

Adrenal Insufficiency: Review and Case Reports

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Abstract

Adrenal insufficiency; It is a condition in which glucocorticoids, mineralocorticoids and adrenal androgens are not secreted in sufficient quantities in the adrenal glands due to any disorder in the hypothalamic-pituitary-adrenal axis. The incidence of adrenal insufficiency is 39-144 per 1000000. Adrenal insufficiency is an important life-threatening disease. Primary adrenal insufficiency due to damage to the adrenal glands and secondary-tertiary adrenal insufficiency due to damage to the hypothalamo-pituitary axis may occur. Acute adrenal insufficiency (adrenal crisis) is a pathology with a sudden onset and a mortal course. Adrenal crisis is a medical emergency with acute symptoms. Nausea, vomiting, abdominal pain, fever, hypoglycemia, seizures, hypovolemic shock, and cardiovascular failure. It occurs in patients with chronic adrenal insufficiency who are exposed to additional stress, such as infection, trauma, or surgical procedures. Dental infection is a possible cause of adrenal crisis in patients with chronic adrenal insufficiency, therefore pediatric endocrinologists and pediatric dentists should be aware of this risk.

Case Report (HRU IJDOR 2021; 1(1): 10-13)

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Introduction

Adrenal insufficiency disease is a very rare disease, 70-90% of which occur as a result of autoimmune adrenalitis. The remaining cases develop due to other infections, cancer metastasis, adrenal hemorrhage / infarction or drug effects.(1) Adrenal insufficiency is a condition in which the adrenal glands do not secrete sufficient amounts of mineralocorticoids and adrenal androgens, especially glucocorticoids.(2) Thomas Addison identified a condition that resulted in fatigue, hyperpigmentation and death, and he described for the first time in 1855 that this condition was due to the destruction of the adrenal gland.(3,4) Although it was a disease that was defined many years ago, cortisone to be used in the treatment could only be synthesized in 1949. Although its treatment is possible approximately 100 years after its definition, patients with adrenocortical insufficiency can be diagnosed and treated very successfully today.(5) This life-threatening disease can result from disorders affecting the adrenal cortex

(Primary Adrenal Insufficiency/Addison's Disease), anterior pituitary gland (Secondary Adrenal Insufficiency) or hypothalamus (Tertiary Adrenal Insufficiency). Secondary and tertiary adrenal insufficiency is also called central adrenal insufficiency.(2) Acute adrenal insufficiency (Adrenal Crisis) is a disease with high mortality and morbidity when not noticed. Acute adrenal insufficiency may develop as a result of an intervening medical event in a patient with chronic adrenal insufficiency, or not taking the medicine, acute infection, or not increasing the patient's medicine at the stress dose.(6) These patients are very important in dentistry. It is stated that possible infection in the mouth and teeth causes adrenal crises.

Primary Adrenal Insufficiency: Primary adrenal insufficiency (PAI) is defined as the inability to produce enough glucocorticoids and/or mineralocorticoids from the adrenal cortex.(7) The most common cause of primary adrenal insufficiency is autoimmune adrenal disease, but tuberculosis is still an important cause in

underdeveloped and developing countries. Tuberculosis is one of the important causes of primary adrenal insufficiency in Turkey.(4)

In his findings; weight loss, orthostatic hypotension due to dehydration, hyponatremia, hyperkalemia, disturbances in blood count (anemia, eosinophilia, lymphocytosis) and hypoglycemia are seen.(7)

Secondary Adrenal Insufficiency: The most common cause of secondary adrenal insufficiency is tumors of the hypothalamic-pituitary region.(4) Any condition that affects the pituitary gland and hence ACTH secretion can cause secondary adrenal insufficiency. ACTH deficiency may be isolated or co-occur with other pituitary hormone deficiencies (panhypopituitarism). Any disease affecting the pituitary gland can result in decreased secretion of one or more pituitary hormones. Pituitary gland damage and hormone secretion may decrease as a result of factors such as large pituitary tumors, tuberculosis, histoplasmosis, and head trauma.(2)

Adrenal crisis: Adrenal crisis can be defined as an acute illness that occurs under severe stress in a patient with adrenal insufficiency.(8) In adrenal crisis, glucocorticoid and mineralocorticoid deficiency are seen together. It is a life-threatening emergency that contributes significantly to mortality.(2) Findings: Severe weakness, syncope, abdominal pain, nausea, vomiting, back pain, confusion, hypotension, abdominal tenderness, confusion and delirium.(7) Adrenal crisis is more common in primary adrenal insufficiency, but can also be seen in secondary or tertiary adrenal insufficiency.(2)

In this case report, intraoral findings of two siblings with adrenal insufficiency were discussed. It is aimed to emphasize the general and oral (oral) symptoms of adrenal insufficiency, and the treatment approach and their evaluation.

Case Report

Case 1: 16-year-old male patient; He applied to our Harran University Faculty of Dentistry Pediatric Dentistry Clinic due to oral and dental problems. In his anamnesis, it was determined that the patient had adrenal insufficiency and was receiving genkort treatment. At the same time, it was learned that the patient had three siblings and three siblings had the same disease and that the patient's parents were consanguineous. In the clinical examination, developmental delay was found according to his age. In the radiographic examination and intraoral examination, it was determined that many teeth of the patient had been extracted and more than one tooth had to be treated. (Figure1-4)



Figure 1. Front profile view.



