The Impact of Subtotal Pancreatectomy on People with Congenital Hyperinsulinism and Their Caregivers

Kristen E. Rohli[1], Indraneel Banerjee[2], Henrik Thybo Christesen[3], Diva D. De Leon[4], Lauren N. Lopez[1], Julie Raskin[1], Tai L. S. Pasquini[1]

[1]Congenital Hyperinsulinism International, Glen Ridge, New Jersey, USA; [2]Royal Manchester Children's Hospital, Manchester, UK; [3]Hans Christian Andersen Children's Hospital, Odense, DK; [4]Children's Hospital of Philadelphia and Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA

INTRODUCTION

- **Congenital Hyperinsulinism (HI) is a rare life-threatening condition that results in severe hypoglycemia and can lead to neurological damage.**
- In HI, the dysfunction of pancreatic beta-cells leads to excessive insulin production and severe hypoglycemia.
- HI is rare, but it is the most common cause of persistent hypoglycemia in newborns and children.
- Focal HI is often curable by lesionestomy but subtotal **pancreatectomy for diffuse HI is not curative** and has lasting impacts, such as an increased risk of diabetes.
- Understanding real-world decision-making and outcomes is essential for clinicians who counsel families facing pancreatectomy.
- **Objective: Describe pre-surgical decision-making, post-surgery health outcomes, and quality of life impacts following ≥75% pancreatectomy for diffuse HI.**

The HI Global Registry (HIGR) is the only international patient-powered registry for people with HI.

Qualitative data from HIGR was analyzed using descriptive statistics.

Qualitative interviews from caregivers and people with HI were summarized using thematic analysis.

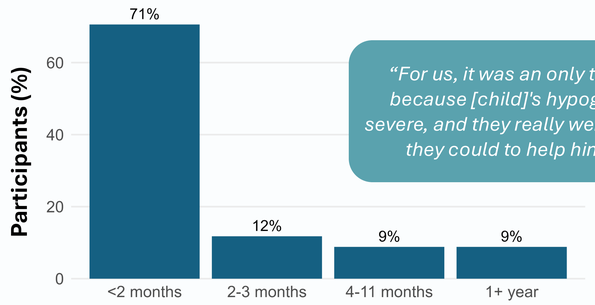
RESULTS

34 Participants were included in the study

Of these, 13 people with HI were described in interviews which were conducted with:

- Caregivers to someone with HI
- Children with HI (14-18 yrs old), supervised by parents
- Adults with HI

When was the first pancreatectomy performed?



Age at First Pancreatectomy

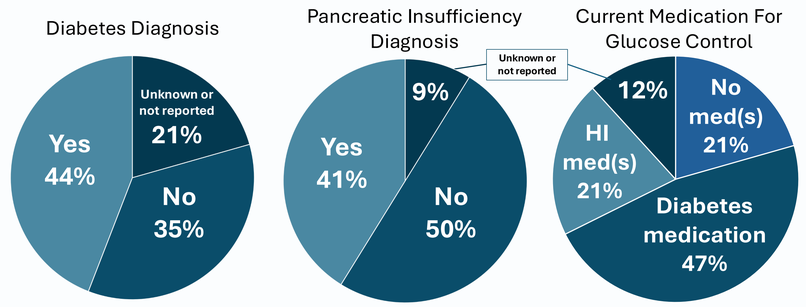
"For us, it was an only treatment option because [child]'s hypoglycemia was so severe, and they really were doing everything they could to help him."—Caregiver

What was the outcome at the time the participant was released to go home after the final pancreatectomy?

Outcome	n (%)
Required HI medication AND frequent, continuous or special feeding for low blood glucose	14 (41%)
Required frequent, continuous or special feeding for low blood glucose; no HI medication needed	11 (32%)
High blood glucose, required insulin	6 (18%)
Normal blood glucose, no medication or special feeding required	3 (9%)

27% Reported resolution of hypoglycemia following pancreatectomy

Ongoing management following pancreatectomy



"It was one year, fully dependent on the G-tube. He learned to walk with the backpack on, 24/7, connected to dextrose, and then the four octreotide shots. That was a year until the octreotide shots were able to be stopped, and we started lanreotide. Then it was once a month injection at [COE] with lanreotide. That allowed us to stop the octreotide shots. That was really exciting. Of course, the lanreotide is traumatic."—Caregiver reflecting on management following pancreatectomy, child now has diabetes

Frequency of hypoglycemia and hyperglycemia by diabetes status

	Participants who do not report having diabetes		Participants who report having diabetes	
Frequency of glucose event	**Hypoglycemia**	**Hyperglycemia**	**Hypoglycemia**	**Hyperglycemia**
More than once per day	4 (25%)	3 (19%)	1 (7%)	12 (80%)
Once a day or several times per week	5 (31%)	6 (38%)	9 (60%)	2 (13%)
Once per week or several times per month	4 (25%)	3 (19%)	4 (27%)	0 (0%)
Once per month	1 (6%)	1 (6%)	0 (0%)	0 (0%)
Infrequently or unknown	2 (13%)	3 (19%)	1 (7%)	1 (7%)
Never	0 (0%)	0 (0%)	0 (0%)	0(0%)
Total	**16**		**15**	

Hypoglycemia: Blood glucose level below 70 mg/dL (3.9 mmol/L, 0.7 g/L)
Hyperglycemia: Blood glucose level above 180 mg/dL (10 mmol/L, 1.8 g/L)

29% Reported still experiencing **daily hypoglycemia** after pancreatectomy and **all participants reported experiencing both hypo- and hyperglycemia following subtotal pancreatectomy**

"His blood sugars were anywhere between 400 [mg/dL] and 40 [mg/dL' in a given day on medication."—Caregiver

"The insulin does not always work because it isn't--the diabetes that I have isn't as predictable as regular diabetes. Sometimes we will do the correct amount, but it will still just be high during the night. That can sometimes affect me. Then during the day, I would say being active can make my sugar go low."—Teenager with HI

DISCUSSION

- Subtotal pancreatectomy is considered when medical therapies are insufficient to prevent hypoglycemia.
- Subtotal pancreatectomy for diffuse HI is not curative and leads to substantial long-term health impacts and quality of life burdens.
- **The patient and caregiver insights highlighted three key areas for improvement**, including:
  - ✓Increasing clinician knowledge of HI and expertise in managing hypo- and hyperglycemia following subtotal pancreatectomy
  - ✓Improved pre-surgical counseling and patient or caregiver education, including expectations and glycemic management at home
  - ✓New therapies that eliminate the need for subtotal pancreatectomy for severe cases of diffuse HI

The authors would like to thank the patients and caregivers for their contribution to HIGR and participation in the interview study.

Learn more about HIGR!