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Research Article

SOME FEATURES OF INTENSIVE THERAPY FOR DIABETIC KETOACIDOSIS

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ABSTRACT

The aim of our work was to develop a comprehensive, pathogenetic substantiated intensive care in patients with diabetic ketoacidosis who are in critical condition. The development of complex pathogenetic substantiated intensive care in patients with diabetic ketoacidosis who are in critical condition is one of the urgent problems of intensive care. It should be noted that the proposed intensive care with solutions containing succinate and potassium in the complex intensive care of diabetic ketoacidosis is one of the promising directions for optimizing the treatment of patients. The intensive care option we proposed contributed over 3 days in 95% of patients to the elimination of diabetic hyperglycemic ketoacidosis.

KEYWORDS

Diabetes, diabetic ketoacidosis, intensive care, succinate.

INTRODUCTION

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Diabetes mellitus (DM) is one of the most common endocrine diseases worldwide. One of the severe complications of diabetes mellitus is diabetic ketoacidosis and hyperglycemic ketoacidotic coma, which require a special approach, both due to the severity of the course and due to high mortality. High mortality in hyperglycemic ketoacidotic coma is associated with insulin insufficiency (1,4,6), tissue hypoxia, endogenous intoxication, water-electrolyte imbalance, metabolic disorders, multiple organ dysfunction (2,3,5). Most clinicians distinguish hypovolemia and concomitant systemic hypoperfusion as one of the leading links in the pathogenesis of systemic and organ insufficiency in patients with diabetic ketoacidosis and hyperglycemic ketoacidotic coma (2,6).

The leading role in the correction of hypovolemia is played by infusion therapy aimed at a rapid increase in the volume of circulating blood, cardiac output, oxygen delivery and its consumption by body tissues. Its optimal choice, along with insulin therapy and other means of pharmacological correction, can prevent the development of a critical condition and multiple organ dysfunction in patients with diabetic ketoacidosis and hyperglycemic ketoacidotic coma. All of the above indicates the relevance and clinical significance of the problem under consideration, since timely diagnosis and adequate intensive therapy of diabetic ketoacidosis and hyperglycemic ketoacidotic coma can not only significantly improve the results of treatment, but also the outcome of the disease as a whole. The aim of our work is to develop a comprehensive, well-founded intensive therapy in patients with diabetes mellitus complicated by diabetic ketoacidosis and ketoacidotic coma.

Materials and methods of research. 65 patients with diabetes mellitus, in critical condition, complicated by diabetic ketoacidosis and hyperglycemic ketoacidotic coma, who underwent inpatient treatment in the intensive care unit, were examined. The study included patients aged 35 to 60 years (average age 55 + 1.2 years). Of these, 37 female and 28 male patients. The duration of the disease ranged from 3 to 15 years. To determine the severity of the patients' condition, the parameters of the central hemodynamics of volemic parameters (Heart rate, Systemic Scleroderma, Stroke Volume (SV), Cardiac index CI, Volume of circulating blood VCB, volume of circulating plasma (VCP) and volume of circulating erythrocytes (VCE) were studied. To optimize infusion therapy, the main and control groups of patients were formed. In the main group, in accordance with the severity of the patients' condition (n=35), pathogenetic-based infusion programs were used, balanced in qualitative and quantitative composition. The volume and optimal ratio of saline, salt-free and colloidal solutions calculated according to the clinical severity of the condition and the body weight of patients were selected. In patients of the

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control group (n=30), a generally accepted classical infusion program was used as part of infusion therapy. All clinical and laboratory studies were carried out at the following stages before the start of therapy, after 2 hours, 6 hours, on the 2nd, 3rd day.

Results of research patients with diabetes mellitus in critical condition complicated by diabetic ketoacidosis and hyperglycemic ketoacidotic coma revealed changes in central hemodynamics, indicating a breakdown of compensatory mechanisms of the circulatory system, a sharp increase in cardiovascular insufficiency due to a combination of low cardiac output, hypovolemia and dehydration. Tachycardia was observed in patients with stable arterial pressure, with an average intake of 90.2+1.2 beats/min, ADP (average dynamic pressure) 110 + 1.7 mmHg, CI (cardiac index) 24.4+1.2 ml x m, SI (cardiac index) 3.0+0.8 l l x min. In 97% of patients, there was a decrease in the volume of circulating blood (VCB) due to a decrease in the volume of circulating plasma (VCP) and a decrease in the volume of circulating erythrocytes (VCE).

