Subcutaneous Injection of 99mTc Pertechnetate at Acupuncture Points K-3 and B-60

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The acupuncture points are known to be morphorlogically related to the nerves and vessels. Yet the physiological role of blood vessels in the formation of acupuncture points remains unknown. With subcutaneous injection of 99mTc pertechnetate at the acupuncture points K-3 and B-60 and with intra-acupuncture point injection of 99mTc pertechnetate at K-3 and B-60, a lower-limb venography like what was obtained by intravenous injection of 99mTc macroaggregated albumin was demonstrated in the present study. It seems that some acupuncture points do play a role in drainage of tissue fluid from soft tissue into the veins.

Key Words: radionuclide venography, technetium-99m pertechnetate, acupuncture points K-3 and B-60.

The concept of meridian is one of the major part of the traditional Chinese medicine. For years, the acupuncture points were known to be closely related to the vessels. Several reports indicated that morphologically the acupuncture points were abundant in vascular components than their surroundings1)-3). In this report, with the subcutaneous injection of 99mTc pertechnetate at the acupuncture points K-3* and B-60**, we disclose that the acupuncture points do play a role in the drainage function of tissue fluid from soft tissue into the vascular bed.

1. Materials and Methods

A 24-year-old male medical student, a volunteer, received 3 varieties of radionuclide injection as:

1) I.V.: Intravenously injected 1 mCi of 99mTc MAA (macroaggregated albumin) through a dorsal vein of the right foot with application of a tourniquet at the ankle joint. Soon after the tourniquet was released, a medial view of the right leg was taken with a commercially available gamma-camera (Elscint Dymax LF) (Fig. 1A).

2) I.A.: Fifteen minutes after I.V., 1 mCi of 99mTc pertechnetate was directly injected into the K-3 and B-6 of the right foot (each point 0.5 mCi/0.5 ml) when he was gaining "chi". And another medial view of the right leg was then taken in the same manner (Fig. 1B).

3) S.C.: Twenty minutes after I.A., 1 mCi of 99mTc pertechnetate was subcutaneously injected at the K-3 and B-60 of the right foot (0.5 mCi/0.5 ml for each point). Then, the other medial view of the right leg was taken (Fig. 1C). Before imaging for I.A. and S.C., pictures were also taken to sure that there

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1) 鍼のK-3、B-60 穴への 99mTc Pertecnetate 皮下注射による研究。高雄医学院、台湾。
2) 太錫穴
3) 嶺錫穴
was no residual vascular image to be visualized from the last injection.

2. Result

The images by the 3 varieties of injections are quite the same to one another, as shown in Fig. 1.

With I.V., there were 3 channels of venous radioactivity to be seen: the deep vein (channel 1), the superficial vein (channel 2), and the communicating vein (channel 3) (Fig. 1A).

With I.A., also were 3 channels of radioactivity to be visualized (Fig. 1B), corresponding to what were seen in I.V., but more prominent in the deep calf vein (channel 1). The initial appearance of radioactivity of leg veins by I.A. was within 5 s.

With S.C., there were 3 channels of venous activity, almost the same as in I.V. (Fig. 1C). The initiation of radioactivity within the leg veins was within 10 s.

3. Discussion

According to the traditional Chinese concept, the acupuncture points were majorly a complex structure of nerve endings, and arterial and venous capillary bed. On I.A. procedures with intra-acupuncture point injection, however, we didn't injure the vessels since no blood could be withdrawn and since the removal of the needle did not lead to oozing of blood. It is probably that the acupuncture points do not consist of arteriols or venules, although they may be physiologically related to the vessels. On the contrary, one of the previous investigations has indicated that by electronic microscopy some of the acupuncture points had more vascular component than its surrounding tissues. Grossly, the acupuncture points with more tenderness to finger pressure might show concomitant blood vessels. But what is the real relationship of blood vessels to the acupuncture points, indeed? We could just say, "still not known". However, in the present study, through injection of 99mTc pertechnetate in the acupuncture points or subcutaneously at the acupuncture points K-3 and B-60, one could see the radioactivity entering the venous system of the legs from the soft tissue. The consequent image was almost the same as what we got by the radionuclide venography of the legs. Injection of radionuclide at other acupuncture points has not yet been tried by us, and we cannot predict what will happen upon injection at different acupuncture points. Nevertheless, subcutaneous injection of 99mTc pertechnetate at the lower portion of Achilles tendon, known to be lack of acupuncture points, did not afford images like what was got by I.A. or S.C. at K-3 and B-60. It seems that some acupuncture points, such as K-3
and B-60, may play a physiological role in drainage of tissue fluid from the soft tissue into the venous system. The pathway through which the subcutaneous injection of $^{99m}$Tc pertechnetate results in venography remains study.

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References

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