DIABETIC KETOACIDOSIS WITH AN ACUTE ABDOMEN AS A FIRST MANIFESTATION OF TYPE 1 DIABETES MELLITUS

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Abstract

Context. Diabetic pseudoperitonitis is a very rare complication of the type 1 diabetes mellitus and it is associated with a severe ketoacidosis. The exact pathogenesis of the status is still unclear, the typical presentation is an acute abdomen by the patient. To confirm the diagnosis, it is necessary to make examinations, which exclude other possible reason of an acute abdomen by the patient (laboratory tests, abdominal ultrasound or a CT scan).

Case presentation. A 46-years old man was admitted to the hospital with a history of a 10 days epigastric pain. Laboratory tests, abdominal ultrasound, CT scan and upper endoscopy were performed, the reason of the pain remained unclear. Because of the peritoneal signs at the first day of the hospitalisation an acute surgery was indicated, without any pathology at the laparoscopy. A severe metabolic acidosis was recognized only after the surgery, the initial hypoglycaemia rose up after giving a total parenteral nutrition to the patient. The increase of the glycaemia, the severe metabolic acidosis with glycosuria and ketonuria, and the elevation of the glycated haemoglobin brought us to the diagnosis of the new onset of the diabetes.

Conclusion. Diabetic pseudoperitonitis with the picture of an acute abdomen can occur as a first manifestation of the diabetes. Thinking of this rare complication and recognising it can avoid unnecessary acute surgery by the patient.

Key words: Diabetic pseudoperitonitis, acute abdomen, type 1 diabetes.

INTRODUCTION

There are many reasons for abdominal pain in a patient with diabetes mellitus. Most of them are independent of the diabetes and are easy to diagnose by laboratory tests or abdominal ultrasound. Diabetic pseudoperitonitis as a complication of diabetes mellitus is very rare, mimics acute abdomen and has no typical findings in the laboratory tests or on a CT scan, except

for a ketoacidosis. Therefore, more than 50% of the patients underwent a diagnostic surgery in the past, which was negative. We report a rare case of diabetic pseudoperitonitis as a first symptom in a new onset of type 1 diabetes mellitus whereas the patient was at the beginning hypoglycemic, but with a severe diabetic ketoacidosis (DKA).

CASE PRESENTATION

A 46-years old patient, with a history of a mild craniotrauma 10 years ago, without internal comorbidities, was presented in the Emergency department with severe abdominal pain in the epigastrium for the last 10 days. During these 10 days upper endoscopy was performed with the presence of mild ulcerative esophagitis, gastritis and bulbitis. Therefore, he was treated with daily oral omeprazole (20mg twice daily) and prokinetics. For last 3 days epigastric pain was worsened and spread to the whole abdomen. He vomited more than 8 times during these 3 days. The stool had a normal appearance; however problems with bloating and pass gas occurred. He suffered with anorexia, his overall per oral intake was less than 0.5 liter of liquids without any food in last 5 days. After targeted question, he admitted lost weight approximately 13 kg in 3 months. On admission he had sinus tachycardia of 110 bpm with normal blood pressure, he was tachypnoic and exhausted. In physical examination of the abdomen significant epigastric pain with normal bowel movement and absence of abdominal resistance was recorded. Chemical laboratory examination showed elevated white blood cell count, C reactive protein (CRP), cholesterol with triglycerides and a low level of potassium and glycaemia (results in Table 1). The renal and liver functional tests with amylases were within normal limits. Ultrasonography of the whole abdomen showed

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only a hepatosplenomegaly. The patient was admitted at internal clinic to treatment and further examination. Initially a rapid intravenous (i.v.) rehydration with crystalloids (Plasmalyte 500 ml/hr), potassium supplementation and analgesic therapy (Acetaminophen 500 mg, Tramadol 50 mg i.v.) was performed. After 2 hours from admittance the patient underwent CT scan of the abdomen considering the possibility of acute pancreatitis (even with a normal level of amylases after more than one week of symptoms), acute appendicitis, intraabdominal tumor (loss of weight) or mesenteric ischemia. Surprisingly, the CT with i.v. contrast was without any intraabdominal pathology. Control laboratory showed increase in the white blood cells count ($35 \times 10^9/L$) and CRP level (750 mg/L). The fasting glycaemia level remained 54 mg/dL. The CT scan, chest X ray and urine examination excluded an infection. At this time the patient was exhausted with tachycardia and tachypnea, simultaneously peritoneal signs occurred. Urgent diagnostic laparoscopy was indicated, however no pathology was revealed. After that, we continued with massive hydration and started with parenteral nutrition (Nutriflex lipid plus 70 mL/hr). In the following day normalisation of hyperlipidemia, hematocrit and hemoglobin levels and decrease of the leukocytosis and CRP level (270 mg/L) occurred. On the other hand, steady increase of glucose levels was observed (up to 360 mg/dL), so the therapy with continuous application of insulin (2-5 IU/hr i.v.) was started. Following tests revealed severe metabolic acidosis with glycosuria and ketonuria. Glycated hemoglobin (HbA1c) was markedly elevated (Table 2). In conclusion, we confirmed the diagnosis

