

It is recommended that amputation be carried out as sparingly as possible.

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23. Diabetes in children and adolescents

Key recommendations
• Children and adolescents with type 1 diabetes should begin treatment with intensive insulin therapy and continuous glucose monitoring systems immediately after diagnosis. [A]
• The blood glucose level should be measured and interpreted at least 8 times a day, on an empty stomach, before meals and sleep, as well as before, during and after physical activity, when the patient is feeling unwell, 1–2 hours after a meal and at night. [B]
• The use of continuous glucose monitoring systems with intensive insulin therapy in children and adolescents improves metabolic control of diabetes (lowering HbA _{1c} and increasing TIR levels), reduces the risk of acute and chronic complications of the disease and increases the lifespan. [A]
• Personal insulin pumps with an automatic insulin suspension function are particularly beneficial in the prevention of hypoglycaemia. [A]
• From the moment diabetes is diagnosed in children and adolescents, a care plan should be implemented that uses appropriate educational tools to achieve individual treatment goals. TIR ≥ 80% and HbA _{1c} ≤ 6.5% should be aimed for with stable glycemia, minimization of hypoglycemic episodes and maintaining a good quality of life. [B]
• Narrowing the target range to 70–140 mg/dl should be considered when using automatic insulin delivery systems. [E]

The following chapter outlines the differences in general recommendations related to the specifics of developmental age.

I. Diagnosis and forms of diabetes in developmental age

1. In children and adolescents, the same tests are used to diagnose diabetes as in adults. In the absence of unequivocal hyperglycemia, the diagnosis of diabetes requires two abnormal test results from the same sample or from two separate samples.
Glycated haemoglobin (HbA_{1c}) less than 6.5% does not exclude diabetes diagnosed by glucose tests. The role of HbA_{1c} alone in the diagnosis of T1D in children is unclear.
2. Type 1 diabetes with autoimmune pathogenesis is the most common.
3. Screening (OGTT or HbA_{1c}) for type 2 diabetes should be performed in children after puberty or over 10 years of age with a BMI \geq 85 percentile for age and sex, and there are risk factors for the development of type 2 diabetes. If the results are normal, they should be repeated at intervals of at least 3 years. Annual screening is required if BMI is increasing, the cardiometabolic risk profile is deteriorating, there is a strong family history of type 2 diabetes, or evidence of prediabetes. Type 2 diabetes in children and adolescents is characterized by earlier development and faster progression of chronic complications of the disease than in adults.
4. It should be noted that monogenic diabetes is the second most commonly occurring form of diabetes in the pediatric population in Poland. The indications for testing for monogenic diabetes have been outlined in chapter 1.
5. The number of children diagnosed with impaired glucose tolerance or cystic fibrosis-related diabetes is increasing. Diabetes is usually asymptomatic. Children aged 10 and more who have been diagnosed with cystic fibrosis should be annually subjected to OGTT with fasting blood glucose level measurement at 30, 60, 90 and 120 minutes.
6. Initial diagnosis of hyperglycaemia or revision of diagnosis includes determination of *glutamic acid decarboxylase* (anti-GAD) antibodies and 1–2 of the following elements: undefined islet cell antibodies (ICA), insulin autoantibodies (IAA), insulinoma-associated autoantigen 2 (IA-2) and zinc transporter family member 8 autoantibodies (ZnT8)

(tests should be performed in a reference laboratory). It is advisable to perform these tests also in people at high risk of developing type 1 diabetes. The presence of a high titer value of one antibody or elevated titre values of two antibodies indicates an active autoimmune process of pancreatic β -cell apoptosis and allows diagnosing stage I (pre-clinical) diabetes. If IFG and/or IGF are included, stage 2 preclinical diabetes can be diagnosed. Due to the significant risk of developing overt type 1 diabetes (stage 3), patients must be educated on periodic assessment of blood glucose values to prevent the development of ketoacidosis. In children in the preclinical phase of the disease, OGTT is recommended as the gold standard in diagnosing the stage of type 1 diabetes. It is recommended to measure glucose at 0, 60 and 120 minutes. test. If it is not possible to perform the test, alternative tests can be used: HbA_{1c}, fasting blood glucose, random blood glucose, CGM, glucometer measurements.

