EFFECT OF TRISOMY 21 ON LONG-TERM GASTROINTESTINAL OUTCOMES IN DUODENAL ATRESIA

A case control study comparing bowel outcomes in duodenal atresia children with Trisomy 21 and without Trisomy 21.

Suyin A. Lum Min[1,2], Emmanuel A. Bello[1], Anna Zrinyi[2], Charanpal Singh[2], Richard Keijzer[1,2]

[1]University of Manitoba, Department of Surgery, Division of Pediatric Surgery, Winnipeg, MB, CANADA, [2] Children's Hospital Research Institute of Manitoba, Winnipeg, MB, CANADA

INTRODUCTION

- Duodenal atresia (DA) is a congenital condition in which the small bowel distal to the pylorus and proximal to the ligament of Treitz is completely or partially obstructed.
- Approximately 1/3 of children with duodenal atresia have Trisomy 21 (T21). Almost 4 percent of children Trisomy 21 have duodenal atresia.
- It is unclear if, and how, management of duodenal atresia with Down syndrome should differ from duodenal atresia alone.

AIM

The purpose of this study was to perform a comparison of specific gastrointestinal (GI) outcomes in children with duodenal atresia and Trisomy 21 compared to children with duodenal atresia but without Trisomy 21.

Gastrointestinal outcomes we looked at:

- esophageal dysfunction
- ulcerative diseases
- intestinal obstruction
- gastric dysfunction

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METHOD

- Identified all children born with duodenal atresia between 1991-2017 from a large database.
- Long-term outcomes were defined as the time after discharge following duodenal obstruction repair.
- Control cohort: 10 date-of-birth matched controls from general population for each duodenal atresia patient from a government data repository
- Baseline characteristics: gestational age at birth, birth weight, sex, 1- and 5-minute APGAR scores and length of hospital stay after birth
- Covariates: sex, socioeconomic status, birth year
- Gastrointestinal outcomes were measured using International Classification of Diseases version 9 (ICD-9) codes
- Risk ratios (RR), rate ratios (RaR), Cox hazard ratio models and Cox recurrent hazard models were constructed for each disease
- Risk: # of individuals diagnosed with ailment of interest
- Rate: # of times diagnosed individual had a complaint
- Analyses:
  - Duodenal atresia cases vs. controls
  - Duodenal atresia and Trisomy 21 vs. duodenal atresia only cases

RESULTS

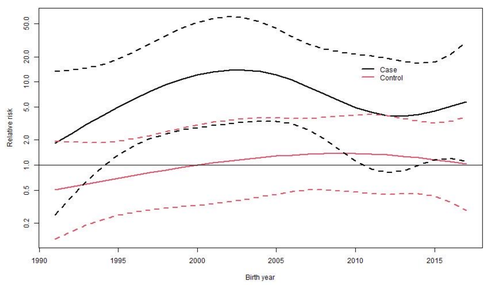

Figure 1. Plot of the relative risk for duodenal atresia cases and controls using a control born in the year 2000 as a reference

RESULTS

Table 1. Comparison of GI diseases between T21 and non-T21 cases.

DISEASE	RISK RATIO		POISSON RATE RATIO		COX HAZARD RATIO		COX RECURRENT HAZARD RATIO	
	Risk ratio	p	Rate ratio	p	HR	p	HR	p
ESOPHAGEAL	4.09	0.002	69.8	<0.001	6.50	0.002	12.7*	<0.001
ULCERATIVE	0.82	1	1.38	0.5	0.91*	0.9	0.86*	0.8
OBSTRUCTIVE	0.91	1	0.57	0.003	0.75	0.6	0.39	0.042
STOMACH	2.39	0.17	6.20	<0.001	2.61	0.090	2.29	0.13

HR Hazard ratio

*Failed Schoenfeld assumption test

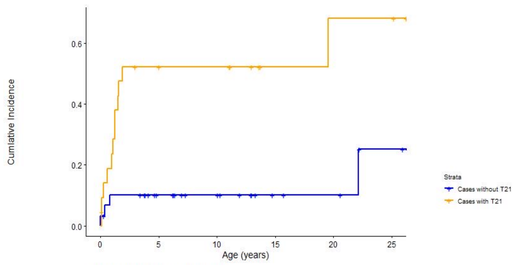

Figure 2. Cumulative incidence of individuals with esophageal diseases for cases with Trisomy 21 and cases without Trisomy 21.

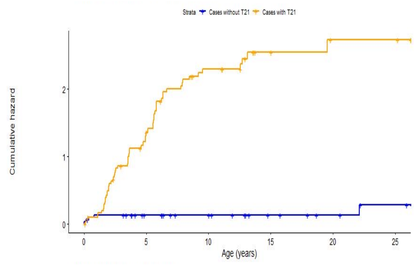

Figure 3. Cumulative incidence of esophageal presentations for cases with Trisomy 21 and cases without Trisomy 21.

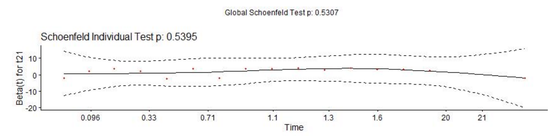

Figure 4. Global Schoenfeld residuals test for the Cox proportional hazard model of esophageal dysfunction for cases with and without Trisomy 21. Appears valid.

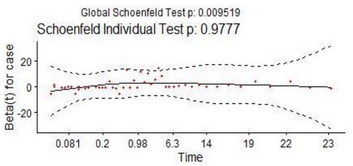

Figure 5. Schoenfeld residuals test for the Cox proportional hazard plots for the duodenal atresia cases compared to controls examining esophageal diseases.

CONCLUSION

- More Trisomy 21 cases had esophageal complaints and the number of esophageal complaints was greater than cases without Trisomy 21.
- Risk and rate of esophageal diagnoses varied by year suggesting changes in diagnoses or treatment plans
- Ulcerative disease was unaffected by Trisomy 21.
- The risk of an obstructive diagnosis was no different between cases but Trisomy 21 cases complained of obstructive symptoms less.
- Stomach diseases diagnoses were no different Trisomy 21 cases and but the frequency with which Trisomy 21 cases complained of stomach issues was greater.
- Overall, more long-term gastrointestinal complications for Trisomy 21 cases.

Contact:

Dr. Suyin A. Lum Min

slummin@hsc.exchange.ca

The Children's Hospital Research Institute of Manitoba

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