



# De Novo Allergy Development After Pediatric Liver and/or Small Bowel Transplant: A 10-Year Experience



Laura J. West, MD<sup>1</sup>, Kyle Soltys, MD<sup>2</sup>, Marian G. Michaels, MD<sup>2,3</sup>, & Allyson S. Larkin, MD<sup>1</sup>

<sup>1</sup>Division of Allergy & Immunology, <sup>2</sup>Thomas E. Starzl Transplant Institute, <sup>3</sup>Division of Pediatric Infectious Diseases, UPMC Children's Hospital of Pittsburgh, PA, USA

## Abstract

**Rationale:** Development of de novo allergies following solid organ transplantation has been described. We hypothesized that pediatric liver and/or small bowel transplant (LSBTX) recipients were at risk for development of de novo allergic disease.

**Methods:** A retrospective review of pediatric LSBTX recipients was conducted with IRB approval. Charts of LSBTX recipients referred to Allergy clinic January 1, 2009 - December 31, 2018 were reviewed. Donor data was queried for any allergic disease.

**Results:** During the study period, 359 patients underwent LSBTX. Thirty-one patients (31/359, 8.6%) developed documented de novo food allergy following LSBTX. Thirty LSBTX recipients were referred to Allergy/Immunology. De novo allergic disease post-transplantation was documented in 19/30 (63%) of these patients with the following distribution: food allergy (12/30, 40%), atopic dermatitis (7/30, 23%), eosinophilic esophagitis (3/30, 30%), and drug allergy (2/30, 6.7%). Of the 19 patients with de novo allergies post-transplant, median age of transplantation was 0.9 years (range 0.2-25.6 yr), median age of allergy diagnosis was 2.0 years (range 1.2-25.6 yr), and median time to development of allergy post-transplantation was 1.2 years (range 0.03 - 4.2 yr). Eight patients were recipients of solid organs from living-related donors; 11 were recipients from deceased donors (no donors died of anaphylaxis). Thirty-two percent of these donors had documented allergic disease. One liver transplant recipient had anaphylaxis to peanut 11 days post-transplant and the liver donor had documented peanut allergy.

**Conclusions:** We present the largest experience of de novo allergy development following pediatric abdominal transplant in the U.S. Ten percent of LSBTX recipients developed documented de novo food allergy following transplant. As food allergy carries significant morbidity, guidelines for risk stratification, screening and availability of injectable epinephrine for this at-risk population may be warranted.

## Background

- Development of de novo allergies following solid organ transplantation has been described in the literature.<sup>1,2,3,4,5</sup>
- Originally reported as case report in NEJM in 1997.<sup>6</sup>
  - Transfer of peanut allergy from a 22yo organ donor who died of peanut anaphylaxis → 35yo liver/kidney transplant recipient
- Hypothesis:** Pediatric liver and/or small bowel transplant (LSBTX) recipients are at risk for development of de novo allergic disease.

## Methods

- Retrospective chart review of pediatric LSBTX recipients at UPMC Children's Hospital of Pittsburgh conducted with IRB approval.
- Charts of LSBTX recipients reviewed January 1, 2009 - December 31, 2018.
  - Initially only reviewed LSBTX recipients referred to Allergy.
  - Subsequently reviewed all LSBTX recipients.
- Donor data also queried using donor database DonorNet for cause of death and allergic disease.