7. It should be remembered that a patient may suffer from diabetes due to mixed causes.

II. Goals of diabetes treatment

1. Prevention of acute and chronic complications of diabetes.
2. Acquisition and maintenance of normal, harmonious physical development: growth, body weight and its composition (value in centiles), as well as the course of puberty appropriate to age and sex, while ensuring the well-being of the child and the child's family.
3. Parameter target values reducing the risk of vascular complications:
 - TIR \geq 80% and HbA_{1c} \leq 6.5% should be aimed, while maintaining stable blood glucose level, minimising hypoglycaemic episodes and maintaining a good quality of life;
 - concentration of total cholesterol < 170 mg/dl (< 4.4 mmol/l), LDL cholesterol < 100 mg/dl (< 2.6 mmol/l), triglycerides < 100mg/dl (< 1.1 mmol/l);
 - blood pressure < 90 centiles depending on age, sex and height (from the age of 13 < 120/80 mm Hg);
 - BMI < 85 centiles depending on age and sex;
 - physical activity of at least moderate intensity > 1 hour per day;
 - sleep duration: children aged 5–13 minimum 9 hours, aged 14–17 minimum 8 hours;
 - no smoking.

III. Treatment of diabetes

1. Pharmacotherapy

Type 1 diabetes – insulin therapy:

- the insulin therapy method should be adapted to the individual needs of the patient, as well as accepted by the patient and their carers;
- the method of choice is intensive functional insulin therapy (IIT) consisting in constant adaptation of insulin doses to the current blood glucose level and the trend of its change, the amount of consumed carbohydrates, fats and proteins in meals, physical activity and emotions, performed as one of the following:
 - » continuous subcutaneous insulin infusion using a personal insulin pump (CSII);
 - » *multiple daily injections* (MDI) of insulin using pen type injectors with ≤ 6 mm length needles;
- for indications and contraindications to CSII, see the relevant topic section;
- the use CSII from the onset of diabetes should be a standard, as long as no contraindications occur and the method of therapy is accepted by the patient and/or their guardians; if they cannot be used, systems that automatically suspend insulin delivery in predicting hypoglycaemia should be considered;
- in CSII and MDI the use of the bolus calculator function is recommended from the beginning of therapy, as it increases blood glucose stability and reduces the risk of hypo- and hyperglycaemia; it is necessary to review and modify the bolus calculator settings regularly;
- the choice of rapid- or ultra rapid-acting and long- or ultra long-acting insulin analogues should be tailored to the individual needs of the patient and take into account the pharmacological differences between the medicines, as well as registered indications; ultra-long-acting analogues reduce the risk of hypoglycaemia and allow for less restrictive adherence to the timing of insulin administration;
- in the pediatric population the daily insulin demand is highly variable; its highest values are recorded during puberty but should not exceed 1.5 units/kg/d. High insulin demand can often be linked to physical inactivity, excessive carbohydrate intake, obesity or co-morbidities. In cases of obesity, the addition of the GLP-1 receptor agonist may be a good option to consider. In patients with concomitant insulin resistance, the addition of metformin may be considered;

- in the functional IIT method: the size of the basal dose (20–50% of the daily dose) and its profile depend on the age of the child and the type of the personal insulin pump used; in the case of using AID systems, the size of the basal rate depends on the algorithm used;
- rapid-acting/short-acting insulin is usually better administered before a meal, 15–20 minutes and 20–30 minutes respectively, while the ultra rapid-acting analogue 2–10 minutes before a meal; in the youngest children, due to the lack of the possibility to plan the timing and sizes of meals, it is advisable to consider dividing the dosage, administering half of the regular dose before a meal and half during or after a meal, in exceptional cases administering the whole dose after a meal;
- the places of insulin administration should be systematically changed, insulin must not be administered in the area of hypertrophy or atrophy of the subcutaneous tissue;
- in CSII patients with low insulin requirements, insulin dilution is acceptable.

Type 2 diabetes – insulin, SGLT-2 inhibitors, metformin and GLP-1 receptor agonists may be used in this age group (age restrictions as indicated in the Summary of Product Characteristics).

