

A Retrospective Analysis of the Treatment of Patients with Diabetes Mellitus in the Intensive Care Unit

Ermachenko MF^{1,2*}, Zemin Yu A¹, Ivanov RA¹, Klimova OS¹, Sergeeva LI¹ and Nomokonov VI¹

¹OGBUZ "Bratsk Children's City Hospital", Irkutsk Region, Russia

²Irkutsk State Medical University, Russia

***Corresponding Author:** Ermachenko MF, OGBUZ "Bratsk Children's City Hospital", Irkutsk Region, Russia.

Received: July 12, 2024; **Published:** March 04, 2025

Abstract

The causes of 186 cases of hospitalization and tactics for treating children with diabetes for the period from 2000 - 2019 are analyzed. In the conditions of the resuscitation department.

Keywords: *Diabetes Mellitus; Coma; Children*

Relevance

One of the most common chronic diseases of the 21st century is diabetes (SD) [11,12]. In 2019, 463 million people patients with diabetes were registered in the world. The number of deaths due to diabetes for 2019 has 4.2 million, which is 11.3% of all deaths in the world [10-12]. Statistics on diabetes of the first type are almost completely represented by children and adolescents, with this disease there are more than 1.1 million around the world [10-12]. Despite the decrease in the rate of growth in the disease in some European countries, the annual increase remains at 3.4%. SD is a problem of state importance due to its epidemic nature associated with vascular complications that cause damage to the vessels of the heart, brain, limbs, kidneys, retina and large economic costs [10-12]. Two paths lead to the disease: two ways: Autoimmune, when immunity suffers, aggressive fragments appear that destroy the cells of the pancreas, and the second is idiopathic, when destruction occurs without the participation of immunity.

These two mechanisms lead to the fact that there is an absolute insulin deficiency in children with diabetes of the first type [1-3,8,12]. According to International Diabetes Federal for 2019. Russia is included in the top ten countries with the largest number of patients with diabetes [3,7,8,10,12]. Every year in Russia, the number of patients with diabetes increases. The total number of patients with diabetes in the Russian Federation as of 01.01.2019 amounted to 4,584,575 (3.12% of the population of the Russian Federation), including: SD1 - 256.2 thousand, SD2 - 4.24 million, other types of diabetes - 89.9 thousand since 2000. The number of patients with diabetes in the Russian Federation increased 2.2 times [7,8,10,12].

So, in the Irkutsk region, the annual growth rate of diabetes among children and adolescents ranged from 4.6% to 7.1% in recent years (about 60 children from 1 year to 18 years old) [4-6,11]. Currently, almost 60 thousand people suffer from diabetes in the Irkutsk region, of which children are 660 people [6,7,11]. Every year, about 500 small patients with diabetes undergo treatment in the endocrinology

department of the Irkutsk Regional Children’s Hospital [11]. In Bratsk in 2019. The incidence of iTip diabetes among children was 0.16% (49 patients with diabetes mellitus for 30180 children’s attached population). Since 2000 in 2019 In Bratsk, there is an annual increase in sick children with diabetes by 4.5 - 7.5% (3 - 5 patients). Many children with diabetes (first detected and repeated) in the pre-commissit and coma, with pronounced metabolic acidosis, are hospitalized, for intensive care, in the department of resuscitation [5,6,11]. In case of neglected cases (later intake in intensive care), the risk of the development of death is maintained [6,11,12].

Purpose of the Study

The purpose of the work to analyze the reasons for the primary and repeated hospitalizations of children with diabetes and the tactics of their treatment in the intensive care unit.

Materials and Methods

Under our observation in the resuscitation department for 8 beds of the OGBUZ “Bratsk Children’s City Hospital” since 2000 - 2019. 186 cases of patients with diabetes from 1 year to 18 years were hospitalized. In 180 cases, the diagnosis of type: type I diabetes mellitus, diabetic prete or coma, ketoacidosis IV 6 cases Diabetes: type I diabetes mellitus, hypoglycemic coma. Of the 186 cases of hospitalization: in 69 cases, children were detected for the first time, and in 117 cases they made up repeated hospitalizations.

Results and Discussion

The absolute and relative number of patients with diabetes treated in the intensive care unit is presented in table 1.

The number of patients with diabetes in ORI in comparison with the total number of patients OIT, ABS. (%) Year the total number of patients in ORI, the number of patients with diabetes, the number of cases of hospitalization of diabetes for the first time identified.

