The impact of COVID 19 on paediatric type 1 diabetes and DKA presentations in a peripheral hospital in Ireland

Irina Chistol*, Livija Ceher-Ebner, Conor Moloney, Niall O’Brien, Deidre Bowers, Maybelle Wallis, Attila Kalm. Wexford General Hospital

10.1136/archdischild-2021-europaediatrics.215

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 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.

Hyperosmolar hyperglycaemic state (HHS) is characterized by severe hyperglycaemia 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 hyperglycaemia (115 mmol/l), hyperosmolality of 382 mOsm/kg (effective osmolality 353 mOsm/kg), mild acidosis (venous pH 7.31), hyponatraemia (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.

**Discussion**

Neuroendocrine tumours of the appendix have an characteristic for multiple endocrine neoplasia type 1. Here we report two cases of boys in whom pathohistological evaluation after appendectomy, following acute appendixitis. They are found in 0.3% appendiceal tumours 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 after appendectomy performed due to acute appendixitis 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 formed at 12.4 years of age. 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) 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.