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Wits University
Donald Gordon
Medical Centre

Patient-centred. Independent. Academic.

Acute Liver Failure: What to do when time is running out!

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ALF-when time is running out

- Try not be in this position if at all possible
- **Early transfer to a liver transplant unit**
- Treat for sepsis – bacterial and fungal
- List for transplant if meets criteria
- ICP monitoring is essential in managing these cases
- **GET LUCKY!!**
- Don’t be tempted to use a marginal organ

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ALF-when time is running out

- **Different scenarios to consider:**
  - Acute liver failure
    - Hyper acute
    - Subacute
  - Post-Transplant
    - Primary non-function
    - Ischaemia reperfusion injury after revascularisation

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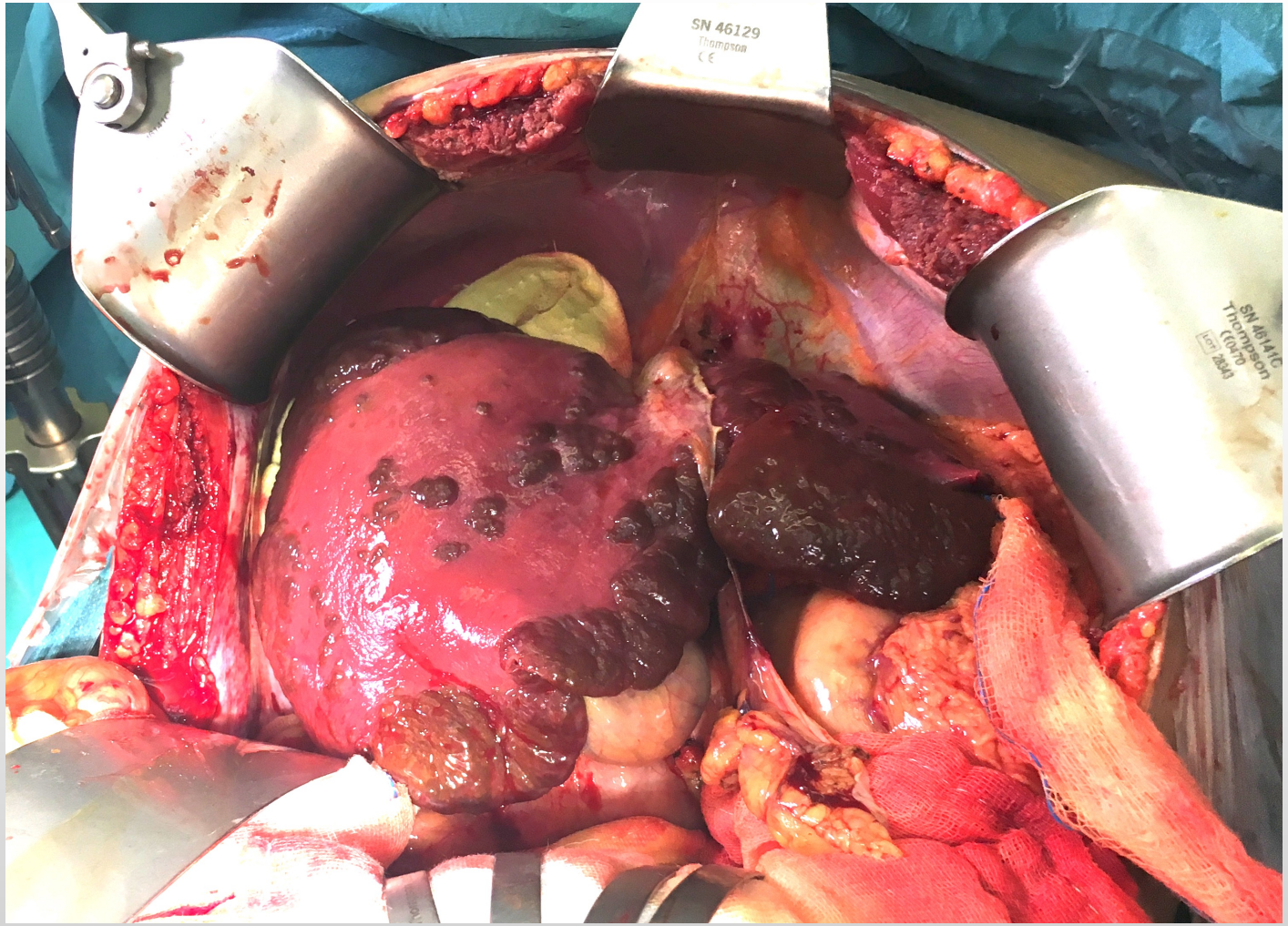
ALF-when time is running out



