TYPICAL CHANGES OF PLATELET VOLUME DURING AND AFTER EXTRACORPOREAL CIRCULATION. E. Wenzel, E. Saavedra, I. Volkmar, H. Monadjemi, E. Pöhler, K. Stapenhorst, G. Harbauer and H. Isringhaus. University of the Saarland, Homburg-Saar, West Germany.

In 32 patients undergoing open-heart-surgery with extracorporeal circulation (ECC), platelet volume distribution curves (PVD) during and immediately and 24 and 48 hours after cardiopulmonary bypass were examined by an electronic particle size analyzer based on the Coulter principle system. The PVD changes, i.e., the reduction of the mean platelet volume (MPV) and the platelet fall correlates significantly with the bypass time (r = 0.78). Two hours after the end of ECC, these changes remained completely irreversible or only partially reversible in patients with perfusion times longer than 60 minutes. In most of the patients with shorter perfusion times, we observed a normalisation of PVD curves and return of platelets to counts approaching normal levels.

Some plasma coagulation parameters (i.e., concentration of clottable fibrinogen, FDP) were estimated in parallel and were found to be in good correlation with the platelet defects.

In patients with marked changes of MPV up to 48 hours after the end of surgery, a pathologic volume distribution curve of thrombocytes was observed, but platelet counts returned in most of them to normal values. This indicates that the determination of PVD, as a simple reliable diagnostic parameter, gives more essential information about platelet damage than does the platelet count alone.

ULTRASTRUCTURAL STUDIES ON THE SURFACE COAT OF HUMAN PLATELETS AGGREGATED BY POLYLYSINE AND DEXTRAN. Y.Taketomi and A.Kuramoto. Research Institute for Nuclear Medicine and Biology, Hiroshima University, Hiroshima, Japan.

The surface coat of human platelets was stained with positive charged colloidal Thorotrast particles and ruthenium red to elucidate the mechanism of platelet aggregation by macromolecules.

Positive charged macromolecule, polylysine (Mw.15,000;23,000;180,000) could induce the aggregation in low concentration but high concentration was needed in the case of neutral macromolecule, dextran (Mw.40,000;250,000;2000,000). The larger molecules of polylysine and dextran were more effective in inducing platelet aggregation. In the dextran induced aggregation, Thorotrast particles on the cell surface did not decrease significantly. On the other hand, the surface membranes of platelets treated with neuraminidase and aggregated by polylysine were essentially devoid of bound particles. These findings suggested that polylysine induced aggregation more effectively than dextran by reducing the negative surface charge and giving stronger adsorption force on cell surface.

In washed platelet suspension, polylysine induced aggregation without release reaction of 14C-serotonin, but average distance between plasma membranes of aggregated platelets did not vary with the degrees of polymerization. In this respect, it seems probable that after forming macromolecular bridging of cell surface, another interaction may follow between cell surfaces.