NON-INVASIVE METHODS FOR TREATING DIABETES INSIPIDUS

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Annotation: Endocrinology is a branch of medicine that studies the endocrine system and its functions, as well as diseases associated with disruption of the endocrine glands. In this article, we will look at the basic concepts and principles of endocrinology, as well as some common endocrine diseases. To diagnose and treat endocrine diseases, an endocrinologist may use a variety of techniques, including blood tests to determine hormone levels, imaging (such as ultrasound or MRI) to study the structure of the endocrine glands, and specialized tests and procedures.

Materials and research methods: The basis of the work was made up of textbooks, teaching aids, lectures on medical subjects.

Results and discussion: Diabetes insipidus, also known as type 2 diabetes, is a chronic disease that requires constant monitoring and management. Although medical science is constantly evolving, there is no definitive cure for this disease. However, there are non-invasive treatments for diabetes insipidus that help improve patients' quality of life and reduce the risk of complications. Non-invasive treatments for diabetes insipidus are methods that do not require surgery or the administration of drugs through the skin. They are usually based on changes in lifestyle, diet and physical activity. One of the main non-invasive treatments for diabetes insipidus is dietary control. Patients are advised to follow a healthy diet that includes moderate intake of carbohydrates, fats and proteins. It is imperative to control portion sizes, food volume, kilocalories and avoid overeating. Another such method is the use of technology to monitor glucose levels. Modern wearable devices allow patients to monitor their glucose levels in real time without the need for blood tests. This allows you to more

accurately monitor glucose levels and take measures to correct them. Physical activity also plays an important role in the treatment of diabetes insipidus. Regular exercise can help lower blood sugar, improve insulin sensitivity, and improve overall health. Be sure to engage in exercise such as running, walking, swimming or cycling for 20 minutes a day, at least 4 days a week. Additionally, managing stress levels is also an important part of non-invasive treatment for diabetes insipidus. Chronic elevated levels of stress can lead to elevated blood glucose levels. Patients are encouraged to engage in relaxation techniques such as yoga, meditation or deep breathing to reduce stress and improve overall health. In some cases, you may need to use medications to control your blood sugar levels. However, non-invasive treatments for diabetes insipidus are often used as an adjunct to drug therapy or as primary treatment for patients with prediabetes or early stages of diabetes insipidus. If diabetes insipidus is confirmed, it is necessary to establish a specific (according to need/thirst) drinking regimen. For central diabetes insipidus, an analogue of vasopressin, desmopressin, is prescribed. Desmopressin activates only the V2 vasopressin receptors of the main cells of the renal collecting ducts. Desmopressin has a less pronounced effect on the smooth muscles of blood vessels and internal organs, having greater antidiuretic activity, more resistant to enzymatic destruction (including placental arginine aminopeptidase, that is, it can be used for the gestagenic type of diabetes insipidus), which is due to changes in the structure of the molecule . Desmopressin is available in various pharmaceutical forms. The drug is used 2–3 times a day at an initial dose of 0.1 mg for tablets, 60 mcg for sublingual tablets, or 1–2 times a day at an initial dose of 10 mcg (1 dose) for intranasal metered-dose spray and 5–10 mcg (1–2 drops) for intranasal drops. Subsequently, the dose of the drug is changed until the optimal dose is achieved - the minimum dose to control excess thirst and polyuria. Nephrogenic diabetes insipidus is treated with thiazide diuretics (hypothiazide 50–100 mg/day) and nonsteroidal anti-inflammatory drugs (indomethacin 25–75 mg/day, ibuprofen 600–800 mg/day) or a combination of these drugs. In case of acquired nephrogenic diabetes insipidus, the concomitant disease is treated first. Treatment of central diabetes insipidus should be carried out with a synthetic analogue of vasopressin - desmopressin.

The main goal of treatment with desmopressin is to select the minimum effective dose of the drug for a specific pharmaceutical form in order to relieve excess thirst and polyuria. The goal of treatment should not be considered to be a mandatory increase in urine density, especially in each sample.

analysis according to Zimnitsky, since not all patients with CND against the background of clinical compensation of the disease achieve normal indicators of renal concentration function during these analyzes (physiological variability of urine concentration during the day, old age, concomitant kidney pathology, etc.).

The choice of pharmaceutical form of desmopressin should be made individually. To initiate therapy, it is not recommended to use the intranasal form of the drug.

Due to the impossibility of determining the dose of the drug at the beginning of treatment with desmopressin, it is necessary to individually select it according to one of two algorithms:

- "average dose" – desmopressin is prescribed in an average dose for tablets

sublingual 3 times a day, 60 mcg, tablets for oral administration 3 times, 0.1 mg per day, metered-dose spray (1 dose) 2 times a day, 10 mcg, with further titration of the dose according to clinical symptoms;

- "as needed" - desmopressin is prescribed in a single dose for sublingual tablets 60 mcg, for regular tablets 0.1 mg, for intranasal

spray 10 mcg; the subsequent dose is taken when the effect of the previous one ends (the appearance of polyuria and thirst); After 2-3 days, the daily dose of the drug is calculated and distributed at a convenient time of administration.

