Alterations in Circulating Platelets Following Administration of Adrenocorticotropic Hormone. (19493)

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Since adrenocorticotropic hormone (ACTH) has become available for clinical use its effect upon the hematopoietic system has been studied. The small amount of information which is available with regard to the behaviour of circulating platelets after ACTH administration has been conflicting. Zondek and Kaatz(9) studied the effect of thyroid extract and adrenocortical extract on platelet levels. They noted a decrease in circulating platelets in a number of patients 2 hours after the injection of Cortigen (cortical extract Richter). Adams(1) noted no change in platelet levels after administering adrenal cortex extract to normal rats. Monto, Brennan, Margulis and Smith(5) studied the effect of ACTH and cortisone in blood coagulation and noted no significant platelet changes. Koller and Zollikofer(4) found platelet levels in 4 patients moderately increased after administration of small doses of ACTH. This increase was preceded in two of the cases by a transitory decrease. Jacobson and Sohier(3) have noted an increase in circulating platelets following administration of ACTH in idiopathic thrombocytopenic purpura and refer to others with similar experience with this disease.

Method. Circulating platelets were counted in normal individuals at regular hourly or 2 hourly intervals following the injection of ACTH. Twenty essentially healthy individuals, one of whom had previously undergone splenectomy, were studied. None were febrile, cachectic or suffering from myeloid, hepatic or splenic disease. Eosinophil counts were taken simultaneously in all instances. Blood was drawn from an arm vein with clean dry syringes and needles and 4 cc samples were transferred to small dry bottles containing 2.0 mg potassium oxalate and 3.0 mg ammonium oxalate. The bottles were agitated gently and counts were performed within one hour. Rees-Ecker diluting fluid (Pohle modification)(6) was used. One pipette was used and one chamber counted. All samples were counted by one investigator experienced in platelet counting. These counts were found to be accurate to within 20,000 platelets (coefficient of variation of 10%) for a single count. Since it was found that there is some variation in the normal platelet counts in different individuals, changes in counts were expressed in per cent of the base line count for the individual tested. Eosinophils were counted from the same sample in a hemacytometer counting chamber after dilution with the phyloxine-ethylene glycol diluent described by Roche, Thorn and Hills(8) and by Henneman, Wexler and Westenhaver(2). It was found that 50 mg or more of ACTH (Armour) intramuscularly regularly elicited a maximal "stress" effect as evidenced by the eosinophil response. Accordingly 50 to 100 mg ACTH was administered intramuscularly in 17 individuals after determining the platelet and eosinophil counts before injection. Two others received intravenous ACTH and one who had previously undergone splenectomy received intramuscular ACTH.

Results. As may be seen from Fig. 1, the subjects developed the expected eosinopenia induced by ACTH and also a concurrent, though more transitory, platelet decrease. The thrombocytopenia is more precipitous but less sustained than the eosinopenia. Twenty-four hours after injection both eosinophils and platelets had returned to pretest levels. The decrease in platelets, amounting to an average of almost 50% at its greatest point, is statistically significant.

The individual without a spleen who received ACTH showed changes similar to the 17 normals. The two individuals who received ACTH by the intravenous route over an 8-hour period had a slightly slower but a more sustained decrease in platelets than the 18 who received it intramuscularly.

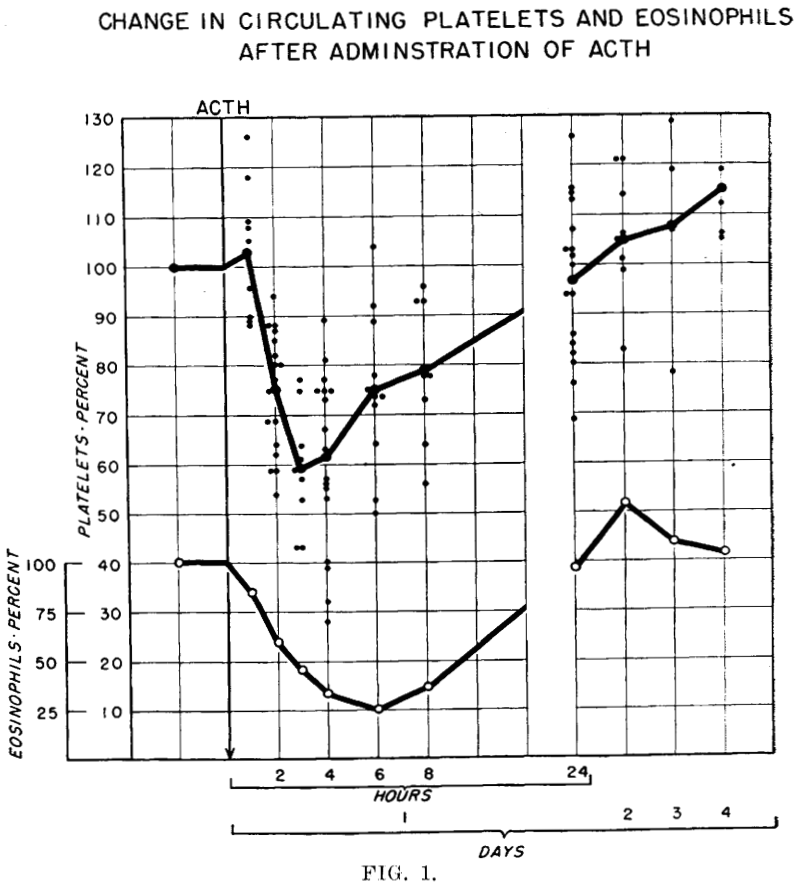

FIG. 1.

Conclusions. 1. After administration of ACTH in doses of 50 to 100 mg to 19 normal individuals there was a temporary significant decrease of platelets in the peripheral blood. This decrease was slightly more rapid and less sustained than the coexistent eosinophil decrease. 2. A similar thrombocytopenia was observed following administration of ACTH to an individual with no spleen.

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