ORIGINAL RESEARCH

Submitted: 29.03.2023; Accepted: 17.04.2023; Published online: 25.05.2023

Endocrine emergencies: clinical manifestations, operative diagnostics and emergency medical care

Elizaveta R. Karpenko, Irina D. Gurova, Anna E. Pogodina, Anastasia N. Kompaniets, Valeria E. Bairova, Daria A. Zaichuk, Anastasia A. Egorova

Pirogov Russian National Research Medical University, Russia, 117997, Moscow, Ostrovitianov str. 1

*Corresponding autor: filosoff123@list.ru

Abstract

The article analyzes clinical manifestations, operative diagnostics and emergency medical care for endocrine emergencies. The authors notes that urgent endocrine conditions are serious and potentially life-threatening conditions that require immediate medical attention. Medical care in such cases may include rapid diagnosis and immediate treatment to prevent complications. Medical care for urgent endocrine conditions is critically important for saving the patient's life and preventing serious complications. One of the directions of improving the methods of medical care for urgent endocrine conditions is the use of the latest technologies and innovative methods of treatment.

Keywords

Endocrinology, Emergency conditions, Clinical manifestations of endocrine pathologies, Operative diagnostics, Emergency medical care.

Imprint

Elizaveta R. Karpenko, Irina D. Gurova, Anna E. Pogodina, Anastasia N. Kompaniets, Valeria E. Bairova, Daria A. Zaichuk, Anastasia A. Egorova. Endocrine emergencies: clinical manifestations, operative diagnostics and emergency medical care. Cardiometry; Issue No. 27; May 2023; p. 150-160; DOI: 10.18137/cardiometry.2023.27.150160; Available from: http://www.cardiometry.net/issues/no27-may-2023/endocrine-emergencies-clinical-manifestations

Introduction

Urgent endocrine conditions, such as thyrotoxic crisis, myxedema coma, diabetic ketoacidosis and acute adrenal crisis, can have serious consequences for the health and life of the patient. These conditions require urgent medical attention, as they can progress rapidly and lead to death [1].

Medical care for urgent endocrine conditions includes rapid and accurate diagnosis, as well as the timely appointment of adequate therapy. It is important that medical professionals are prepared for such situations, have sufficient knowledge and skills to effectively treat patients with these conditions.

Thanks to the development of medical technologies and scientific research, new methods of diagnosis and treatment of urgent endocrine conditions are emerging, which makes it possible to improve treatment results and reduce mortality. However, it is also important to observe preventive measures and control diseases that can cause the development of urgent endocrine conditions [2].

Diagnosis of urgent endocrine conditions includes various methods that allow you to assess the patient's condition and determine the cause of symptoms.

The main methods of diagnosing urgent endocrine conditions are as follows:

– clinical examination and anamnesis – allow you to identify symptoms and previous diseases, which can help to establish a diagnosis and determine the necessary treatment measures;

– laboratory tests – include blood and urine tests that can show changes in hormone levels, electrolytes and other indicators related to the endocrine system. For example, with diabetic ketoacidosis, an increase in blood glucose levels may be detected, as well as the presence of ketone bodies;

– instrumental studies – include various imaging techniques such as ultrasound, computed tomography and magnetic resonance imaging. They can help identify changes in the structure and function of organs associated with the endocrine system, such as the thyroid gland, adrenal glands and others.

Electrocardiography (ECG) can be used to assess cardiac activity and detect changes associated with certain urgent endocrine conditions, such as acute corticosteroid deficiency. A biopsy can be used to diagnose thyroid cancer or other endocrine glands. However,

in most cases, the diagnosis of urgent endocrine conditions is based on clinical signs and laboratory data, and instrumental studies are used to confirm the diagnosis and assess the degree of organ damage.

The purpose of the work is to consider the features of clinical manifestations, operative diagnosis and emergency medical care in endocrine emergencies.

Material and methods

In the process of writing the work, an analysis of publications and scientific works of specialists in the field of endocrinology was carried out, comparative and analytical research methods were used when summarizing the data obtained.

Results

Let's consider the features of clinical manifestations, operative diagnostics and emergency medical care for certain endocrine emergencies. A therioid storm (or thyrotoxic crisis) is an acute, life-threatening reaction of the body to an excess of thyroid hormones in the blood, which are produced by the thyroid gland. The thyroid gland plays an important role in the regulation of metabolism, so an excess of its hormones can lead to serious disorders in the body.

Therioid storm occurs as a result of excessive release of thyroid hormones (triiodothyronine (T3) and thyroxine (T4)) thyroid gland, which leads to hyperthyroidism (increased levels of thyroid hormones in the blood). Thyroid hormones are usually produced under the control of hormones secreted by the hypothalamus and pituitary gland. The hypothalamus secretes a hormone called tyroliberin release hormone (TRH), which stimulates the release of thyroid hormone – thyroid stimulating hormone (TSH) by the pituitary gland. TSH, in turn, stimulates the thyroid gland to synthesize and release thyroxine (T4) and triiodothyronine (T3) [3].

