Experimental Arteriosclerosis in the Lungs, especially on Research by Reconstructing Model.

Part 2. Lanoline-Arteriosclerosis.

By

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Preface

Experimental arteriosclerosis by lanoline-feeding was found out by Prof. Kon (1915), originating in Ignatowski's yolk-test, and the pathological changes are chiefly the thickening of the intima, deposition of fat, according to deposition of cholesterol which is containing in the yolk and lanoline. So this is called cholesterol-type-arteriosclerosis, and there are some scholars who say that this will intimate the essence of abiogenetic human arteriosclerosis.

I have attempted to observe such cholesterol-type-arteriosclerosis in the rabbit's lungs according to the same reconstructive method stated in the 1st part.

Materials and Methods

The materials and the methods which I have employed this time, were the same as I stated in the 1st part. Merely adrenalin-injecting was exchanged for lanoline-feeding. Namely, the rabbits had been fed by lanoline and injected Enarmon or enucleated the testicles to compound abnormal function of the male sexual organ. I picked out No. 122, 64, 125 (contrast) and 24 (the testicles enucleated) among those rabbits and researched their lungs according to the same method as I stated in the 1st part.

Results

The results that I have obtained by the above mentioned method, will be described generally as follows:

1. On the pulmonary arteries of the rabbits, according to lanoline-feeding there are caused cholesterol-type-arteriosclerotic changes in various degrees. Namely, I have observed the deposition of fat that was caused on the intima, when significant it spread to the media, and it can be observed as vacuoles, for staining was in the usual method, and the thickening of the intima. The adventitia did not clearly show reaction for sclerotic change throughout

the course of the blood vessels.

2. The parts where this cholesterol-type-arteriosclerosis are occurred and progressed, are almost definite.

- a. On the convex surface of the blood vessel's curving, it could be observed more powerfully the thickening of the intima and deposition of fat on the intima, spreading on the media moreover. These changes are sometimes caused on concave surface of the blood vessel's curving.

- b. The thickening of the intima and the deposition of fat are more powerfully appear on the inside thigh of bifurcating part, especially on the upper and lower parts of the inside thigh of the bigger branch. Deposition of fat are sometimes permeating the adventitia.

3. The formation of aneurysms are sometimes seen on the peripheral arteries in the rabbit's lungs by means of lanoline-feeding. Especially in the lungs of No. 122 rabbit it was observed a fairly great aneurysm. The center of this aneurysm is on bifurcating part and spreads to both branches.

Fig. 1

Schema of fat-deposition
on bifurcating part.

Discussion

I intend to discuss the results that have been obtained in this study, comparing with the literature of the old scholars.

Fig. 2 a, b: Miliary aneurysm on bifurcating part in case of lanoline-arteriosclerosis.

We are succeeded to cause experimental hypercholesterinaemia according to lanoline-feeding, so-called cholesterin-type-arteriosclerosis in the artery system, but it is also clear that such changes occur on the pulmonary arteries, as the researches of our pioneers say. I have observed clearly, too, the occurrence of cholesterin-type-arteriosclerosis on the pulmonary arteries of the rabbits in this study. But you may know clearly, too, that the sclerotic changes will not always equally occur on the whole course of the blood vessels, even if judging from the result of this research.

I have made clearly that there was always an established rule for the local relations that cholesterin-type-arteriosclerosis was occurred and progressed, especially fat was deposited. In stating concretely, the sclerotic changes and especially the deposition of fat were first caused on the convex surface of the blood vessel's curving, progressing gradually on to concave surface. Second, on bifurcating part of the blood vessels, they are occurred on the lower part of the inside thigh of the branch, specially on the same side of the bigger branch, spreading gradually to the outside thigh.

This is really very interesting and makes clear that the deposition of cholesterin on the walls of the blood vessels will be controlled by the local elements of the blood vessels in themselves, in case of experimental hypercholesterinaemia. The convex surface of the blood vessel's curving and inside thigh of bifurcating part are the parts where they are always receiving powerfully the collision of

blood stream, so that they will sooner be fatigued in overwork than the other parts.

Thus it will be considered that these proper parts allow the deposition of fat, specially of cholesterin and consequently the early occurrence or progressing of sclerotic changes would be caused on these parts.

These relations will entirely tally with what I had already discussed on the adrenalin-arteriosclerosis, and will accord well with the researches of our pioneers on the central artery or some organ's arteries. (Thoma, Anitschkow, Kodama, Tanaka).

Really we must know that the essence of the occurrence of arteriosclerosis, whatever it may be cholesterin-type-arteriosclerosis or not, is controlled by the stereo-local elements of the blood vessels themselves.

Lastly I intend to discuss about the aneurysms that I discovered accidentally on the peripheral arteries of the lungs of the rabbits fed on lanoline.

The aneurysm that was found out in No. 122 rabbit among the rabbits that I have employed, was observed on a little complicated part of bifurcation of the medium sized artery, and it was pretty big.

In the study on adrenalin-arteriosclerosis in the 1st part, I had discovered many aneurysms, but at this time, I could also find the same result in the lanoline-feeding group, as in the last part, excepting a few frequency.

Then we have to consider that this fact is very significant.

In my opinion, the first sclerotic changes will

be powerfully occurred gradually with lanoline-feeding, and consequently they will cause the ascending of the blood pressure, thus at last the peripheral arteries would fall in collapse, losing their resistance for the blood pressure, though dilating to adapt for hypertension.

Conclusion

I conclude as follows, variously discussing on the results of this research:

1. Cholesterin-type-arteriosclerosis in various degrees have been caused on the pulmonary arteries of the rabbits by means of lanoline-feeding. Namely, there were, the thickening of the intima, the deposition of fat on the intima, spreading to the media sometimes. The adventitia did not show clear reaction generally for sclerotic changes throughout the course.

2. The localization of these cholesterin-type-arteriosclerosis has an established principle, concretely as follows: a. On the convex surface of the blood vessel's curving, b. On the inside thigh of bifurcating part, specially on the upper and lower parts of the same side of the bigger branch.

3. Sometimes aneurysms were formed on the peripheral arteries of the rabbit's lungs by means

of lanoline-feeding.

On closing, I wish to extend my gratitude to Prof. *Suzue*, my teacher, for his kind guidance and revising my work.

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肺臓に於ける實驗的動脈硬化症特に象形複成模型による立體的な研究

第二編 ラノリン 動脈硬化症に就て

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余はラノリン飼養によりコレステリン型動脈硬化症を惹起せしめたる家兎肺臓動脈について、第一編に於けると同様の方法を用ひ、動脈硬變性變化の發現態様を立體的に觀察し、凡そ次の如き結論に達した。

1. ラノリン飼養により家兎肺臓動脈には種々なる程度のコレステリン型動脈硬變性變化が惹起せられる。即ち内膜の肥厚。内膜更に中膜に迄及ぶ脂肪沈着である。外膜は概して硬變性變化に對し著しい反應を示さない。

2. 斯かるコレステリン型動脈硬變性變化の發現增強の部分は必ず一定の原則があつて具體的には、
イ、血管彎曲部凸面側。
ロ、分岐部内股側特に大なる分枝の内股側を中心としてその上下に發現增強する。
3. ラノリン飼養により家兎肺臓動脈管殊に其の末梢部に時として動脈瘤が形成せられることがある。