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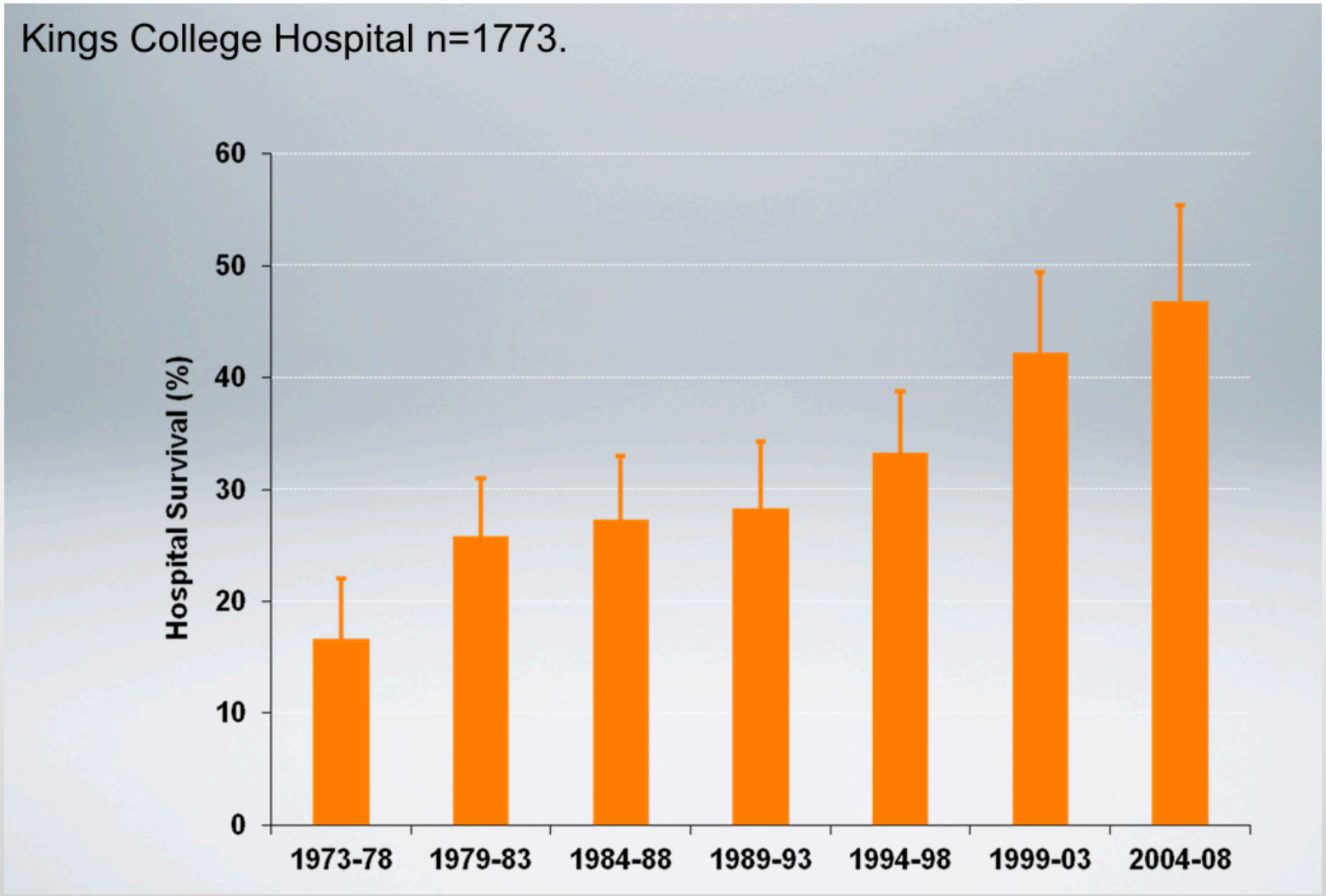
Improving outcomes for ALF



