BSGAR

NHS
Kings College Hospital
NHS Foundation Trust

Early Hepatic Artery Thrombosis after Liver Transplantation: Imaging, Management and Outcomes over 25 Years

A retrospective study of 5,614 transplants at King's College Hospital

Tiffany Lau[1], My Nhi Dang[1], Raneem Albazaz[2], Praveen Peddu[1]

[1]*Kings College Hospital NHS Trust, United Kingdom*
[2]*Leeds Teaching Hospital NHS Trust, United Kingdom*

BSGAR

Kings College Hospital
NHS Foundation Trust

Background & Aims

Hepatic artery thrombosis (HAT) is a critical vascular complication after liver transplantation

- Early HAT (<30 days) and late HAT (≥ 30 days)
- Early HAT is associated with graft failure, biliary complications, and need for urgent re-intervention[1]

Our aim is to determine diagnosis, management and outcomes of HAT in paediatric and adult populations

- Data comparing outcomes between adult and paediatric populations remain limited
- HAT management strategies across centers remain varied

Figure 1: CT angiogram demonstrates complete occlusion of the hepatic artery (arrow) after liver transplant

Figure 2: Fluoroscopy image during ERCP demonstrates a biliary stricture (arrow) subsequent to HAT after liver transplant

[1]Stange 2003

BSGAR

NHS
Kings College Hospital
NHS Foundation Trust

Methods

Single centre retrospective study

Inclusion:
- All liver transplant recipients at King’s College Hospital
- Transplanted 1 January 1999 – 17 July 2025
- Adult and Paediatric
- With early HAT

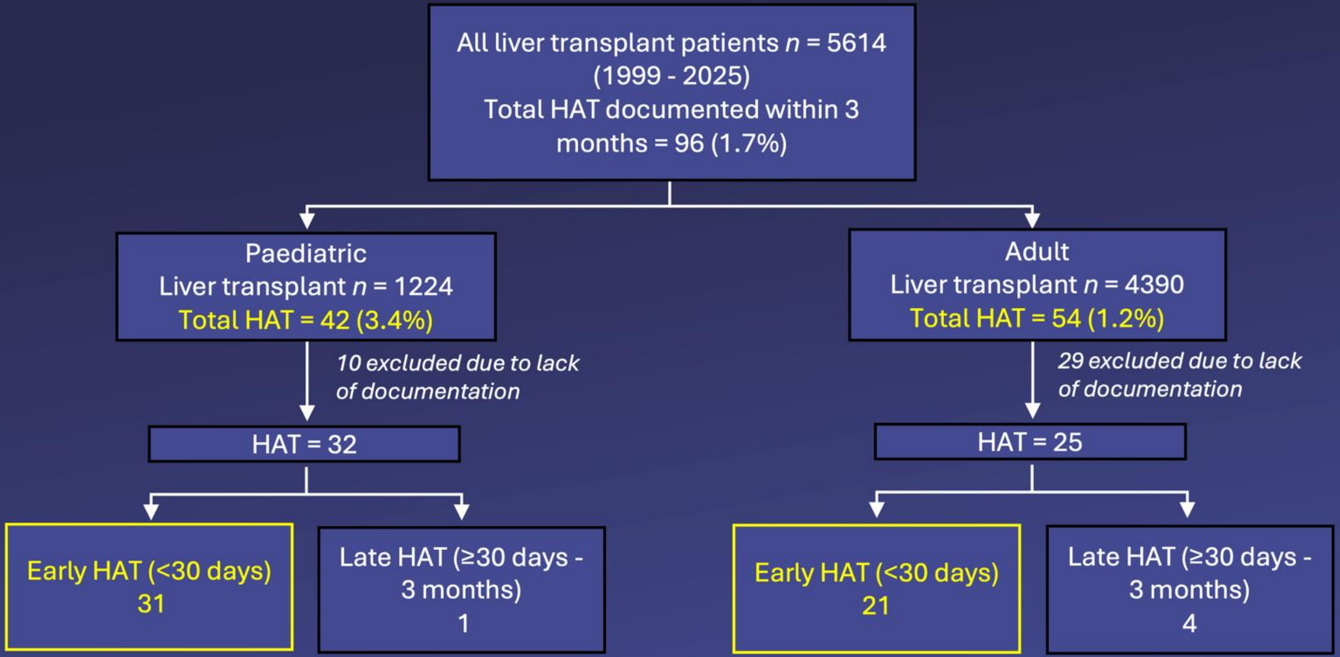
Data collected from electronic patient record and NHS Blood and Transplant database:
- Patient demographics
- Transplant technique
- Biochemical markers (bilirubin, ALP, albumin) at HAT diagnosis and at 1 and 3 months post diagnosis
- Management of HAT
- Associated complications and their management
- Mortality

