

of his life he had been in the habit of taking one or two quarts of whiskey a day for about eight months in the year. At the postmortem examination particular attention was paid to the condition of the arteries, and they were found to be entirely normal.

CONCLUSIONS.

1. Only 6 per cent. of 283 cases of chronic and excessive alcoholism under 50 years of age showed any evidence of arteriosclerosis.

2. Of 45 cases of arteriosclerosis examined by me at the Massachusetts General Hospital, only 13 per cent. gave any history of alcoholism.

3. Of 656 autopsy cases of arteriosclerosis, only 95, or 14.5 per cent., were under the age of 50.

4. Out of these 95 cases under 50, in which arteriosclerosis was found postmortem, only 21 per cent., and if we exclude cases complicated by chronic nephritis, only 17 per cent. appear to have consumed alcohol in any notable excess.

The details of the autopsied cases may be seen from the following table:

TABLE OF POSTMORTEM AND CLINICAL RECORDS IN CASES OF ARTERIOSCLEROSIS.

Case.	Age in Years.	Pathologist's Diagnosis.	Previous Diseases and Pre-ent Complications.	Amount of Alcohol Consumed.
1	30	Art.	Ch. nephritis.	Five or six whiskies daily for last 15 years.
2	36	Art.		One or two wines daily; never to excess.
3	41	Art.	Phthisis.	Moderate alcohol.
4	24	Sl. art.	Ch. nephritis.	Alcohol moderate.
5	43	Sl. scl. of aorta.		Always hard drinker.
6	37	Art.	Phthisis.	Four or five whiskies and four or five beers daily.
7	21	Sl. scl. of aorta.	Typhoid fever	Alcohol in moderation, but regularly.
8	35	Gen. art.	Ch. nephritis.	Four or five whiskies before breakfast.
9	21	Sl. art.	Typhoid fever.	One whisky every other day.
10	38	Sl. art.	Diphtheria, ch. nephritis.	Four to six beers daily; occasionally whisky.
11	31	Sl. art.		Two or three whiskies and four or five ales daily.
12	32	Art.		"Drinks considerably."
13	43	Sl. art.		Alcohol excessive.
14	30	Art. of aorta.		Two glasses of whisky a week and two beers daily.
15	43	Art. aorta.		Beer and whisky occasionally.
16	39	Art.	Typhoid fever.	Half pint whisky daily.
17	39	Art.	Typhoid fever.	Occasionally whisky.
18	40	Art.		Alcohol to excess.
19	44	Art.	Ch. nephritis.	Drank heavily of beer.
20	46	Art. of aorta.		Alcohol to excess.
21	34	Art.		Alcohol to excess.
22	46	Art.		Two or three whiskies and two beers daily.
23	46	Art.	Aortic regurg.	Alcohol moderate, but steadily for years.
24	25	Sl. art.		Alcohol in excess.
25	33	Scl. mitral curtain and aortic arch.		Alcohol in great excess.
26	37	Aortic scl.		Alcohol for last 10 years.
27	24	Coronary scl.	Ch. nephritis; scarlet fever.	Three or four beers daily; occasionally whisky.
28	42	Aortic scl.	Ch. nephritis.	Alcohol to excess.
29	43	Gen. art.	Phthisis.	Four or five beers daily.
30	48	Gen. art.	Ch. nephritis.	Alcohol considerable.
31	38	Gen. art.	Fatty deg. heart.	Diag. "alcoholism" (acute). Amt. of alcohol not known.
32	20	Art.	Typhoid fever.	Takes less than one drink a day (beer).
33	44	Gen. art.	Ch. nephritis.	Occasional glass of ale, gin or whisky.
34	29	Gen. art.	Aortic insuf.	Four beers daily.
35	41	Art.		Rum, three glasses week, year around.
36	42	Art.		Two or three bottles of ale a day.
37	39	Art.	Typhoid fever.	Drank lots of beer till year ago—four or five glasses a day—and "a certain amount of whisky."
38	40			No alcohol for last 13 years; before then 14 or 15 whiskies a week.
39	41	Art.	Smallpox.	Two or three beers daily; half pint of whisky a week, off and on.

In Cases 40 to 95 the record expressly states that the patient did not use alcohol.

