

NHS BLOOD AND TRANSPLANT

LIVER ADVISORY GROUP

INVESTIGATION OF THE IMPACT OF CONTRACTED CAVITY INTESTINAL PATIENTS ON LIVER ALLOCATION

SUMMARY

Background

- 1 This report investigates whether giving paediatric status to certain adult intestinal recipients for organ allocation purposes would have any impact on access to donor organs by liver recipients.

Data and Methods

- 2 We took adult patients from Addenbrooke's Hospital with a contracted abdominal cavity and weighing more than 35 kg who were active on the transplant list at any point since 22 July 2013.
- 3 We simulated how Addenbrooke's patients would have been offered organs had they been given paediatric status for allocation purposes, the impact on liver allocation and whether it will result in any disadvantage to liver patients.

Conclusion

- 4 Two liver patients may have potentially been disadvantaged in organ allocation by giving paediatric status to the adult patients with a contracted abdominal cavity.

Action

- 5 Members are asked to consider these investigations and agree whether a change to the *Intestinal transplantation: Organ allocation* policy is endorsed, with regards to giving paediatric status for allocation purposes to adult intestinal patients with a contracted abdominal cavity and weighing more than 35 kg.

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Background

- 1 As part of the work plan of the National Bowel Allocation Working Group of the Multivisceral and Composite Tissue Advisory Group (MCTAG), NHSBT agreed to conduct a simulation exercise to determine whether giving paediatric status to certain adult intestinal recipients for organ allocation purposes would have any impact on access to donor organs by liver recipients. We took adult patients from Addenbrooke's Hospital with a contracted abdominal cavity and weighing more than 35 kg¹ who were *active* on the transplant list at any point since 22 July 2013; the date when the National Bowel Allocation Scheme (NBAS) was implemented. We simulated how Addenbrooke's patients would have been offered organs had they been given paediatric status for allocation purposes. This report, therefore, investigates *actual* matching runs² and compares them to hypothetical matching runs that would have arisen under our *simulated* conditions. It then investigates if this would deny elective liver recipients access to the liver for these donors.
- 2 The Liver Advisory Group (LAG) are interested in the impact granting these patients paediatric status will have on liver allocation and whether it will result in any disadvantage to liver patients.

Rationale

- 3 Giving paediatric status to contracted cavity intestinal patients who do not require the liver will not negatively impact the availability of the liver at the elective liver offering tier. This is because they will never be offered the liver so it does not matter where they rank on the matching run. However, the same cannot be said for contracted cavity intestinal patients who do require the liver. Under the proposed change, these patients may move up rank in matching runs and therefore receive offers they may not have previously received. If, in our simulated run, they overtook a patient not requiring a liver who, in actual terms had accepted the intestinal offer, there is a chance the patient requiring a liver may have accepted this offer had they received it first. This would mean that the liver, which was previously available at the elective liver tier, is no longer available at that tier. Therefore the focus of this paper is the contracted cavity patients requiring a

¹ The [Intestinal transplantation: Organ allocation Policy](#) already includes a provision whereby adult recipients weighing 35 kg or less may be treated as paediatrics in the allocation scheme. This provision gives small adults, for whom adult organs are unlikely to be of a suitable size, preferential access to the pool of paediatric organs. It is noted that no adults weighing 35 kg or less have been registered for transplant since the introduction of NBAS.

² A matching run for organ allocation is a series of computational processes carried out by NHSBT ODT Hub Operations, in agreement with national policy, to determine the offering order of an organ donor to patients on the waiting list.

liver and when they overtook a proceeding intestinal donor where the recipient did not require a liver and the effect this would have on the elective liver recipients who received the liver from these donors that would potentially have not been available under the proposed change.

Data

- 4 Donor cohort: any donor after brainstem death (DBD) between 29 July 2013 and October 2016 (the last date any of the recipients in **Table 1** were active) who had their small bowel offered and had at least two recipients appear on the actual matching run, with at least one of the concerned recipients appearing.
- 5 Recipient cohort: patients identified by Addenbrooke's Hospital as having a contracted abdominal cavity and weighing more than 35kg whilst active on the transplant list at any point since the implementation of the NBAS. The patients are listed in **Table 1**. Of these recipients, only two require a liver as part of their intestinal registration and so these are the patients of interest for this analysis.