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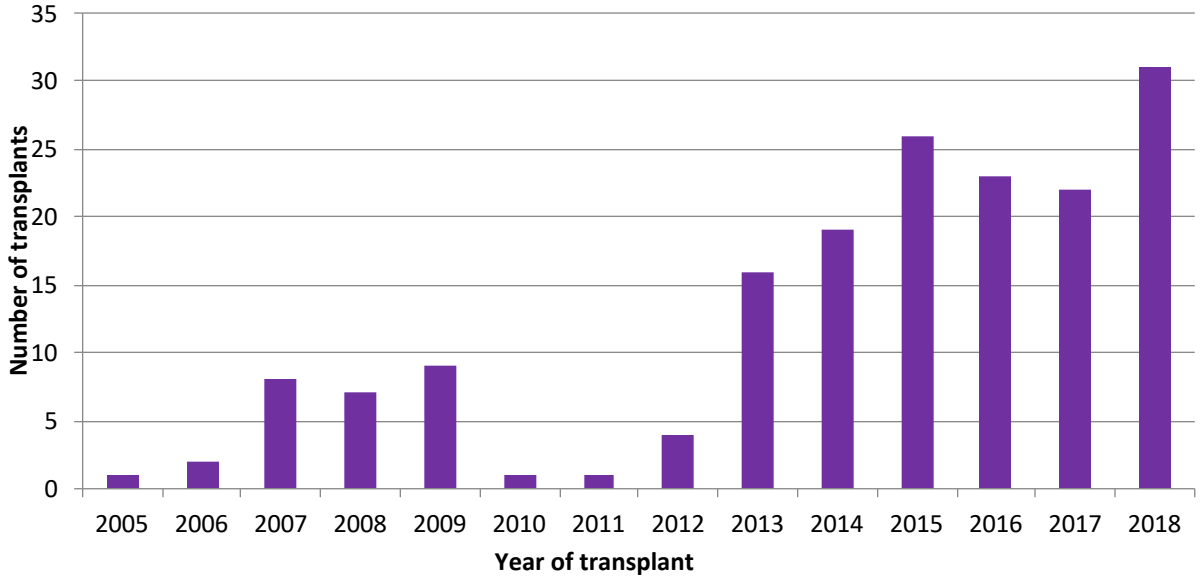
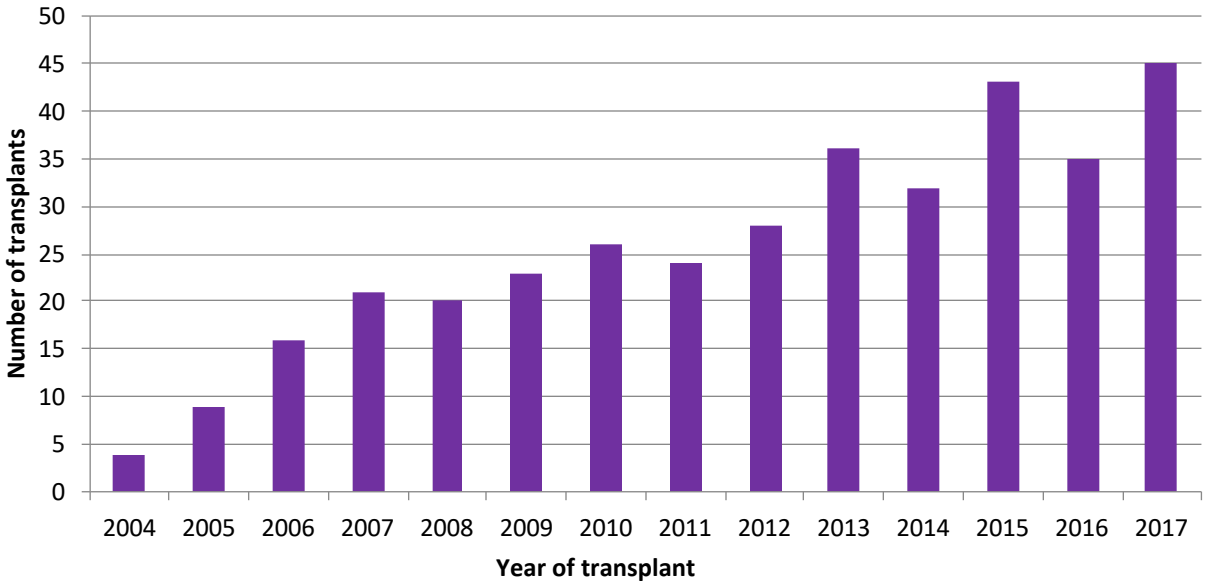
Wits transplant – Unit Growth



Children : 22% transplanted for ALF

Adults: 10% transplanted for ALF



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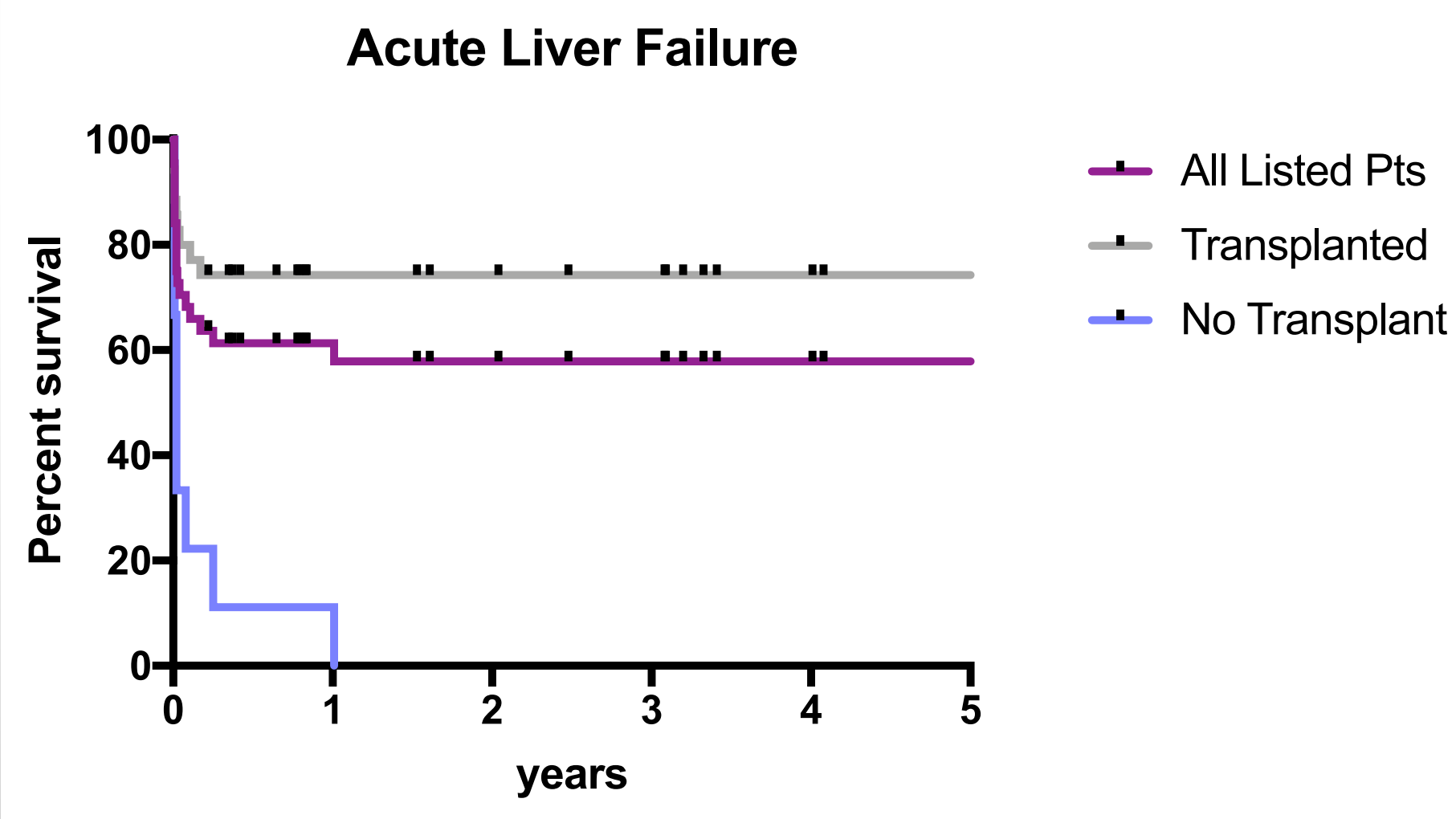
Improving outcomes for ALF



