Investigation of Blood Compatibility of PMEA Coated Extracorporeal Circuits

M. Kocakulak
C. Koçum
R. Saber
H. Ayhan
S. Günaydin
T. Sari
Y. Zorlutuna
Hacettepe University, Chemical Engineering Department and Bioengineering Division, Beytepe, Ankara, Turkey

Bayindir Medical Centre, Cardiovascular Surgery Department, Söğütözü, Ankara, Turkey

N. Bingöl
Bayindir Medical Centre, Biochemistry Department, Söğütözü, Ankara, Turkey

In this study, the blood compatibility of the PMEA-coated and uncoated hollow fibers was investigated using poly(2-methoxyethyl acrylate) PMEA-coated (X-coating, Terumo Corp., Japan) and uncoated (Capiox SX 18, Terumo Inc., Japan) oxygenators. Total protein, human serum albumin, fibrinogen, erythrocyte, leukocyte and platelets loss quantities were detected on blood samples taken in five different times during cardiopulmonary bypass (CPB) such as; baseline (T1), during CPB (T2), end of CPB (T3), after protamine injection (T4) and intensive care (T5). The average loss of fibrinogen for uncoated and PMEA-coated fiber surfaces was 1.34 and 0.25 g/L, respectively. After operation protein desorption assay from the PMEA-coated and uncoated fiber surfaces were examined, and significant protein desorption differences were found as 1.46 and 5.70 mg/dL, respectively. More platelet aggregation was observed for the uncoated fibers. Also for platelet loss quantities, significant differences were found as 116,000 and 36,000 cell/mm³, respectively for uncoated and PMEA-coated fibers. Less bleeding was observed in the patients operated with oxygenator containing PMEA-coated fibers; more and longer postoperative haemorrhaging were observed when uncoated circuits have been used; fibrinogen losses caused longer blood clotting times. Differences in adsorbed protein quantities on hollow fiber surface and denaturation were examined by the aid of STM images, which showed that more proteins existed in the sample solution of uncoated fiber surfaces.

Key Words: extracorporeal circuits • fibers • protein and platelet adhesions • STM imaging

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