COMPARISON OF THROMBOXANE A_2 IN NORMAL AND DIABETIC BLOOD PLATELETS BY SUPERFUSION BIOASSAY

BY

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ABSTRACT

The superfusion bioassay of relative TXA_2 in blood platelets of normal subjects, diabetic patients with and without DR was studied. The patients with DR were on aspirin for treatment of their retinopathy. Platelet aggregation was estimated by Born's method. Of 18 normal subjects, two of them were disaggregating type, four were hypo-normal type, other seven were normal type and the rest were hyperaggregating type of platelet activity. In 22 diabetics without aspirin treatment, nine had platelet disaggregating activity; the other eight, three and one were normal, hyper-normal and hyperaggregating activity, respectively. The estimation of platelet aggregation of one subject in this group was impossible due to the turbidity of her PRP. Eight of 10 diabetics with aspirin-intake showed platelet disaggregating type. Each of the two left was hypo-normal and normal type, respectively.

The washed platelet suspension in the Krebs solution without calcium was prepared from PRP. Bioassay of TXA_2 in thrombin-treated platelet suspension was carried out using the rabbit aorta superfusion technique at 37°C. Estimated TXA_2 level was a relative value. The diabetics without aspirin treatment had the highest concentrations of TXA_2 with the mean $\pm$ S.D. equal to 2.27 ± 1.69, while the estimated TXA_2 in normal subjects was assumed to be 1.00. The diabetics with aspirin-intake had the lowest concentrations of TXA_2 with the mean $\pm$ S.D. of 0.66 ± 0.40. The relative TXA_2 levels of the normal and diabetic with aspirin-intake groups were significantly different from that of the diabetic without aspirin group ($p < 0.001$). The difference of the relative

TXA_2 concentrations in the normal and diabetic with aspirin-intake groups was also statistically significant ($p < 0.05$). This indicated that DM tended to have higher concentrations of TXA_2 than normal and this might be a cause of several vascular complications in DM. In addition, aspirin does reduce the TXA_2 concentrations. Treatment or prevention of the diabetic complications by the PG inhibitor seems to be rational. However, further studies in this field are needed for this conclusion.

After washing procedure, the loss of platelets occurred. Therefore, it was necessary to concentrate the washed platelets to obtain the sufficient TXA_2 activity. The platelet yield from our washing procedure was about 50%.

There was a report indicated the unstability of TXA_2 that its half-life was 30 sec at 37°C. We, therefore, determined the degradation-time of TXA_2 by the superfusion technique. The result was that TXA_2 contracting activity had still been detectable up to 6 min.

The study of TXA_2 will be the basis of searching for new drugs that have abolished the TXA_2 activity or synthesis. They may be useful in treatment or prevention of the pathology caused by the excessive amounts of TXA_2.