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Why have outcomes improved

- Dedicated liver ICU effect
- Maintenance of cerebral perfusion pressure
  - Fluid management
  - Pressors
  - Temperature control – cooling
  - ICP monitoring
- Prophylaxis/treatment of sepsis
- Early CVVHD
- Early access to transplantation

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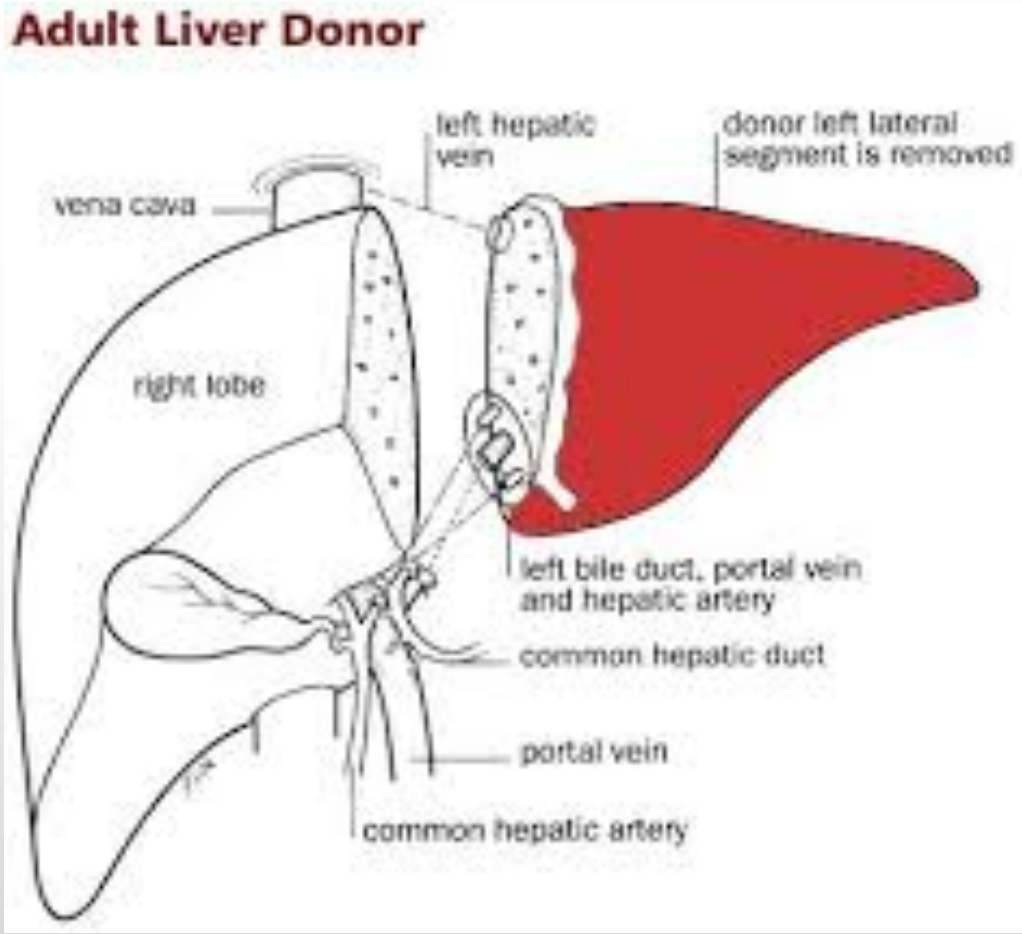
Access to organs - LDLT for Children

- Access greater organ pool
  - Significant ethical issues
- Benefits
  - Decreasing waiting list death
  - “elective” transplant
  - Well matched organ
    - may lead to better long-term graft and patient survival
- Donor operation places well individual at risk:
  - morbidity overall average 30%
- Psychosocial/medical/surgical evaluation
- Anatomical/radiologic assessment
- 50% children transplanted for ALF got LDLT



