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BACKGROUND

Controversy exists regarding the age limits for routinely performing MRI in girls with Central Precocious Puberty (CPP).

OBJECTIVE

- To evaluate the outcome of brain MRI in girls diagnosed with CPP and its relationship with age and clinical and biochemical parameters.

METHOD

- 381 girls with CPP from single-center, who had brain imaging between 2008-2018.
- Imaging Results:**
 - Group 1: Normal
 - Group 2: incidental CNS lesions
 - Group 3: previously known CNS lesions
 - Group 4: newly identified CNS lesions
- Clinical and biochemical features of four groups were compared.
- MRI lesion frequency was determined based on three age categories (<6 y, 6-8, >8 years)

RESULTS

MRI findings were abnormal in 73 patients (19%).

- 18 girls (4.7%) had known brain pathologies at the time of referral.
- In the remaining 363 girls with CPP, who had no neurological symptoms;
 - MRI revealed CNS abnormalities in 55 girls.
 - In 34 girls (8.9%) MRI findings were considered as incidental findings, which were not related to CPP
 - Another 21 girls (5.5%) had newly identified MRI abnormalities which were considered to be causally related to CPP.
- There were only 2 tumoral lesions (0.5%) in the cohort (1 hamartoma and 1 glioma) and they required surgical intervention.
- These two cases were the youngest of the entire cohort (1.0 and 2.7 years of age respectively) and had the highest baseline LH and Estradiol levels.
- Clinical and biochemical parameters were similar in 4 groups.
- Newly identified CNS lesions (except above mentioned two tumours) were detected throughout all ages including those above 8 years (Table 1).

Table 1. Clinical and biochemical characteristics according to brain MRI findings

	Normal MRI	Known CNS lesion	Incidental lesion	New MRI lesion
N: 381	308/381(%80)	18/381(%4.7)	34/381 (%8.9)	21/381 (%5.5)
Age <6 years (N: 54)	39/308 (%72)	6/18 (%11)	6/34 (%11)	3/21 (%5)
Age 6-8 years (N: 170)	146/308 (%85)	6/18 (%3.5)	13/34 (%7.5)	5/21 (3)
Age >8 years (N: 157)	123/308 (%78)	6/18 (%4)	15/34 (%9.5)	13/21 (%8)
Age at admission	7.6 ± 1.5	6.7 ± 2.06	7.4 ± 2.1	7.4 ± 2.14
Breast stage	3.0 ± 0.77	3.3 ± 0.69	3.3 ± 0.87	2.9 ± 0.94
Bone age at admission	9.3 ± 2.05	7.8 ± 3.06	9.4 ± 2.81	8.9 ± 2.46
Bone age-Chronological age	1.8 ± 1,2	1.1 ± 1.41	2.1 ± 1.20	1.5 ± 1.3
Basal E2 (pg/ml)	19.2 ± 19.1	23.8 ± 13.03	21.7 ± 29.48	20.5 ± 15.31
Basal LH (mIU/ml)	0.95 ± 1.43	1.37 ± 1.5	1.9 ± 2.30	1.0 ± 1.16
Peak LH on LHRH testing	8.8 ± 10.8	12.46 ± 10.3	8.8 ± 8.38	11.1 ± 9.10
Peak LH/FSH ratio	0.63 ± 0.59	1.0 ± 1.14	0.6 ± 0.77	0.8 ± 0.67
Uterine length(mm)	33.1 ± 9.12	33.8 ± 13.39	36.1 ± 13.39	34.9 ± 10.2

Table 2. Characteristics of MRI findings in the study population.

Incidental lesion (34)	Known CNS lesion (18)	New MRI lesion (21)
Cyst of pars intermedia 12 Rathke's cleft cyst 6 Pituitary microadenoma 7 Empty sella 3 Pituitary hypoplasia 3 Increase in pituitary volume 1 Enlarged cisterna magna 1 cavum septum pellicidum 1	Hydrocephalus 10 Neurofibromatosis 1 Tuberous sclerosis 1 Meningitis 2 Gliosis 1 Agenesis of corpus callosum 2 Encephalitis 1	Arachnoid cyst 6 Pineal cyst 3 Hydrocephalus 3 Arnold Chiari Malformation 1 Dandy Walker malformation 1 Hypothalamic hamartoma 1 Glioma 1 Gliosis 5

CONCLUSION

- Although CNS lesions can be detected throughout all age categories in girls with CPP, only 5.5 % are causally related and most of them do not require intervention
- CPP due to neoplastic lesions are detected in younger patients who also had a robust activation of pituitary-gonadal axis