Radioisotopic Dynamic Study of Assessment of Peripheral Obstructive Arterial Desease

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A tracer technique was performed for evaluation of peripheral vascular disease by injecting of an intravenous bolus of 10 mCi of ^{99m}Tc pertechnetate: Buerger's disease, 15 cases; Arteriosclerosis obliterans, 7 cases; Raynaud's phenomenon, 2 cases; Venous thrombosis, 3 cases; and Vascular neuropathy, 3 cases. In total, 67 legs were examined including pre-and postoperatively.

The time activity curve in bilateral calf muscles was obtained during reactive hyperemia. Although in normal subjects (Group A), the typical peak activity was seen, the slight peak or the absence of peak was recognized in obstructive arterial disease.

In obstructive arterial disease, the time activity curve in the Group B with occlusion of leg arteries was different from that in the Group C with occlusion in the arteries proximal to the popliteral artery.

The first appearance of activity in the calf muscles was symbolized as ta (seconds): Group A, 10.44 ± 3.02; Group B, 11.91 ± 2.50 and Group C, 13.41 ± 2.50. The result was statistically significant, between Group A and Group C.

Perfusion index (P.I.) is defined as the ratio of the counts on the peak of the activity curve to the counts on the tail of the plateau (240 seconds): Group A, 1.62 ± 0.35; Group B, 1.17 ± 0.16 and Group C, 0.65 ± 0.16.

The result was statistically significant, among Group A and Group B and Group C.

Diagnosis of Peripheral Arterial Disease by Means of a Whole Body Scintillation Camera

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In a case of obstractive disease of peripheral artery, it is rather hard to obtain a good imaging by a traditional radiography, especially in the more peripheral areas from the obstraction, the changes are evaluated only from the dilution curve.

We have utilized the whole body scintigraphy with ^{99m}Tc albumin—a non-diffusible substance—fur judgement of peripheral vascular changes in 35 cases (from Jan. 1975 to Oct. 1975).

In this method, a scintigram is obtained by

Pho/Gamma HP whole body scintillation camera ten minutes after injection of RI intravenously. Also, quantative evaluation has been carried out by management of densitometer on a scintiphoto.

By this method, the scintigram reveals imaging of the both arterial and venous systems, however, it shows the changes of the blood volume in the peripheral vessels in phisical conditions and it is possible to presume the obstraction point.

Thus, this new method is usefull for diagnosis, evaluation of treatment or prognosis.

The Effect of Chemical Sympathectomy on Muscle Blood Flow in Thromboangitis Obliterance

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Fybe et al (1975) reported the effect of chemical sympathectomy by phenol-water followed by Raid's technic on A.S.O. did not improved intermittent claudication after one month period being compared with those performed sympathetic block by local anesthetics.

I have been performed chemical sympathectomy by 20 ml of 5% phenol-glycerine warmed to 45°C from L_1 to L_4, mainly L_2 and L_3, on 27 cases of T.A.O. for 52 times under televised X-ray. Among them 11 cases had it bilaterally and 7 of them had been already underwent surgical sympathectomy some years ago.

The effect of chemical sympathectomy was confirmed by raized skin temperature, disappearance of GSR as well as improvement of digital electropletysmography.

Muscle bood flow of anterior tibialis, gastrocunemius and soleus had been measured twice each by ^{133}Xe clearance with honey comb filter in rest and after mild kinetic load followed by modified Lassen's technic. 100 μC (20 μl) of ^{133}Xe was injected into muscles 25 mm through skin.

As control, blood flow obtained from 10 healthy candidates.

In order to know relation of juscluar blood flow to total lower limb flow, simultaneous measurement of the latter performed by IMF-Impedance method.

RESULTS

1) Total blood flow of lower legs: The ratios of after kinetic load to rest were ad followed; 1.47 (85 to 125 ml/cm/min.) in healthy control, 1.34 (20 to 27) in T.A.O. before chemical sympathectomy became 1.64 (25 to 41) after with significant increase ($p<0.05$).
2) Muscle blood flow: The ratios of after load to rest was very small in m. soleus even in healthy candidates. In m. ant. tibialis, the ratios were 2.88 in healthy control, 1.73 in T.A.O. before and 1.57 after chemical sympathectomy, while in m. gastrocunemius they were 5.89, 2.14 and 3.13 alternatively and significant increase observed ($p<0.05$).

From these, there is a trend to improve muscular blood flow by repeated chemical sympathectomy on T.A.O. because m. gastrocunemius, a white muscle by Walls (1964), revealed its blood reservation.