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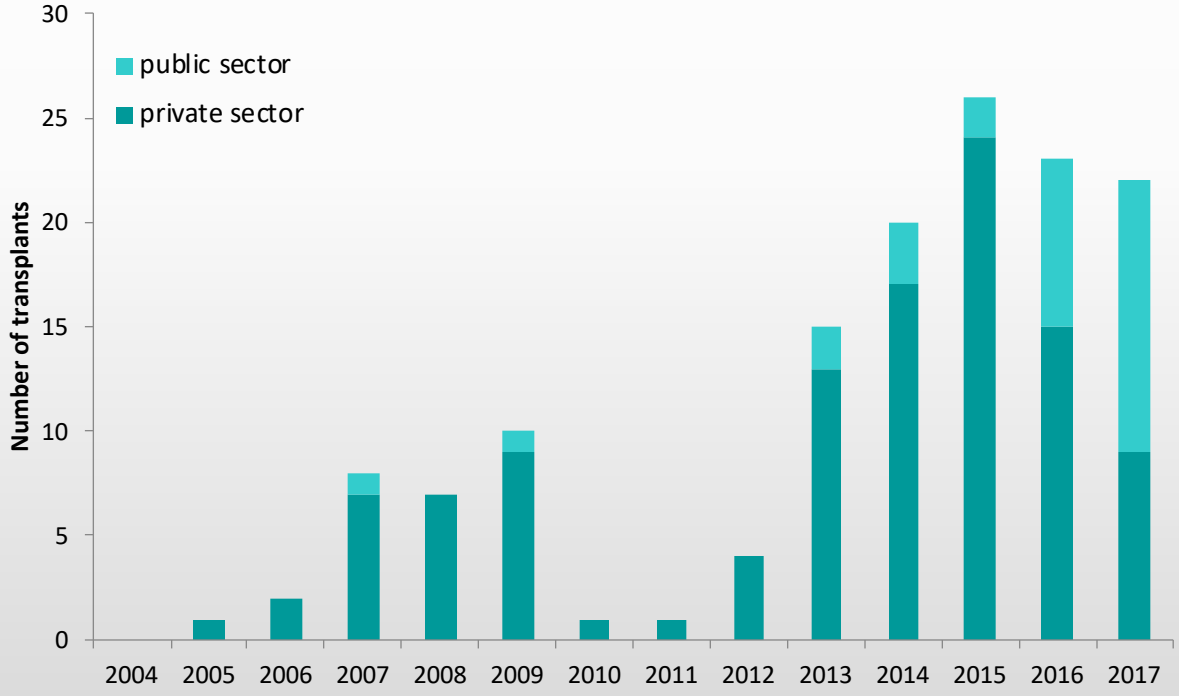
Access to Liver Transplant

	2017	2016	2015	2014	2013
Number of transplants	21	23	26	20	15
Donor type (n)					
Deceased donor transplants	14	9	13	12	7
Living donor transplants	7	14	13	8	8
Sector (n)					
Private	**8**	15	24	17	14
Public	**13**	8	2	3	1



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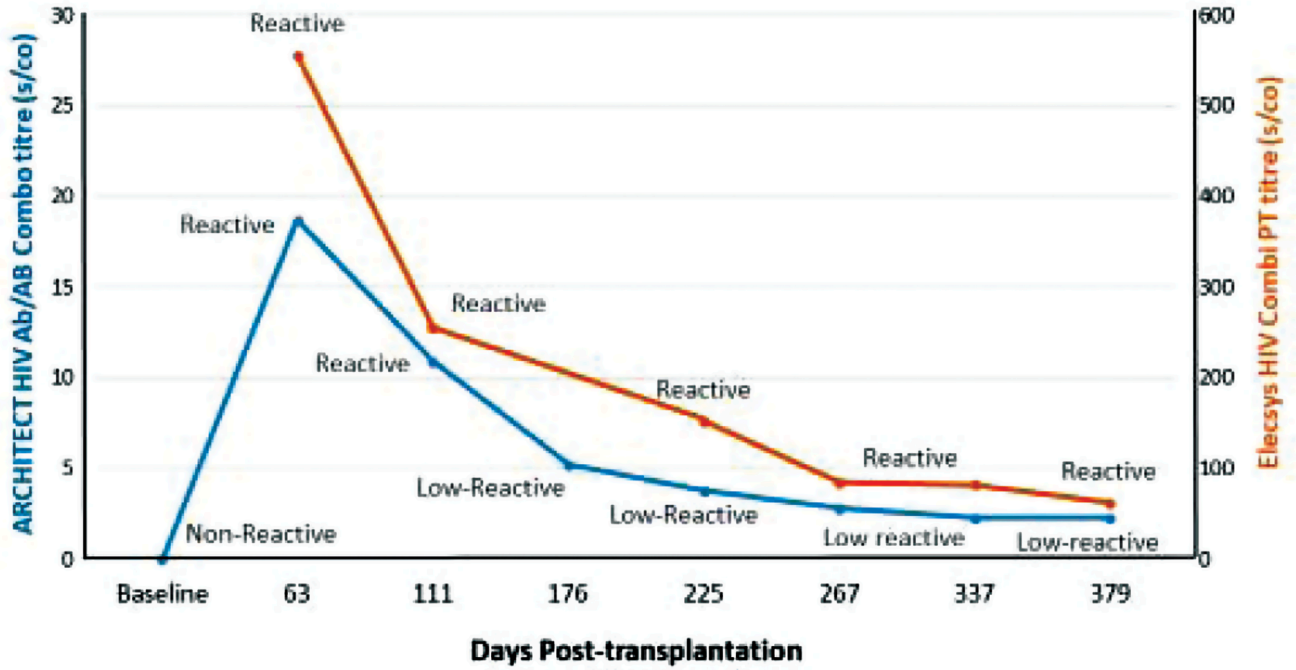
Access to organs – HIV positive donors

