Supplemental Table 1. Patients with congenital GHD and known mutations in genes for pituitary development or GH secretion, and numbers of patients who also had pituitary abnormalities

Gene	Total number of patients with mutations	Septo-optic dysplasia	Ectopic posterior pituitary	Pituitary aplasia	Stalk defects	Pituitary hypoplasia	Pituitary enlargement	Unspecified pituitary abnormality	Pituitary abnormalities / mutations	Triad
GH1	33	0	0	0	0	4	0	1	5/33 (15%)	0
GHRHR	14	0	1[a]	0	0	1	0	0	2/14 (14%)	0
GHRHR, SOX3	1	0	0	0	0	0	0	0	0/1	0
GLI2	3	0	1	0	1	1	0	0	3/3 (100%)	1
HESX1	7	0	4	1	2	0	0	0	7/7 (100%)	2
LHX3	4	0	0	0	0	1	0	0	1/4 (25%)	0
POU1F1	5	0	0	0	0	0	0	0	0/5	0
PROP1	53	0	1[b]	0	0	10	4	4	19/53 (36%)	0
Total	120	0	7	1	3	17	4	5	37/120 (31%)	3

Abnormal pituitary development categories were based on a pre-determined hierarchical diagnostic scheme of potentially overlapping categories in descending order of expected severity, where for example patients with SOD were included in the category of SOD irrespective of the presence of additional abnormalities further down the hierarchy, and thus the SOD category could include patients who also had EPP, but the EPP category could not include patients who had SOD; [a]patient with IGHD and reported EPP and pituitary hypoplasia; [b]patient with multiple pituitary hormone deficiencies and reported EPP

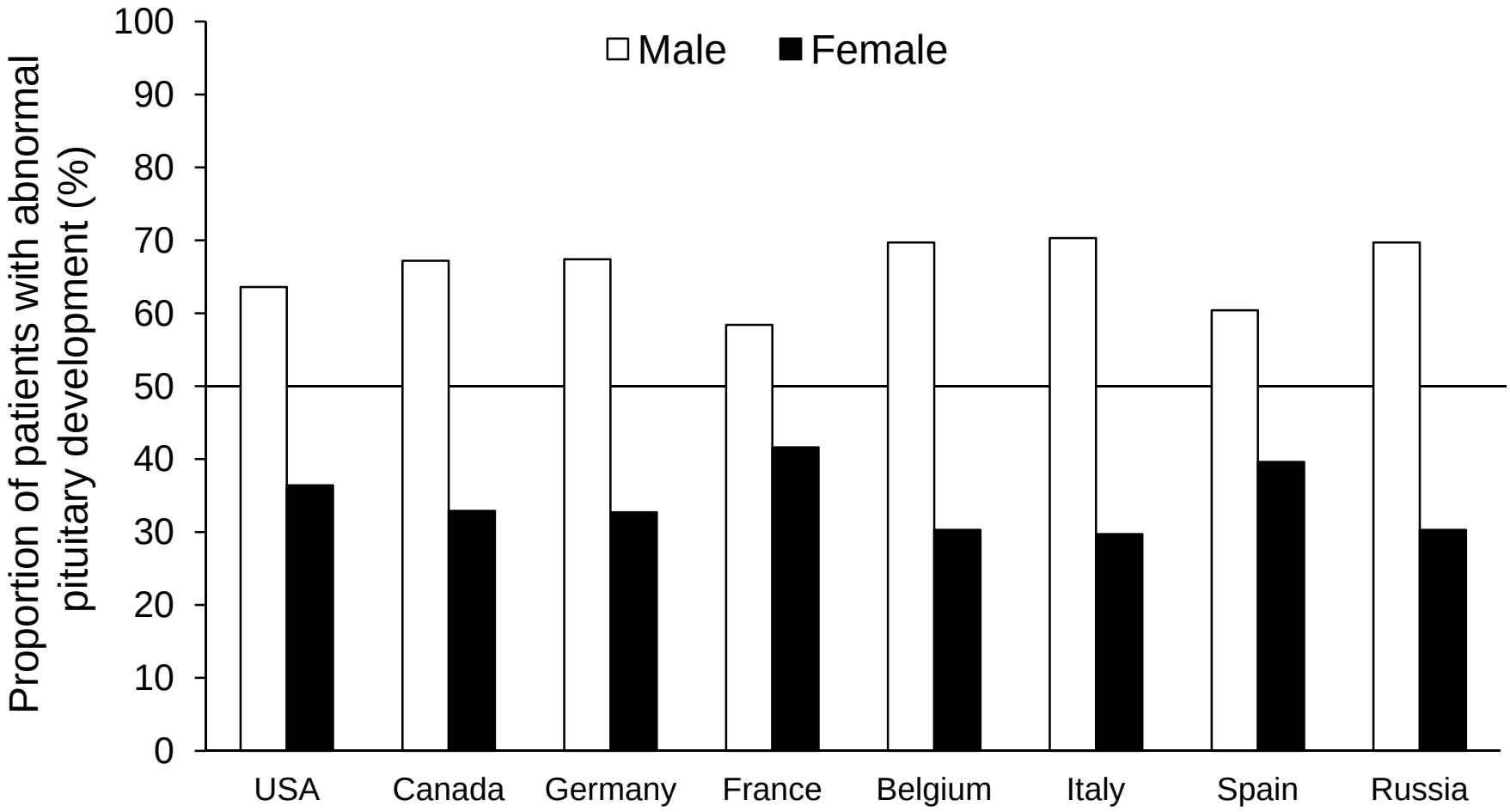
Supplemental Table 2. Multiple pituitary hormone deficiencies at baseline in patients with congenital GHD with septo-optic dysplasia vs. patients with triad components

	Septo-optic dysplasia	Ectopic posterior pituitary	Pituitary aplasia	Stalk defects	Pituitary hypoplasia	p value by ANCOVA
Max GH <5 µg/liter	103 (50.7%)	220 (68.8%)***	43 (56.6%)	58 (66.7%)*	171 (50.0%)	<0.001
TSH deficiency	75 (37.0%)	99 (30.9%)	29 (38.2%)	21 (24.1%)	62 (18.1%)***	<0.001
ACTH deficiency	82 (40.4%)	83 (25.9%)**	27 (35.5%)	23 (26.4%)*	35 (10.2%)***	<0.001
LH/FSH deficiency [a]	9 (4.4%)	35 (10.9%)*	14 (18.4%)**	6 (6.9%)	23 (6.7%)	0.001
ADH deficiency	22 (10.8%)	6 (1.9%)***	3 (4.0%)	4 (4.6%)	3 (0.9%)***	<0.001
Prolactin deficiency	3 (1.5%)	9 (2.8%)	4 (5.3%)	1 (1.2%)	13 (3.8%)	0.300
Prolactin abnormally high	9 (4.4%)	21 (6.6%)	2 (2.6%)	6 (6.9%)	1 (0.3%)**	<0.001

Categories are mutually exclusive, based on the pre-determined hierarchical scheme in order of severity, and each category can contain patients with additional abnormalities from categories to the right but not to the left.

[a] Tanner stage 1 for 68-77% depending on category; *p < 0.05, **p < 0.01, ***p < 0.001 versus septo-optic dysplasia group.

Supplemental fig. 1



Supplemental Fig. 1. Proportion of males and females in patients with abnormal pituitary development in countries where more than 35 patients with abnormal pituitary development were included.