In the case of newly diagnosed diabetes and:

- the lack of symptoms, $HbA_{1c} < 8.5\%$ and the absence of ketosis/acidosis, pharmacotherapy in children may begin with metformin; (at a dose successively increased to 2 g/d or tolerated);
- the presence of symptoms and/or $HbA_{1c} \geq 8.5\%$ and the absence of ketoacidosis, treatment begins with the metformin and basal insulin (at a dose of 0.25–0.5 U/kg b.w./d);
- the presence of ketoacidosis – the initial treatment is identical as in the case of type 1 diabetes (intravenous insulin).

In patients suffering from prolonged illness with insufficient glycemic control and body weight not normalized despite the use of metformin, a second antihyperglycemic drug (GLP-1 receptor agonist and/or SGLT-2 inhibitor) should be added. In the case of ineffective therapy or inability to use a GLP-1 receptor agonist and/or SGLT-2 inhibitor, basal insulin should be started.

In selected cases, bariatric treatment is acceptable.

Monogenic diabetes or diabetes due to genetic syndromes associated with diabetes – the treatment method depends on the type of disease (use of sulphonylurea derivatives is “off label”).

Diabetes due to cystic fibrosis (see chapter 1).
2. Nutrition of children and adolescents diagnosed with diabetes

The basic principles of healthy nutrition for children with diabetes are the same as for healthy children. It is advisable to maintain a balanced calorie intake and reduce the consumption of digestible carbohydrates to a maximum of 40–50% of daily calorie requirements. The consumption of simple sugars should be limited to 10% of daily caloric intake and a portion of vegetables should be a part of every meal.

3. Self-monitoring:

- blood glucose monitoring should be carried out by self-measuring glucose levels using continuous glucose monitoring systems, by regular scanning (isCGM, formerly FGM) or real-time scanning (generating notifications and audible alarms without user intervention (rtCGM, real-time continuous glucose monitoring). The CGM system is indicated in all children and adolescents from the onset of the disease;
- if CGM cannot be used, blood glucose measurements should be performed with a glucometer;
- the required frequency of blood glucose measurements using a glucometer is individualised;
- in the case of functional IIT, the measurements should not be carried out less than eight times a day. The blood glucose level should be measured on an empty stomach and before meals, 1–2 hours after a meal, before sleep, as well as before, during and after physical activity. It is also necessary to check the nocturnal glucose profile. If the patient is feeling unwell, they should immediately measure their blood glucose level.

The use of CGM systems requires structured diabetes education on the correct interpretation of current results, modification of therapy according to the dynamics of changes in glucose concentration (trend arrows), retrospective analysis of results according to the recommendations on TIR (see chapter 4). If rtCGM is used, the education should also include the principles of correct sensor calibration, as well as proper selection and programming of alarm and notification limits. In the event of obtaining a glucose value determined with the use of CGM that is inadequate to clinical symptoms, blood glucose should be measured using a glucometer.

The use of CGM systems allows adjusting insulin doses to glucose trends more effectively and thus increase the stability of glucose concentra-

tion, reduce the number of hypoglycaemic events, improve metabolic control and the quality of life of patients and their carers, as well as decrease the risk of cardiovascular complications. Only constant use of CGM is therapeutically effective (at least 70% of the time).

The use of rtCGM, optimally insulin pumps integrated with rtCGM with automatic insulin suppression function in the event of a low glucose level or with automatic insulin suppression with predicted hypoglycaemia is recommended in patients unaware of hypoglycaemia or suffering from frequent hypoglycaemic events.

The measurement of β -hydroxybutyrate concentration in blood using strip tests is a more sensitive indicator of ketonaemia than the measurement of the level of ketones in urine.