Recipient ID	Date Listed	Transplant Date	Require Liver?
161916	May 2012	December 2014	Yes
173577	March 2013	October 2013	No
183592	June 2014	August 2014	No
193369	September 2015	May 2016	No
198960	May 2016	October 2016	Yes
199127	June 2016	September 2016	No

Methods

- 6 The six recipients in **Table 1** appeared on the actual matching runs for a total of 283 donors. This resulted in a total of 336 appearances for the six recipients. The reason there are more appearances than donors is because more than one of the recipients can appear on the matching run for any given donor.
- 7 To adjust for paediatric status in the simulation, points were adjusted as follows:
 - a) **Paediatric donor**. Extra points were given to the recipient when a paediatric donor occurred to account for the point benefit given to paediatric recipients for a paediatric donor. In particular, for donors before 17 December 2015, recipients were given 1,000 extra points and for donors on or after that date, 5,000 points were given. These donor and recipient age match points are in line with the changes in policy implemented in December 2015.

- b) **Adult donor.** Conversely, points were taken away from the concerned recipients when an adult donor occurred. According to policy, an adult donor to adult recipient pairing gets 500 points, but an adult donor to paediatric recipient gets only 250 points. In the actual matching runs, our recipient cohort would have been treated as adult recipients but, in our simulation, they are treated as paediatrics. Therefore these recipients lost 250 points, relative to their actual matching run points, for each adult donor that appeared.

FINDING 1 – When points were adjusted to account for their new paediatric status, the two patients requiring a liver moved up rank for a total of 15 donors.

- 8 A recipient breakdown of matching run changes is presented in **Table 2** with the patients requiring a liver highlighted in yellow.

Recipient ID	Number of matching runs	Outcome of points change on rank		
		No change	Moved up	Moved down
161916	86	82 (95%)	4 (5%)	0
173577	16	11 (69%)	1 (6%)	4 (25%)
183592	36	8 (22%)	3 (8%)	25 (69%)
193369	64	28 (44%)	5 (8%)	31 (48%)
198960	86	75 (87%)	11 (13%)	0
199127	48	46 (96%)	2 (4%)	0

- 9 In 7 of the 15 donors, the donor proceeded to intestinal transplant, three of which did not include the liver. For one of these three cases, the liver was used in a super-urgent patient so was not available for elective intestinal or liver patients. The small bowel and liver outcomes for the seven donors can be found in **Table 3**.

Donor ID	Small bowel outcome	Liver outcome
104278	Including liver transplant	Used in small bowel transplant (whole)
110063	Including liver transplant	Used in small bowel transplant (whole)
107493	Including liver transplant	Used in small bowel transplant (whole)
121303	Including liver transplant	Used in small bowel transplant (whole)
120515	Not including liver transplant	Super-urgent liver only transplant (whole)
122458	Not including liver transplant	Elective liver only transplant (whole)
122203	Not including liver transplant	Elective liver only transplant (split)

FINDING 2 – Of the 15 donors where the two recipients moved up ranks, 7 proceeded to intestinal transplant. Three of these seven transplants did not include the liver.

- 10 Two of the three donors had their livers offered and accepted at the super-urgent stage and so only one had the liver available to intestinal patients. The offering outcome for the liver of the three donors can be seen in **Table 4**. For this one donor where it was available, the accepting intestinal patient was the highest ranked patient on the matching run. Under the proposed change, the contracted cavity patient would have become the highest ranked patient, and if they had accepted it, the two recipients who received the liver (highlighted in **Table 4**) would have missed out on this transplant opportunity. However, we cannot be certain whether Addenbrooke's would have accepted the intestinal offer for this patient so cannot decisively say if the two patients would have been disadvantaged.

Table 4. Summary of liver offering for three donors where a liver transplant happened

Donor ID	Donor Age	Super-urgent outcome	Intestinal offering outcome	Elective liver outcome	Liver Recipient Age
120515	13	Accepted by the Royal Free	Intestinal offers without the liver only	N/A	36
122458	14	Accepted by Dublin (later declined once bowel placed)	Intestinal offers without the liver only	Accepted by Leeds	15
122203	14	No super-urgent patients	Accepted by highest ranked recipient who did not require liver	Accepted by King's College and split	Left lateral segment – 1 Right lobe – 49

FINDING 3 – Of the 3 donors whose liver was not used in an intestinal transplant, only one had their liver available for offering at the intestinal stage, therefore two liver recipients could have been disadvantaged under the proposed change.

CONCLUSION – Two liver patients may have potentially been disadvantaged in organ allocation purposes in our simulation by giving paediatric status to the six adult patients with a contracted abdominal cavity from Addenbrooke's Hospital.

Action

- 11 Members are asked to consider these investigations and agree whether a change to the *Intestinal transplantation: Organ allocation* policy is endorsed, with regards to giving paediatric status for allocation purposes to adult intestinal patients with a contracted abdominal cavity and weighing more than 35 kg.