The dose of desmopressin should not be predicted before starting treatment.

age characteristics, urine output, body weight, renal function or

liver. In this case, the selected dose of the drug for an individual patient,

as a rule, it is a certain value, subject to only a few fluctuations. Initiation of treatment with desmopressin is a transient period associated with the possibility of drug overdose and the development of water intoxication. Desmopressin intranasal spray has a relatively high dosage compared to tablet forms, without the possibility of reducing it, which makes it redundant for 25-35% of patients with CND, and therefore, its use to initiate therapy may be associated with a greater risk of water intoxication or be less easy to administer to patients (eg, with a dosage duration of approximately 18 hours).

It is recommended that patients be educated about the use of various desmopressin preparations. The bioavailability of various desmopressin preparations differs significantly from each other, which is characterized by the dosage of the drug in its release forms.

But desmopressin, like other peptides, is subject to enzymatic destruction and therefore the specifics of using a specific form of the drug must be observed:

• tablets for oral administration – on an empty stomach, 30 minutes before and 2 hours after

food, since taking it with food reduces the absorption of the drug

by approximately 40%;

• lyophilized sublingual tablets (MELT) – placed directly under the tongue, to optimize absorption it is necessary to maintain a 15-minute interval before taking food/meal;

• intranasal spray – insufflation into the nasal passage, placing the dosing device parallel to the back of the nose for more complete irrigation of the mucous membrane; when using, it is important to ensure that the tube of the dosing device is immersed in the solution with the drug (for some trade names it is important to store the drug in a refrigerator) .For colds or allergic diseases, accompanied by swelling of the nasal mucosa and the impossibility of intranasal use of desmopressin, spraying the drug into the oral cavity (under the tongue, on the buccal mucosa) in doses exceeding intranasal by 1.5 - 2 times, can help compensate for the symptoms of polyuria-polydipsia , the approach of insufflating a vasoconstrictor 15 minutes before intranasal desmopressin can also be used.

If it is necessary to change one form of desmopressin to another, you can use the following approximate dose conversion: clinical effectiveness of 0.2 mg desmopressin tablets = 120 mcg desmopressin sublingual tablets = 10 mcg desmopressin when administered intranasally.

In practice, tablet forms of the drug are more convenient for therapy when the patient's need for the drug is small (up to 0.4 mg per day), since the tablets are available in various dosages and, if necessary, are easily divided into parts.

The intranasal form is practically irreplaceable in patients with a high need for the drug (more than 40 mcg per day), which constitutes approximately 10% of all patients with central nervous system dysfunction, with pathology of the gastrointestinal tract, and low patient compliance with taking the usual tablet drug on an empty stomach.

Treatment of partial/mild forms of diabetes insipidus (urine output < 4 liters per day) can be carried out without drug therapy - by consuming sufficient amounts of fluid to satisfy thirst.

Recommendation 16. To reduce the risk of overdose in the form of water intoxication and hyponatremia, it is recommended to teach patients to comply with the drinking regime - drink only when thirsty; make periodic pauses in the action of the drug (delay the next dose), expressed by polyuria until a feeling of thirst, during which excess accumulated fluid is eliminated.

Strength of recommendation: C (level of evidence: 4) Comment. During treatment with desmopressin, patients should be instructed to drink only when thirsty and to avoid excessive fluid intake (eg, do not drink more than 300 ml of drinks at a time, do not eat a whole watermelon/melon alone). This is due to differences in the duration of action of endogenous vasopressin and desmopressin. If for vasopressin it is about 15-20 minutes, then while the need for antidiuresis remains, the hormone must be additionally secreted in the neurohypophysis. Desmopressin has a duration of action of about 8-12 hours, during which it has a constant antidiuretic effect. Therefore, the elimination of excess fluid may be impaired in patients receiving desmopressin. One of the key aspects of treating diabetes insipidus is controlling blood glucose levels. To achieve

this, patients are often prescribed a carbohydrate-restricted diet, regular exercise, and special medications. However, in addition to traditional treatments, there are non-invasive approaches that can be effective in managing the disease. Additionally, there are various alternative medicine techniques such as yoga, meditation and acupuncture that can help patients with diabetes insipidus manage stress and improve overall well-being. Although these methods are not aimed at treating the disease itself, they can be useful in a comprehensive approach to managing diabetes insipidus.

Conclusions: Thus, noninvasive treatments for diabetes insipidus may be useful in addition to traditional approaches. They can help patients improve control of their disease and improve their quality of life. It is important to note that before using any non-invasive treatments for diabetes insipidus, you should consult with your doctor or diabetes specialist. They will be able to determine the most appropriate treatment methods in each case and explain possible limitations or side effects.

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