Living donor liver transplant from an HIV-positive mother to her HIV-negative child: opening up new therapeutic options

Jean Botha[a], Francesca Conradie[b,c], Harriet Etheredge[a,c], June Fabian[a,c], Mary Duncan[a], Ahmad Haeri Mazanderani[d,e], Maria Paximadis[d,f], Heather Maher[a], Russell Britz[a], Jerome Loveland[a,g], Bernd Ströbele[a], Sharan Rambarran[a], Adam Mahomed[a,c], Alta Terblanche[a], Marisa Beretta[a], Liam Brannigan[a], Michael Pienaar[a], Lindsay Archibald-Durham[a], Allison Lang[a] and Caroline T. Tiemessen[d,f]

(a) **HIV-1 antibody/antigen detection by diagnostic immunoassays**



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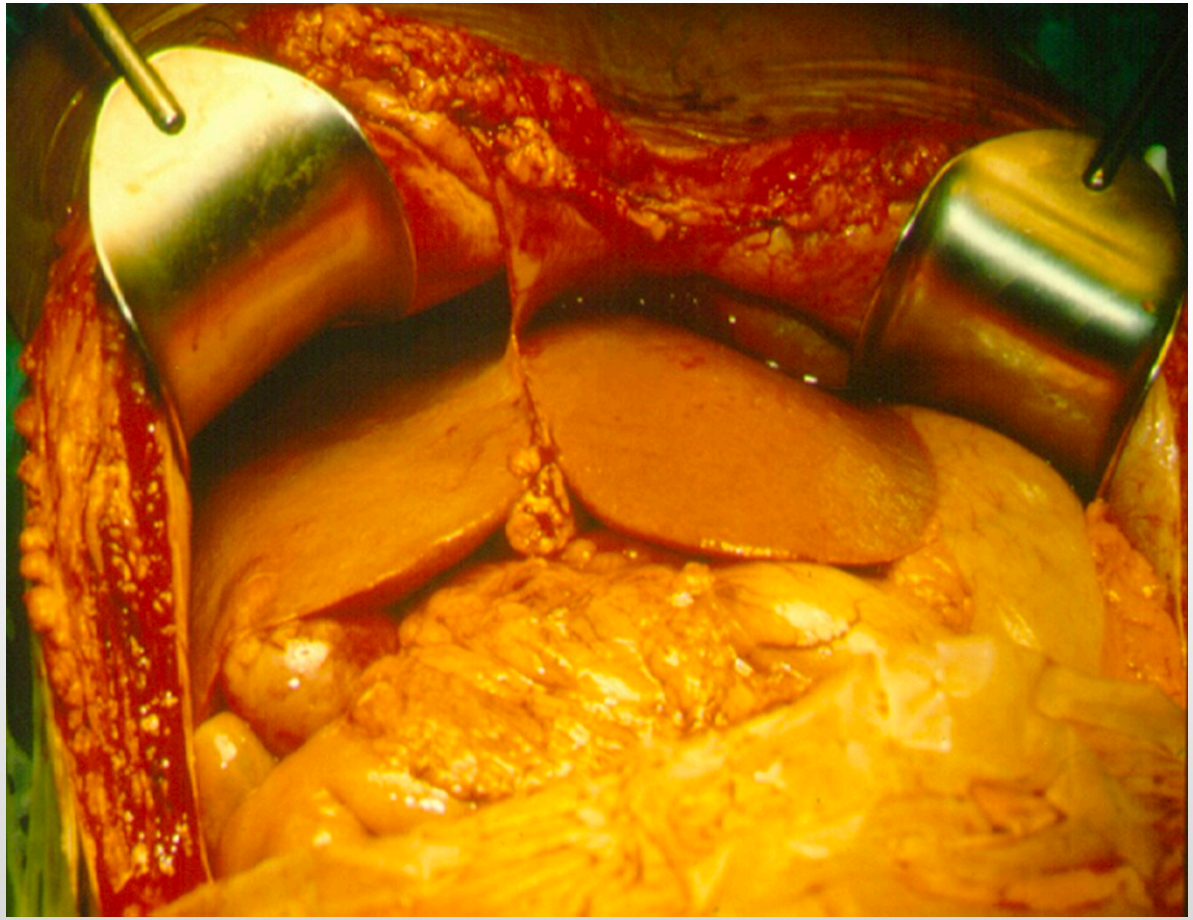
ALF-when time is running out



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ALF and liver is available

- There must be room for things to get worse
  - Cerebral perfusion pressure > 40mmHg
  - FiO_2 < 70%
  - Must be able to go up on pressors and be haemodynamically stable
  - Donor liver must be good