Figure 2. Intraoral view.



Figure 3. Intraoral view.



Figure 4. Panoramic radiographic image.

Treatment was started in the patient and root canal treatment was performed on the necessary teeth. Surgery was consulted for the teeth that needed to be extracted. After tooth extraction, prosthetic treatment was planned.

Case 2: A 14-year-old male patient was found to have developmental delay in his clinical examination. In the intraoral examination and radiographic examination, it was determined that the patient had extensive dental caries. (Figure 5-7)

Treatment was planned in order to regain the patient's aesthetic, function and phonation loss.



Figure 5. Front profile view.



Figure 6. Intraoral view.

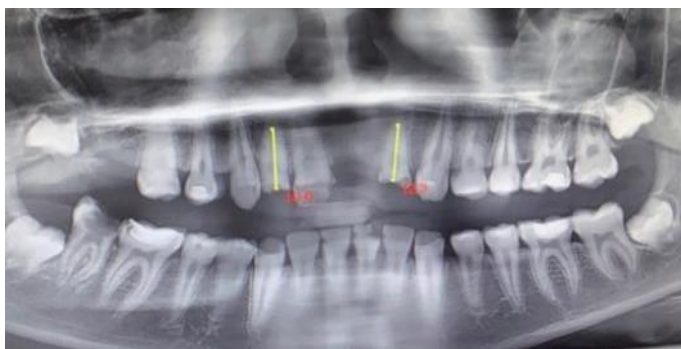


Figure 7. Panoramic radiographic image.

Discussion

Adrenal crisis is a medical emergency.(9) Differential diagnoses include severe acute infections, various disorders of the central nervous system, and acute poisoning.(10) Some situations that cause stress can increase the secretion of ACTH through certain neural pathways in the brain and increase the secretion of cortisol up to 10 times.(11) Infection, trauma, surgical stimulation, anesthesia, mental and emotional stresses, hypothermia, hypoxemia, hypercarbia and the use of sympathomimetic agents such as epinephrine or norepinephrine increase cortisol secretion.(12)

The greatest risk for the patient with primary adrenal insufficiency is the detection of the absence of a normal serum cortisol response to stress. The precise mechanism of the cortisol response to stress is not fully understood.(9) Glucocorticoids are of vital importance and affect the production of sugar (gluconeogenesis), the response of the vessels to catecholamines, the suppression of the immune system and the regulation of the central nervous system.(12) It has been observed that, without higher cortisol serum levels during stress, vascular smooth muscle becomes less sensitive to circulating epinephrine, causing capillaries to dilate and become more permeable. Compared with adults, children are more susceptible to organ hypoperfusion due to increased resting metabolic rate and increased insensible water loss, placing them at greater risk for the serious outcome and complications of acute adrenocortical insufficiency.(10) Acute adrenal crisis has been found to be precipitated by stress, such as dental treatment or dental infection. In children with adrenal insufficiency who do not treat the infected tooth, pre-existing symptoms will intensify. In a patient with primary adrenal insufficiency, additional steroid administration should be established to prevent stress symptoms and adrenal crisis.(13)

Primary adrenal insufficiency has many symptoms such as weakness, fatigue, loss of strength, decreased

appetite, dizziness, salty food cravings, weight loss, nausea, vomiting, and muscle aches. Children with primary adrenal insufficiency are very often nauseous and vomit.(5) It is stated that these patients are high-risk dental patients.(14) Where a diagnosis of primary adrenal insufficiency is made, the dentist should take a comprehensive medical history and discuss the type and extent of dental treatment required with the endocrinologist for necessary premedication.(15) The recommended stress dose regimen in adult patients with chronic adrenal insufficiency undergoing major oral surgery consists of hydrocortisone 50-100 mg/d before surgery and during the first day after surgery. The recommended steroid supplementation for adult patients in the intermediate risk category (minor oral and periodontal surgery) is a single 25 mg dose of hydrocortisone prior to surgery, and it has been stated that no increase in steroid dose is necessary for patients undergoing routine nonsurgical dental treatment.(16)

In our case, the amount of cortisone used by both siblings the day before and on the day of the procedure was doubled.

Conclusion

Pediatricians and dentists should be aware of possible adrenal crises due to dental infection. Further efforts should be made to continually improve oral health in children with adrenal insufficiency. In these patients, infection originating from the mouth and teeth may cause adrenal crisis. Therefore, families of children with adrenal insufficiency should be informed about oral and dental health. These patients have a high risk of caries due to their frequent vomiting. Regular dental examinations, preventive fluoride applications, fissure sealants allow for the improvement of both oral and general health and therefore better quality of life for these high-risk children. Therefore, it is necessary for patients with adrenal insufficiency to eliminate underlying dental conditions that may cause a crisis. They should work in a multidisciplinary approach and cooperation between pediatric endocrinology and pediatric dentistry.

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