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STUDY OF ENZYMATIC PROPERTIES OF SALIVA IN PATIENTS WITH RENAL PATHOLOGY

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Annotation: The enzymatic properties of saliva, urine, and blood in patients with kidney pathology were studied. An increase in the content of amylase and pepsinogen in the blood and a decrease in lipase, were found in patients with acute and chronic renal failure and chronic pyelonephritis. Similar changes are observed in saliva and urine. There is a direct dependence of the release of enzymes from saliva on their level in the blood. This indicates that many enzymes in saliva are of both secretory and secretory nature.

Key words: saliva enzymes, amylase, pepsinogen, lipase, chronic pyelonephritis, amylolytic activity, lipolytic activity.

The relevance of the problem. Determination of blood hydrolases is a diagnostic criterion for characterizing the homeostasis of the human body. But, at the same time, taking blood for subsequent analysis should not be the most common manipulation in diagnostics, as it is at present. Non-invasive methods are being developed all over the world, and methods are being sought that could indirectly characterize the homeostasis of the body. One of these ways is to study the properties of saliva.

It is known that the main digestive glands, along with the excretion of the main amount of enzymes synthesized by them, transport some of them not into the cavity of the gastrointestinal tract, but increte them into the blood and lymph, from where these enzymes are excreted. The main way of excreting increted enzymes from the body is the kidneys. It has also been shown that a number of enzymes are excreted from the blood as part of the secretions of other digestive glands by the type of recreation. Based on this information, the share of participation of the salivary glands in maintaining enzyme homeostasis is of great interest.

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Purpose of the work. To study the enzyme-secreting activity of the salivary glands in various kidney pathologies associated with a violation of their excretory function.

Materials and methods. The study included 160 subjects aged 20-61 years with kidney pathology. Of these, 10 subjects had acute kidney failure (AKF), 50 had chronic kidney failure (CKF), and 100 had chronic pyelonephritis. Mixed saliva was collected from the subjects on an empty stomach, without stimulation, in centrifuge tubes for 5 minutes. Before collecting saliva, the oral cavity was thoroughly rinsed with tap water and then with distilled water. Urine was collected for one hour after preliminary emptying of the bladder. Blood was taken from the cubital vein. Hydrolytic enzymes were studied in the collected and volume-accounted saliva and urine, as well as in the blood serum (amylase - by the Smith-Roy method modified by A.M. Ugolev, pepsinogen - by the Hirschowitz method, lipase - by the Tietz method, total protein - by the Lowry method). The control group consisted of practically healthy individuals aged 20–25 years (5).

Results and discussion. The enzymes (amylase, pepsinogen and lipase) in saliva were studied. Their content in saliva is higher than in blood and urine. Also, their excretion with saliva prevails over the excretion of such with urine, which is physiological for the body, since enzymes in saliva mainly perform digestive functions. In patients with renal failure, the volume of urine and saliva remains at the level of healthy individuals (27.4 + 1.7 ml / h; 2.6 + 0.11 ml / 5 min), in patients with chronic pyelonephritis, the volume of urine and saliva changed in different directions, the volume of urine increased (33.0 + 1.5 ml / h, P less than 0.05), and the volume of saliva, on the contrary, decreased (2.26 + 0.12 ml / 5 min, P less than 0.05).

Total blood protein in patients with ARF and CRF decreases. This is most likely the result of protein loss with urine, since total protein in urine of patients significantly increases. In patients with chronic pyelonephritis, total protein in blood and saliva remained unchanged, and its excretion with urine increased.

The enzyme spectrum of blood, saliva and urine in patients with renal pathology undergoes a number of changes. Amylolytic activity of blood in acute renal failure and chronic pyelonephritis significantly increases, approximately 1.5 times, and in chronic renal failure it remains unchanged.

In all patients with renal pathology, the amylolytic activity of saliva and its flow increased. A direct relationship is observed between the amylolytic activity of blood and saliva, the correlation coefficient between 0.72+- 0.23. These results confirm previously obtained data (1,2,5) that saliva contains secreted S-amylases, as well as pancreatic P-amylases resected from the blood.

Amylolytic activity and its flow rate in urine in patients with acute renal failure, chronic renal failure and chronic pyelonephritis increases. The correlation coefficient between the content of amylase in blood and urine is low (r=0.45±0.35).

In patients with renal pathology, the content of pepsinogen in the blood increases by 6-9 times, especially in acute renal failure. It is known that the main source of pepsinogen is the main cells of the gastric glands, which means that in renal pathology, the incretion of this

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enzyme into the blood increases. This may be due to increased secretory activity of the gastric glands, as well as increased permeability of cell membranes.

The content of pepsinogen in saliva and its flow in patients with CRF and chronic pyelonephritis increases by 1.5-2 times, and with ARF by 4-5 times. There is a high correlation between the content of pepsinogen in the blood and saliva (0.78+0.15).

Blood lipolytic activity decreases in acute renal failure and chronic renal failure, while in chronic pyelonephritis it remains at the level of the control group. There is a multidirectional change in the content and release of lipase in saliva and urine. In patients with chronic renal failure, lipolytic activity and its flow rate increase in saliva, while in urine, on the contrary, it decreases. The correlation coefficient between the lipase content in blood and saliva (0.48+0.25) is lower than between blood and urine (0.55±0.36).

From this we can conclude that the information content of salivary and urinary enzymes in renal pathology is not the same. The most informative enzyme was pepsinogen: it increases in parallel in the blood, saliva and urine. There is a high correlation between the content and excretion of this enzyme with saliva and, to a lesser extent, with urine from its level in the blood. The second most informative enzymes are amylase and lipase. Amylolytic activity is more informative in acute renal failure, lipolytic activity is more informative in chronic renal failure.

Conclusions. In chronic pyelonephritis, hourly diuresis increases and salivation decreases, while in acute renal failure and chronic renal failure they remain unchanged. In renal pathology, the excretion of amylase and pepsinogen with saliva and urine increases, and the excretion of lipase decreases. There is a direct dependence of salivary enzymes on their level in the blood.

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