A significant decrease in VCB was observed by 45.7% ($p<0.05$). When patients breathed, the smell of acetone was clearly detected, hard breathing without wheezing. In 59% (38) of patients with palpation of the abdomen, pain was observed during palpation. The urine test for acetone in all patients was positive and sharply positive. Decompensated metabolic acidosis was detected in all patients, with an average blood pH of 7.22 +0.3 in all patients. Modern intensive therapy for diabetes mellitus in a critical condition complicated by diabetic ketoacidosis and hyperglycemic ketoacidotic coma includes two mandatory components. This is a subsidy of fluid with compensation for its deficiency and correction of current pathological losses of the water-electrolyte composition of the blood, as well as insulin therapy (Alexandrovich Yu.S.). Patients of the main and control groups underwent standard insulin therapy to correct blood glycemia. The dose of insulin and the rate of its administration are selected in such a way that the rate of glucose reduction does not exceed 3.5-5.5 mmol / l / hour or 10% of the initial values. Rehydration therapy with salt and salt-free solutions is carried out strictly under the control of CVP and hourly diuresis. Patients of the control group received standard infusion therapy with saline solutions: 0.9% sodium chloride solution or Ringer's solution, 0.45% sodium chloride solution were used. The concentration of sodium chloride (0.9 or 0.45%) was selected depending on the concentration of sodium in the blood plasma. With normonatremia, 0.9% are used, and with hypernatremia, 0.45%.

It was mandatory in infusion therapy to pay attention to the correction of potassium deficiency, since its deficiency can lead to the development of cardiac arrhythmias. Correction of potassium deficiency was carried out by intravenous drip administration of

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potassium chloride solution. Polycomponent and multifunctional crystalloid Succinasol solution was used in patients of the main group in the intensive care complex in order to correct acidosis and detoxification. Succinasol is based on sodium succinate, which supplies succinic acid anion - a substrate of the Krebs cycle and a supplier of energy-rich compounds, with a pH of 6.97. Its main property is the ability to influence the electrolyte composition and volume of the extracellular and intracellular fluid, as well as the acid-base state (ABS). This solution is able to have an effect on not only hemodynamics, water-electrolyte composition and ABS, but also improves blood microcirculation, activates energy metabolism, improves the function of the heart muscle increases energy production by including fumarate ion in the Krebs cycle. To correct severe hypovolemia, we prescribed this solution 200-400 ml, 1-2 times a day. One of the problems in the correction of diabetic ketoacidosis is the stabilization of blood levels of potassium and glucose. After lowering blood glucose to 14-16 mmol / l, Cadence solution was included in the infusion in order to provide parenteral carbohydrate nutrition and regulation of salt balance with the addition of short-acting insulin (SAI) against the background of insulin therapy. Since potassium deficiency occurs especially in diabetes mellitus complicated by diabetic ketoacidosis and hyperglycemic ketoacidotic coma. The use of ready-made potassium solutions reduces the likelihood of errors in the dosage of potassium, which can be observed when preparing solutions from ampoule and pharmacy concentrates, thereby preventing the risk of potassium overdose and the development of hyperkalemia. The ability of this infusion drug to increase potassium levels without the risk of hyperkalemia distinguishes it from other potassium-containing drugs. Dosage: 10-20 mmol of potassium (0.5-1.0 L), administered within 1-3 hours. The dosage of Cadence solution depends on the age, body weight, severity of the clinical condition of the patient and the indications of laboratory tests. When conducting a rehydration program in patients in the main group, an improvement in the indicators of the water-electrolyte balance of the blood was revealed. As can be seen from the table, patients of the main group had an increase in the Na+ content in blood plasma by 3.6% on day 1, and by 6.5% on day 2. No change in Na+ was observed in blood plasma in patients of the control group on days 1 and 2. Such normalization of the electrolyte composition of the blood in patients of the main group led to an improvement in the indicators of central hemodynamics.