However, with a therioid storm, various factors arise that can lead to a violation of the usual feedback mechanism between the hypothalamus, pituitary gland and thyroid gland. For example, it may be caused by an infection, injury, surgery, a sharp reduction in medication intake, including medications containing thyroid hormones, or taking certain medications such as amphetamines.

In addition, various stressful factors, such as physical injuries, surgical interventions, emotional stress can lead to an increase in the level of adrenaline and norepinephrine, which, in turn, can enhance the effect of thyroid hormones, exacerbating the therioid storm. As a result of these disorders, the level of thyroid hormones increases sharply, which leads to various pathological changes in the body and can cause the development of a therioid storm. Also, the use of amphetamines can increase the production of thyroid hormones and contribute to the development of a therioid storm [4].

Therioid storm develops rapidly and passes through several stages:

– pre-storm period. This stage is characterized by increased activity of the thyroid gland and an increase in the release of thyroid hormones. At this stage, nervousness, insomnia, headache, excessive sweating, severe thirst, diarrhea and vomiting may occur;

– storm period. At this stage, the symptoms become more pronounced and serious complications arise. Patients may experience severe tachycardia, arrhythmia, elevated body temperature, loss of consciousness, seizures, hypertension, respiratory failure, and may also develop metabolic acidosis and acute renal failure;

– post-storm period. After a stormy period, a recovery phase may occur when patients begin to show signs of improvement, but relapses may occur. At this stage, skin rashes, idiopathic orthostatic hypotension, myopathies and other complications associated with thyroid pathology may appear;

– the fading period. At this stage, the symptoms of a therioid storm begin to gradually decrease. However, patients may continue to experience some complications, such as weakness, increased fatigue, and relapses are also possible [5].

It is important to note that the development of a therioid storm can be very rapid, and the transition from the first symptoms to serious complications can take several hours or even minutes. Therefore, rapid diagnosis and proper treatment of therioid storm is critical to prevent serious consequences.

Characteristics of a therioid storm include:

– rapid increase in body temperature (up to 40 degrees Celsius);

fast heart rate (more than 140 beats per minute);

increased blood pressure;

– disorders of the nervous system (aggressiveness, anxiety, delusions, hallucinations);

– disorders of the gastrointestinal tract (nausea, vomiting, diarrhea);

– disorders of the cardiovascular system (pulmonary edema, cardiac arrhythmias, heart failure);

– disorders of the respiratory system (difficulty breathing).

Treatment of a therioid storm requires immediate hospitalization in the intensive care unit and appropriate therapy aimed at reducing the level of thyroid hormones in the blood, reducing inflammation and symptomatic support of all body systems.

Therioid storm is a serious and dangerous disease that can lead to serious complications and even death in the absence of timely and effective treatment. Among the problems and complications associated with the therioid storm, the following can be distinguished:

– cardiovascular disorders such as tachycardia, arrhythmia, heart failure and myocardial infarction;

– respiratory system disorders, such as pulmonary edema and respiratory disorders;

– disorders of the nervous system, such as delusions, hallucinations, convulsions and coma;

– disorders of the liver and kidneys;

– violations of the water-electrolyte balance, which can lead to dehydration and a decrease in blood pressure;

– disorders of the gastrointestinal tract, such as nausea, vomiting and diarrhea;

– decreased immunity and the risk of infectious complications;

– mental disorders such as anxiety, aggressiveness and panic attacks [6].

In addition, a therioid storm can have a negative impact on pregnancy and lead to early termination of pregnancy or fetal hypoxia, therefore, at the first signs of a therioid storm, it is necessary to seek medical help in order to start treatment in a timely manner and prevent the development of complications.

A therioid storm is a medical emergency requiring immediate hospitalization in the intensive care unit. The following types of assistance are provided to the patient in this situation:

– administration of medications to reduce the level of thyroid hormones in the blood;

– infusion therapy to maintain the water-electrolyte balance;

– oxygen therapy to improve the functioning of the respiratory system;

– correction of disorders of the cardiovascular system, including reduction of blood pressure and correction of arrhythmias;

– symptomatic therapy to relieve symptoms such as nausea, vomiting and pain;

– monitoring and monitoring of the patient's condition, including measurement of body temperature, pulse and blood pressure [7].

In some cases, surgical intervention may be required to remove the thyroid gland or part of it.

It is important to note that the therioid storm is a serious disease that requires timely and competent medical care. Patients who receive timely treatment have a more favorable prognosis than those who do not receive timely care.

Drug therapy is an important component of the treatment of therioid storm. The purpose of drug therapy is to reduce the level of thyroid hormones in the blood, reduce heart load and reduce other symptoms.

The most commonly used medications for therioid storm are listed below:

– propranolol. This drug is used to reduce heart rate, lower blood pressure and reduce other symptoms associated with hyperthyroidism. Propranolol is started to be used immediately if a therioid storm is suspected, before the results of thyroid hormone level tests are received;

– thiamazole. This drug blocks the production of thyroid hormones in the thyroid gland. Thiamazole is started to be used as soon as possible after the diagnosis of a therioid storm;

– glucocorticosteroids. These drugs are used to reduce inflammation in the body and reduce the immune system's response to thyrotoxicosis [8].

