

Structure of Lymphatics in the Aorta and the Periaortic Tissues, and Vascular Lesions Caused by Disturbance of the Lymphatics

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Summary

In the cases of obstruction of the lymphatics alone, vascular lesions were slighter compared with those of obstruction of the arterial vasa vasorum (5). However, in the cases of severe disturbance of flow from the vascular wall with marked increase of the connective tissues, vascular lesions such as wide intimal thickening progressed. So, disturbance of lymphatics in the aorta and the periaortic tissue seemed to give an influence on the microcirculation in the vascular wall and vascular lesions.

Distribution of the lymphatics concerned with microcirculation in the aortic wall has been discussed recently (1, 2, 3). In this report, distribution and normal structure of lymphatics in the human abdominal aorta and the periaortic tissues were studied. Further, vascular lesions caused by an experimental obstruction of lymphatics in the abdominal aorta of dogs were investigated (2, 3).

Normal structure

In the human aorta, lymphatics started from the border area between the adventitia and

the periaortic tissue, and collected to larger lymphatics or partially enter to the upper lymph node. Lymphatics showed irregular size and form, and had many valves. These lymphatics had several layers of smooth muscle cells and elastic fibers, and also had own vasa vasorum. It was suggested that there were many lymphaticovenous anastomoses, because contrast media injected directly into the periaortic lymphatics was able to observe in the venous vasa in the media of the aorta (4).

Experiment

In order to study a role of these lymphatics, following experiments were done, using 53 mongrel dogs (2, 3). A Mixture of 0.5 normal hydrochloric acid with 10 % gelatin and 5 % India ink was injected into the external iliac lymph nodes bilaterally. After the injection, lymphatics were ligated at the level of the renal artery. India ink was used as tracer in microscopic study.

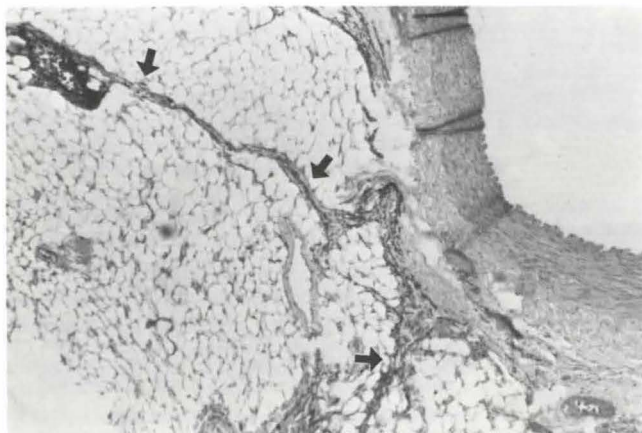


Fig. 1 In the outer coat and the perivascular tissue, obstruction of lymphatics alone which contained India ink in the lumen (arrow) is seen. No remarkable change is observed in the vascular wall. One week after the operation. Hematoxylin-eosin, x 40

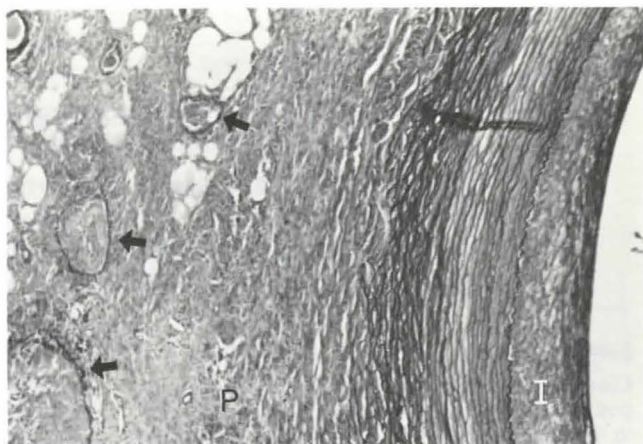


Fig. 2 Marked increase of connective tissue in the periaortic tissue (P) and wide intimal thickening (I) is seen. India ink is observed in the obstructed lymphatics (arrow). Three weeks after the operation. Elastica-Van Gieson, x 20

At one week after the operation, obstruction of lymphatics contained India ink was seen clearly in the periaortic tissues. Accumulation of the interstitial fluids was observed in the inner coat. However, no intimal thickening was observed and elastic fibers in the media seemed to be intact (Fig. 1). By microangiogram of the same specimen, the vasa vasorum showed a normal form and distribution, which indicated normal supply of blood into the aortic wall and suggested disturbance of lymphatics alone.

In some cases, connective tissues increased extensively around the obstructed lymphatics so that flowing out of interstitial fluids through the lymphatics or the venous vasa in the periaortic tissues was disturbed. In the region mentioned above, an intimal thickening was observed from 3 weeks to 3 months after the operation (Fig. 2). Metachromasia positive substance increased in these regions.

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