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Background

Complication rates following hypospadias surgery are variable and given that hypospadias may be associated with a genetic or an endocrine condition, hypospadias outcome may depend on several clinical factors that require exploration

Objectives

To perform a systematic review of cases of hypospadias operated at one tertiary centre to identify clinical determinants of optimal outcome.

Methods

Retrospective review of clinical records of all cases that were reported to have undergone hypospadias surgery according to operating theatre records at the Royal Hospital for Children, Glasgow between 2009 and 2015. Details of all relevant clinical evaluations, associated genital and non-genital malformations, and timing of surgery, complications and reoperation were collected.

Results

Of 748 boys, 626 with complete data were included. Distal, middle, proximal and unknown forms of hypospadias were reported in 422 (67%), 108 (17%), 80 (13%) and 16 (3%) respectively. An extra-genital congenital anomaly was reported in 139 (22%) boys (Fig1) and 62 (10%) had more than one anomaly. Of the 626 boys, 54 (9%), including 44 with proximal hypospadias had endocrine as well as some limited genetic evaluation (Table 1). Of these, 10 (19%) had biochemical evidence of hypogonadism and 5 (9%) had a molecular genetic abnormality. At least one complication was reported in 167 (27%) of patients with 20% of complications occurring after 2 years of surgery; fistula was the most frequent complication reported in 78 of the 167 (47%) cases. The severity of hypospadias and existence of other anomalies were clinical factors that were independently associated with an increased risk of complications ($p < 0.001$) (Table 2), but endocrine abnormalities, type of procedure and age at primary surgical repair were not associated to outcome.

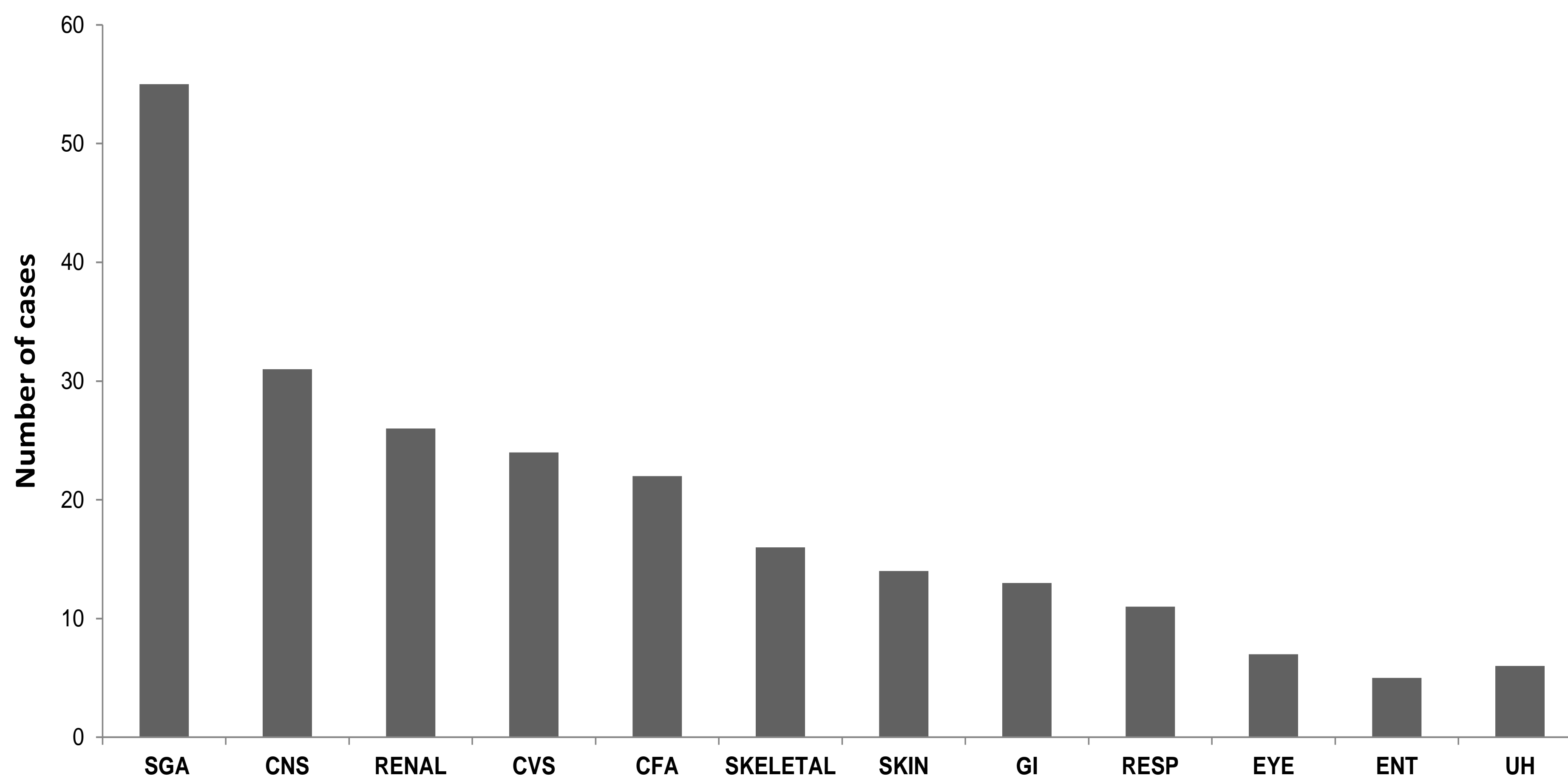


Figure 1. Frequency of extra-genital anomalies
Abbreviation: SGA, small for gestational age; CNS, central nervous system; CVS, cardiovascular system; CFA, craniofacial anomaly; GI, gastrointestinal; RESP, respiratory; UH, umbilical hernia

Conclusions

Complications following surgery are more likely in those cases that are proximal or who have additional extra-genital anomalies. To understand the biological basis to these complications, there is a greater need to understand the aetiology of such cases.

	Normal endocrine and/or genetic evaluation N=44	Abnormal endocrine and/or genetic evaluation N=10	P-value
<i>Type of hypospadias</i>			0.088
Distal	5	0	
Middle	4	0	
Proximal	35	9	
Unknown	0	1	
<i>Presence of extra-genital anomalies</i>	24 (55%)	7 (70%)	0.372
<i>Median EMS (2.5th, 97.5th)</i>	9 (3,10)	5 (1,9)	0.007
<i>Median age at first hypospadias surgery (2.5th, 97.5th) (months)</i>	23 (14.5,142.7)	27(18,109)	0.456

Table 1. Characteristic of cases that had endocrine and genetic evaluation.
EMS: External Masculinisation Score (max score, 12).

	N= 80	P value	Odds Ratio (95%CI)
<i>Associated genital anomalies</i>		0.648	
No	40		1 (reference)
Yes	40		1.334 (0.388 - 4.586)
<i>Extra-genital anomalies</i>		0.002*	
No	45		1 (reference)
Yes	35		5.593 (1.930 - 16.205)
<i>Endocrine evaluation</i>		0.576	
Not evaluated	36		1 (reference)
Normal evaluation	35		1.464 (0.414 - 5.174)
Abnormal evaluation	9		3.255 (0.357 - 29.696)
<i>Age at the first surgical repair</i>		0.408	0.832 (0.538 - 1.287)
<i>Surgical procedure</i>		0.979	
Tubularized incised plate	17		1 (reference)
Snodgraft	6		1.145 (0.139 - 9.433)
Staged procedure	55		0.817 (0.240 - 2.784)
Unknown	2		NA

Table 2. Association between the risk factors and post-surgical complication in cases of proximal hypospadias