of diabetes mellitus type 1, with a severe ketoacidosis at the beginning, with a normal level of C peptide but positive anti-glutamic acid decarboxylase and anti-islet antibodies. The first manifestation of diabetes was accompanied with severe ketoacidosis, leading to a very rare and life threatening complication – diabetic pseudoperitonitis.

After another 48 hours of intensive fluid resuscitation and i.v. administration of insulin we observed restoration of ketoacidosis and clinical improvement of the patient. Currently, the patient is in a good condition and is observed in our diabetologic center.

DISCUSSION

Acute abdomen is a rare complication of diabetes mellitus. The most frequent reason for acute abdomen in a patient with diabetes are: acute pancreatitis, acute appendicitis and acute cholecystitis (1, 2). Therefore, every patient with diabetes and abdominal pain should undergo complete laboratory tests, abdominal ultrasound or CT scan.

Diabetic pseudoperitonitis has to be considered as a differential diagnosis of acute abdomen in diabetic patients with severe ketoacidosis. There are no epidemiology data regarding the incidence of diabetic pseudoperitonitis. The possibility of this complication is usually only a remark in the literature, to our knowledge there have been published only few case reports. The pathogenesis of the diabetic pseudoperitonitis is supposed to peritoneal irritation by severe ketoacidosis (probably by the ketone bodies); therefore this

Table 1. Pathological laboratory findings on admission

Parameter	Units	Results	Reference intervals
White blood cell	$\times 10^9/L$	27	4.1 – 10.2
Hemoglobin	g/L	210	135 – 174
Potassium	mmol/L	3	3.8 – 5.0
Cholesterol	mmol/L	20	3.1 – 5.2
Triglycerides	mmol/L	13	0.68 – 1.69
Glycemia	mg/dL	54	70.2 – 106.2
C-reactive protein (CRP)	mg/L	152	< 8

Table 2. Laboratory results at the time of the diagnosis

Test	Units	Results	Reference intervals
Glycemia	mg/dL	360	70.2 – 106.2
pH		7.09	7.35 – 7.45
Base excess (BE)	mEq/L	-27	-2 – +2
pCO ₂	kPa	1.3	4.75 – 5.85
HbA1c	%	16.6	2.8 – 4
C-peptide	nmol/L	0.7	0.37 – 1.45
Bicarbonate	mmol/L	6	22–26

complication mostly occurs in type 1 diabetes patients (3-5). Severe ketoacidosis without hyperglycemia can occur in insulin – dependent patients who are unable to take sufficient carbohydrates. With a lack of insulin the activated lipolysis with the production of the keton bodies increases (6).

The main risk factors for the DKA in the type 1, diabetes subjects are: long starvation, infection, prolonged vomiting (can be even the consequence of the DKA), psychological stress and nowadays the SGLT2 inhibitors therapy).

In the reported case, difficulties with assessment of correct diagnosis of type 1 diabetes were the age of the patient (46 years old, without any history of hyperglycemia before) and especially the presence of hypoglycemia (54 mg/dL) at the beginning. The reason of the hypoglycemia in our patient remains unclear, probably it could be caused by starvation with low carbohydrate intake for few days, prolonged vomiting, depletion of the glycogene reserve and probably a decrease of the activity of the gluconeogenesis in the critical status. Only after the surgery (another stress factor) and starting the parenteral nutrition containing glucose, the glucose levels increased extremely.

Diagnostic laparoscopy or laparotomy is an often diagnostic procedure in patients with unclear acute abdomen, without any clear diagnosis established by the blood tests and CT scan. In patients with diabetic pseudoperitonitis a diagnostic surgery is not recommended, but in previously published case reports in the literature between 1950-1990 more than 50% of the patients underwent a surgery to exclude other possible reasons of acute abdomen. In the present

time, with a better and faster availability of laboratory determinations, unnecessary surgery has been reduced to almost none (7, 8).

In conclusion, in our case report we are trying to focus on the rare diagnosis and course of diabetic pseudoperitonitis, which can mimic any other reasons of acute abdomen. In cases of unexplained acute abdomen, it may be useful to think of this diagnosis, which can save the patient from an unnecessary surgery.

Conflict of interest

The authors state that there are no conflicts of interest regarding the publication of this article.

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