In addition, plasmapheresis or infusion therapy may be required to remove excess thyroid hormones from the body.

It is important to note that drug therapy should be prescribed only under the supervision of a doctor, since the wrong choice and dosage of drugs can lead to serious complications.

Myxedematous coma is a severe complication of hypothyroidism, which occurs when the level of thyroid hormones in the blood drops to a critical level. The mechanism of development of myxedematous coma is associated with a violation of many processes in the body, which are caused by a lack of thyroid hormones.

With hypothyroidism, metabolism decreases and changes occur in the electrolyte balance of the body, including a decrease in the level of sodium and potassium in the blood. This can lead to disruption of the nervous system and deterioration of the function of the cardiovascular system. In addition, with hypothy-

roidism, there is a decrease in heat production, which can lead to a decrease in body temperature.

In a myxedematous coma, even more serious changes occur in the body. In this case, heart failure, respiratory disorders, acute renal failure, seizures, as well as brain edema and a decrease in its functions may develop. The cause of myxedematous coma may also be an infectious disease, trauma, surgery, the use of certain medications or untimely treatment of hypothyroidism.

One of the most serious complications of myxedematous coma is brain edema, which can lead to impaired consciousness and a decrease in its functions. In addition, myxedematous coma can lead to heart failure, acute respiratory disorders and kidney function.

Myxedematous coma can also be complicated by infectious diseases, hypokalemia, hyponatremia and other electrolyte disorders, as well as hypoglycemia.

Myxedematous coma develops gradually, usually within a few days or even weeks. Its development can be divided into several stages:

– the stage of early decompensation. At this stage, the patient experiences general weakness, fatigue, depression and drowsiness. In addition, there may be a decrease in appetite, constipation, a feeling of cold and the skin may become dry and flaky;

– decompensation stage. At this stage, the symptoms become more pronounced. The patient may experience memory impairment, slowing down of thought processes, difficulty in speech and a decrease in the ability to concentrate. In addition, there may be swelling of the face and hands, a decrease in body temperature and a decrease in blood pressure;

– stage of severe coma. At this stage, the patient loses consciousness and stops reacting to the environment. Breathing becomes shallow and difficult, cardioarrhythmia and hypothermia may occur. In severe cases, death may occur [9].

Symptoms of a myxedematous coma may appear gradually over several days or weeks, and may include signs such as:

– severe weakness and fatigue;
– chills and cold limbs;
– low blood pressure;
– low body temperature;
– slow pulse and breathing;
– loss of appetite and weight loss;
– dry and pale skin;
– violation of consciousness, up to coma;
– slow speech and thinking;
– deterioration of memory and concentration;
– an increase in the size of the thyroid gland [10].

In general, myxedematous coma is an extremely dangerous condition that can lead to death if measures are not taken in a timely manner to stop it

Treatment of myxedematous coma is an emergency measure and includes the introduction of thyroid hormones and correction of electrolyte balance disorders. However, despite timely treatment, myxedematous coma can lead to serious and even fatal consequences, so prevention and early treatment of hypothyroidism are extremely important.

The following are the main measures that should be taken when providing emergency care to a patient with a myxedematous coma:

– provision of respiratory function: it is necessary to ensure free access of air and, if necessary, carry out artificial ventilation of the lungs;

– correction of electrolyte balance: in case of severe hyponatremia, hypokalemia and other electrolyte disorders, infusion therapy and the administration of appropriate drugs should be carried out;

– introduction of thyroid hormones: to quickly restore the level of thyroid hormones in the blood, it is necessary to introduce high doses of levothyroxine or other thyroid hormones;

– prevention of rapid administration of thyroid hormones: thyroid hormones should not be administered quickly, as this can lead to a rapid increase in metabolism and heart failure;

– carrying out therapeutic measures in case of possible complications: in the presence of complications, such as brain edema, infectious diseases, hypoglycemia and others, appropriate therapy should be carried out;

– control of body temperature: it is necessary to control body temperature and, in case of hypothermia, ensure its maintenance;

– patient monitoring: the patient should be under constant medical supervision, as his condition can change rapidly [11].

In general, emergency medical care for myxedematous coma consists in intensive therapy aimed at restoring normal body functions and preventing complications.

Drug therapy is the main method of treating myxedematous coma. The main drug used in the treatment of myxedematous coma is levothyroxine. It is

used to quickly restore the level of thyroid hormones in the blood.

Glucocorticosteroids are sometimes used to correct the immune response and restore the functions of the adrenal glands. For example, hydrocortisone, prednisone, dexamethasone and others.

Solutions of glucose, salts, and electrolyte solutions can be used to correct the electrolyte and water-salt balance. With hypothermia, medications that increase body temperature, such as infusion of hot liquids, hot water bottles and others, can be used. In the presence of complications, such as infectious diseases, brain edema and others, appropriate therapy should be used [12].

Treatment of myxedematous coma is a complex process and requires an individual approach to each patient. The dosage of medications, the duration of the course and their combination depend on the severity of the patient's condition and the presence of complications.