## Results

### Clinical Features of De Novo Food Allergy in Patients Referred to Allergy/Immunology Following LSBTX

Sex	Race	Tx Indication	Age of Tx (yr)	Hx of Atopy Prior to Tx	Family Hx of Atopy	Immuno-suppression	Culprit Food	sIgE (kU/L)	SPT (mm)	Age of Allergy Diagnosis (yr)	Time to Allergy Post-Tx (yr)	Donor Allergy Hx
F	White	Citrullinemia	2.2	None	None	Tacrolimus	Peanut	4.43	8/15	4.7	2.5	None
F	White	Biliary Atresia	0.52	None	Adopted	Tacrolimus	Peanut Cashew Pistachio	2.14 0.53 0.81		2.0	1.0	Shellfish
F	White	Hepato-blastoma	2.6	None	Father: AR	Mycophenolate & Tacrolimus	Hazelnut	1.96		4.0	1.4	Atopic dermatitis
F	White	Alpha 1 Antitrypsin	5.0	None	None	Mycophenolate & Tacrolimus	Black bean	1.6		111	4.2	None
M	White	Jejunal atresia	2.5	Milk allergy	None	Sirolimus	Egg	1.2	5/10	9.3	1.2	None
F	White	Biliary Atresia	0.6	None	None	Tacrolimus	Milk Egg Hazelnut	25.6 0.11 0.55	8	2.0	1.4	None
M	White	Hepatic Failure	0.2	None	None	Tacrolimus	Egg Peanut	6.62 0.3	8/15 15/30	1.3	1.1	None
F	White	Biliary Atresia	1.1	None	None	Tacrolimus	Milk Egg	0.50	10/15 5/10	1.3	0.2	Drug allergy
M	White	Volvulus	1.6	None	None	Tacrolimus	Peanut	18.5	15/20	2.2	0.7	None
F	White	MSUD	0.8	None	None	Prednisone	Milk	1.99		4.0	3.2	None
M	White	Hepato-blastoma	0.9	None	None	Tacrolimus	Egg Milk Peanut	12.4 21.3 24.4	6/15 5/15	1.3	0.5	Asthma
F	White	MSUD	25.6	None	None	Tacrolimus	*Peanut	0.89		25.6	0.03	*Peanut

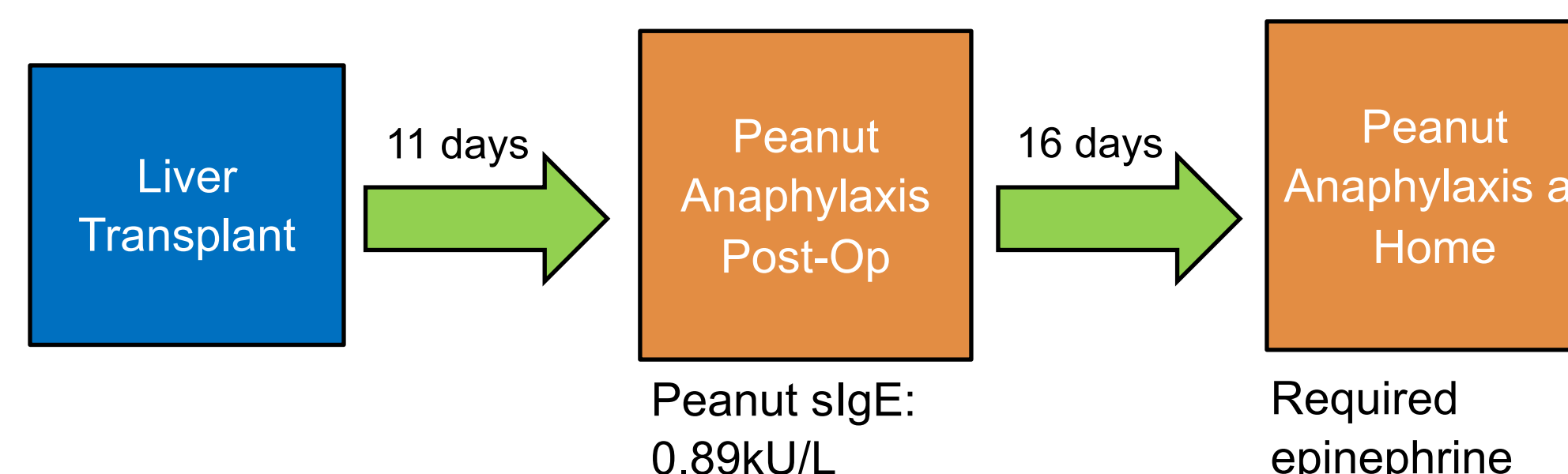
## \*Notable Case

### Recipient:

- 25yo F with Maple Syrup Urine Disease
- Tolerated peanut prior to transplant
- Peanut allergy** post-transplant

### Donor:

- 18yo M
- On donor intake form noted to have **peanut allergy** diagnosed age 1yo with history of "full-blown peanut reaction at 3yo"



## Conclusions

- We present the largest experience of de novo allergy development following pediatric abdominal transplant in the United States.
- 8.6% of LSBTX recipients developed de novo food allergy following transplant.
- As food allergy carries significant morbidity, guidelines for risk stratification, screening and availability of injectable epinephrine for this at-risk population may be warranted.

## Future Directions

- 19 patients had documented de novo food allergy following LSBTX in the electronic medical record but were never referred to Allergy/Immunology at our institution.
- We are in process of obtaining further details regarding allergy history and workup in this subset of patients.

## Acknowledgements

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