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Diabetes Ketoacidosis Caused by Stress in an Ectopic Pregnancy: A case study

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Abstract

1–2 percent of all pregnancies involve an ectopic pregnancy. The majority occur in the fallopian tube, necessitating surgical or methotrexate-based treatment. The hemodynamic instability that can result from ruptured ectopic pregnancies necessitates immediate surgical intervention. The patient in this case presented at an unidentified location with diabetic ketoacidosis and a pregnancy. She was taken to the operating room for surgical management after a further evaluation revealed that she had a ruptured ectopic pregnancy. The pathophysiology of stress-induced diabetic ketoacidosis, the effects of elevated glucose in perioperative management, and the significance of multidisciplinary approaches to urgent clinical decision-making are among the topics we discuss.

Keywords: Type 2 diabetes; Ketoacidosis with diabetes; Comorbidities in mental health; Addiction to drugs; Control of blood sugar; Adherence to insulin

Introduction

One to two percent of pregnancies result in an ectopic pregnancy, with 18 percent eventually rupturing. The fallopian tubes are the most common site for ectopic pregnancies, accounting for over 90% of them. Some ectopic pregnancies, such as those that require a cesarean section, may result in live births and significant maternal morbidity. Intervention is required for tubal ectopic pregnancies; A conservative approach to management is not an option [1]. The majority of hemorrhagic maternal deaths are the result of ectopic pregnancies, which are responsible for up to 3% of all deaths related to pregnancy. A true gynecologic surgical emergency is a ruptured ectopic pregnancy. Because ectopic rupture can quickly result in hypovolemic shock, abdominal surgery is required. Treatment typically consists of a laparoscopic salpingectomy with the ectopic pregnancy being removed in the event that methotrexate is not an option [2]. Laparotomy may be necessary in instances of severe hemodynamic instability. The patient may present in varying ways due to such acute physiologic changes. An adult patient without a diabetes history is the subject of our case, which combines an ectopic pregnancy with diabetic ketoacidosis (DKA).

A 35-year-old woman with gravida 1 para 0, presented with acute, diffuse abdominal pain and nausea at 5 weeks, 3 days, and the date of her last menstrual period. She acknowledged increased thirst but denied fevers, discharge, or vaginal bleeding [3]. She had no huge past clinical or careful history and knew about her ongoing pregnancy.

Her temperature was 36.6 degrees Celsius, her respiratory rate was 34, and her oxygen saturation was 100 percent. Her blood pressure was 92/65 mmHg. She spoke in short phrases and appeared pale and anxious [4]. All quadrants of her abdomen were palpably tender, with mild distention and voluntary guarding.

At this point, a number of possible diagnoses were considered, including hypovolemic shock, septic shock, acute kidney injury, intraabdominal abscess, DKA, pregnancy of unknown location favoring ectopic pregnancy, and ruptured ectopic pregnancy [5]. Her urinary tract versus pelvic collection was the suspected source of sepsis.

Meropenem upon arrival to treat what was thought to be septic shock. A magnetic resonance image (MRI) of the abdomen and pelvis was obtained to better characterize the pelvic collection after an obstetrician-gynecologist determined that her abdomen was non-acute at the time. It revealed a 20x17x9 cm ill-defined material surrounding the uterus and a cystic structure in the left adnexa, as well as questionable active extravasation of contrast.

Materials and Methods

A retrospective, descriptive case-control study was conducted at Tays, a tertiary hospital in Pirkanmaa, Finland, and used a case-control design. A prospectively collected local endocrinological patient registry included the clinical characteristics, treatment method, and causes of ketoacidosis of all Tays-treated DKA patients under the age of 15 with DKA.

Age at DKA onset, gender, BMI, duration, type of diabetes (DM1, DM2, monogenic, or secondary diabetes), insulin replacement therapy (no insulin, multiple daily injections, or pump therapy), and blood glucose monitoring or self-monitoring were all included in the Endo Registry data. We evaluated patients with DM1 in addition to those with monogenic or secondary diabetes for the statistical analysis. Additionally, the data included the most obvious DKA causes [6]. At the time of the DKA, a specialist evaluated and recorded the causes of the condition using six predefined categories: diabetes that has not been treated with insulin, infection or medication that affects glucose tolerance, device mechanical issues, denatured insulin, and other or unknown causes The following four groups were further subdivided into for implemented insulin therapy: unawareness, learning difficulties, other illnesses, and social factors like alcohol abuse that lead to neglecting insulin therapy or a lack of self-care commitment. The Endo Registry also provided us with the number of DKA episodes that occurred during the time period. Due to a lack of specific data on DKA episodes, patients who moved to another hospital district during this follow-up period were excluded.

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By dividing all DKA episodes treated at Tays during the period by person-time, the overall incidence of DKA was calculated. The sum of the time each person was observed was used to calculate person time. Additionally, the annual incidence of DKA in Tays was calculated in relation to the total number of diabetic patients in the Pirkanmaa hospital district. All DKA patients, as well as DM1 and DM2, had their annual incidences separately calculated.

From the pilot version of the Finnish National Diabetes Registry, three controls for each DKA patient were collected. In the event that no control patient could be found in the same municipality, they were taken from the same hospital district [7]. To ensure that there were enough controls, the ages of three patients were changed to +/- 1 year.

Using routinely collected clinical data, laboratory values, other diagnoses, and mortality among patients and controls were gathered from the Finnish National Diabetes Registry for the period. For the patients and a few controls, the index date was the day of the patient's first day of ketoacidosis.