Diabetic ketoacidosis (DKA) is an acute complicated form of diabetes mellitus that develops due to impaired glucose metabolism in the body. The mechanism of occurrence of DKA is associated with insulin deficiency and an increase in blood glucose levels, which leads to the mobilization of fatty acids from adipose tissue to the liver, where they are oxidized to acetyl-CoA and enter the Krebs cycle. However, due to insulin deficiency, which usually stimulates the use of glucose as the main source of energy, the body's cells cannot use glucose efficiently, and fatty acids continue to oxidize, forming a large number of acetone bodies.

When the concentration of acetone bodies in the blood exceeds the norm, ketonemia and ketonuria begin, that is, ketones appear in the blood and urine. This leads to the development of metabolic acidosis, which is aggravated by excessive lactate formation and excretion of bicarbonate ions in the urine. As a result of these processes, there is a violation of the acid-base balance in the body, which can lead to serious complications, such as impaired consciousness, impaired functions of the cardiovascular and respiratory systems, as well as dehydration and impaired kidney function. In addition, elevated glucose levels in the blood and urine, characteristic of DKA, can cause dehydration and electrolyte imbalance, as the kidneys begin to remove large volumes of fluid and electrolytes from the urine.

Other factors contributing to the development of DKA include infections, trauma, stress, surgery, and skipping insulin therapy. These factors can increase the need for insulin and/or reduce the sensitivity of tissues to insulin, which leads to insulin deficiency and an increase in blood glucose levels, which further leads to the development of DKA.

Usually, the symptoms of DKA develop quickly and include great thirst, frequent urination, dry mouth, nausea and vomiting, abdominal pain, acetone smell from the mouth, fatigue, insomnia and other symptoms. If proper measures are not taken, DKA can lead to death.

Diabetic ketoacidosis (DKA) can go through several stages of development.

1. The initial stage. at this stage, the blood glucose level begins to rise, which leads to polyuria (frequent urination), polydipsia (excessive thirst) and general weakness. At the same time, the level of insulin in the blood increases, which leads to an increase in the processes of mobilization of fatty acids and an increase in the concentration of ketone bodies in the blood.

2. Stage of moderate severity. At this stage, the blood glucose level continues to rise, and the insulin level continues to decrease. In addition, there is an increase in the concentration of ketone bodies in the blood, which leads to symptoms such as vomiting, abdominal pain, drowsiness, fatigue and decreased appetite.

3. The stage of severe form. At this stage, the concentration of ketone bodies in the blood reaches a critical level, which can lead to a ketoacidotic coma. The patient may experience severe disorientation, breathing problems, tachycardia and elevated body temperature [13].

It is important to note that the development of DKA does not always go through all stages and sometimes it can occur in a more smoothed form. In addition, symptoms may vary depending on the patient's age, the causes of DKA and the presence of concomitant diseases. If any symptoms associated with an increase in blood glucose levels occur, it is necessary to consult a doctor for consultation and prescribe the necessary treatment.

Symptoms of diabetic ketoacidosis can develop rapidly within a few hours or days, and may include:

– fatigue and weakness;
– intense thirst and frequent urination;
– abdominal pain and nausea;
– severe dryness in the mouth and on the skin;
– the smell of acetone from the mouth;

– increased body temperature;
– drastic weight loss;
– inability to concentrate and reduced productivity;
– feeling of hunger and increased appetite;
– chest pain and difficulty breathing;
– convulsions and loss of consciousness [14].

Emergency care for diabetic ketoacidosis includes the following measures:

– cardiopulmonary resuscitation (CPR) if the patient is not breathing or there is no cardiac activity. If CPR is not possible, an intravenous injection of glucagon should be initiated. This may be necessary if the patient develops an insulin coma caused by too much insulin;

– maintenance of vital functions. In the case of ketoacidosis, it is important to maintain blood pressure, cardiac activity and oxygen levels in the blood. If necessary, an infusion of fluid, oxygen and medications may be required to maintain cardiac activity;

– control of blood glucose levels. In diabetic ketoacidosis, it is necessary to monitor the level of glucose in the blood, and, if necessary, adjust it using insulin;

– adjustment of the electrolyte balance. Diabetic ketoacidosis can disrupt the balance of electrolytes in the body, such as sodium, potassium and chlorine. If this happens, then it is necessary to correct the electrolyte balance with the help of appropriate infusions [15].

To prevent repeated episodes of diabetic ketoacidosis, it is necessary to conduct an examination and treatment of the underlying disease, that is, diabetes. It is necessary to monitor the level of glucose in the blood, take insulin and other medications prescribed by a doctor, as well as monitor the diet and physical activity.

Acute adrenal crisis (AAC) occurs as a result of acute insufficiency of the adrenal cortex, which can be caused by a sharp decrease in the level of glucocorticoids and mineralocorticoids, which are produced by the adrenal cortex. Glucocorticoids, such as cortisol, play an important role in regulating metabolism, suppressing the immune system and adapting to stress. Mineralocorticoids, such as aldosterone, help regulate sodium and potassium levels in the body.

