EPH47

Common and Serious Complications Among Patients with Glycogen Storage Disease Type III (GSD III)

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INTRODUCTION

- Glycogen Storage Disease Type III (GSD III) is a rare inherited deficiency of glycogen-debranching enzyme[1,2]
- GSD III is characterized by organ dysfunction due to glycogen accumulation in tissues (primarily liver, heart, and skeletal muscle) and may present as hepatomegaly, hypoglycemia, hyperlipidemia, or growth delay[1,2]
- Currently, there are no approved treatments for GSD III
  - Management practices to avoid hypoglycemia and preserve skeletal and cardiac muscles include a high-protein diet and uncooked cornstarch supplementation[2]
- The burden of complications associated with GSD III is not well characterized

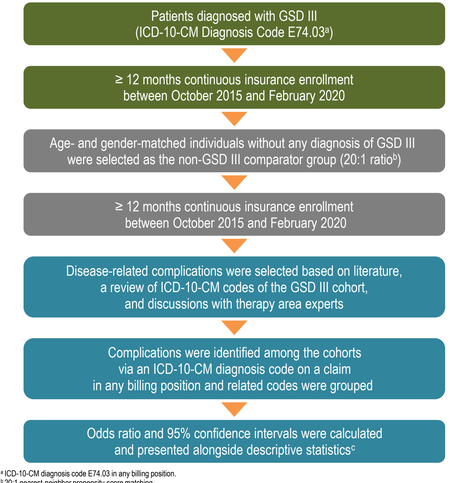
OBJECTIVES

- This retrospective cohort study investigated common and serious complications among patients in the US diagnosed with GSD III

METHODS

- The PearlDiver claims database with Mariner research set was used for this exploratory analysis[3]
  - Includes 122 million distinct patients across the entire US and territories and all payer types

Figure 1. Patient population and inclusion criteria



[a] ICD-10-CM diagnosis code E74.03 in any billing position.
[b] 20:1 nearest-neighbor propensity-score matching.
[c] Patient counts of 1–10 were rounded up to 10 for the comparator group for conservative reporting purposes (unable to disclose exact numbers between 1–10 due to dataset privacy policy).
GSD III, Glycogen Storage Disease Type III; ICD-10-CM, International Classification of Diseases, Tenth Revision, Clinical Modification.

RESULTS

Patient Demographics

- In total, 230 unique patients with GSD III and 4600 comparators were included **(Table 1)**
  - Approximately half were pediatric patients (52%) and half were female (50%)
  - Mean age at index was 24.3 years and mean duration of enrollment was ~3.5 years

Table 1. Baseline demographics were similar between groups

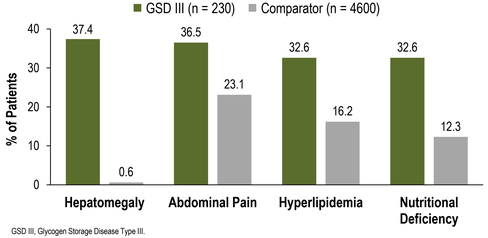
Characteristic	GSD III	Comparator
Total Number of Patients	230	4600
Female, n (%)	116 (50)	2320 (50)
Male, n (%)	114 (50)	2280 (50)
Overall Age (years) – mean (SD)	24.3 (22.5)	24.3 (22.4)
Pediatric (age 0-17), n (%)	120 (52)	2400 (52)
Adult (age ≥ 18), n (%)	110 (48)	2200 (48)
Plan Type – n (%)		
Commercial	162 (70)	3363 (73)
Medicaid	37 (16)	768 (17)
Medicare	20 (9)	273 (6)
Government[a]	(<5)[b]	64 (1)
Not Available	(<5)[b]	132 (3)
Region – n (%)		
Midwest	43 (19)	1127 (25)
Northeast	50 (22)	883 (19)
South	88 (38)	1899 (41)
West	47 (20)	658 (14)
Unknown	()[b]	33 (1)
Enrollment (years) – mean (SD)	3.6 (1.0)	3.5 (1.0)

[a] Government plans include US Department of Veterans Affairs (VA), Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), Title V, Federal Employees' Compensation Act (FECA), and other federal plans.
[b] Unable to report exact patient numbers between 1-10 for privacy reasons.
GSD III, Glycogen Storage Disease Type III.

