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THE IMPACT OF COVID 19 ON PAEDIATRIC TYPE 1 DIABETES AND DKA PRESENTATIONS IN A PERIPHERAL HOSPITAL IN IRELAND

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The purpose of our study was to identify any change in the presentation rates of children with type 1 diabetes or diabetic ketoacidosis (DKA) to our hospital during the first wave of the Covid 19 pandemic.

In Ireland, the first case of Covid 19 was reported on the 29th of February 2020. Schools were closed on the 1st of March 2020. Initial restrictions were implemented on the 15th of March 2020 and the first lockdown spanned from the 27th of March to the 18th of May 2020, while the second one lasted from the 15th of September to the 1st of December 2020 (1).

We retrospectively studied presentations of children with diabetes and DKA to our hospital, which serves the population of County Wexford, Ireland, during the first 7 months of the Covid 19 pandemic from the 18th of March 2020 to the 30th of November 2020, comparing them to presentations in the same months of the previous year, 2019. We extracted data from the hospital Diagnosis Related Groups (DRG) database.

All children with type 1 diabetes who were admitted to the hospital through emergency department (ED) including those who presented with DKA and were managed as per HSE DKA guidelines (2) were included in our study. We did not include children with diabetes who attended the ED but were not admitted.

Admissions of children 1929 (2019) 714 (2020)

Admissions of children due to diabetes: 19 (2019) 15 (2020)

Admissions of children with diabetes, not DKA 12 (2019) 9 (2020)

Admissions of children in DKA 7 (2019) 6 (2020)

A decline in non-covid related admissions had been noted in many healthcare facilities. (3) In our Paediatric department there was a sharp decrease in the number of childhood admissions during the Covid 19 pandemic. Although the absolute numbers were similar, the proportion of admissions related to diabetes including DKA showed an upward trend during the pandemic in our hospital with the relative risk of 2.14 and the odds ratio of 2.16.

A change in the pattern of utilisation of health care and altered diabetes presentation has also been reported in other studies. (4,5) Covid 19 related stress, isolation, transport restrictions, post viral onset and changes in the life style may have been contributing factors.

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DISCREPANCY BETWEEN CLINICAL PRESENTATION AND SEX STEROID HORMONE VALUES IN A PREPUBERTAL GIRL

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Background Laboratory evaluation is crucial for accurate assessment of patients with endocrine disorders. When clinical

picture is in obvious contradiction with laboratory results, one should suspect and prove analytical interference.

Case presentation: a 6.7-year-old girl presented with sexual and axillary hair accompanied by adult-type body odor. She was tall (height SDS 2.6), with no other signs of virilisation and no breast development. Her bone age was slightly advanced (7.5 years), and laboratory workup showed markedly elevated levels of dehydroepiandrosterone sulphate (DHEAS), elevated testosterone and appropriate level of 17-hydroxyprogesterone (17-OHP) measured by electrochemical luminescence immunoassay (ECLIA). Subsequent investigations confirmed previous laboratory results, but also revealed elevated serum estradiol with no evidence of estrogen effect on uterus and no adrenal or adnexal mass. Cortisol level was unremarkable. During one year follow up, there were no changes in girl's clinical appearance, while levels of her sex steroids determined by ECLIA fluctuated from undetectable or slightly elevated to markedly elevated. There were no apparent risk factors for analytic interference (no biotin supplementation or drugs, negative rheumatoid factor, no hypergammaglobulinemia). When samples were reanalyzed with the addition of a blocking agent, significantly lower levels of serum sex steroids were obtained, while liquid chromatography tandem mass spectrometry (LC-MS/MS) revealed sex steroids appropriate for age.

Conclusion Laboratory interference is a drawback in hormonal testing.

Clinicians should have that in mind when faced with laboratory results discordant with patient's clinical presentation. Elevation of multiple sex steroid hormones in a prepubertal girl due to laboratory interference in immunoassay was finally unmasked by LC-MS/MS.

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HYPEROSMOLAR HYPERGLYCEMIC STATE IN A 7-YEAR-OLD BOY WITH NEWLY DIAGNOSED TYPE 1 DIABETES MELLITUS

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Hyperglycemic hyperosmolar state (HHS) is characterized by severe hyperglycemia and hyperosmolality without significant ketosis and acidosis. Although the incidence of HHS is increasing, it is considerably less frequent in children than diabetic ketoacidosis (DKA). We report a rare case of HHS as the first presentation of type 1 diabetes mellitus (T1DM) in a 7-year-old boy with previously diagnosed Joubert syndrome (JS). He presented to the emergency room with a 3-day history of vomiting. The symptoms of polydipsia and polyuria started several days earlier. On the day of admission he had been drinking an excess of beverages rich in sugars (approximately 800 -900 ml/day). At admission he was tachypnoic, normotensive and moderately dehydrated. It was difficult to assess his mental and neurological status because of JS, but his mother claimed that he was acting normally. Initial biochemistry results demonstrated severe hyperglycemia (115 mmol/l), hyperosmolality of 382 mOsm/kg (effective osmolality 353 mOsm/kg), mild acidosis (venous pH 7.31), hyponatremia (sodium 119 mmol/l; corrected for blood glucose: 138 mmol/L), severe glycosuria, and ketones in urine were negative. The diagnosis of HHS was made and the treatment with intravenous fluid was started and insulin administration begun later.

Serum glucose level normalized 20 hours after treatment started. The diagnosis of T1DM was made based on elevated blood antibodies against islet cells (ICA) and islet antigen 2 (IA-2) antibodies. He was discharged after 10 days without any complications related to HHS and is being regularly followed up. Since HHS has high mortality rate, early recognition and proper management are necessary for a better outcome.