Acute corticosteroid deficiency can be caused by various causes, including impaired adrenal cortex function, autoimmune diseases, infections, injuries, surgical interventions, as well as discontinuation of long-term glucocorticoid intake.

In patients with impaired function of the adrenal cortex, an acute crisis may occur when more glucocorticoids and mineralocorticoids are required than their body can produce.

AAC may occur in patients with Itsenko-Cushing syndrome who have excessive levels of cortisol in the blood. After removal of the pituitary tumor, which can lead to Itsenko-Cushing syndrome, an acute shortage of corticosteroids, also known as an acute adrenal crisis, may occur.

AAC can also be caused when stopping long-term use of glucocorticoids, for example, after prolonged treatment with medications such as prednisone or dexamethasone. With such treatment, the adrenal glands may temporarily decrease their function, and an acute shortage of corticosteroids may occur when medication is discontinued.

AAC can be caused by various causes, such as acute stress, trauma, infectious diseases, surgical interventions, adrenal tumors, and others. In some diseases, such as Addison's disease or adrenal tumors, AAC can occur regularly [16].

The main symptoms of AAC are severe weakness, dizziness, nausea, vomiting, severe abdominal and chest pain, heart rhythm and breathing disorders, as well as mental disorders such as delusions, hallucinations and disorientation in space. Also, with this disease, peripheral vascular collapse may occur, as well as a sharp decrease in the amount of urine in combination with azotemia. Body temperature may decrease, although its sharp increase is often noted, especially in crises provoked by acute infection.

Many patients with partial adrenal insufficiency (reduced reserves of cortical matter) feel healthy, but under stress (for example, surgery, infection, burn, severe illness) they develop an adrenal crisis. The only signs may be shock and fever.

Untimely and inadequate treatment of AAC can lead to the development of serious complications, such as acute renal failure, hyperglycemia, hypokalemia, as well as cardiac and respiratory disorders, therefore it is very important to seek medical help in a timely manner if AAC is suspected and to carry out the necessary treatment [17].

Acute adrenal crisis develops quite quickly, in a few minutes or hours. The stages of development of this condition are not very distinguished, since the process proceeds very quickly and can lead to death if immediate measures are not taken.

However, there are several stages of the occurrence of an acute adrenal crisis:

– the initial stage. The first symptoms appear, such as headache, nausea, vomiting, weakness, palpitations, sweating and trembling. Convulsions, severe pain syndrome and other manifestations may also occur;

– advanced stage: symptoms become more pronounced, severe disorders of the cardiovascular, respiratory and nervous systems may occur. Homeostasis disorders lead to a significant increase in potassium levels and a decrease in sodium in the blood, which can lead to life-threatening complications;

– terminal stage: acute insufficiency of many organs and systems occurs, which can lead to death.

It is important to note that these stages may not manifest to the same extent in all patients. In some cases, the condition can progress very quickly, in others – more slowly.

Emergency medical care in acute adrenal crisis should be immediate and targeted. It includes the following measures:

1. Ensuring the patency of the respiratory tract and maintaining adequate ventilation of the lungs. If necessary, intubation and connection to a ventilator are performed.

2. Administration of high doses of glucocorticosteroids (for example, hydrocortisone) to suppress the immune response and prevent further deterioration of the patient's condition.

3. The introduction of salts (for example, sodium chloride) to maintain the electrolyte balance.

4. Correction of hypoglycemia by intravenous glucose administration.

Maintaining blood pressure by administering vasopressors (for example, norepinephrine) or fluid infusion.

5. Solving the issue of surgical treatment if an acute adrenal crisis is caused by a malignant tumor of the adrenal glands.

6. Monitoring of the patient's condition, including monitoring of heart rate, breathing, blood pressure and blood glucose levels [18].

It is important to note that acute adrenal crisis is a potentially life-threatening condition requiring immediate and comprehensive treatment. Patients who are at risk of developing this condition should receive regular monitoring by an endocrinologist and follow the recommendations for disease control and medication.

Drug therapy in acute adrenal crisis is aimed at eliminating the deficiency of corticosteroids and restoring the normal level of electrolytes in the body. It may include the following drugs:

– glucocorticosteroids: hydrocortisone, which is an analogue of natural cortisol, is usually preferred. It can be administered intravenously or intramuscularly at a dose of 100-300 mg per day, divided into several doses. If the patient is in critical condition, an initial dose of 500-1000 mg intravenously may be prescribed;

– electrolytes: in acute adrenal crisis, there is often a deficiency of sodium, potassium and other electrolytes. Therefore, it may be necessary to replace them intravenously in accordance with the level of their content in the blood.

With an acute adrenal crisis, it may be necessary to restore vital body functions, such as breathing and cardiovascular activity. To do this, drugs such as adrenaline, dopamine, etc. can be prescribed.

It is important to note that drug therapy in acute adrenal crisis should be carried out only in stationary conditions under the supervision of qualified medical specialists.

