Experimental Arteriosclerosis in the Lungs, especially on Research by Reconstructing Model.
Part 3. Vitamin D-arteriosclerosis.

by
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Preface

In order to attempt the reconstructive research on the experimental arteriosclerosis in the lungs, I have already discussed on the adrenalin-arteriosclerosis in the 1st part and the lanolin-arteriosclerosis in the 2nd part. In the 3rd part, I intend to attempt to describe my researching on the Vitamin D-arteriosclerosis. Dr. Pfannenstiel first succeeded to cause experimental arteriosclerosis by Vitamin D-giving, originating in the Kreitmair and Moll's test.

The pathological change of Vitamin D-arteriosclerosis are chiefly the thickening of the intima, degeneration, necrosis, deposition of calcarea on the intima and the media, owing to abnormal metabolism of calcarea; but it sometimes causes the deposition of fat on the intima and its thickening. Namely the pathological changes are medium or mixing type of adrenalin- or choliterin-type-arteriosclerosis.

I have caused arteriosclerosis in the rabbits according to Ovoral-giving and researched by reconstructing model, on the genesis of the arteriosclerosis on the lungs.

Materials and Methods

The materials that I have employed this time are the same as those in part 1 and 2, but merely in order to accelerate arteriosclerosis Ovoral-giving has been employed. The rabbits have been used in No. 52 (only Ovoral-giving) and 82 (compound Enarm-injecting). I have made their lungs series of sections according to the same method as in part 1 and 2, and then observed as reconstructing model. Moreover, the staining was haematoxylin-eosin-staining.

Results

The results of this study, followed according to the above mentioned method, are as follows:

1. By means of Ovoral-giving, we could find the occurrence of Vitamin D-arteriosclerosis in various degrees on the rabbit's lungs. Namely, there are thickening, degeneration and necrosis of the intima, sometimes the formation of vacuole, and the thickening of the media. The deposition of calcarea could not be observed. The adventitia did not generally indicate any reactions for arteriosclerotic changes.

2. The parts of the occurrence and progress of this Vitamin D-arteriosclerosis are almost definite. Namely: a. On the convex surface of the blood vessel's curving. b. On the bifurcating part of the blood vessels. On this part, the sclerotic change was beginning to occur before bifurcating and progressed powerfully on the inside thigh of the branches, especially more powerfully on the same side of the bigger branch, and disappeared or decreased soon after the completion of bifurcation.

3. By means of Ovoral-giving, we could observe the formation of aneurysms on the peripheral arteries of the rabbit's lungs.

Fig.

Schema of thickening, degeneration of the intima and the media in case of Vitamin D-arteriosclerosis

Discussion

In chapter 3, I have described the general results of my researching of the arteries of the rabbit's lungs that had been given Ovoral in a long period. And now I am intending to attempt to discuss about the results, comparing with the old scholars' literatures. We have now the researches of many professionals who had studied for the changes of the rabbit's lungs, specially arteriosclerotic changes, occurring by Vitamin D-preparation-giving (Suzuki, Suzue and Okansura). But the research as I have been making according to my methods at this time, cannot be
found yet.

The arteriosclerosis caused by Vitamin D-giving is said to be due to the abnormal metabolism of calcarea, and it is well known that in one case the pathological changes are similar to adrenalin-type-arteriosclerosis, chiefly indicating thickening, degeneration, necrosis or deposition of calcarca of the intima, but in the other case those are analogous to cholesterin-type-arteriosclerosis, chiefly indicating thickening, deposition of fat of the intima. In my case, the histological changes shows medial of those, namely thickening, degeneration, necrosis or vacuolization of the intima and thickening, degeneration of the media. But these arteriosclerotic changes have been occurred and progressed on definite parts, when I have observed throughout the course of the blood vessels of all.

These sclerotic changes have a tendency to occur and progress on the convex surface of the blood vessel's curving and bifurcating parts, especially on the upper and lower parts of the inside thigh of the bigger branch. These facts are very agreed with the facts that I had found out in the study on adrenalin-arteriosclerosis and lanoline-arteriosclerosis, and moreover with the researches that old scholars had made. on arteriosclerosis in the central artery system. The changes on the bifurcating parts are complicated considerably and they are first occurred before bifurcating, and progress gradually on the inside thigh of bifurcating part, but are decreased and disappeared soon after the completion of bifurcation. And the condition that sclerosis are spreading on the branches, are more powerful on the inside thigh of the bigger branch. These facts have a great important meaning, namely there are some local elements of the blood vessels to regulate the occurrence of Vitamin D-arteriosclerosis that has been said as abnormal metabolism of calcarea. Thus we must consider that these facts indicate the essence of its occurrence or progression. The two parts as I mentioned above are received to the collision of blood stream more powerfully than the other parts, so these proper parts will cause arteriosclerosis, getting deposition of calcarea, owing to their faster fatigue in overwork.

Thus I could touch one part of the essence of the occurrence or progressing of Vitamin D-arteriosclerosis on the pulmonary artery, according to this reconstructive researching.