Art.—Arteriosclerosis; ch.—chronic; sl.—slight; gen.—general; scl.—sclerosis; deg.—degeneration.

ANGINA PECTORIS AND ARTERIOSCLEROSIS.*

WILLIAM OSLER, M.D.

BALTIMORE.

In contrast to the many uncertainties relating to angina pectoris is the circumstance that in a large proportion of cases the attack is only an incident in the history of arteriosclerosis. Since Edward Jenner demonstrated postmortem disease of the coronary arteries, the association of a lesion of these vessels with the disease has been accepted as one of the best attested facts in cardiac pathology. Not that it has helped much to explain the mysterious nature of the pain of the attack, or all of the phenomena of the paroxysm. Pain in arteriosclerosis, as we see it in other parts, deserves a more careful study than it has yet received. In the head there is the association of migraine with arterial disease, the severe and characteristic headaches of arteriosclerosis and high pressure, and the agonizing pain in some cases of embolism of the cerebral arteries, more rarely in thrombosis. Abdominal pain is not often due to vascular disease, though there are cases in which, from the situation and intensity of the paroxysm it might rather be called angina abdominis than pectoris. There may be severe pain in lesions of the mesenteric arteries and in thrombosis of the iliac vessels in typhoid fever. It is in sclerosis of the arteries of the extremities that we meet with the most remarkable disturbances of sensation. The pain in embolism or thrombosis of the femoral or popliteal arteries is very intense, particularly at the site of the lesion. In the ordinary sclerosis, particularly of elderly persons, there may be, first, simple paresthesiæ, the numbness and tingling so commonly complained of; secondly, attacks of painful cramps, usually slight and nocturnal, or recurring paroxysms of extraordinary intensity and deserving the name of angina cruris more than intermittent claudication, which Walton has applied to it; thirdly, the pain, not always present, in intermittent claudication; fourthly, the paroxysms of pain with erythema, etc., the arteriosclerotic type of erythromelalgia.

But the pain in angina pectoris is *sui generis*, unlike in intensity any known variety, and while its association with coronary artery sclerosis is unquestionable, there is something additional, some other element for which, as yet, we have no explanation.

In relation to arteriosclerosis, there are four groups of cases of angina pectoris. First, the neurotic, in which in young persons all the symptoms of the disease may be present and death occur, and autopsy shows normal coronary arteries and neither local nor general disease of the arteries. Such cases are not common, but I have reported an instance in a young man of 28, who had had for years paroxysms of cardiac pain of the most agonizing form, who died in an attack.

Secondly, the angina pectoris of young men associated with syphilitic arteritis, aortic or coronary, or both. This is a very distinctive form, occurring usually in men under 35 years of age. There may be no general arteriosclerosis, but the lesion is either at the root of the aorta, or involves the sigmoid valves, or it may be confined to the coronary arteries. The anginal attacks, while severe, are sometimes relieved or even cured by the iodids. The paroxysms of pain may be the initial symptoms of aneurism of the first portion of the arch.

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Thirdly, the presenile cases, forming the great majority, in which the attacks are associated with coronary artery sclerosis as part of a widespread degeneration of the vessels. Hard work, mental more often than bodily, the stress and strain of modern life, excesses in diet and drink, are the factors most concerned, though why in individual cases angina should occur we can not say. There is another element, as yet unknown, since in only a very small proportion of cases of coronary artery sclerosis does angina occur.

Fourthly, the senile group. After 70 angina is a not infrequent manifestation, a sort of terminal event in the cardiovascular degeneration. Death often results from an attack, or there may be a series of paroxysms preceding a final breakdown.

THE TREATMENT OF ARTERIOSCLEROSIS.*

J. M. ANDERS, M.D., LL.D.

Professor of Medicine and Clinical Medicine in the Medical-Chirurgical College.
PHILADELPHIA.

To develop the subject of the treatment of arteriosclerosis in its principal bearings, it will be necessary first to subdivide the cases into etiologic categories, as follows: 1. Those due to toxic agencies in the blood, e. g., in chronic alcoholism, lead poisoning, diabetes mellitus, syphilis, gout, rheumatism and other infectious diseases. 2. Arteriosclerosis caused by the constant ingestion of an excess of either the carbohydrates or nitrogenous foods. 3. Cases dependent on constant hypertension, due to muscular overexercise, as in certain laborious occupations and violent competitive sports. 4. Aortic regurgitation, in which overfilling of the blood vessels is a concomitant; also exalted tension arising from ingestion of an excess of fluids, as in beer drinkers. 5. Cases due to senile degenerative changes.