Age and gender can influence the development of some urgent endocrine conditions. For example, diabetic ketoacidosis develops more often in young patients with type 1 diabetes, but it can also occur in older patients. In addition, diabetic ketoacidosis can develop in women in connection with pregnancy, as well as with the use of contraceptives and hormone therapy.

Thyroid storm can occur in patients of any age and gender, but women and the elderly are more likely to suffer. Myxedematous coma usually occurs in elderly patients, especially in women. Acute adrenal crisis can occur in patients of any age and gender, but is more common in people aged 20 to 50 years, as well as in women during pregnancy.

However, it should be noted that age and gender are not determining factors for the development of urgent endocrine conditions. These conditions can occur in any person at any age and gender, and require timely medical care and treatment.

Urgent endocrine conditions may manifest in elderly patients as well as in younger people, but in this category of patients there may be some features that are important to take into account when providing medical care. For example, in this category of patients with diabetes, insulin sensitivity may be reduced, and there may also be concomitant diseases that can worsen the course of diabetic ketoacidosis. Elderly patients

may also have cognitive impairments, which may make it difficult to diagnose and treat urgent endocrine conditions.

Elderly patients with thyrotoxicosis may have more pronounced cardiovascular symptoms, such as cardiac arrhythmias and high blood pressure, which should also be taken into account when providing medical care. Also, renal function may be reduced in elderly patients, which may affect the choice and dosage of medications in the treatment of urgent endocrine conditions [19].

It is also worth noting that elderly patients may have atypical or less pronounced symptoms of urgent endocrine conditions, which complicates diagnosis and requires special attention from medical personnel.

In this regard, it is necessary to pay special attention to the prevention of urgent endocrine conditions in elderly patients through timely diagnosis and treatment of endocrine diseases, as well as the establishment of individual recommendations for monitoring the condition of patients with an already established diagnosis.

In general, in elderly patients, urgent endocrine conditions may have a more severe course and require a more individual approach to diagnosis and treatment.

It should also be borne in mind that the relief of urgent endocrine conditions and further therapy should be carried out taking into account the presence of polypragmasia in patients. Polypragmasia is the use of a large number of medications at the same time. It can be especially problematic when providing medical care to patients with urgent endocrine conditions, since various drugs can interact with each other and enhance or weaken the effects of treatment.

To provide medical care to patients with polypragmasia in urgent endocrine conditions, the following features must be taken into account:

– it is important to conduct a thorough history of taking medications, including all medications, dosages and time of administration, in order to exclude possible interactions between medications;

– it is necessary to avoid prescribing new medications, if possible, especially in cases where there is no clear understanding of their interaction with already taken medications;

– when prescribing medications, it is necessary to take into account possible side effects that may worsen existing diseases in the patient;

– it is necessary to monitor the patient's condition during treatment and evaluate the effectiveness of drug therapy in order to quickly adjust it if necessary;

– it is necessary to strictly control the levels of glucose, electrolytes and other important indicators in the blood to avoid possible complications and reduce the effectiveness of treatment [20].

If surgical intervention is necessary, it is necessary to provide complete information about taking medications and the possible risks of their interaction with anesthesia and other medications.

After discharge, it is necessary to regularly monitor the patient and assess his condition in order to timely identify possible complications and adjust treatment.

Discussion

Modern innovative approaches to medical care for urgent endocrine conditions include the use of new diagnostic methods, the development of treatment technologies and the creation of specialized centers.

One of these approaches is the use of telemedicine. Telemedicine allows you to consult online, remotely control medical devices and analyze large amounts of data. This is especially important for urgent conditions, when every minute can be crucial.

Also, recently, methods of gene therapy and cell immunotherapy therapy have been actively developing, which may represent a prospect in the treatment of severe endocrine diseases. In addition, the development of technologies makes it possible to create intelligent decision support systems based on artificial intelligence and machine learning. These systems can help doctors quickly and accurately diagnose endocrine conditions and determine the optimal course of treatment [21].

Finally, the creation of specialized centers for emergency endocrinological care, where all the necessary resources and specialists are available, is also an important innovative approach. In such centers, it is possible to provide the most qualified medical care to patients with urgent endocrine conditions, which will reduce the risks of complications and increase the effectiveness of treatment.

Some innovative approaches in medical care for urgent endocrine conditions include the use of telemedicine and artificial intelligence. Telemedicine can be useful in cases where patients are in remote or hard-to-reach places, and specialists cannot get to them quickly. With the help of telemedicine, doctors can

consult and remotely assess the patient's condition, as well as provide treatment recommendations [22].

Artificial intelligence can be useful in the diagnosis and treatment of urgent endocrine conditions. With the help of machine learning algorithms, artificial intelligence can help doctors quickly and accurately determine the diagnosis, as well as offer the most effective treatment plan. Some studies have also shown that artificial intelligence can help prevent the development of urgent endocrine conditions by early diagnosis and treatment of diseases that can lead to the development of such conditions.