4. Therapeutic education:

- is the key element of diabetes management and should always include the child and their guardians;
- the patient and/or their parents/guardians require education covering the principles of diabetes self-control, taking into account modern technologies in diabetes care and regular re-education in accordance with the individual needs of the patient; all persons providing permanent or temporary care for a child must be educated;
- educational methods and programmes should be varied and adapted to the child's age and intellectual abilities, as well as to the parents'/guardians' educational tasks;
- in cases involving adolescents and young adults, particular attention should be paid to the prevention of chronic complications of diabetes, contraception, pregnancy, risky behaviour and addiction;
- the process of acquiring self-management skills should be gradual; the shift of responsibility to diabetic children and adolescents too early or too late may result in treatment failure;
- workshops and camps for children, adolescents and young adults diagnosed with diabetes constitute beneficial and effective educational tools;
- members of the diabetes team providing care for patients under 18 staying at camps without their parents should provide intensive medical care that includes night duty. Legal and organisational support from administrative units providing care for children with diabetes is expected;

- provision of education on diabetes and its follow-up is the responsibility of the entire diabetes team, especially the diabetes educator.
5. Psychological care:
- children, adolescents and young adults with diabetes and their families must be under constant psychological care from the onset of the disease;
 - subclinical and clinical depressive syndromes, anorexia nervosa (especially in adolescent girls) and other eating disorders not otherwise specified (ED-NOS) are frequently observed;
 - care should be provided by an experienced psychologist, a specialist in the field of diabetes occurring in developmental age, in cooperation with a pediatric psychiatrist;
 - screening for depressive disorders, eating disorders and diabetes-related stress should be performed in all patients over 12 years of age every 1–2 years and in each patient with unsatisfactory metabolic control of the disease.

6. Additional notes:

- it is necessary to involve the whole family in the management of diabetes in children and adolescents; it is advisable to discuss treatment goals together;
- patients should be encouraged to be independent and take responsibility for their own treatment to an extent appropriate to their age, taking into account their intellectual development and emotional maturity;
- correctly developing children aged 10 or more should independently measure their blood glucose level using CGM system and a glucometer, as well as interpret the results, administer insulin with a pen injector, change insulin pump infusion sets and CGM sensors;
- children over 13 years of age should independently conduct daily diabetes self-monitoring with parental supervision.

In the event of occurrence or suspicion of social problems, cooperation with a social worker should be established.

IV. Comorbidities of type 1 diabetes:

The most common comorbidities include:

- autoimmune thyroiditis and coeliac disease; they usually give a small number of symptoms or are asymptomatic (e.g. fluctuations of blood glucose levels, improper dynamics of growth and pubescence);
- IgA deficiency;
- certain additional chronic diseases (e.g. epilepsy, Asperger's disease, mental and intellectual

disorders) may place additional conditions on diabetes therapy.

V. Acute and chronic complications of diabetes

1. Acute complications:

- in the case of blood glucose levels below and equal to 70 mg/dl (3.9 mmol/l) or clinical symptoms of hypoglycaemia, glucose should be administered in the dose of approx. 0.3 g/kg bw, the dose depends on blood glucose and active insulin values, (the maximum dose usually does not exceed 15 g of glucose for a child \geq 50 kg bw), the blood glucose level should be measured again after 15 minutes; if AIDs are used, treatment of hypoglycaemia with less glucose (5 to 10 g) should be considered;
- the blood glucose level $<$ 54 mg/dl (3.0 mmol/l) indicates clinically significant hypoglycaemia;
- in the case of CGM, hypoglycaemia is diagnosed if the blood glucose level is $<$ 54 mg/dl for more than 15 minutes;
- severe hypoglycaemia in children is diagnosed in the case of disorders of consciousness and/or convulsions;
- the management of severe hypoglycaemia is described in chapter 14;
- biochemical criteria for the diagnosis of acute hyperglycaemic conditions in children and adolescents are shown in Table 23.1;
- the management of ketoacidosis in children is presented in Figure 22.1. It is emphasised that hydration can be carried out using 0.45% or 0.9% NaCl;
- management of hyperglycaemic hyperosmolar state:
 - » **fluid therapy:** rapid initial infusion of 0.9%NaCl in the dose of \geq 20 ml/kg, the next doses should be administered until the restoration of peripheral perfusion, then fluids should be replaced within 24–48 hours using 0.45% NaCl. The optimal rate of reduction of sodium level is 0.5 mmol/l per hour, blood glucose level is 50–70 mg/dl per hour and no more than 90 mg/dl per hour. If the blood glucose level decreases by more than 90 mg/dl, the addition of 2.5–5% glucose solution should be considered after the first few hours of hydration,
 - » **insulin therapy:** insulin should be included in the treatment if despite the appropriate fluid therapy, the blood glucose level does not decrease by more than