Most Common Complications of GSD III

- Complications were diagnosed among 96.1% of patients with GSD III versus 74.8% of non-GSD III comparators

Figure 2. Hepatomegaly, abdominal pain, hyperlipidemia, and nutritional deficiency were the most common complications among patients with GSD III

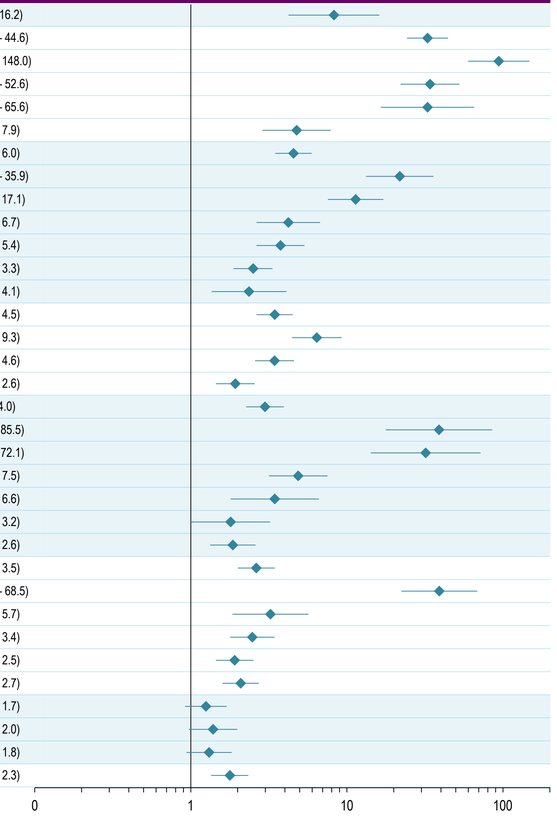


GSD III, Glycogen Storage Disease Type III.

Complications Among Patients with GSD III

Figure 3. Patients with GSD III were significantly more likely to have hepatic, cardiovascular, nutritional, musculoskeletal, and gastrointestinal complications compared with non-GSD III comparators