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ALF – When not to proceed

- **CVS** – low CI, right heart failure, elevated pulmonary pressures (>50mmHg)
- **Respiratory** – FiO_2 >80%, high PEEP and low saturation
- Acute Pancreatitis
- **Sepsis** - Fungal
- **Neuro** – Raised ICP and fixed dilated pupils
- **Age** – Older do worse

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Intraoperative management

- Transport from ICU to operating theatre and back is the most dangerous time
- Position on table – head up
- Good IV access
- Early hepatic artery ligation
- Minimal handling of liver until devascularised
- Maintain temperature

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Time is running out and NO liver

- Patient trajectory is key to management
- Rapid progressive deterioration is due to 1 of 3 things:
  - Sepsis
  - Toxic liver failure
  - Multi-organ failure
- CVVHD
- Cardiac function
- ICP monitoring

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Rapidly progressing patient – No Liver

- Choice to made – Is this sepsis?
- Do you continue with medical therapy and wait?
- Do you render them anhepatic and support until a liver becomes available?
  - A very difficult decision to make!
- Deterioration continues after being made anhepatic
  - Almost always sepsis
  - Can be due to cardio-respiratory deterioiration
  - Brings in the discussion regarding ECMO

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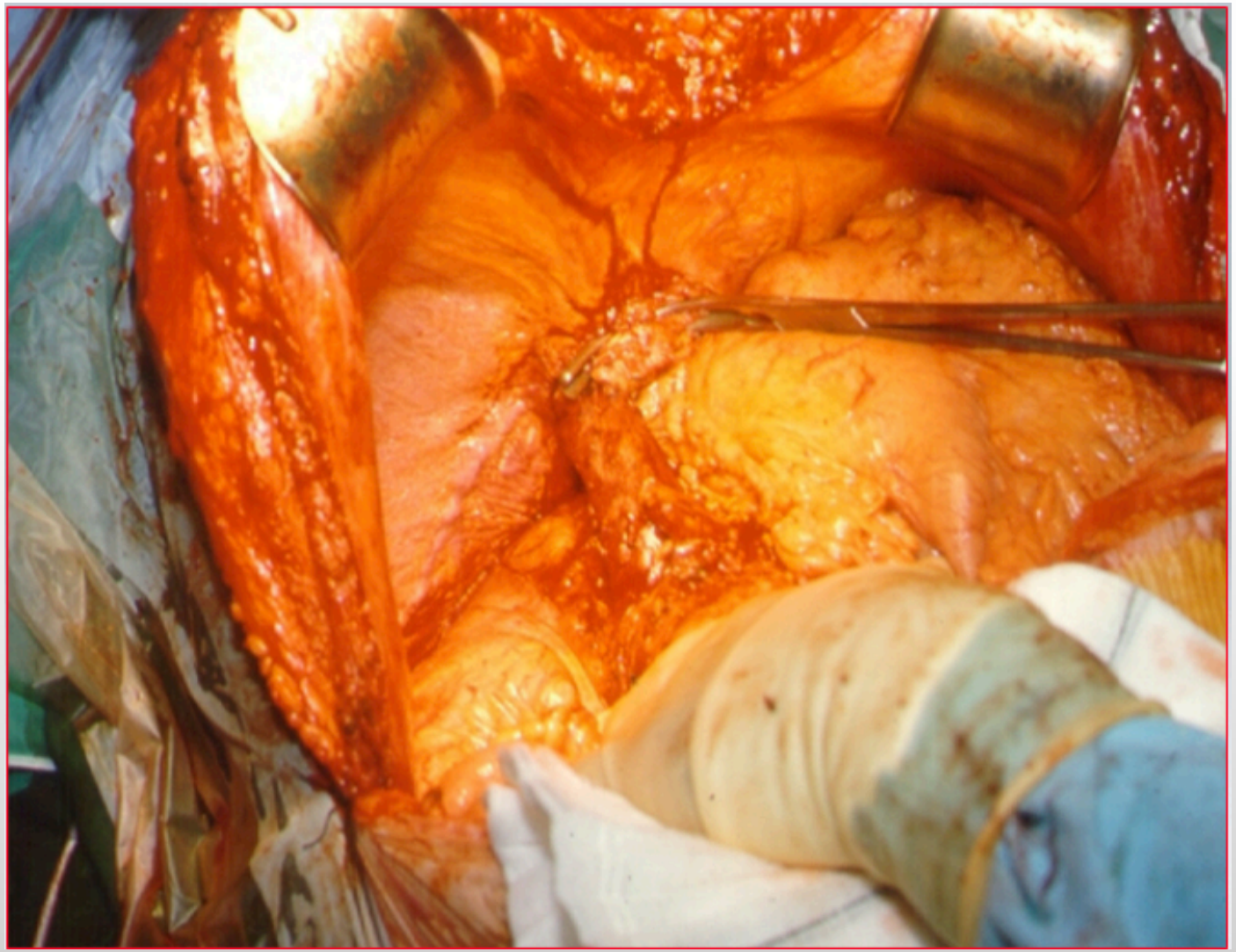
Temporary anhepatic state



