

INFLUENCE OF HEMOCOAGULATING FACTORS OF THE PROSTATE GLAND AND ITS ADENOMA ON THE BLOOD COAGULATION SYSTEM

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Abstract: In the article We studied the thromboplastic and fibrinolytic properties of extracts of 45 human prostate glands taken from corpses, 20 prostate adenomas removed during surgery. As the results of the experiments showed, prostate extracts significantly increase the degree of thromboses, shorten the time of recalcification of platelet-free plasma, promote the utilization of prothrombin, and this effect is maintained until diluted 10,000 times. The obtained data indicate that prostate tissue and its adenomas contain very active thromboplastic and fibrinolytic agents, as well as natural anticoagulants.

Key words: human prostate glands, prostate adenomas, thrombotest, heparinized plasma, fibrinolysis,

ВЛИЯНИЕ ГЕМОКОАГУЛИРУЮЩИХ ФАКТОРОВ ПРЕДСТАТЕЛЬНОЙ ЖЕЛЕЗЫ И ЕЕ АДЕНОМЫ НА СВЕРТЫВАЮЩУЮ СИСТЕМУ КРОВИ

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Резюме: В статье изучены тромбопластические и фибринолитические свойства экстрактов 45 предстательных желёз человека, взятых у трупов, 20 аденом простаты, удалённых во время операции. Как показали результаты поставленных экспериментов, экстракты простаты существенно повышают степень тромботеста, укорачивают время рекальцификации бестромбоцитной плазмы, способствуют утилизации протромбина, причём это действие сохраняется до разведения в 10.000 раз. Полученные данные свидетельствуют

о том, что ткань простаты и её аденомы содержат весьма активные тромбопластические и фибринолитические агенты, а также естественные антикоагулянты.

Ключевые слова: предстательных желёз человека, аденом простаты, тромботеста, гепаринизированной плазмы, фибринолиз.

Introduction. Prostate adenoma (PA) is a common disease in elderly and senile men, with its clinical manifestations consisting of lower urinary tract symptoms [1,2]. Conservative and surgical treatment of patients with lower urinary tract dysfunction symptoms resulting from benign prostatic hyperplasia (BPH) remains one of the most widespread and pressing problems in urology [3,4]. In recent years, significant attention has been given to tissue hemostatic compounds in the pathogenesis of fibrinogenemic bleeding [5,6]. However, the hemostatic and fibrinolytic properties of the prostate gland itself have not been sufficiently studied, and the available literature contains limited data on the characteristics of the adenoma [7,8].

Aim of the study. Study of the thromboplastic and fibrinolytic properties of human prostate gland extracts obtained from cadavers and prostate adenomas removed during surgery.

Materials and Methods. We studied the thromboplastic and fibrinolytic properties of extracts from 45 human prostate glands obtained from cadavers and 20 prostate adenomas removed during surgery. Extracts were prepared at a ratio of 1 g of tissue to 9 ml of physiological saline (concentration 1:10), and, when necessary, diluted 100-fold, 1000-fold, or more. Fibrinolytic and thromboplastic properties were assessed using standard methods. The research results were processed using variational statistics for paired observations.

Results. It is known that the degree of the thromboplastin test, recalcification time of platelet-poor and heparinized plasma, and prothrombin consumption reflect the thromboplastic activity of blood. The results of our experiments showed that prostate extracts significantly increase the degree of the thromboplastin test,

shorten the recalcification time of platelet-poor plasma, and promote prothrombin utilization, with this effect persisting up to a dilution of 10,000-fold. Simultaneously, the extracts reduced the recalcification time of heparinized plasma by 90% compared to control. It should be noted that the thromboplastic activity of prostate tissue is relatively low compared to extracts of decidua and placenta, which retain thromboplastic activity up to dilutions of 100,000–320,000-fold. It was of interest to determine the thromboplastic activity of prostate adenoma. Prostate extracts prolonged prothrombin time in Ac-globulin-deficient plasma by 48%. Homogenates of adenomatous nodes inhibited fibrin formation in Ac-globulin-deficient plasma by 55% compared to control, but the results were not statistically significant. This effect of the extracts may be explained by the presence of anticoagulants in the prostate and its adenoma. Evidence for anticoagulants in the extracts comes from their influence on thrombin time in plasma and 1% fibrinogen solution. After addition of prostate homogenate, thrombin time was prolonged by 106% compared to control, and in 12 out of 36 experiments, no clot formed even after 300 seconds. Clot formation in 1% fibrinogen solution under the influence of prostate extracts was inhibited by 25%. Adenoma extracts had a minor effect on plasma thrombin time but significantly delayed fibrin formation in 1% fibrinogen solution. This fact indicates that the anticoagulant properties of prostate tissue are partially due to heparin or heparinoids. However, toluidine blue did not restore thrombin time to control values, suggesting the presence of other types of anticoagulants in the extracts. We found that extracts of prostate and benign prostatic lesions slowed the lysis of clots in which the conversion of fibrin polymer to fibrin “I” was inhibited by monoiodoacetate—by 24% and 48%, respectively, compared to control. This indicates the presence in prostate tissue and its adenoma of an enzyme similar to plasma fibrinase. This compound increases fibrin resistance to plasmin, thereby indirectly affecting the efficiency of fibrinolysis. The obtained data indicate that prostate tissue and its adenomas contain highly active thromboplastic and

fibrinolytic agents as well as natural anticoagulants. What, then, is the role of tissue coagulation factors and tissue fibrinolytic agents in the development of hemostatic disorders during surgical interventions on the prostate gland? It has been proven that tissue trauma during surgery leads to the release of their hemocoagulating and fibrinolytic substances into the bloodstream, resulting in coagulation disturbances. Our research results show that the hemocoagulating substances of the studied tissues are more resistant to dilution than the fibrinolytic ones, with thromboplastic activity being higher and fibrinolytic activity lower in adenoma than in normal prostate. Therefore, upon entering the bloodstream, the action of thromboplastic compounds will predominate, and the coagulation disorder will develop according to the mechanism of thrombhemorrhagic syndrome, which involves bleeding following intravascular coagulation.

Conclusion. Prostate tissue from 45 cadavers and 20 prostate adenomas removed during surgery was investigated. It was established that the prostate gland and its adenoma contain a complex of hemocoagulating and fibrinolytic compounds. Along with fibrinolysis activators, inhibitors are also present in the prostate gland tissue and its adenomas. Analysis of the hemocoagulating and fibrinolytic properties of the prostate and adenoma suggests that when tissue "juice" enters the bloodstream, hemostasis disorders develop according to the mechanism of thrombhemorrhagic syndrome.

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