- 50 mg/dl per hour as a result of the administration of fluids only, the initial dose of insulin: 0.025–0.05 unit/kg/hour, then modified dose to achieve the blood glucose level reduction of 50–70 mg/dl per hour,
- » **electrolytes:** sodium, potassium, phosphorus, and magnesium deficits are higher than in diabetic ketoacidosis, the supplementation of potassium should be started as soon as renal function and diuresis is stabilised; the intravenous administration of potassium phosphate and potassium chloride 1 : 1 ensures adequate phosphate supplementation, the administration of phosphates may result in hypocalcemia, the supplementation of magnesium should be considered in hypomagnesemia;
 - each centre treating children with diabetes should develop a protocol for the management of diabetic ketoacidosis specifying local indications for hospitalisation in intensive care units, taking into account human resources of the diabetes unit, experience of the team, and access to intensive care units;
 - indications for treatment in an intensive observation room within diabetes units or in intensive care units:
 - » severe diabetic ketoacidosis (pH < 7.1*) with a long duration of symptoms, circulatory disorders, decreased level of consciousness,
 - » increased risk of cerebral oedema (age < 5 years, rapidly developing acidosis, low pCO₂ level, high urea nitrogen level),
 - » hyperosmolar diabetic ketoacidosis.
2. Chronic complications:
 - to prevent complications, regular health examinations are necessary (tab. 23.1);
 - if any chronic complication is diagnosed, screening for other disorders must be performed (e.g. diabetic kidney disease, retinopathy, neuropathy and macroangiopathy);
 - in case of persistent albuminuria exceeding normal values, the use of an ACE inhibitor or AT1 receptor antagonist is recommended to inhibit its progression. For the treatment to be effective, albuminuria must be managed appropriately;
 - ACE inhibitors or AT1 receptor antagonists are recommended for use in normalising blood pressure; the therapy effectiveness should be continuously monitored, and it is also advisable to achieve a reduction in nocturnal blood pressure, as recorded during continuous ambulatory blood pressure monitoring (ABPM);
 - for lipid disorders: when LDL-C > 100 mg/dl (2.6 mmol/l), improved blood glucose control and lifestyle changes are required;
 - in children above the age of 8, unless previous attempts at lifestyle changes have not had a beneficial effect on the plasma lipid profile or if other atherosclerotic risk factors coexist with LDL levels above 159 mg/dl (4.1 mmol/l), it is recommended to consider genetic testing for LDL cholesterol receptor mutations and possible use of statins.

VI. Surgery-related treatment

See the section on the relevant topic.

Table 23. 1. Biochemical criteria for the diagnosis of acute hyperglycaemic conditions in children and adolescents with diabetes

Parameter	DKA			Hyperglycaemic-hyperosmolar state	Hyperosmolar DKA
	Mild	Moderate	Severe		
Plasma glucose [mg/dl]	> 200	> 200	> 200	> 600	> 600
venous blood pH	< 7.3	< 7.2	< 7.1	> 7.3	< 7.3
Bicarbonate [mmol/l]	< 15	< 10	< 5	> 15	< 15
Ketotic hypoglycemia a (β-hydroxybutyrate [mmol/l])	> 3	> 3	> 3		> 3
Ketonuria	Moderate or high	Moderate or high	Moderate or high	Absent or mild	Moderate or high
Effective plasma osmolality [mOsm/kg]	< 320	< 320	< 320	> 320	> 320

*All three biochemical criteria are required for the diagnosis of DKA: 1) hyperglycemia > 200 mg/dl, 2) venous blood pH < 7.3 or bicarbonate < 18 mmol/l, 3) ketonaemia or ketonuria