In chapter 3, I have specially described that a-neurysms had sometimes been formed on the pulmonary arteries of the rabbit's lungs in Ovoral-giving. This information is owing to my accidental discovery, and we hear no scholar attempted to prove. After adrenalin- and lanoline-group, I have also discovered the formation or aneurysms in this ovoral-group, and this fact is very interesting. I am supposing that if the blood vessels would be fallen in collapse for hypertension as a result of progressing of arteriosclerotic changes, following continuation of Ovoral-giving.

Conclusion

I have concluded as following owing to my discussion as above mentioned:

1. The pulmonary arteries of the rabbits caused clearly Vitamin D-arteriosclerosis by means of Ovoral-giving. Namely there are thickening, degeneration, necrosis or vacuolization of the intima and thickening, degeneration, necrosis of the media. The adventitia did not show clearly the reaction on arteriosclerotic changes.

2. The parts where Vitamin D-arteriosclerosis is caused and progressed are established as following:
   a. On the convex surface of the blood vessel's curving.
   b. On the bifurcating parts of the blood vessels. On this part, sclerotic changes are beginning to occur before bifurcating, and progressing powerfully on the inside thigh of bifurcating point, and decreased or disappeared soon after the completion of bifurcation. On the branches, these changes are occurred more powerfully on the bigger one.

3. Owing to the Ovoral-giving, there are formed sometimes aneurysms on the pulmonary arteries of the rabbit.

On closing, I express my heartfelt thanks to Prof. Suzuki, my teacher for his kind guidance and revising my traits for a long time.

References

肺臓に於ける実験的動脈硬化症に於て心筋障害模型による立地的研究

川 上 一 朗

昭和48年4月22日

肺臓に於ける実験的動脈硬化症の立地的研完を企画し、先に第三編に於ては「アドレナリン動脈硬化症
第二編に於てはラノリン動脈硬化症に就て論じたのであるが、此處に第三編として、其の等の初代型乃至混合型たる「ビタミンD動脈硬化症に就て記述する。余は家兔に「オポラールを投与動脈硬化症を惹起せし、
次の場合に於ける肺臓動脈硬化症の現況を立地的に研究し次の事に明らかにした。

「オポラール投与により家兔肺臓動脈は明らかに様々な程度の「ビタミンD動脈硬化性変化を惹起する。

心 臓 疾 患 の 血 清 学 的 診 断 (第33報)

第1編 心筋ホスファティド血清反応 (CPR) (3)

第四章 CPR の性味

心筋ホスファティド血清反応 CPR に就き次ぎの性味を行つた。

細菌反応との関係

心筋の細菌反応はウッサルマン氏反応及びディアックス
ゲオルギー氏反応及びディアックス
ゲオルギー氏反応及血清の抗原である故、本反応は自然的に末代の反応と関係して来る事が考へられ
る。即ち昭和20年より昭和21年に亘って行った本反応
検に依れば、ウッサルマン氏反応及びディアックス,
ゲオルギー氏反応陽性者検証9例中心肺病院がないにも拘らず
CPRが陽性のものが6例あり、細菌反応とCPRとは
有力な相関関係がある様に思念された。然らに昭和22
年になり CPR に使用するホスファティドの可及的純
化を始めた。即ちホスファティッド製作中アセトン溶
分を完全に除きせんがため、アセトン不溶、石油エーテ
ル可溶の操作を再三繰返した。かくして得た心筋ホス
ファティドに続いて再び細菌反応の関係を吟味した。即
ち細数341例に就きウッサルマン氏反応、ディアックス,
ゲオルギー氏反応を検査した。その中この両細菌反応が陽
性で心電図に依り心筋障害あり CPR が陽性のもの34
例、細菌反応が陽性で心電図に依り心筋障害なく CPR陰
性のもの14例にして、夫々は心電図所見と CPR の成績
が一致する例に問題ではない。又細菌反応陰性者に於
ても問題にならない。故に注目すべきは心電図所見に依
り心筋障害がないにも拘らず、細菌反応が陽性である

鍵に CPR も陽性に出たと思われる例である。幸にかか
る例は僅か4例に過ぎなかった(第四表)。かくして微機
反応と CPR とは不可分の関係にあると思へられたもの
も、ホスファティド純化に依り之等両反応とは密接な
関係がないと云へ得る様になった。

Tab. 4

Relation to serological reaction in syphilis

<table>
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<th>WaR</th>
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血漿蛋白量との関係

CPR は血清よりオイゴプロリンを採り反応を行ふ、
血漿蛋白量との間に関係が有る事は考へられる、
血漿蛋白量測定は血漿鹸性11に依り行ひ、血漿蛋白
量正常範囲内(即ち6.5～8.0 g/dl)、それ以下及びそれ以
上の三階に分ち CPR を検査し、血漿蛋白量 6.5 g/dl
以下の低蛋白血漿を示すもの131例に於ては、強陽性66
例、弱陽性者34例に依り、陰性は31例に過ぎない、血
漿蛋白量 6.5～8.0 g/dl の正常蛋白血漿を示す 160例に