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NEUROENDOCRINE TUMOURS OF THE APPENDIX

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Introduction Neuroendocrine tumours (NETs) are rare tumours in paediatric population. They are most often located at appendix and are usually diagnosed accidentally, as a result of pathohistological evaluation after appendectomy, following acute appendicitis. They are found in 0.3% appendectomies in children, more often in girls (56%), with median age of 12 years at the time of diagnosis. The prognosis is usually favourable and depends on the size and location of the tumour, protrusion into the mesoappendix, metastatic potential (Ki-67 index) and possible local metastasis. NET of the appendix can rarely be found as a part of some genetic diseases, such as multiple endocrine neoplasia (MEN) type 1 and 2, neurofibromatosis, tuberous sclerosis and von Hippel-Lindau disease. Due to the small number of individuals affected, there are no standardised diagnostic and therapeutic guidelines in paediatric population.

Case Report Here we report two cases of boys in whom pathohistological evaluation following appendectomies performed due to acute appendicitis revealed appendiceal NETs in both patients. The appendectomy upon the first patient was performed at 12.4 years of age. The tumour was located at the apex of the appendix, it was up to 0.5 cm in diameter, well differentiated, with low mitotic index (Ki-67 around 1%) and with clear resection margins. Family history revealed that the boy's grandfather was treated for appendiceal tumour at the age of 17 years. The other patient was operated at 12.8 years of age. The tumour was located at the apex of the appendix, in its muscular layer, with the length of 0.6 cm and Ki67 4% – grade 2 NET. During the follow-up (6 years and 2 months) neither relapse nor other tumours occurred. The additional diagnostic procedure revealed elevated parathormone levels (7.7...7.3...7.46 pmol/L, norm. 1.0-6.0 pmol/L), while blood calcium levels were at the upper limit of normal range (up to 2.57 mmol/L, norm. up to 2.53 mmol/L), blood phosphate levels were normal, vitamin D levels periodically lowered (60...51 nmol/L, norm. >75 nmol/L), despite the peroral substitution therapy, and the US examination of the neck was normal. Molecular genetic analysis did not reveal mutations characteristic for multiple endocrine neoplasia type 1.

Discussion Neuroendocrine tumours of the appendix have an excellent prognosis, particularly tumours smaller than 1 cm, with low mitotic index, located in the apex of the appendix and with clear resection margins. When such cases occur (as described here in two of our patients), appendectomy is considered a therapeutic method of choice. Our patients did not experience a relapse of the tumour. Furthermore, there were no signs of associated diseases during the follow-up (6.2 years

and 1 year), which is consistent with the data published in literature (a 100% survival rate and no evidence of relapse occurrence). Even though aforementioned tumours are described for the most part in girls, both of our patients are boys. Reports on patients with this rare form of appendiceal tumour will contribute to accumulation of data regarding the course and prognosis of the disease and will contribute to development of guidelines for treatment and monitoring of paediatric patients, which are currently insufficient.

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ADRENAL SUPPRESSION WITH GROWTH RETARDATION IN AN INFANT TREATED WITH TOPICAL OCULAR GLUCOCORTICOID

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Introduction Corticosteroid therapy can lead to severe iatrogenic adrenal insufficiency (IAI) and Cushing syndrome. These side-effects are common with systematic corticosteroid treatment and are less common with topical treatment modalities, even though it has been described with corticosteroid inhalation, trans- or intradermal use, intranasal and intraarticular corticosteroid application. Although ocular administration was thought to rarely lead to the development of IAI, recent studies have shown that more than two-thirds of children develop some degree of adrenal suppression, and patients who have developed an adrenal crisis during anaesthesia have been described.

Case Report We present a female infant who developed post-operative glaucoma following the surgery for congenital cataract. The therapy with topical corticosteroid eye preparations was started at the age of 5.5 months [Maxitrol drops (dexamethasone 0,1%), Tobradex ointment (dexamethasone 1 mg/g)], at an average dose of 1.5 mg/day dexamethasone. At the age of 8.7 months, 3 months after the initiation of corticosteroid use, she was examined by a paediatric endocrinologist for growth retardation [BW 6190 g (<3 ct, -2.1 SDS), BH 63 cm (<3 ct, -2.4 SDS)]. There were no other clinical signs of Cushing syndrome or other growth hormone deficiency associated syndromes. Laboratory finding revealed low ACTH levels with suppressed cortisol secretion (ACTH 1,1 pmol/L; norm 1,6-13,9; cortisol <3 nmol/L, norm 138-690). Further investigation ruled out other endocrine causes of reduced growth and congenital malformations of other organ systems. A normal female karyotype was found by classical karyotyping, 46, XX. Analysis of a panel of genes whose mutations are associated with congenital cataracts found no pathogenic variants. The girl was of normal intellectual development, and the result of pharmacogenetic analysis showed normal metabolism of corticosteroid drugs. Despite the recommendation to gradually reduce the dose of corticosteroids, local therapy was abruptly discontinued and at the age of 9 months the girl was hospitalized due to the development of an adrenal crisis. Hydrocortisone replacement therapy was initiated (10 mg/m²/day) and topical ocular corticosteroids (dexamethasone 0,1%) were continued in the dose of 2-5 drops daily. Adrenal function recovered after 10 months (ACTH short test 250 µg/m²; cortisol 60' 523,7 nmol/L), followed by growth spurt. At the age of 3 years and 4 months, the girl reached 25-50 centile in high-for-age curve (-0.15 SDS) which is in accordance with