BURDEN AND SHORT-TERM OUTCOME OF CONGENITAL GASTROINTESTINAL SURGICAL CONDITIONS IN MALAYSIA: WHERE DO WE STAND?

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Introduction

Many congenital anomalies which were once considered fatal are now surgically treatable and allow affected children to have near normal life. However, despite advances in surgical care, technology and recognition for specialised surgical needs for children separate from adults, sparse data are still available with regards to the delivery of paediatric surgical care in the low (LIC) to middle income (MIC) countries. Children contributes to the overall number of about one third of Malaysian population with the highest percentage reported to be at the central region[1]. Using the reference of study protocol used by the Global PaedSurg[2] study group, we aimed to analyze the burden and short term outcomes of common congenital gastrointestinal anomalies within different regions across Malaysia.

Objectives

- The study conditions of interest were oesophageal atresia (OA), congenital diaphragmatic hernia (CDH), intestinal atresia, gastroschisis, exomphalos, anorectal malformation (ARM) and Hirschsprung's disease
- The primary objectives of this study were to provide prospective benchmark data on:
  - (i) demographics pattern of the study population
  - (ii) analyze incidence of studied congenital anomalies across Malaysia
  - (iii) study the preoperative profiles and conditions of the study population
  - (iv) measure types of primary intervention
  - (v) analyze specific surgical related outcomes
  - (vi) addressing factors affecting each outcome

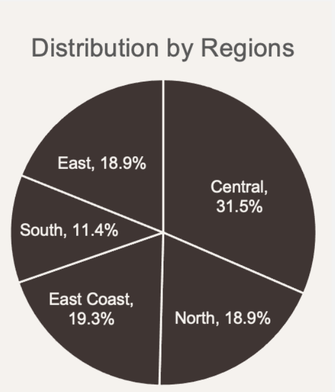
Methodology

Using the reference study protocol by the Global PaedSurg[2] study group, we conducted a multicentre, 30-day prospective cohort study for children presenting for the first time with any of these conditions i.e. OA, CDH, intestinal atresia, gastroschisis, exomphalos, ARM and Hirschsprung's disease during a consecutive six-months period between October 2021 until April 2022. All 14 public hospitals in Malaysia with specialist paediatric surgery services as of October 2021 were involved. We compared data across geographic regions: Northern, Central, East Coast and Southern regions of Peninsular Malaysia and East Malaysia. Ethical approval was obtained (NMRR-21-1581-60349).

Results

Total, n=228 patients

Region	n	%	n (%) by region
Central	57	25%	72 (31.5)
	9	3.9%	
	6	2.6%	
North	26	11.4%	43 (18.9)
	13	5.7%	
	4	1.8%	
East Coast	1	0.4%	44 (19.3)
	13	5.7%	
	10	4.4%	
	20	8.8%	
South	20	8.8%	26 (11.4)
	6	2.6%	
East Malaysia	26	11.4%	43 (18.9)
	17	7.5%	



STUDY CONDITIONS

Total patients = 228
Total cases = 242

	n (%)
Oesophageal atresia (OA)	28 (12.3%)
Congenital diaphragmatic hernia (CDH)	36 (15.8%)
Intestinal atresia	49 (21.5%)
Gastroschisis	12 (5.3%)
Exomphalos	8 (3.5%)
Anorectal malformation (ARM)	77 (33.8%)
Hirschsprung's disease (HD)	32 (14.0%)

% does not add up to 100% because of patients presenting with multiple conditions

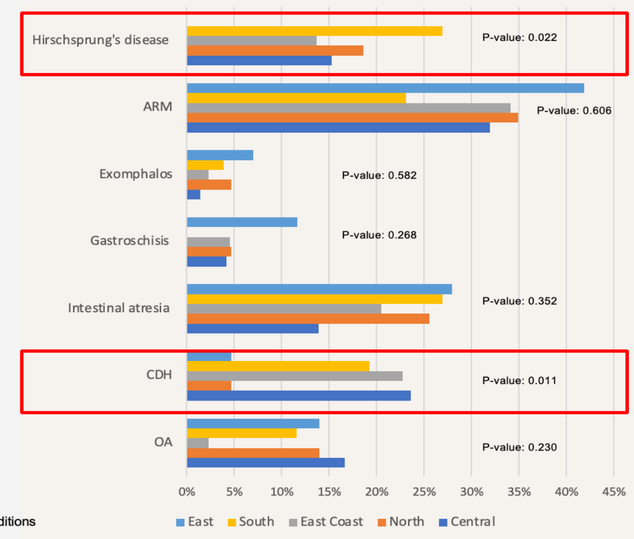
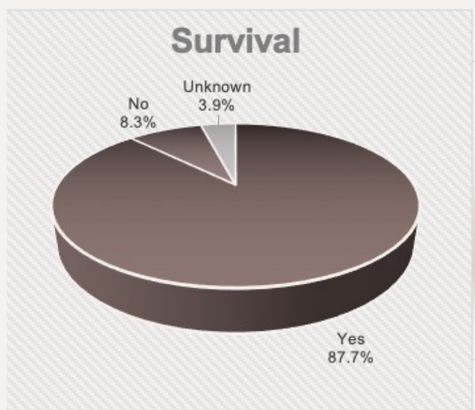
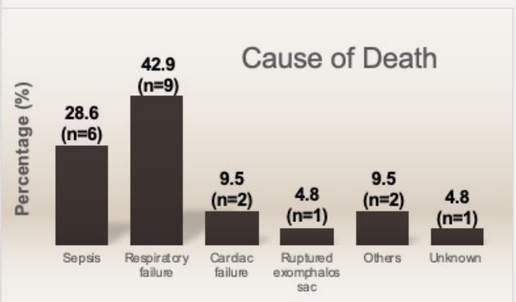


