

A STUDY OF THE LYMPHATIC SYSTEM OF THE CANINE SALIVARY GLAND

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Most of our knowledge concerning the lymphatic system of salivary glands dates back to the late 19th century, and had been obtained by the injection method, which has until recently remained the method of choice. The inadequacies of the injection method, however, have repeatedly been stressed by Hungarian authors [3, 4].

For this reason it seemed justified to reinvestigate the lymph vessels of the dog's salivary glands by a method superior to the injection technique, notably by the one making the lymph capillaries visible by inducing lymph congestion.

Methods

Twenty dogs, weighing about 10 kg each, were used. The main lymphatic trunks and the deep lymph glands were ligated in the neck. This interference with the lymph flow made it possible to visualize the lymphatics in the salivary glands. It had been namely observed [2] that obstruction of the cervical lymph flow results in oedema of the salivary glands whose lymph vessels dilate in about 1/3 of the cases. In some cases we obstructed not only the cervical lymph flow, but also ligated all oral orifices of the salivary glands that could be located. The animals were sacrificed 24, 48 and 72 hours following operation, respectively. The salivary glands in the oedematous environment were fixed in 5 per cent cold formaldehyde. The sections prepared by the usual method were stained with haematoxylin-eosin. Most often the submandibular gland was studied.

Results

a) *The lymph vessels of the capsule*

In the capsule, large lumina lined with endothelium and filled with a homogeneous substance staining with eosin occurred side-by-side sometimes like a string of pearls. At sites, only endothelium separated one lumen from the other. Some lumina contained valves. In the immediate proximity of the lymph vessels blood vessels, with narrow lumen filled with blood were seen. As compared the nuclei in the endothelial wall of the dilated lymph vessels were farther from one another than those in the wall of blood capillaries.

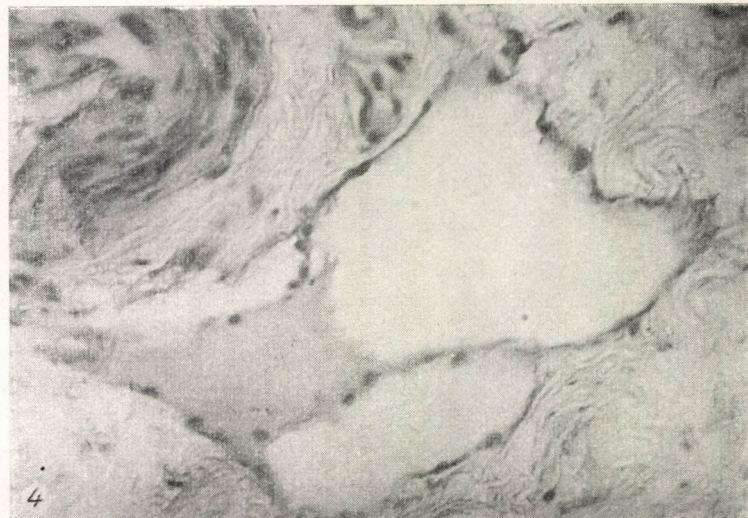
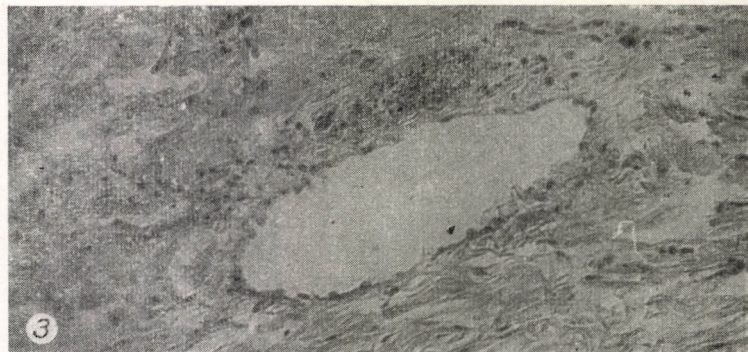
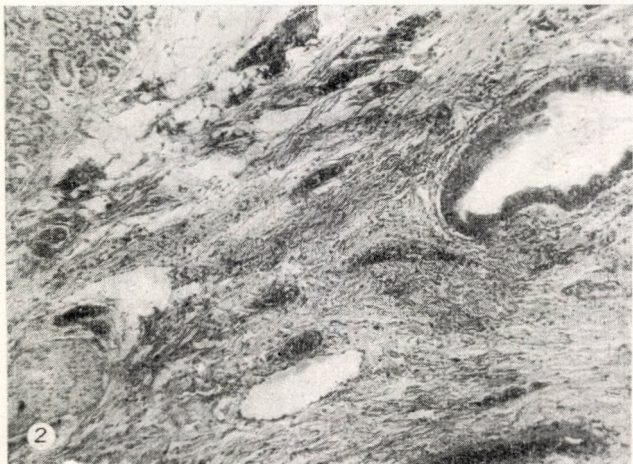
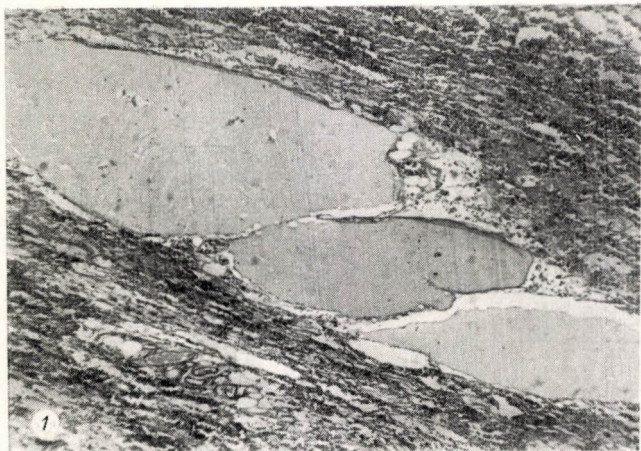