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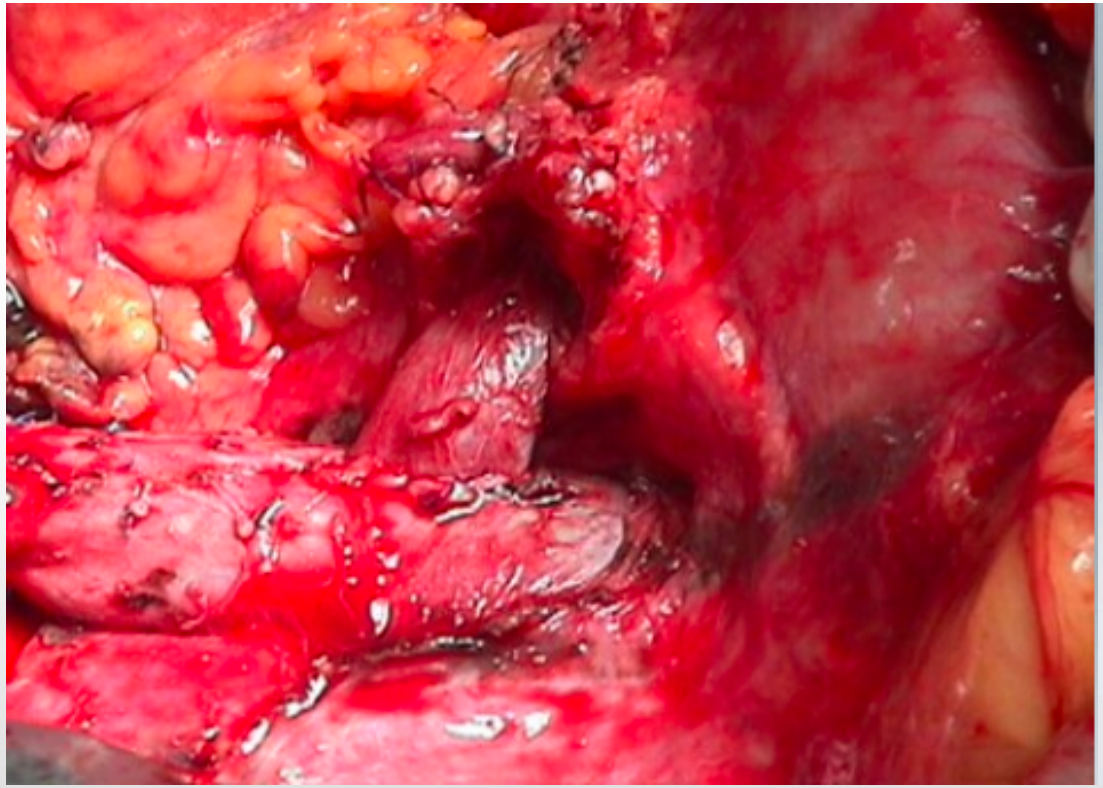
Temporary anhepatic state



Ringe et al reported 32 cases of total hepatectomy

Varied indications including ALF, PNF and trauma

13 (of 32) patients underwent hepatectomy but no LTx (early death)

19 underwent LTx within 6-41 hours

9/19 died of sepsis or ARDS

7 alive long term (ie 12 died post LTx)

Ringe et al, Ann Surg 1993; 218: 3

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Temporary anhepatic state

Ringe et al - Conclusions

- Trauma and PNF were good indications
- Prolonged ischaemia / necrosis had a poor prognosis
- Early decision required
- Avoid ARDS

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Temporary anhepatic state

13 patients anhepatic, age 7 months to 61years

12 salvage transplants (one death)

Aetiology – ALF 3, PNF 7, HAT 2, haemorrhage 1

Survival

1 year 54% 5 years 46%

Anhepatic time < 24 hours 100% 30 day and 78% one year

Anhepatic time > 24 hours no survivors

Lau et al, Abstract UCLA experience

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Temporary anhepatic state

Montali et al et al reported 4 cases of TP and PCS

Indications – PNF, ischaemic hepatitis, reperfusion syndrome

and donor kidney tumour identified after HA ligated

Mean anhepatic time 19 hours

All 4 survived 'bridge to transplant'

Longest anhepatic time 95 hours (67 hours anatomically anhepatic)

for PNF with patient survival survival

Montali et al, Clin Transplant 2010; 24: 122

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Alf and time is running out

Summary

Medical management within specialist ITU

Early high volume haemodiafiltration / plasmaphereis

Treat for sepsis – bacterial and fungal

List for transplantation on meeting criteria

Continued deterioration:-

Consider anhepatic state

ECMO

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Alf and time is running out - ecmo

Artificial Organs

Thoughts and Progress

Extracorporeal Membrane Oxygenation Can Save Lives in Children With Heart or Lung Failure After Liver Transplantation

Sandrine Jean ✉, Christophe Chardot, Mehdi Oualha, Carmen Capito, Olivier Bustarret, Philippe Pouard, Sylvain Renolleau, Florence Lacaille, Laurent Dupic

First published: 18 September 2017 | https://doi.org/10.1111/aor.12975 | Cited by: 2

Crit Care. 2014; 18(Suppl 1): P203. PMCID: PMC4068239
Published online 2014 Mar 17. doi: [10.1186/cc13393]

Extracorporeal membrane oxygenation before and after adult liver transplantation: worth the effort?

G Auzinger,[1] C Willars,[1] R Loveridge,[1] A Vercueil,[1] T Best,[1] and J Wendon[1]

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Refer early!

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Large-for-size Syndrome