

STUDY OF PROSTHETIC GRAFT HEALING IN A PRIMATE MODEL UTILIZING AUTOLOGOUS INDIUM-111 LABELED PLATELETS. R. Gembarowicz, T. O'Donnell, J. Vecchione, R. Connolly, P. Kahn, K. Ramberg, G. Bottomley, A. Ucci, C.R. Valeri and A. Callow. Departments of Surgery, Nuclear Medicine and Pathology, Tufts-New England Medical Center; and U.S. Naval Blood Research Laboratory, Boston, MA.

In a primate model (*Papio papio*) whose coagulation system is similar to man, we have previously shown that Indium-111 labeled platelets (IN111) are taken up acutely in the region of a synthetic graft. IN111 uptake was maximal by 48 hours post-graft implantation and was no greater at 7 days. The purpose of the present study was to detail platelet-graft dynamics during later phases after graft implantation. IN111 platelets were infused intravenously into animals two weeks after implantation of a 4 mm synthetic carotid artery interposition graft. The radioactivity in the region of the graft was contrasted to a comparable blood volume in a control artery and this activity was calculated by a computer algorithm which accounted for isotopic decay and tissue attenuation. Radioactivity was expressed as % of the total injected dose of IN111 (%TID). The difference (%TID on graft - %TID on control artery) was calculated to determine platelet-graft associated activity. Histologic sections were subsequently examined to correlate graft morphology with in vivo dynamic changes. **Results:** The mean uptake of IN111 platelet associated activity during the early post graft implantation phase (<7 days) was 0.22%. By contrast at 14 days there was no appreciable uptake of IN111 platelets within the region of the graft. Histologic sections of selected graft specimens removed at 2 weeks demonstrated no significant endothelialization. These findings may have important pharmacologic implications with respect to the platelet's role in early synthetic graft healing.

0600

10:30 h

LOCATING AND MONITORING THE ACTIVITY OF INTRACARDIAC THROMBI WITH INDIUM-111 PLATELET SCINTIGRAPHY. M.D. Ezekowitz, E.O. Smith, A.C. Cox, S.W. Herren and F.B. Taylor. Department of Medicine, University of Oklahoma Health Sciences Center, Oklahoma City, OK.

Indium-111 is 2.8 day half-life gamma emitting radionuclide which is suitable for scintigraphic study and has been used to label platelets without causing significant attenuation of function. The purpose of this study was to utilize this technique for localization of left ventricular mural thrombi in patients with regional LV dysfunction. The patient population consisted of 55 patients between the ages of 24 and 77 (53.4 ± 11.3 , mean \pm SD). Twenty-four required coronary artery bypass surgery with aneurysmectomy for intractable angina and/or heart failure. This provided an opportunity to validate the preoperative findings at surgery. Platelets were separated from 43 ml blood in ACD solution by centrifugation and were labelled in ACD:saline (1:7) solution at a pH of 6.5-7.0. A total of $3.8 \pm 2.9 \times 10^9$ (mean \pm SD) platelets labelled with $451.9 \pm 111.6 \mu\text{Ci}$ with a final labelling efficiency of $72.1 \pm 14.1\%$ were injected IV. Platelet recovery at 15 minutes was $51.1 \pm 17.7\%$ (mean \pm SD). EM studies before and after labelling showed no morphological change due to the labelling procedure. Aggregation of platelets in response to ADP and collagen was not altered significantly during the labelling process. Patients on aspirin showed the expected inhibitory effect of aspirin on collagen and ADP induced aggregation. Patients were imaged in multiple views on at least alternate days for a maximum of 8 days. Seventeen had positive studies. In those patients in which surgical confirmation of the scintigraphic studies was possible, a sensitivity of 72% and specificity of 100% was found. We conclude that: 1) Indium-111 platelet scintigraphy promises to be a reliable method of identifying intracardiac thrombi. 2) It may also be useful in monitoring thrombus activity in vivo. 3) Patients on aspirin incorporated platelets onto the thrombus surface in spite of showing the expected inhibitory response to ADP and collagen induced aggregation in vitro.