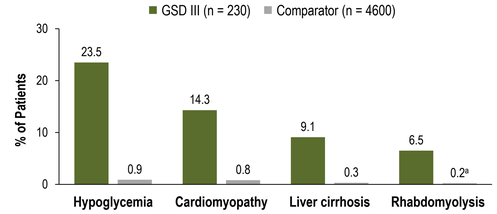
	GSD III (n = 230)	Comparator (n = 4600)	OR (95% CI)
Any	96.1%	74.8%	8.3 (4.2 – 16.2)
Overall Hepatic	53.9%	3.4%	32.9 (24.3 – 44.6)
Hepatomegaly	37.4%	0.6%	94.1 (59.9 – 148.0)
Hypoglycemia	23.5%	0.9%	34.1 (22.1 – 52.6)
Liver Cirrhosis	9.1%	0.3%	32.9 (16.5 – 65.6)
Fatty Liver	8.7%	2.0%	4.8 (2.9 – 7.9)
Overall Cardiovascular	53.0%	19.9%	4.6 (3.5 – 6.0)
Cardiomyopathy	14.3%	0.8%	21.9 (13.3 – 35.9)
Cardiomegaly	17.0%	1.8%	11.4 (7.6 – 17.1)
Heart Valve Disorder	10.0%	2.6%	4.2 (2.6 – 6.7)
Arrhythmia	18.7%	5.8%	3.8 (2.6 – 5.4)
Hyperlipidemia	32.6%	16.2%	2.5 (1.9 – 3.3)
Heart Failure	6.5%	2.9%	2.4 (1.4 – 4.1)
Overall Nutritional	57.0%	27.7%	3.5 (2.6 – 4.5)
Poor Growth	18.7%	3.5%	6.4 (4.5 – 9.3)
Nutritional Deficiency	32.6%	12.3%	3.4 (2.6 – 4.6)
Other Nutritional[a]	32.2%	19.8%	1.9 (1.5 – 2.6)
Overall Musculoskeletal	37.0%	16.4%	3 (2.3 – 4.0)
Myopathy	7.8%	0.2%[b]	39 (17.8 – 85.5)
Rhabdomyolysis	6.5%	0.2%[b]	32 (14.2 – 72.1)
Muscle Weakness	12.2%	2.8%	4.9 (3.2 – 7.5)
Osteoporosis	4.8%	1.4%	3.5 (1.8 – 6.6)
Muscle Pain (Myalgia)	5.7%	3.2%	1.8 (1.0 – 3.2)
Other Musculoskeletal[c]	20.0%	11.8%	1.9 (1.3 – 2.6)
Overall Gastrointestinal	63.5%	39.8%	2.6 (2.0 – 3.5)
Gastrostomy	15.2%	0.5%	39.1 (22.4 – 68.5)
Intestinal Gas	6.5%	2.1%	3.2 (1.9 – 5.7)
Diarrhea	21.7%	10.1%	2.5 (1.8 – 3.4)
Abdominal Pain	36.5%	23.1%	1.9 (1.5 – 2.5)
Other Gastrointestinal[d]	43.5%	26.9%	2.1 (1.6 – 2.7)
Overall Psychiatric	24.3%	20.5%	1.3 (0.9 – 1.7)
Depression	16.5%	12.5%	1.4 (1.0 – 2.0)
Anxiety	19.6%	15.6%	1.3 (0.9 – 1.8)
Other[e]	62.6%	48.5%	1.8 (1.4 – 2.3)



[a] Other nutritional includes obesity, feeding difficulties, and deficiency anemia.
[b] Patient counts of 1–10 were rounded up to 10 for the comparator group for conservative reporting purposes (unable to disclose exact numbers between 1–10 due to dataset privacy policy).
[c] Other musculoskeletal includes generalized weakness and fracture.
[d] Other gastrointestinal includes gastroesophageal reflux disease (GERD) and nausea/vomiting.
[e] Other includes fatigue, obstructive sleep apnea, type 2 diabetes, and chest/limb/unspecified pain.
CI, confidence interval; GSD III, Glycogen Storage Disease Type III; OR, odds ratio.

Serious Complications of GSD III

Figure 4. Serious complications among patients with GSD III were hypoglycemia, cardiomyopathy, liver cirrhosis, and rhabdomyolysis



[a] Patient counts of 1–10 were rounded up to 10 for the comparator group for conservative reporting purposes (unable to disclose exact numbers between 1–10 due to dataset privacy policy).
GSD III, Glycogen Storage Disease Type III.

DISCUSSION

- **Key Findings**
  - GSD III is associated with a high prevalence of complications, including hypoglycemia, liver cirrhosis, cardiomyopathy, heart failure, and myopathy
  - The incidence of cirrhosis reported in our study (9.1%) is higher than reported in Sentner et al (2.3%),[2] but lower than reported in Hijazi et al (44%),[4] indicating that long-term liver complications are an under-recognized problem in this patient population
- **Limitations**
  - Payment records in claims databases are based on diagnostic coding that may be driven by reimbursement concerns and may or may not accurately reflect the true medical condition
  - Complication severity could not be differentiated or accurately identified in claims data
  - Unable to determine how patients were being managed as common therapeutics, such as cornstarch, are not available in claims databases
  - Due to the small sample size, multiple GSD III diagnosis codes were not required, nor we were able to compare pediatric vs adult complications
- **Conclusions**
  - There is a large unmet medical need for patients with GSD III
  - Future studies may assess healthcare resource utilization among this population

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3. PearlDiver Mariner Patient Claims Database (PearlDiver Technologies, Colorado Springs, CO, USA).
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