With the two last-mentioned groups of cases I shall not deal at present writing, although many of the measures that will be recommended for arteriosclerosis originating in other ways tend to retard senile degeneration.

PROPHYLAXIS.

Prophylaxis should begin in early life, restraining enthusiasm, energy and pluck which lead to competitive efforts in the popular domain of athletics, and cripples the arterial system on which the individual must rely for work and usefulness in after life. Another consideration pertains to the regulation of the occupation, particularly during childhood and adolescence. On the detection of any discoverable, adequate cause for the arteriosclerosis, however, early in life the aim should be to counteract or overcome them, and at the same time bring into requisition certain hygienic measures for their favorable influence in improving the metabolic processes. Attention must be paid to the foodstuffs that furnish suitable products for both anabolism and catabolism. Oxidation, that most important chemical process in catabolism, by means of which decomposition of albumin, sugars and fats is accomplished with fixation of oxygen, is greatly favored by well-regulated, systematic muscular exercise. This is especially true of the fats, less so of the proteids. The maintenance of a complete nutritive equilibrium is a potent means of preventing those pathologic processes which

inevitably result in various forms of degeneration among which arterial changes are apt to be earliest manifested.

GENERAL TREATMENT.

In existing arteriosclerosis, each sufferer must be minutely investigated as regards the extent of the arterial changes, the tension of the pulse, condition of the heart, digestive functions and eliminative power of the kidneys.

Perhaps the majority of cases are dependent on gout. At all events it may be regarded as the type of the causative conditions mentioned under one and two; and in the etiology of individual cases two or more of these factors may be present together. Thus the use or abuse of alcohol plays a not unimportant rôle in the arteriosclerosis of gouty subjects.

HYGIENIC MEASURES.

In this class (due, as above mentioned, to toxic agencies which, in turn, are often dependent on faulty metabolism, acting as irritants of the blood) nothing is so vitally important as a suitable diet and régime. There is, however, no special diet suitable for all cases of gout; no dietetic rules universally applicable. When the metabolic processes are abnormal they vary with the individual cases.

It is highly probable that certain individuals are proof against overindulgence in foods and alcohol. At least, in my view, the amount of aliment that can be ingested without apparent pathologic effects differs within almost inconceivable limits in different persons. On the other hand, when there is distinctly marked evidence either of gormandizing or mere overeating of either the carbohydrates or the more concentrated nitrogenous articles of diet, in gouty individuals we find that a careful regulation of the patient's dietary is obviously helpful. Such subjects, in addition to manifesting gouty features, are, as a rule, plethoric, robust and often inclined to corpulency, and a rigid system of living must be enjoined. A suitable and oftentimes a considerable restriction in the amount of food is a prime requisite. Both fat-forming and urea-producing foods must be lessened, as a rule.

It is highly probable that urea, which is so irritating to the kidneys, acts similarly on the coats of the blood vessels. Again, granular kidneys are a not uncommon concomitant of arteriosclerosis, and when present demand a special diet.

Per contra, spare subjects, whose general tone is low and who are afflicted with arteriosclerosis, require a more generous diet, embracing a liberal allowance of fat-producing foods.

Time and space will not permit me to enter into details concerning a podagric dietary, but broadly speaking, permissible articles of food are: Whole milk, eggs, butter, succulent vegetables, fruits (except strawberries, bananas and tomatoes) and farinacea.

Of animal substances, oysters, fowl and fish (except those that contain much protein, as salmon, mackerel, smoked herring, halibut, salt codfish, flounders, canned sardines, and the like) may be partaken of, while beef and mutton are to be employed, although cautiously. Mohr and Kaufman have shown that the nitrogen excretion is quite as good for the dark as the light meats. Respecting animal food, it may be said that it is beneficial rather than harmful if taken in moderate, suitable quantity.

In the gouty subjects, certain waste products, as uric acid and urate of soda, are retained in the system because too little fluid is taken to hold them in solution

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