BSGAR

NHS
Kings College Hospital
NHS Foundation Trust

Results

Patient inclusion chart

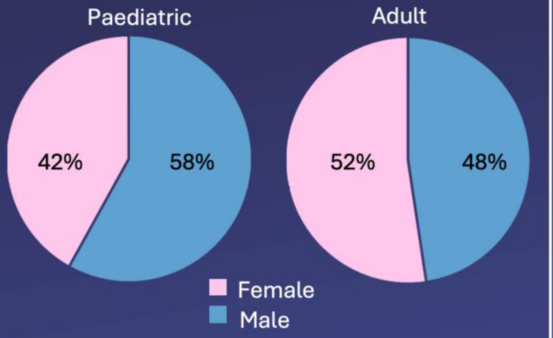


Demographic and Transplant technique

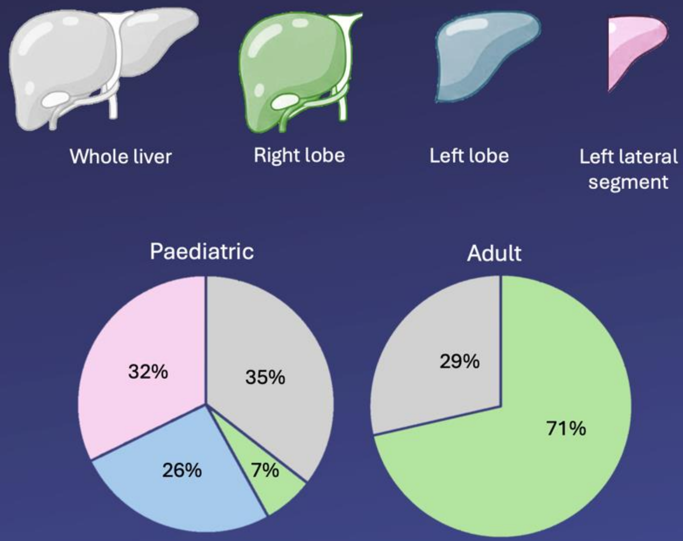
Median age (years)

- **Paediatric:** 2 (0 – 17)
- **Adult:** 44 (19 – 59)

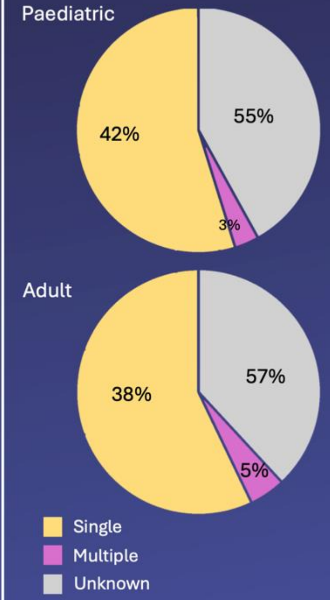
Gender



Types of liver transplant



Type of HA anastomosis



BSGAR

NHS
Kings College Hospital
NHS Foundation Trust

Diagnosis

Median time to diagnosis

Paediatric — 6 days

Adult — 13 days

Imaging indication

Most imaging for eHAT discovery was due to clinical concern

Paediatric:
Clinical concern: 81%
Incidental finding: 19%

Adult:
Clinical concern: 95%
Incidental finding: 5%

Imaging at diagnosis

CT was the primary diagnostic modality in both groups

	CT	US
Paediatric:	71%	29%
Adult:	86%	14% (1 CEUS)

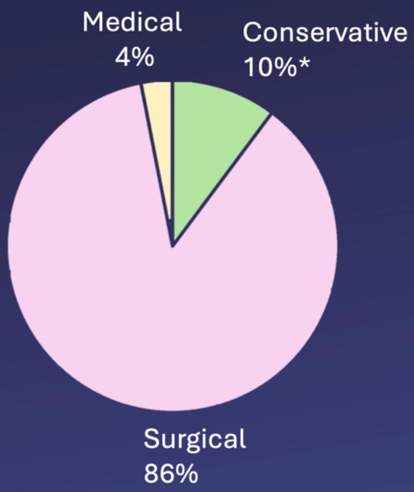
Our routine post liver transplant US is on day 1 & 5

BSGAR

Kings College Hospital
NHS Foundation Trust

Management

Paediatric

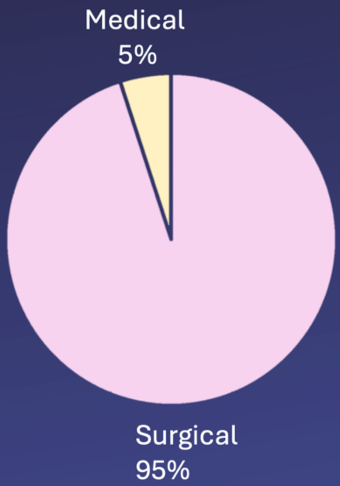


Surgical

- Re-transplantation (60%)
- Revascularisation with conduit (20%)
- Revascularisation without conduit (20%)