EXTRACRANIAL CAROTID ARTERY DISEASE ASSESSED BY INDIUM-111 LABELLED PLATELETS IN MAN. M. Goldman, D. Simpson, R.J. Hawker, Z. Drolc, C.N. McCollum. Queen Elizabeth Medical Centre, Birmingham, UK.

Platelet microemboli have been implicated in the aetiology of transient ischaemic attacks and strokes. Current non-invasive diagnostic methods are restricted to assessing blood flow. Arteriography may demonstrate non-occluding atheromatous ulcers but carries a significant morbidity. 111-In labelled platelets and gamma camera imaging of diseased carotid vessels have therefore been evaluated.

Eight patients proceeding to unilateral carotid endarterectomy received an injection of autologous platelets labelled with 111-In-oxine 48 hours preoperatively. Gamma camera images were taken at 4 and 24 hours. Operative endarterectomy specimens were collected and gamma emissions were measured.

The scintigraphic images were independently assessed by two observers. Nine abnormal vessels were identified by platelet accumulation. In 5 cases the observers combined assessment was in complete accord with previous bilateral angiography. Individually each observer identified the symptomatic side in 6 patients. Activity in the endarterectomy specimens measured ex vivo varied from 1.22-84.5 times greater than background activity. The ratio of specimen activity to 5 ml blood samples simultaneously taken varied from 0.017 to 0.360 (mean 0.089).

This non-invasive technique allows localisation of platelet activity in the extracranial cerebral circulation. Objective assessment in vivo is hindered by the relatively small amount of activity on the diseased vessels by comparison with circulating blood activity.

0601

10:45 h

THE EFFECT OF ANTIPLATELET DRUGS ON PLATELET SURVIVAL TIME AND BETATHROMBOGLOBULIN IN CORONARY ARTERY DISEASE. A.C. de Boer, P. Han, A.G.G. Turpie, R. Butt, M. Gent, E. Genton. Departments of Medicine and Clinical Epidemiology and Biostatistics, McMaster University, Hamilton, Ontario, Canada.

Platelets play a role in the development and complications of coronary artery disease (CAD). Abnormal platelet tests which can be corrected by antiplatelet drugs have been reported in CAD, including shortened platelet survival time (PST) and increased plasma betathromboglobulin (BTG) concentration. However, most of these reports were retrospective and unblinded. For these reasons we studied in a randomized double-blind crossover trial, the effect of sulphinyprazole (800 mg) or aspirin (1200 mg)/dipyridamole (200 mg) on 51-Chromium PST calculated by an exponential model (normal 118 ± 16 hrs; mean \pm SD) and on plasma BTG measured by radioimmunoassay (28 ± 8 ng/ml) in 40 patients with angiographically documented CAD. Mean PST pretreatment (116 ± 16 hrs) was not different from normal; after 1 month's treatment with placebo, sulphinyprazole or aspirin/dipyridamole, mean PST was 123 ± 22 , 123 ± 17 and 128 ± 26 respectively. Mean BTG pretreatment (52 ± 33) was elevated compared to normal ($p < 0.005$) and abnormal in 21%; after treatment with placebo, sulphinyprazole or aspirin/dipyridamole, mean BTG conc. was 59 ± 68 , 51 ± 35 and 47 ± 33 respectively. Analysis of variance showed no significant differences between the various treatment groups for either PST or BTG. There was no correlation between PST and BTG ($r = -0.04$). In addition, there was no correlation of BTG or PST with the severity of CAD either clinically or angiographically. The data indicate that BTG levels were elevated in a proportion of patients with CAD and were not affected by the antiplatelet drugs tested. The values of PST in CAD were usually within the range of normal, varied significantly between determinations and were not influenced by the antiplatelet drugs.