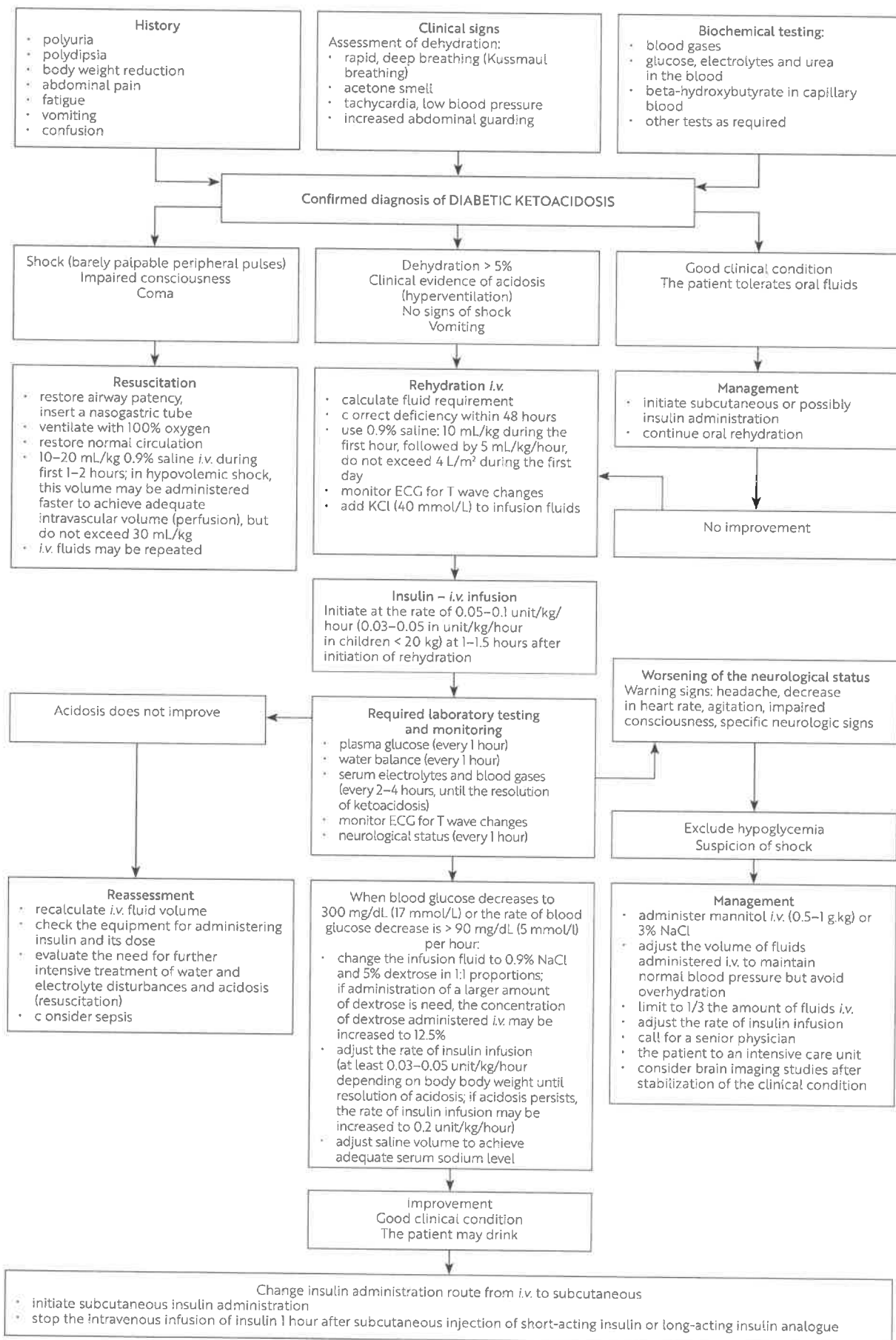


Figure 23.1. Management of diabetic ketoacidosis in children

ECG – electrocardiogram; i.v. – intravenous

VII. Recommendations regarding diabetes care in children and adolescents with diabetes (tab. 23.1)

1. General recommendations:

- for each new onset of diabetes, the child should be hospitalised in a specialised paediatric diabetes unit, and thereafter, should only receive regular specialised care in paediatric and adolescent diabetes clinics until he or she is transferred to an adult diabetes clinic (for transfer rules, see Appendix 1):
 - » it is necessary to provide 24-hour access to diabetes information for patients and their caretakers,
 - » hospitalisation in a diabetes unit should always be considered in case of disease decompensation (persistent hyperglycaemia, blood glucose fluctuations, recurrent hypoglycaemia),
 - » in diabetes care, it is necessary to read data from the memory of insulin delivery devices and blood glucose monitors and interpret them during each hospitalisation and diabetes consultation, in close co-operation with the patient and their guardians.