Fig. 1. String of pearls-like arrangement of lymph vessels in capsule

Fig. 3. High power view of the centre of Fig. 1.: A dilated lymph vessel with a single layer of endothelium as its wall; the endothelial cells are distant from one another. Above, a capillary filled with blood

b) *The lymph vessels of the salivary gland (submandibular gland)*

Within the more extensive islets of connective tissue containing efferent ducts and blood vessels of major calibre, dilated lymph vessels were also visible, near to the efferent ducts, the larger blood vessels (mainly arteries)

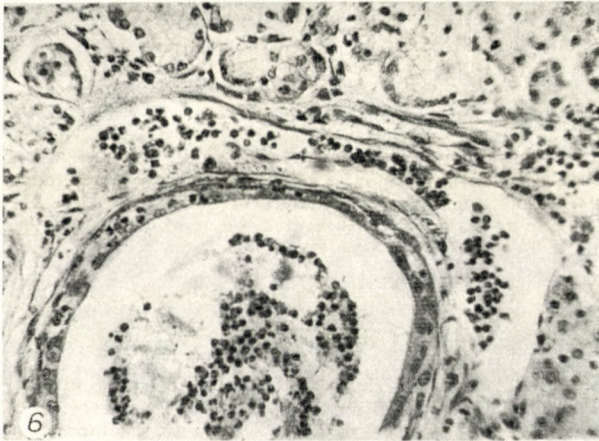
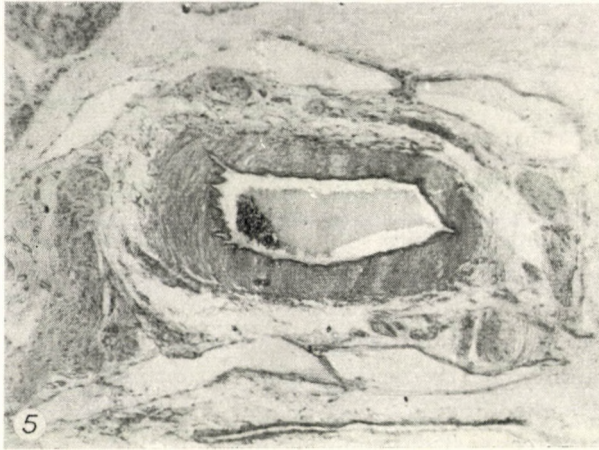


Fig. 5. Lymph vessels with valves grouped around a bigger artery

Fig. 6. A dilated efferent salivary duct half, surrounded by a dilated lymph vessel. Above right, the endothelial wall composed of cells distant from one another, next to the acini. The efferent duct and the lymph vessel are filled with serum and leucocytes. (Ligation of the efferent duct caused inflammation)

and, at sites, the nerve trunks. Some lymph vessels contained valves. Next to the smaller efferent ducts, often adhering to their wall comparatively large lymph vessels with a wall of a single endothelial layer are found. The nuclei, as already mentioned, were at a considerable distance from one another. These lymph vessels were in close contact not only with the efferent ducts, but also

with the acini of glands, to the basal membrane of which they adhered so closely that with the usual magnifications the former cannot be differentiated from the latter. In other areas there was a space between the capillaries running between the acini and the basal membrane of the acini, in which endothelium-like cell nuclei were occasionally were.

Discussion

By causing a mechanical obstruction of lymph flow, it was demonstrated that the efferent ducts as well as the blood vessels and nerve trunks of salivary glands are accompanied by lymph vessels. Similar evidence has been obtained by injecting a dye into the parenchyma [1]. The latter method would make visible also the lymph spaces around the acinus. Such spaces have been stated to empty into the lymphatics at the periphery or in the centre of the lobules. We have been unable either to confirm or to exclude the existence of such spaces with certainty, partly because of the stunting effect of the commonly used method of embedding.

A very close connection could be demonstrated at sites between the lymph vessels around the efferent duct and the acini.

Summary

By inducing lymphatic congestion in salivary glands, the location and relation to other structures of lymph has been studied. The lymph vessels are arranged around larger blood vessels, nerves and efferent ducts; in some of them valves are present. The lymph vessels around the efferent ducts are in close contact with the acini of glands. We have been unable either to confirm or to exclude the existence of periacinar lymph spaces.

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ИССЛЕДОВАНИЕ ЛИМФАТИЧЕСКОЙ СИСТЕМЫ СЛЮННЫХ ЖЕЛЕЗ У СОБАК

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Посредством застоя лимфы авторы добились того, чтобы лимфатические сосуды в слюнных железах стали видимыми и исследовали ход этих сосудов, также как и их отношение к другим образованиям. Лимфатические сосуды располагаются вокруг больших сосудов, нервов и отводящих трубчатых образований. Отдельные лимфатические сосуды показывают тесную связь с железистыми пузырьками. Авторам не удалось ни доказать ни опровергнуть существование лимфатических пространств вокруг железистых пузырьков.

UNTERSUCHUNG DES LYMPHATISCHEN SYSTEMS DER SPEICHELDRÜSEN
VON HUNDEN

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Die Lymphgefäße in den Speicheldrüsen wurden durch Lymphstauung sichtbar gemacht und ihre Lagerung, sowie ihr Verhältnis zu anderen Gebilden beobachtet. Die Lymphgefäße verlaufen rings um die grösseren Gefäße, Nerven und Ableitungsröhrchen. Einzelne Lymphgefäße stehen auch mit den Drüsenzini in engem Zusammenhang. Das Vorhandensein von periazinären Lymphspalten konnte weder mit Sicherheit bestätigt, noch widerlegt werden.

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