Also in recent years, new methods of treating urgent endocrine conditions have been actively investigated, including the use of new drugs and the use of gene therapy technologies. For example, some studies show that new medications for the treatment of diabetes can help prevent the development of diabetic ketoacidosis. In addition, gene therapy may be useful for the treatment of hereditary forms of urgent endocrine conditions. However, these methods are in the research stage and require additional research and clinical trials

After undergoing urgent endocrine conditions, patients need to be carefully monitored and rehabilitated. After discharge from the hospital, patients should undergo regular examinations to identify possible relapses or complications. Treatment should begin as early as possible to prevent the development of serious consequences.

Patients who have undergone urgent endocrine conditions should monitor the level of hormones in the blood. To do this, it is necessary to undergo regular tests and consult with an endocrinologist.

For patients who have undergone urgent endocrine conditions, it is especially important to follow the diet. Depending on the disease, the doctor may recommend limiting the consumption of certain foods or adding new ones to the diet.

Patients should monitor their daily routine, including sleep, nutrition, physical activity and medication. The daily routine should be set taking into account the disease and the individual characteristics of the patient.

Physical exercise can have a beneficial effect on the health of patients who have undergone urgent endocrine conditions. However, before starting classes, it is necessary to consult with a doctor and choose suitable exercises [23].

After undergoing urgent endocrine conditions, patients may experience emotional stress. In this case, psychological support is needed, which can be provided by both a doctor and specialists in the field of psychology.

In general, the monitoring and rehabilitation of patients who have undergone urgent endocrine conditions requires an integrated approach and individual appointments.

Rehabilitation of patients who have undergone urgent endocrine conditions is aimed at restoring impaired body functions and preventing the recurrence of such conditions. It is carried out depending on the type of endocrine condition and concomitant diseases.

Medications can be used to control the function of the thyroid gland or adrenal glands. For example, hormone replacement therapy is used to treat hypothyroidism, and insulin is used to treat diabetic ketoacidosis. Other drugs may also be used, for example, to control blood pressure or treat concomitant diseases [24].

Restoring proper nutrition after an urgent endocrine condition is an important part of rehabilitation. Depending on the type of endocrine condition, different diets may be recommended. For example, patients with diabetic ketoacidosis may require a protein-rich and low-carbon diet.

After stabilization of the condition and under the supervision of a doctor, patients may be recommended exercises or physical activity that will help restore strength and endurance. However, it is necessary to take into account the limitations associated with the patient's condition and concomitant diseases.

Some patients may experience emotional stress and anxiety after an urgent endocrine condition. In such cases, you may need to consult a psychologist or psychotherapist.

After discharge from the hospital, patients should periodically undergo medical examinations and consultations with doctors in order to monitor their health and prevent possible complications [25].

There are several ways to improve methods of medical care for urgent endocrine conditions:

– development of new diagnostic methods. This includes the development of more accurate and faster diagnostic methods, such as modern biochemical analyses, computed tomography and magnetic resonance imaging;

– improvement of treatment methods. This process includes the development of new treatment protocols,

the optimization of existing methods and the introduction of new technologies, such as telemedicine and interactive patient monitoring systems.;

– development of preventive measures, which include carrying out public work to raise public awareness of the risks of urgent endocrine conditions, improving screening methods and preventive medicine;

– training and advanced training of medical personnel. It should be noted here that seminars, courses and trainings are held on the diagnosis, treatment and rehabilitation of patients with urgent endocrine conditions, as well as the creation of specialized units and centers to serve patients with these conditions [26].

It is also important to note the conduct of clinical studies to develop new methods of diagnosis and treatment, as well as to study the mechanisms of occurrence of urgent endocrine conditions and risk factors for their development.

In general, the improvement of medical care methods for urgent endocrine conditions is aimed at improving the effectiveness of treatment and preventing complications, improving the quality of life of patients and reducing mortality from endocrine diseases.

Conclusions

Urgent endocrine conditions, when they occur, require urgent medical care, since they directly threaten human life and can lead to death. For this reason, the study of the features of clinical manifestations, operative diagnosis and emergency medical care in endocrine emergencies is extremely relevant today.

Despite the existing practice of providing medical care to patients with urgent endocrine conditions, this process needs to be improved. One of the directions of improving the methods of medical care for urgent endocrine conditions is the use of the latest technologies and innovative methods of treatment. For example, the development of biotechnological drugs that allow you to more accurately regulate the level of hormones in the body, the study of new methods for diagnosing and monitoring the condition of patients, as well as the introduction of telemedicine and Internet medicine for remote monitoring of patients and timely assistance in case of exacerbation of the condition.

Also an important direction is to increase the level of knowledge and competencies of medical workers in the field of emergency endocrinology, the development of new protocols and standards of medical care, as well as the organization of specialized centers for emergency endocrinological care, where patients can receive prompt and qualified medical care. It is also necessary to work with patients as part of the prevention and prevention of urgent endocrine conditions, including teaching patients how to take medications correctly, control hormone levels and regulate their health in general.

