplantation: The next frontier?



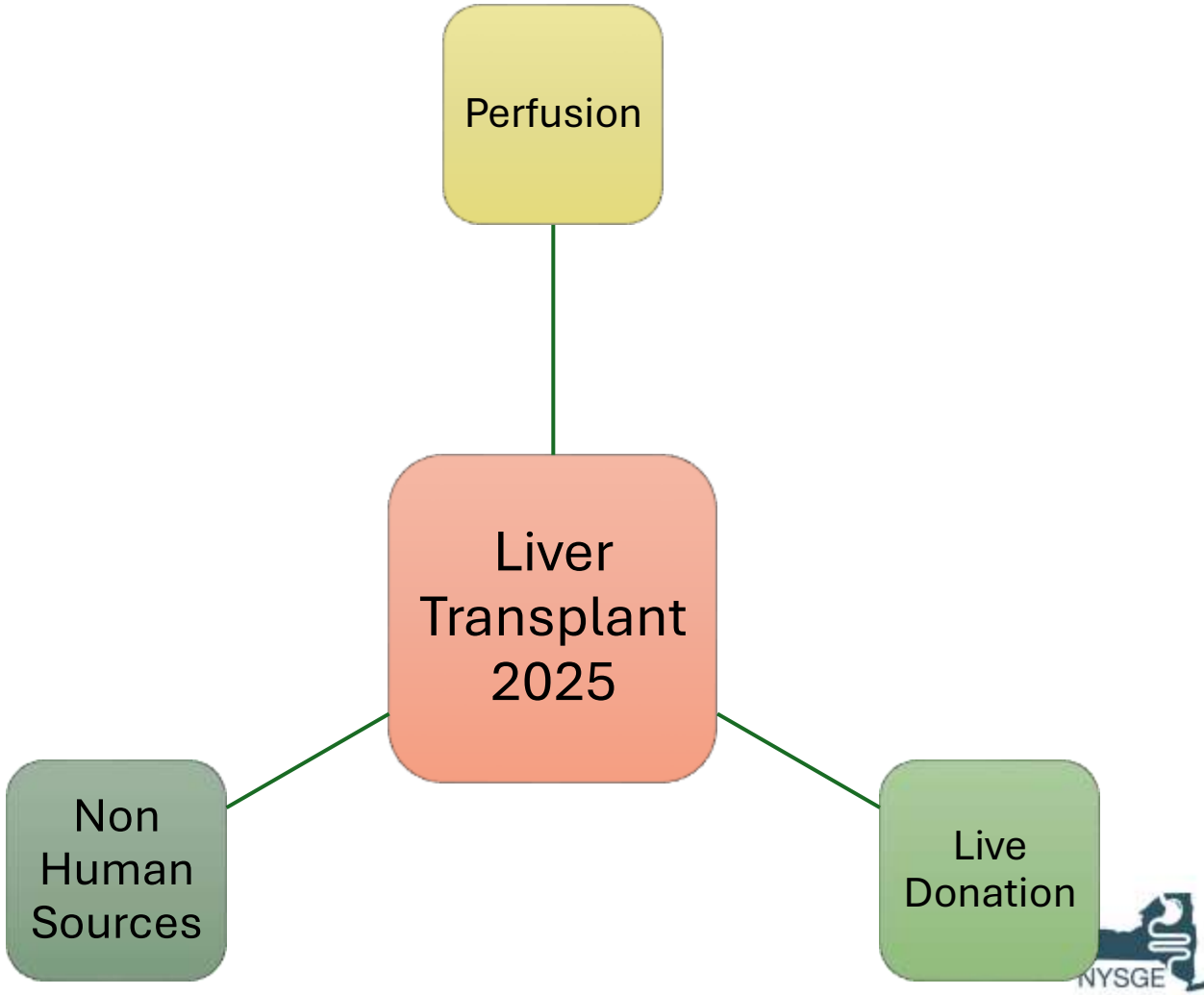
News Release

Penn Medicine Achieves First Successful External Liver Perfusion Using a Porcine Liver, Pointing to a Potential Bridge-to-Transplant Approach

January 18, 2024

An Exciting Future for Liver Transplantation!

- Improved organ preservation
- Improved utilization
- Improved access



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Thank You!

Contact Me!

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