*due to collateralisation

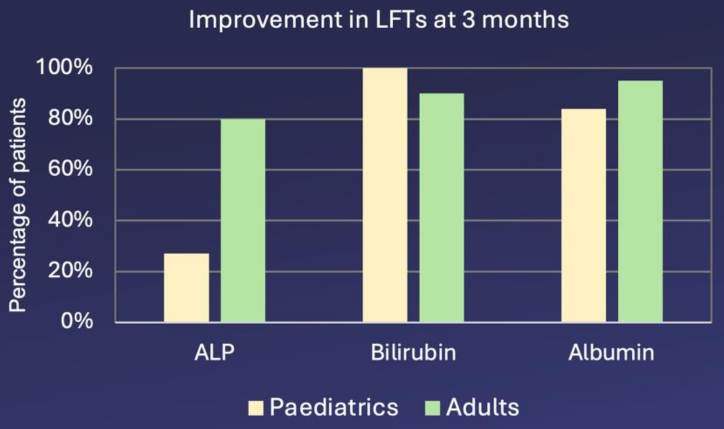
Adult

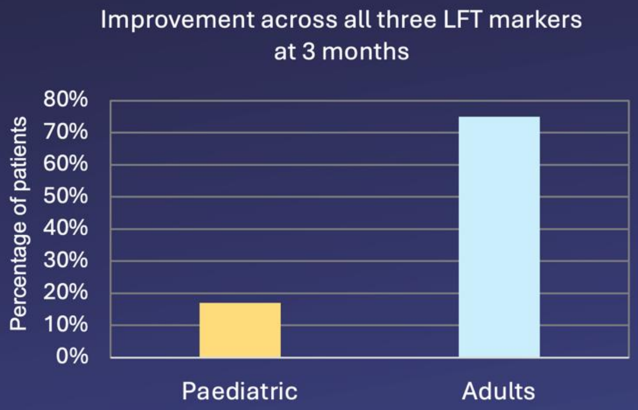


Surgical

- Re-transplantation (89%)
- Revascularisation with conduit (11%)

Biochemical markers pre and post eHAT treatment





Findings

Adults were significantly more likely to demonstrate improvement in all three biochemical markers at 3 months post treatment compared to paediatric patients (75% vs 17%; odds ratio = 15.0, p = 0.00017)

BSGAR

NHS
Kings College Hospital
NHS Foundation Trust

Post eHAT Complications

Biliary complications on imaging

	Incidence	Median time from first HAT (days)
Paediatric :	36.7%	26
Adult :	40%	291

In paediatrics, 27% required treatment via:
- Biliary reconstruction
- Balloon dilation
- Biliary drainage

In adults, 12.5% required treatment via:
- Biliary stent

Figure 3: Fluoroscopy image during ERCP pre- and post- balloon dilatation and stent insertion of the stricture

Re-thrombosis

	Incidence	Median time from first HAT (days)
Paediatric:	10.3%	2
Adult:	5%	149

First thrombosis treatment	Re-thrombosis treatment
Paediatric: Revascularisation with and without conduit	Retransplant, Resection, Medical treatment
Adult: Retransplant	Retransplant

BSGAR

NHS
Kings College Hospital
NHS Foundation Trust

Graft survival and Mortality in patients with eHAT

Graft survival

	Median survival time (days)	1 year graft survival with eHAT (%)
Paediatric:	378 (IQR 9 – 2553)	52%
Adult:	23 (IQR 12 – 35)	14%

Graft survival time was lower in adults than in paediatrics. In adults, management was predominantly retransplantation, while paediatric management was more heterogeneous.

Mortality

No deaths within 5 years of early HAT diagnosis

BSGAR

Kings College Hospital
NHS Foundation Trust

Discussion

Context in literature

Incidence

Our HAT incidence was lower than reported elsewhere

- Adults: our total HAT reported within 3 months were 1.2% (54 /4390) compared to reported HAT within 2 months 2.9%[1] and HAT within 1 month 1.9%[2]
- Paediatrics: our total HAT reported within 3 months were 3.4%(42/1224) compared to reported HAT within 2 months 8.3%[1] and total HAT 6.2%[3]

Diagnosis, Management and Outcomes

Our local screening day 1 and day 5 US are in keeping with international paediatric practice[4], 100% conduct Day 1 US and 60% conduct daily US for first week

Compared with a systematic review, a higher proportion of our eHAT adults and lower proportion of paediatrics underwent retransplantation. In our cohort, retransplantation was performed in 51.6% of paediatrics and 84.6% of adults, versus 61.9% of paediatrics and 50% of adults[1]

Limitations

- Large number of excluded patients due to insufficient patient notes
- Only included HAT reported in first 3 months
- Single centre study
- Changes in surgical techniques, increasing knowledge of pro and anticoagulant factors over time

Potential impact

Contribute to our understanding of the incidence, current management practices and outcomes of HAT following liver transplantation in both paediatric and adult populations

Informs consensus for optimal screening, and management of HAT and its complications (including surgical, anticoagulant therapy), for paediatric and adult populations

[1]Bekker 2009, [2]Pareja 2010, [3]Li 2023, [4]Li 2025

BSGAR

Kings College Hospital
NHS Foundation Trust

Summary and Take-home

- Early HAT is rare but more common in paediatric than adult liver transplant recipients
- CT is the primary diagnostic modality, with US and CEUS playing adjunct roles
- Adults are predominantly managed surgically, whereas paediatric management is more heterogenous
- Adults demonstrate significantly better biochemical recovery at 3 months compared with paediatric patients
- Despite morbidity, no 5-year mortality attributable to HAT was observed in this cohort