Table: Peri-operative care

	Total (n=228)	Central (n=72)	North (n=43)	East Coast (n=44)	South (n=26)	East (n=43)	P-value*
Primary intervention	209 (91.7%)	68 (94.4%)	39 (90.7%)	35 (79.5%)	25 (96.2%)	42 (97.7%)	0.018
Time from arrival to intervention, h	24 (12, 55)	24.5 (8, 60)	24 (12, 48)	48 (24, 72)	24 (12, 51)	20 (16, 34)	0.0568
Type of anaesthesia							<0.001
GA	174 (76.3%)	54 (75.0%)	33 (76.7%)	33 (75.0%)	18 (69.2%)	36 (83.7%)	
Ventilation, yes	146 (64.0%)	50 (69.4%)	25 (58.1%)	28 (63.6%)	19 (73.1%)	24 (55.8%)	0.441
Parenteral nutrition, yes	114 (54.5%)	33 (45.8%)	22 (51.2%)	25 (56.8%)	12 (46.2%)	22 (51.2%)	0.773

[1]Median (interquartile range); *Chi-square test for proportion and Kruskal-Wallis test for median - Comparison between regions





Total cases	242			
Died				
	No. of cases (a)	Died (b)	% died by cases (b)/(a)	% died of total cases (b)/total (242)
Gastroschisis	12	0	0.0%	0.0%
CDH	36	12	33.3%	5.0%
OA	28	4	14.3%	1.7%
Intestinal atresia	49	2	4.1%	0.8%
ARM	77	2	2.6%	0.8%
Hirschprung's disease	32	0	0.0%	0.0%
Exomphalos	8	2	25.0%	0.8%

19 patients, 22 study conditions

Discussion &Conclusion

- We concluded our overall mortality rate to be 8.3%, which is much lower in comparison to the rate in MICs from the Global PaedSurg study which reported mortality rate of 39.8% in LICs, 20.4% in MICs and 5.6% in HICs[2]
- The highest risk of mortality from the same study was reported by CDH and the lowest was by Hirschsprung's disease[2], comparable with our local data whereby our rate of mortality for CDH and Hirschsprung's disease were 33.3% and 0.0% respectively
- Another comparison study in Africa reported high incidence of mortality for gastroschisis and ARM in comparison to HICs, at 75.5% vs 2.0% and 11.2% vs 2.9% respectively[3]. This pattern, however were not seen from our study.
- Our overall leading cause of death were sepsis and respiratory failure, similar to the Global PaedSurg study[2]
- There were only 14 public hospital in Malaysia, all of which are tertiary with paediatric surgery services as of October 2021. Only 11 hospitals from this total of 14 are under Malaysian Ministry of Health (MOH)[4]
- Our result showed that overall mortality rate in Malaysia is lower than reported by the Global PaedSurg group for middle income countries at 20.4% while morbidity rate varies.

Limitations & Strength

Limitations:

- Small sample size
- Limited time frame for data collection
- Did not include private hospitals and patients managed remotely in secondary centres without in-house paediatric surgeon

Strength:

- First nationwide collaborative, multicentre study among paediatric surgeons in Malaysia

References:
1. Malaysia DoS. Children Statistics, Malaysia, 2021. 2021.
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3. Collaboration PAR. Paediatric surgical outcomes in sub-Saharan Africa: A multicentre, international, prospective cohort study. BMJ Glob Health. 2021;6(9).
4. Malaysia DoS. Children Statistics, Malaysia, 2021. 2021.