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Beyond Hypoglycemia: Insulinoma in an Adolescent Male

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Abstract

We present a case of an adolescent male who presented with altered mental status secondary to hypoglycemia. After evaluation of relevant studies, the patient was revealed to have an insulinoma. Insulinoma in the pediatric population is quite rare yet should be considered when encountering recurring episodes of hypoglycemia in the hospital setting.

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Case presentation

A 16-year-old previously healthy boy presented to the ED with Altered Mental Status (AMS) after being found unresponsive at home by his family, slumped over on the recliner and mumbling incoherent speech. Family members reported concern that he potentially had a seizure and called EMS. On arrival, his glucose level was 42 mg/dL and the patient was confused and disoriented. EMS adminsitered glucagon and transferred the patient to the ED for further care. While there, the patient had limited memory of the event and day prior. He could not recall whether or not he had consumed breakfast or lunch that day. However, he mentioned that he drank several energy drinks before becoming unconscious. He denied any illicit or prescription drug use.

On physical examination, his respiratory rate was 18 breaths/min, heart rate was 114 beats/min, blood pressure was 134/70 mm Hg, and oxygen saturation was 97% in room air. His body mass index was 49.9 kg/m^2. His lungs were clear on auscultation and abdomen was soft and nontender, without masses or organomegaly. The patient was found to have slight conjunctival injection, a tired appearance, and a right shoulder dislocation. He was awake, alert, oriented. His neurologic exam was reassuring, with normal gait, reflexes, sensation and strength. All other exam findings were normal.

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On arrival, glucagon was administered to the patient to correct his hypoglycemia. Due to the severity of his presentation, glucose levels were monitored regularly. Additional history revealed a pattern of ongoing fatigue and hyperphagia, with frequent nighttime awakening to eat or drink. Throughout his admission, he had multiple drops in glucose levels requiring glucagon administration despite IV dextrose at high glucose infusion rates. Lab work was significant for high insulin levels, high C peptide levels, and imaging studies revealed a mass in the body of the pancreas suspicious for insulinoma. The patient underwent surgical removal of the mass. Postoperative recovery was complicated by a pancreatic duct leak but was corrected with the removal of drainage over the next two months. Three months after surgical removal of the insulinoma, he appeared well and had not experienced any other complications.

Discussion

AMS can be encountered by the pediatrician and is generally a nonspecific term describing a presentation ranging from global CNS depression to confusion or agitation. The differential diagnosis for AMS in a teenager includes but is not limited to drug or alcohol intoxication, trauma, cerebrovascular events, sepsis or infection [1,2]. Vital signs and laboratory findings can further clue one in on the cause of AMS. Hypoglycemia, as was seen in our patient, can also cause a decrease in mental capacity. Alcohol or ingestion in adolescent patients may cause or worsen hypoglycemia. Systemic causes of hypoglycemia include sepsis, glycogen storage diseases, and various endocrine disorders, one of which is insulinoma. Recurrent severe hypoglycemia leading to AMS is concerning, especially when refractory to standard treatment protocols.

Insulinoma is a rare cause of hyperinsulinemic hypoglycemia in pediatric patients [3]. It is a neuroendocrine pancreatic malignancy that produces insulin. Insulinomas are usually solitary or sporadic, but can be associated with multiple endocrine neoplasia type I[4]. Most cases present with confusion, sweating, rapid heart rate, and coma if blood glucose drops significantly. Initial diagnosis is based on Whipple's Triad, which consists of symptoms/signs of hypoglycemia, low blood glucose levels, and improvement in symptoms with carbohydrate administration [4].

Once the diagnosis is suspected, a variety of invasive and non-invasive techniques can help confirm the presence of insulinoma[5]. Invasive procedures include Endoscopic Ultrasonography (EUS) and arterial stimulation venous sampling. Non-invasive procedures include transabdominal ultrasound, computed tomography, or magnetic resonance imaging. In addition, measurement of plasma glucose, insulin, C-peptide and proinsulin during a 72 hour fast can further confirm the diagnosis.

Insulinomas require surgical correction, although other forms of management such as the injection of octreotide, EUS-guided alcohol ablation, Radiofrequency Ablation (RFA), or embolization of an insulinoma of the pancreas can be considered. Although hypoglycemia secondary to insulinoma can be controlled with continued monitoring and medication to normalize blood glucose, removal of the tumor is the definitive treatment. Management varies on a case by case basis. For patients who are more susceptible to postoperative complications such as pancreatic fistula, EUS-guided alcohol ablation and CT-guided RFA are minimally invasive procedures that may be more appropriate [5].

This case describes AMS resulting from hypoglycemia induced by an insulinoma. Diagnosis of insulinoma is often delayed in the pediatric population because neuropsychiatric signs and symptoms such as confusion, personality change, ataxia, and seizure are commonly seen in other more common pediatric diseases. Timely diagnosis of insulinoma is crucial because severe recurrent hypoglycemia can cause irreversible neurological damage.

Author Disclosure

Dr. Heller, Ms. Li and Ms. Ong have no disclosures or financial relationships relevant to this article. This case has been previously presented in a poster format at Society of Hospital Medicine 2019 in St. Louis, MO. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.

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