References

1. American Diabetes Association. Position statement: Hyperglycemic crises in patients with diabetes mellitus. Diabetes Care. 2001; 24:154–61.
2. Annane D, Sebille V, Troche G, Raphael JC, Gajdos P, Bellissant E. A 3-level prognostic classification in septic shock based on cortisol levels and cortisol response to corticotropin. JAMA. 2000; 283:1038–45.
3. Bajwa S, Bajwa SK. Anesthesia and Intensive care implications for pituitary surgery: Recent trends and advancements. Indian J Endocrinol Metab. 2011; 15: 224–32.
4. Bouillon R. Acute adrenal Iinsufficiency. Endocrinol Metab Clin North Am. 2006; 35:767–75.
5. Dhatariya KK. Diabetic ketoacidosis. BMJ. 2007; 334: 1284–5.
6. Dickstein G. On the term "relative adrenal insufficiency"–or what do we really measure with adrenal stimulation tests? J Clin Endocrinol Metab. 2005; 90: 4973–4.
7. Ho JT, Al-Musalhi H, Chapman MJ, Quach T, Thomas PD, Bagley CJ, et al. Septic shock and sepsis: A comparison of total and free plasma cortisol levels. J Clin Endocrinol Metab. 2006; 91: 105–14.
8. Stentz FB, Umpierrez GE, Cuervo R, Kitabchi AE. Proinflammatory cytokines, markers of cardiovascular risks, oxidative stress, and lipid peroxidation in patients with hyperglycemic crises. Diabetes. 2004; 53: 2079–86.
9. Trachtenbarg DE. Diabetic ketoacidosis. Am Fam Physican. 2005;71:1705–14.
10. Wall CR. Myxedema coma: Diagnosis and treatment. Am Fam Physician. 2000; 62: 2485–90.
11. CharniaM.A., DementievaI.I., Morozov Yu.A. Gladisheva V.G. Cardiac biomarkers in cardiology and cardiac surgery. Part 1. General characteristics of the biomarkers. Kardiologija i serdechno-sosudis-taja hirurgija. 2010; 3: 26-33.
12. Christ-Crain M, Jutla S, Widmer I, Couppis O, König C, Puder J, et al. Measurement of serum free cortisol shows discordant responsivity to stress and

dynamic evaluation. J Clin Endocrinol Metab. 2007; 92: 1729–935.
13. Dementieva I.I. Laboratory organization express-diagnostics in surgical clinic. Spravochnik zavedujushhego kliniko-diagnosticheskoj laboratorii. 2006; 3: 10-5.
14. Kinney MA, Narr BJ, Warner MA. Perioperative Management of Pheochromocytoma. J Cardiothorac Vasc Anesth. 2002; 16: 359–69.
15. Kukaeva E.A., Dementieva I.I. Technique to study the acid-base balance and blood gases. In book: Metodiki klinicheskih laboratornyh issledovanij. 2009; 2: 174-82.
16. Lpp E, Huang C. Diabetes mellitus, hyperglycemia and critically ill patient. In: Bongard FS, Sue DY, Vintch JRE, editors. Current diagnosis and treatment critical care. 3rd ed. New York: McGraw-Hill; 2008. pp. 581–97.
17. Pimentel L, Hansen K. Thyroid disease in the emergency department: A clinical and laboratory review. J Emerg Med. 2005; 28: 201–9.
18. Prigent H, Maxime V, Annane D. Science review: Mechanisms of impaired adrenal function in sepsis and molecular actions of glucocorticoids. Crit Care. 2004; 8: 243–52.
19. Ringel MD. Management of hypothyroidism and hyperthyroidism in the intensive care unit. Crit Care Clin. 2001; 17: 59–74.
20. Savage MW, Mah PM, Weetman AP, Newell-Price J. Endocrine emergencies. Postgrad Med J. 2004; 80: 506–5.
21. Schif RL, Welsh GA. Perioperative evaluation and management of the patient with endocrine dysfunction. Med Clin N Am. 2003; 87: 175–92.
22. Kishkun A.A., Arsenin S.L. Organizational aspects of the laboratory diagnosis of emergency conditions. Klinicheskaya laboratornaya di-agnostika. 2012; 1: 19-27.
23. Kitabchi AE, Nyenwe EA. Hyperglycemic crises in diabetes mellitus: Diabetic ketoacidosis and hyperglycemic hyperosmolar state. Endocrinol Metab Clin North Am. 2006; 35: 725–51.
24. Kitabchi AE, Umpierrez GE, Murphy MB, Barrett EJ, Kreisberg RA, Malone JI, et al. Management of hyperglycemic crises in patients with diabetes mellitus (technical review) Diabetes Care. 2001; 24: 131–53.
25. Steele BW, Wang E, Palmer-Toy DE, Killeen AA, Elin RJ, Klee GG. Total long-term within-laboratory precision of cortisol, ferritin, thyroxine, free thyroxine, and thyroid-stimulating hormone assays based on a College of American Pathologists fresh frozen serum study: Do available methods meet medical needs for precision? Arch Pathol Lab Med. 2005; 129: 318–22.
26. Widmer IE, Puder JJ, Konig C, Pargger H, Zerkowski HR, Girard J, et al. Cortisol response in relation to the severity of stress and illness. J Clin Endocrinol Metab. 2005; 90: 4579–86.