0991

DISTRIBUTION OF PLATELETS IN PTFE BYPASS GRAFTS. J.T. Christenson, J. Megerman, K.C. Hanel, G.J. L'Italien, W.M.Abbott, and H.W. Strauss. Mass.General Hospital, Boston, MA. U.S.A.

Autologous platelets labeled with Indium-111-oxine were used to examine the thrombotic process by which small diameter bypass grafts often fail. PTFE grafts were inserted into the carotid and femoral arteries of dogs, and labeled platelets were injected. Thirteen 6 cm grafts (Group I) were harvested after 3 hrs as follows: after systemic heparinization, the graft and adjacent arterial segments were perfuse-fixed in situ, cut open longitudinally, rinsed gently in saline and counted in a well counter. The flattened specimen was then placed inside an x-ray cassette for 24-48 hrs, depending on measured total activity. Fifteen 4 cm grafts (Group II) were similarly harvested, but 4 days later. All grafts included herein were patent. The autoradiograph was developed in an automatic processor and subjected to densitometry to quantitate platelet deposition. Each graft image was divided into 3 longitudinal segments.

	Flows, ml/min (range)	Average Density (± S.D.) Proximal	Medial	Distal
Group I	60-608	0.32±0.27	0.68±0.29	1.16±0.47
Group II	60-550	0.05±0.03	0.13±0.08	0.30±0.17

The average density in the proximal and distal artery was zero. Significant differences ($p<.01$) were measured between segments within each group, and between the 2 groups. Deposition in the distal segment, compared to that in the proximal segment, was 65% greater in group II than in group I. With time, therefore, platelets were preferentially deposited toward the distal anastomosis. The tendency to form occluding thrombus is thus non-uniform along the length of PTFE bypass grafts. No dependence of platelet deposition on flow was observed; their distribution appears to be independent of flows $\geq$ 60 ml/min. Efforts to reduce thrombosis in current PTFE bypass grafts should focus on the influence of the distal anastomosis on blood-surface interactions within the graft.

0992

ANTIPLATELET DRUGS IN HAEMODIALYSIS

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Platelet and fibrin desposition on dialysis membranes remains a significant problem despite systemic heparinisation. In randomised double blind cross-over studies the effect of three antiplatelet drug regimens have been investigated:
1) Placebo, 2) Low Dose Aspirin (ASA) and Dipyridamole (DPM) (110 mg + 75 mg) tds, 3) Standard Dose ASA + DPM (330 mg + 75 mg) tds, 4) Ticlopidine (250 mg) bd.

No antiplatelet drugs were given for 21 days prior to each study and the heparin schedule remained unchanged throughout all the studies. Seventeen patients received the ASA + DPM regimens for 7 days and the Ticlopidine regimen for 14 days. Investigations were performed at the last dialysis of each study period and comprised of platelet count pre and post-dialysis, post-dialysis heparin and drug concentrations, scanning electron microscopy (SEM) of the dialysis membrane and in addition platelet aggregation pre-dialysis in the Ticlopidine group.

Standard Dose ASA + DPM significantly inhibited the reduction in platelet count during dialysis ($p<0.01$) and increased the post-dialysis heparin concentration compared to the other regimens ($p<0.05$). SEM demonstrated that only Standard Dose ASA + DPM produced consistent reduction in platelet and fibrin deposition. Ticlopidine significantly reduced platelet aggregation with ADP ($p<0.05$). Patient compliance was monitored by serum drug concentrations.

This study indicates that Standard Dose ASA + DPM significantly reduces the thrombogenic potential of dialysis membranes, hence improving overall dialysis efficiency. Low Dose ASA + DPM and Ticlopidine show marginal reduction compared to Placebo. Standard Dose ASA + DPM exerted a deparin-sparing action.

0993

PLATELET AND COAGULATION BEHAVIOUR DURING OPEN HEART SURGERY. A. Sturk, E.M.G. Hoogendijk, M.C.L. Schaap, P.S. Sebel, J.G. Bovill, J.L. Beiboer, J.W. ten Cate.
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Studies were undertaken in 19 patients (16 m, 3 f) having open heart surgery. Parameters investigated were: hematocrit; whole blood platelet count; β-TG levels in plasma and platelets; aggregation by ADP, adrenalin and ristocetin; glycoprotein analysis of whole platelets; plasma levels factor II, X,plasminogen (plg), antithrombin III (AT III) and $\alpha_2$antiplasmin (ap). Samples were taken before (1) and 5 min after induction (2), five min after opening the sternum (3), at aortic canulation (4), 15 min after start of extracorporeal circulation (5) and at release of aortic crossclamp (6). Measurements in 5 and 6 were corrected for dilution. Platelet count was decreased 20-30% in samples 5 and 6. There was a 350% increase in plasma β-TG levels in sample 6, without a change in the circulating-platelet β-TG content. The increase therefore appears to be due to destruction or release of the non-circulating platelets. ADP-aggregation was normal in all samples, Adrenalin and ristocetin aggregation was absent in samples 5 and 6 due to the pump priming fluid (haemaccel). However, in sample 4 aggregation induced by ristocetin (1 mg/ml) was also absent. This could not be explained by the presence of haemaccel or heparin. Absence of GP I_B (the possible ristocetin receptor) also could not be demonstrated. Plasma II, X, plg, AT III and ap did not change in sample 1-4. Factor II and X decreased 8-9% in sample 5 and 6, whereas plg, AT III and ap resp. decreased 12, 14 and 20%. Evidently activation of the coagulation starts with the extracorporal circulation.

0994

CENTRAL VENOUS CATHETERS AND THROMBOTIC COMPLICATIONS. A COMPARISON OF THREE DIFFERENT CATHETER MATERIALS.

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Different frequences of thrombosis due to central venous catheters (CVC) is reported. Only few studies have compared the thrombogenecity of different catheter materials. This study was undertaken to evaluate and compare the frequency of thrombotic complications with three catheter materials.

MATERIAL: The patients were randomized into three groups receiving: teflon catheter, siliconized polyethylen catheter and heparinized polyethylen catheter.

METHODS: Percutanous insertion (subclavian or internal jugular vein) was made under strict aseptic conditions as well as the daily care of the CVC. The condition of the veins was assessed by either phlebography or post-mortem examination. Phlebography was usually made on the seventh day after insertion of the CVC by contrast injection in a cubital vein.

RESULTS: Of 110 patients 99 were examined by phlebography and 20 by post-mortem.

Type of catheter	No. thrombosis/ No. phlebographies	No. thrombosis/ No. autopsies
Teflon	1/29	2/6
Siliconized polyeth.	6/38	4/8
Heparinized polyeth.	1/32	1/6

Repeat phlebography was made after 3 to 4 weeks use of CVC in 14 patients and showed no late thrombotic development. Two patients had pulmonary embolism, one with fatal outcome. No other source for embolism than the thrombosis around the CVC was found.

CONCLUSION: The siliconized polyethylencatheter had a significantly higher frequency of thrombosis than teflon or heparinized polyethylen catheters had. CVC did not give any late thrombotic development. Two patients developed pulmonary embolism, one with fatal outcome.