2. Therapy team:

- hospital care – per 10 paediatric-diabetes beds: 2 full-time physicians (paediatric diabetology specialist, paediatric endocrinology and diabetology specialist, and if they are unavailable, paediatrics/diabetology/endocrinology specialist experienced in paediatric diabetology, as confirmed by the provincial diabetology consultant or provincial paediatric endocrinology and diabetology consultant); 2 full-time nurses dedicated exclusively to diabetes education or 2 full-time diabetes educators, full-time dietician and psychologist and a 1/4 FTE social worker. A nurse dedicated to diabetes care must be available at diabetes units providing intensive care;
- outpatient care – a therapy team rendering services for 300 patients: 1 full-time paediatric diabetologist, endocrinology and paediatric diabetology specialist (and if no such specialist is available, paediatrics specialist, diabetologist or endocrinologist experienced in paediatric diabetology, as confirmed by a provincial consultant); 1–2 nurses whose scope of duties is limited to only to diabetological care or 1–2 diabetological educators; a half-time dietician and a half-time psychologist;
- the therapeutic team must ensure close cooperation with: a child psychiatrist, a social work-

er and an IT specialist who may be part of the diabetes team.

3. Outpatient consultations:

- unlimited frequency of diabetes visits; the recommended frequency is one visit every 6–8 weeks, with no less than 4 visits a year;
 - some outpatient appointments can be replaced by video or phone consultations provided that the relevant data can be read and sent to the clinic remotely:
 - » data from blood glucose monitoring devices,
 - » data from insulin delivery devices or apps used as electronic self-management journals;
 - irrespective of the use of remote consultations, patients must visit the clinic at least once every 6 months;
 - in patients with poorly metabolically balanced diabetes or additional health problems, in-person clinic visits should be recommended;
 - the recommended average visit time is 20–30 minutes for specialist advice and 30–40 minutes for treatment and diagnostic advice (personal insulin pump therapy);
 - educational, dietary and psychological advice should be a separate clinic visit, independent of medical advice, and may also be conducted electronically;
 - additionally, the tasks of the therapeutic team include: substantive supervision of education on the care of children with diabetes in educational institutions, educational camps/workshops, and the preparation of information materials.
- ### 4. Clinic and ward equipment:
- equipment: automatic syringes, personal insulin pumps, glucometers, continuous glucose monitoring devices, blood pressure Holter (ABPM), ophthalmoscope, monofilament device, food scales, a computer set for reading and printing data from the memory of therapeutic systems;
 - facilities and the necessary teaching aids for diabetology and dietary education and psychological care;
 - additional ward equipment: 1 or more intensive metabolic monitoring stations equipped with pulse oximeters per 10 diabetic patient beds, ECG monitor, oxygen access, ultrasound machine with vascular flow assessment capability.

Table 23.2. Recommendations regarding diabetes care in children and adolescents with diabetes