Year	The total number of patients in ORI, the number of patients with diabetes	The number of cases of hospitalization of diabetes for the first time identified	The number of re- hospital- ized diabetes
2000	285; 9 (3,1)	2	5
2001	279; 6 (2,1)	1	2
2002	290; 7 (2,4)	3	4
2003	184; 7 (3,8)	2	2
2004	291; 10 (3,4)	1	5
2005	296; 7 (2,3)	2	2
2006	344; 5 (1,5)	2	2
2007	345; 4 (1,2)	1	1
2008	405; 7 (1,7)	2	1
2009	323; 5 (1,5)	3	1
2010	305; 12 (3,9)	7	2
2011	254; 12 (4,7)	3	2
2012	252; 5 (1,2)	1	5
2013	254; 8 (3,1)	5	7
2014	243; 9 (3,7)	2	9
2015	206;15 (7,2)	7	10
2016	284; 9 (3,1)	2	10

2017	300; 10 (3,3)	7	9
2018	260; 21 (8,0)	8	18
2019	294; 23 (7,8)	8	20
Total:	5694; 186 (3,5)	69	117

Table 1: The number of re-hospitalized diabetes.

Analysis of table 1 shows that patients with diabetes of the total number of patients are from 1.2 to 8.0% (on average 3.5%). Depending on the severity of the state upon receipt and regression of symptoms of diabetic coma, patients were in the department resuscitation from 1 to 6 fps (on average - 3 f/d). Mortality in the group of patients with diabetes was 0.54% (1 patient). Patient 9 years entered the intensive care unit in 2012, after 2 weeks from the onset of the disease in extremely serious condition with a diagnosis: type I diabetes mellitus, first detected, diabetic coma 3 tons, decompensation period, and edema of the brain. Later, the intake, despite intensive therapy, led to the development of decompensation and death.

The reasons for the hospitalization of patients with diabetes in ORIT are presented in table 2.

The reasons for hospitalization	Number of cases, abs. (%)
Primary hospitalization	
First detected diabetes mellitus	69 (37,1%)
Repeated hospitalization	
Diet violation	60 (32,3%)
Untimely injection of insulin	32 (17,2%)
accompanying illnesses	25 (13,4%)
Total	186 (100%)

Table 2: Causes of hospitalizations of patients with diabetes in *i*th.

Table 2 shows that the main reason for the hospitalization of patients with diabetes in the intensive care unit is the first detected diabetes with the development of a prete or coma - 69 patients (37.1%). Among the repeated hospitalizations in ORI, a diet disorder in patients with SD 60 (32.3%), which led to the development of a diabetic coma. In the history of the development of the disease, these children noted the use of carbohydrates in the form of chocolate, sweets, carbonated drinks. In 6 patients, untimely eating against the background of insulin injection led to the development of a hypoglycemic coma. U32 patients (17.2%) independent abolition of insulin led to the development of a diabetic coma. In 25 patients (13.4%), concomitant diseases (SARS, influenza, pneumonia) led to a "breakdown" of compensatory mechanisms against the background of selected insulin therapy and the development of a diabetic coma. The analysis we conducted showed that patients for several years were regularly received with signs of coma in the intensive care unit. Over the twenty years of observation, 6 patients moved to other cities to permanent place, and 14 patients were removed from "D" - accounting in the children's clinic, in connection with the achievement of them of the 18th age and their transition to "D" accounting to adult clinics. Interaction with precinct pediatricians and a social teacher revealed that most children with repeated hospitalization in the resuscitation department were brought up in asocial families (parents drinking or drug addicts). Children were not paid to due attention, which ultimately led to the development of coma. Emergency notifications about the "syndrome of abuse" are transferred to the parents of these children.

Upon receipt of the patient with suspected diabetes mellitus, the patient is examined by the doctor with a pediatrician, an endocrinologist and resuscitator, and a blood test for sugar is taken by Cito.

Of the 47 patients entered the intensive care unit, with the first detected diabetes and 24 patients with repeated hospitalization, there were manifestations of diabetic prete or coma, as well as signs of metabolic acidosis. Expressed violations of KSHS were noted: pH 7.1-7.3 (in one patient, pH was noted-6.9), VE-4.2-19.0. Blood sugar during admission ranged from 14.4 - 51.1 mmol/l.