In the main group, the values of the parameters of central hemodynamics improved in the first days. This was confirmed by a significant decrease in heart rate by 5% after 1 day, SSD by 13%, an increase in CI by 24%, SV by 14%. It should be noted that the Specific peripheral resistance SPR decreased by 50%. On the

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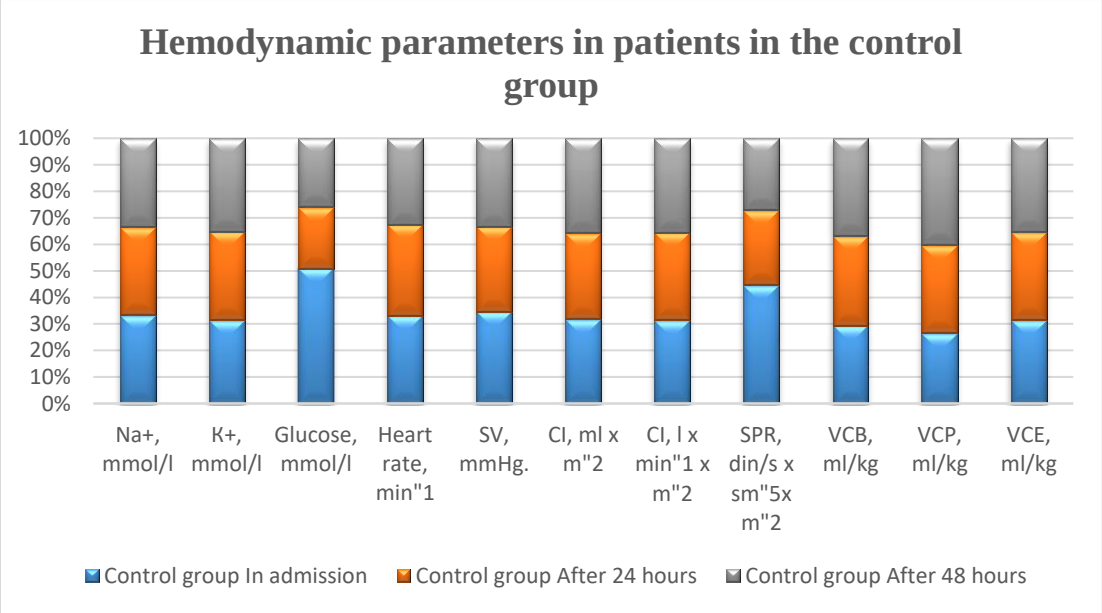
second day of observation, there was an improvement in CG indicators, which are reflected in the table. In patients of the control group, against the background of treatment according to the standard algorithm, the parameters of the CI, SV did not differ significantly from the initial values. The heart rate remained at the same level. The indicators of the study results presented in Table c show that, in the control group, against the background of traditional infusion therapy, achieving the target level of glycaemia was accompanied by a significant decrease in this indicator on day 1 to 52.4%, and on day 2 to 48.8%. In patients of the main group, patients have a smooth decrease in glycaemia, by 60 and 68%. According to the data obtained, patients with hyperglycemic ketoacidosis in critical condition have volemic disorders associated with a decrease in VCB, VCP and a decrease in VCE.

Despite the therapy, during rehydration therapy, the control group patients showed an increase in VCB by only 15%, VCP by 24%, and VCE did not undergo significant changes. In the patients of the main group, there was an increase in VCB by 39% on day 1, and on day 2 by 60%, while the increase in VCP by 2 times, respectively by 54.5% and 71%, indicating the effectiveness of the therapy. This allowed to correct the VCB deficiency, stabilize blood circulation, creating optimal conditions for circulation.



It should be noted that the recovery of pH was observed on the 2nd day of treatment, in 42% of patients of the main group, this indicator began to increase. And on the 2nd day of treatment, 89% began to meet the norm. There was a connection between changes in the pH of blood and urine during treatment. Elimination of diabetic hyperglycemic

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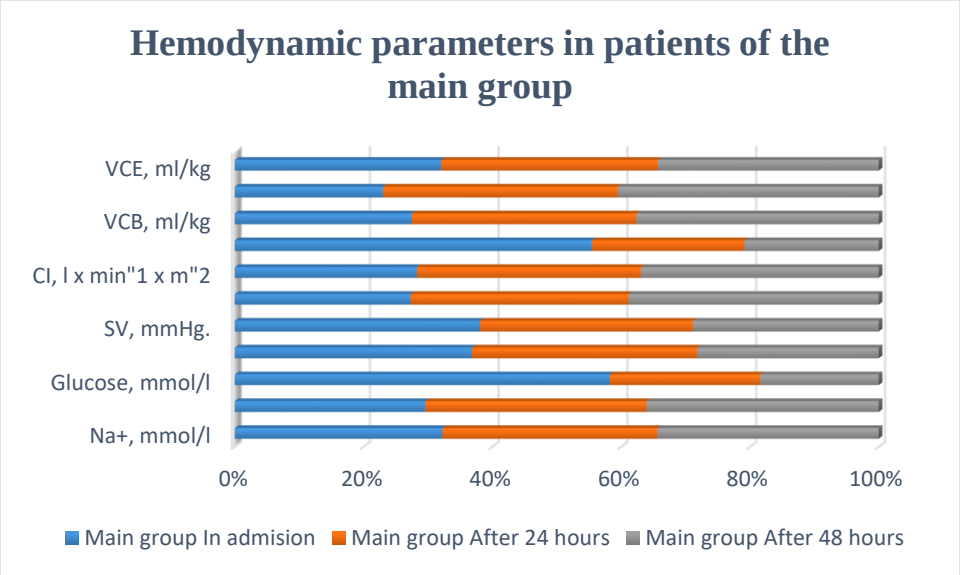
ketoacidosis was observed in all patients of the main group within 3 days. 5% of patients in the main group had a relapse of diabetic ketoacidosis.



