Experiments on rabbits showed that the period of organization of a venous thrombus and the first 24 h after thrombosis is characterized by a decrease in the number of platelets and in their coagulation, adhesive, and electrophoretic activity and by an increase in their aggregation and sedimentation rate. The changes in platelet function became less marked 2–5 days after thrombosis and were actually characteristic of hemorrhage.

KEY WORDS: venous thrombosis; platelet function.

Clinical and experimental investigations have shown that in intramuscular venous thrombosis marked quantitative and qualitative changes take place in the platelets [1, 3–5, 12]. Frequently, however, the findings are conflicting. Some workers [2, 4, 12], for instance, observed thrombocytosis, increased coagulation and aggregation properties of the platelets, and a decrease in their electrophoretic mobility in intravascular venous thrombosis; others [13, 14] found the opposite changes in platelet function. These contradictions evidently arose because the investigations of the coagulation and physicochemical properties of the platelets were carried out at different times of organization of the venous thrombus. Usually in clinical practice it is impossible to study the dynamics of changes in platelet function at different times of formation of a venous thrombus, and no experimental data on this problem could be found.

This paper describes the study of changes in the coagulation and physicochemical properties of platelets at various times of organization of an intravascular venous thrombus.

EXPERIMENTAL METHOD

Experiments were carried out on 54 rabbits weighing 2.5–3 kg. A method of production of an experimental intravascular thrombus corresponding to clinical conditions was chosen. For this purpose an intravascular thrombus was produced in the femoral vein [6]. By this method operative trauma and mechanical injury to the vein could be completely ruled out. Blood for the study of platelet function was taken before thrombosis and at various times after its production. The coagulation activity of the platelets was estimated by double elastography [9]. The thromboelastogram of platelet-free plasma and of plasma containing 250,000 platelets/mm³ was recorded. The following physicochemical properties of the platelets were investigated: aggregation induced by ADP, recorded on an aggregatometer (EEI); the rate and degree of agglutination [3]; mechanical resistance [8]; osmotic resistance [7]; adhesion of the platelets to a collagen fiber [15]; sedimentation rate [10]; electrophoretic mobility on a cytophrometer (Opton). The platelet count also was determined by phase-contrast microscopy. After the investigations the presence and localization of the thrombus in the femoral vein were determined. The results were subjected to statistical analysis.

EXPERIMENTAL RESULTS

The mean platelet count in the rabbits was 669,000 ± 28,000. During organization of the thrombus in the femoral vein the platelet count fell by 277,000 ± 11,000 below its initial level (P < 0.01). Between 1 and

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The results show that in intravascular venous thrombosis marked quantitative and qualitative changes are observed in the platelets. The most important changes are observed during the first 24 h after thrombus formation. Unlike the results obtained by other workers [11, 12], in the present experiments the period of organization of the thrombus and the first 24 h after its formation were characterized by a decrease in