Therapeutic education provided to the patient and his/her caregivers	At the diagnosis and afterwards, at the discretion of the doctor or education nurse
Nutritional education provided to the patient and his/her caregivers	At the diagnosis and afterwards, at the discretion of the doctor or education nurse/dietician
Psychological care of the patient and his/her caregivers	At the diagnosis and afterwards, at the discretion of the doctor or education nurse or psychologist
Evaluation of the type of diabetes	At the diagnosis and revision of the diagnosis: clinical picture; family history; assessment of insulin secretion, pancreatic antibody test [#] , insulin sensitivity test [*] ; genetic tests [*]
HbA _{1c}	3–4 times a years, may be measured less frequently in patients who regularly use FGM/CGM
Total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides in serum	After the stabilisation of blood glucose level, and then, if in normal range, every 2 years in patients over the age of 10
Abdominal ultrasound	At the diagnosis of diabetes
Body weight and growth monitoring	During each visit using percentile charts for age and gender
Monitoring of physical development according to the Tanner scale	At the discretion of the doctor, at least once a year, assessment of the regularity of the menstrual cycle
Blood pressure	During each visit, in children < 7 years of age at least twice a year, in children > 10 years of age 24-hour ambulatory blood pressure monitoring (ABPM) – every two years or in the case of elevated blood pressure values in random measurements
Testing for celiac disease	According to the ESPGHAN guidelines regarding the diagnosis of celiac disease, if no clinical symptoms – screening every 2 years
Evaluation of thyroid function/evaluation for disorders	At the onset of the disease: TSH, fT ₄ , anti-TPO and anti-TG (USG in case of positive antibodies and/or thyroid dysfunction), then TSH, anti-TPO and anti-TG every 2 years (at the discretion of the doctor)
Screening for chronic complications: creatinine, albuminuria, general urinalysis, ophthalmological consultation	After the stabilisation of blood glucose level, and then every 2 years in patients over the age of 10 or with the duration of diabetes of more than 5 years. In the case of abnormal results, the frequency of subsequent tests should be determined on a case-by-case basis according to the patient's need
Specialist consultations	According to the general paediatric indications and at the revision of the diagnosis

^{*} depending on the needs

VIII. Children with diabetes at educational institutions

1. The diabetes treatment team must work with the teaching staff, the school nurse and the family to ensure the child's safety at school and prevent the stigmatisation of diabetics:
 - once a child has been diagnosed with diabetes, the teaching staff should be provided with written information about diabetes and about providing assistance in emergency life-threatening conditions, as well as phone numbers of the child's parents and doctor and of the nurse at the given educational institution;
 - the staff at the educational institution must also be informed about the need for the child to have a mobile device (mobile phone, smart-watch) with applications used to receive and transmit CGM system, insulin pump, integrated system and therapy support application data (e.g. to calculate the carbohydrate content in the food);
 - the teaching staff must receive the appropriate training in diabetes self-care;
 - training the nurse/staff responsible for supervising the diabetic child at school in the use of glucometers, CGM systems, injectors or personal insulin pumps;
 - caretakers must provide the institution with a continuous supply of glucose and glucagon;
 - diabetes is not an indication for the student to be granted an individual teaching programme or be exempt from any classes (e.g. physical education, school trips).
2. The tasks of the teaching staff include:
 - immediately providing diabetes first aid in life-threatening situations;
 - providing comprehensive assistance aimed at enabling a child with de novo diabetes to quickly and safely return to their educational institution and fully integrate with their peers;
 - knowing the basic scope of diabetes self-care;

- enabling self-monitoring in educational and childcare settings for all age groups, with younger children being supervised by school staff;
- enabling the use of glucose monitoring and insulin devices during school activities, including tests and exams;
- working closely with the diabetes treatment team and the patients' caretakers.

IX. Travel:

- it is the responsibility of the patient and his/her caregivers to inform the organiser about the disease, its treatment, nutrition and help and to provide telephone numbers to the therapeutic diabetes team;
- in the case of international travels, an appropriate certificate in English informing about the disease should be prepared;
- insulin, glucagon, glucose, glucose meter with test strips, insulin pens, and equipment for insulin pumps and CGM systems should be secured for the duration of the travel and stored in a hand luggage.

X. Physical activity, practising sports

1. Children and adolescents with diabetes:
 - should be encouraged to engage in daily moderate or intensive physical activity lasting for at least 60 minutes;
 - should regularly participate in physical education classes;
 - may practice sports, including extreme sports, similarly to children without diabetes.
2. Recommendations regarding physical activity and practising sports are presented in chapter 7 and Annex 7.

XI. Choice of profession:

- particular attention should be paid to the education of diabetic adolescents – they should be provided with the best education possible;

- it is the task of the diabetes team to help the patient choose a profession by evaluating his/her health, presence of complications, and intellectual and mental capabilities.

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