The treatment tactics in patients with a diabetic ketoacidotic coma were as follows: Certification was carried out, based on physical strength by age, with the addition of 20 - 50 ml/kg/day, depending on the degree of dehydration, as well as taking into account the ongoing losses. 0.9% NaCl (in sodium of plasma is < 150 meek/l), 0.45% NaCl (when sodium plasma > 150 meek/l), with low blood pressure - solutions of colloidal plasma substitutes (HAC, albumin 10%), A 4% solution of sodium bicarbonate 1 - 2.5 ml/kg with a solution of the Ringer (for pH < 7.1, under control of KSHS), insulin therapy of short -acting insulins in/B through infusomat 0.1 - 0.05 units before decrease before decreased Glucose in the blood up to 13 mmol/l, then 5% glucose with 0.9% NaCl (1: 1), symptomatic therapy (potassium preparations, heart glycosides, dopamine, heparinotherapy, 25% sulfate magnesia, cocarboxylase). Control of therapy due to hemodynamics, hourly diuresis, blood sugar level every 2 hours, express urine tests for sugar and acetone stripes "Diaphan". Positive dynamics of the condition, the transfer of the patient to the p/c the introduction of insulin was the basis for transferring him to the profile department.

Tactics of treatment in patients with a hypoglycemic coma (sugar at admission < 3 mmol/l) was as follows: A 40% solution of glucose was introduced to patients in/V to the restoration of consciousness, then in/in a drop of 10% glucose with the addition of 4% KCL, Panangin, and heparin under the control of blood glucose levels. Diet No. 9 was prescribed for all patients when restoring consciousness

Conclusion

1. The pattern is noted within 20 years, in the direction of increasing the receipt of patients with diabetes in the department of children's resuscitation.
2. Patients with diabetes are from 1.2 to 8% (on average 3.5%) of the total number of resuscitation patients.
3. The main reason for hospitalization of the implementation department among patients with sugar diabetes is the manifestation of first detected diabetes with the development of precoma or coma - 69 patients (37.1%).
4. Among repeated hospitalizations, the main reason is the violation of the diet regime in patients - 60 (32.3%), in second place is the untimely injection of insulin - 32 (17.2%), in the third - concomitant diseases - 25 (13.4%).
5. Treatment and observation of patients with diabetes in a state of coma in a modern resuscitation department made it possible to reduce the mortality in this group to - 0.54% (1 patient).

Bibliography

1. Arbatskaya N Yu. "Type 1 diabetes and pregnancy". *Pharmacate* 5 (2002): 30-36.
2. Grandfather II and Balabolkin MI. "New opportunities for compensation for diabetes of type 1 and the prevention of its vascular complications". M: Publishing House "Ima-Press" (2003).
3. Dedov II, *et al.* "Epidemiology of diabetes in the Russian Federation: clinical and statistical analysis according to the Federal Mell Association of Diabetes". *Diabetes* 20.1 (2017): 13-41.
4. Ermachenko MF, *et al.* "The case of successful treatment of decompensated metabolic acidosis in a patient with diabetes mellitus". Abstracts of the IX Congress of anesthesiologists and resuscitators. Irkutsk (2004): 100.
5. Ermachenko MF, *et al.* "The reasons for hospitalization and tactics for treating patients with diabetes mellitus in the conditions of a children's resuscitation department". *Doctor* 2 (2014): 67-68.

6. Ermachenko MF, *et al.* "Monitoring the causes of hospitalization and treatment of patients with type I diabetes in the intensive care unit". *Actual Issues of Intensive Therapy* 30 (2013): 18-19.
7. Kolabekov IG. "Russian reforms in numbers and facts". Reference publication. M: Publishing House "Rusaki" (2010): 498.
8. Shestakova MV, *et al.* "Epidemiology of diabetes in the Russian Federation: what has changed over the past decade?" *Therapeutic Archive* 91.10 (2019): 4-13.
9. Yankovskaya VN, *et al.* "Treatment of diabetic ketoacidotic coma in children". *Pediatrics* 5 (2005): 106-110.
10. "Global diabetes report". Geneva: World Health Organization. License: CC by-NC-SA 3.0 (2018).
11. <http://www.ogirk.ru/2019/11/14/v-irkutskoj-oblasti-zhivut-660-detej-s-saharnym-diabetom>
12. https://www.endocrincentr.ru/sites/default/files/all/EVENTS2019/NEWS%20SUM/13.03.19%20Prof.komissia/VIK_Exp_13.03.19.pdf

Volume 12 Issue 2 February 2025

©All rights reserved by Ermachenko MF, *et al.*