The cause was chronic renal failure, pneumonia was observed in 7% of patients. Mortality of patients in the main group was not observed. All patients of the main group were transferred to the endocrinological and therapeutic departments. The average duration of stay of patients of the main group in the ICU was 2.65 ± 0.12 days, in patients of the control group 3.45 ± 0.18 days.

Thus, based on the above, it can be assumed that the developed intensive therapy of solutions containing succinate and Cadence in the complex therapy of diabetic ketoacidosis is one of the promising directions for optimizing the treatment of patients. And also significantly contribute to reducing the length of stay of patients in the ICU and reducing the mortality rate.

REFERENCES

1. Aleksandrovich YU.S. Intensivnaya terapiya diabeticheskogo ketoatsidoza u detey. / YU.S.Aleksandrovich K.V. Pshenisnov.// Rossiyskiy vestnik detskoy khirurgii, anesteziologi, reanimatologi.-2012.-T.2.-№2.-S.92-99. Aleksandrovich Yu.S. Intensive care of diabetic ketoacidosis in children. / Yu.S. Aleksandrovich K.V. Pshenisnov.// Russian Bulletin of Pediatric Surgery, anesthesiologists, resuscitators.-2012.-T.2.-No.2.-S.92-99
2. Kriticheskiye sostoyaniya v klinicheskoy praktike. // S. A. Rumyantseva, V. A. Stupin,V. V. Afanas'yev, A. I. Fedin, Ye. V. Silina — M.: MIG «Meditsinskaya kniga»;2010. — 640 s. Critical

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conditions in clinical practice. // S. A. Rumyantseva, V. A. Stupin, V. V. Afanasiev, A. I. Fedin, E. V. Silina - M .: MIG "Medical Book"; 2010. — 640 p.

3. Potemkin, V.V.3. Diabeticheskiy ketoatsidoz / V.V. Potemkin, Ye.G. Starostina // Neotlozhnaya endokrinologiya: rukovodstvo dlya vrachey. — M.: Meditsinskoye informatsionnoye agentstvo, 2008. — S.11—125, 365—387. Potemkin, V.V.3. Diabetic ketoacidosis / V.V. Potemkin, E.G. Starostina // Urgent endocrinology: a guide for physicians. - M .: Medical Information Agency, 2008. - P. 11-125, 365-387.

4. Rabochaya gruppa po diabetu i SSZ Yevropeyskogo obshchestva kardiologov i Yevropeyskoy assotsiatsii po izucheniyu sakharnogo diabeta, 2007 g. Rekomendatsii po lecheniyu sakharnogo diabeta, prediabeta i serdechno-sosudistykh zabolevaniy // Sakharnyy diabet, 2008. №1. S. 86-92. Diabetes and CVD Working Group of the European Society of Cardiology and the European Association for the Study of Diabetes Mellitus, 2007. Recommendations for the treatment of diabetes mellitus, prediabetes and cardiovascular diseases // Diabetes mellitus, 2008. No. 1. pp. 86-92.

5. Brown, T.B.4. Cerebral oedema in childhood diabetic ketoacidosis: Is treatment a factor? / T.B. Brown // Emerg. Med. J. — 2004. — № 21. — P.141—144.

6. Wolfsdorf, J.5. Diabetic ketoacidosis in infants, children and adolescents: A consensus statement from the American Diabetes Association / J. Wolfsdorf, N. Glazer, M.A. Sperling // Diabetes Care. — 2006. — № 29. — P.1150—1159.