Patients with diabetes were identified using the Finnish version of the 10th revision of the International Classification of Diseases in the pilot version of the Finnish National Diabetes Registry. Since January 2011, diabetes was identified in patients with diagnoses ranging from E10 to E14 who had been registered in the Care Register for Health Care and the Register of Primary Health Care Visits (Avohilmo). The statutory data for all Finnish residents who have been discharged from any Finnish hospital's inpatient care as well as outpatient visits to public health care are collected in these registers, which are kept up by the Finnish Institute of Health and Welfare (THL) [8]. During the follow-up period, prevalences of mental and behavioral disorders, such as ICD-10 diagnoses of dementia, alcohol or drug addiction, psychoses, bipolar disorder, intellectual disability, depression, and eating disorders, were gathered. The analyses included both the primary and secondary diagnoses.

For both patients and controls, data on HbA1c (mmol/mol), estimated glomerular filtration rate, low-density lipoprotein cholesterol, urine albumin-creatinine ratio (U-ACR, mg/mmol), and urine albumin were collected less than a year before and less than a year after the index date. Using the CKD-EPI equation, the eGFR was determined. The following three categories of albuminuria were used in the statistical analysis: none, a high level of albuminuria, or a very high level of albuminuria.

Patients with recurring DKA and those with only one episode were compared in terms of their characteristics, treatment options, and DKA causes. In patients with recurring and single DKA, the differences in glycaemic control, comorbidities, and mortality between the patients and their matched controls were examined separately.

Register-based research is exempt from ethical approval and informed consent requirements under Finnish law. This study is thought to be important to public health because it is based solely on registry data and does not involve any contact with the study participants [9]. The study protocol was approved by the National Institutes of Health and Welfare. Throughout the study, the Declaration of Helsinki, good clinical practice, and the new EU regulation on data protection.

Statistical analysis

Statistical software version 17.0, and IBM SPSS Statistics for Windows, version 26.0, were utilized for statistical analyses [10]. Continuous variables were compared between groups using the Student's t-test, Kruskal-Wallis, Mann-Whitney U test, and categorical variables were compared using the 2 or Fisher's exact test. For the matched case-control data, a conditional logistic regression model was utilized. P-values of less than 0.05 were considered to be statistically significant.

Results and Discussion

The study included 846 control diabetics who did not have DKA from the Finnish National Diabetes Registry and 282 DKA patients treated at Tays. During the course of the study, Tays treated a total of 324 DKA patients [11]. One patient was left out due to non-diabetic ketoacidosis, and 41 patients were left out because they didn't live in the Tays catchment area for the whole time they were followed up.

Cases and matched controls' baseline characteristics are shown. The majority of patients were male, with a mean age of 36 years. 79% of people had type 1 diabetes, 0.4 percent had monogenic diabetes, 6% had secondary diabetes, and 15% had type 2 diabetes.

Patients with diabetes and superimposed DKA had an average hospitalization rate of 6.3%, and between 2% and 5% of DKA cases resulted in death [12]. It is expected to be extremely uncommon for DKA and ectopic pregnancy to occur simultaneously. A single case study on ectopic pregnancy with superimposed DKA has been documented. The patient had a cardiac arrest while planning the surgery. She was brought to the operating room, where the confirmed ruptured ectopic pregnancy was removed. The patient passed away after four hours.

There are two differences between the current case report and the report. First, despite having elevated blood glucose levels and no diabetes history, occult Type I diabetes is more likely to be present in a 17-year-old than in a 30-year-old. A 17-year-old patient's overlapping DKA and ectopic pregnancy could be explained by this [13]. However, in our case report, it is much less likely that a patient without a diabetes history will develop DKA. Second, the 17-year-old's eventual outcome and recovery from the ectopic pregnancy removal will sadly never be known because she passed away shortly after surgery. In our case, we were able to determine that the patient had normal blood glucose levels following the resolution of the acute insulting event and had a normal hemoglobin A1C without occult diabetes. Patients with hyperglycemia requiring urgent surgery face a significant perioperative risk of morbidity and mortality as a result of this.

Perioperative mortality and morbidity are high for DKA patients. Skin and soft tissue infections, systemic infections, and other perioperative procedures are more common in diabetic patients [14]. Diabetic patients are expected to have a 50% higher risk of perioperative mortality than non-diabetic patients. Diabetes-related long-term complications, such as cardiovascular, neurologic, and ophthalmic complications, which would influence perioperative morbidity, can account for a portion of this estimated risk. However, perioperative complications in hyperglycemic patients without diabetes have been the subject of several studies [15]. Frisch et al.'s study demonstrated that patients with hyperglycemia have significantly increased mortality, complications, and length of stay in the hospital, regardless of diabetes status. One study found that hyperglycemic patients who received insulin prior to surgery had a similar risk of adverse outcomes to those with normal blood glucose, despite the outcomes in hyperglycemic patients.

Conclusion

The emergency physician ought to have a low threshold for discussing ED presentations of ICI-treated patients with treating oncologists.

Additionally, the emergency physician ought to be aware of the range of adverse events associated with ICI therapy. Steroids, in particular, are used to treat many immune-related adverse events; despite the fact that steroids have the potential to worsen hyperglycemia and DKA, they are typically not used as the initial treatment for ICI-induced DKA. Patients on ICIs who present to the emergency department with DKA symptoms (nausea, vomiting, lethargy, encephalopathy) or unexplained elevated anion gap metabolic acidosis should be evaluated for DKA because this potentially fatal condition may go unnoticed in a patient who does not have a diabetes history. DKA is thought to be triggered by the "5 I's" by many emergency physicians: contamination, localized necrosis, newborn child (pregnancy), dietary carelessness, and absence of insulin. This uncommon etiology can be identified with the help of this mental checklist's sixth "I," which is ICI therapy.

Acknowledgement

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Conflict of Interest

None

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