Atherosclerotic Popliteal Aneurysm in a Man Thirty-five Years Old
Report of a Case

By Ray W. Gifford, Jr., M.D., Thomas W. Parkin, M.D., and Joseph M. Janes, M.D.

This case of atherosclerotic aneurysm of the popliteal artery is of interest because the patient was a man 35 years old and because the condition was discovered only because palpation of the peripheral arteries was included as a part of routine examination. Only after the aneurysm had been found was a history of intermittent claudication elicited. The indications for the surgical treatment of popliteal aneurysms are discussed.

The following case is of interest because we have been unable to find in the literature any report of an aneurysm of proved atherosclerotic origin occurring in the popliteal artery of a patient as young as 35 years.

REPORT OF CASE

A white man, 35 years old, registered at the Mayo Clinic concerned chiefly about a lump on his right testicle which he had noted six months previously. Examination of this lump revealed it to be a small spermatocoele.

During the physical examination, an aneurysm of the right popliteal artery was noted. Only upon direct questioning did the patient then disclose that for the previous 10 years he had experienced a sensation of numbness in the anterior portion of his right leg when walking. If he continued to walk, the entire leg would feel full and tight, and on several occasions he had had to stop because of this distress. He was not sure, however, whether cessation of walking actually would relieve this discomfort. The story was somewhat atypical, so far as intermittent claudication was concerned. The patient had no complaints referable to the left leg.

Physical examination disclosed nothing abnormal except for an aneurysmal dilatation of the right popliteal artery, which was about 3 or 4 cm. in diameter. An arterial pulsation was readily palpable in the left popliteal space. Both femoral arterial pulsations were normal. The pulsation of the right posterior tibial artery was graded 2 (on the basis of 1 to 4); that of the left posterior tibial artery, 3. No pulsations were evident in either of the dorsalis pedis arteries. Both legs and feet were of normal color. The feet were cool to the touch. There was no pallor on elevation of the lower extremities, nor was there any delay in venous filling. The patient was asked to walk in the corridor; after such exercise he experienced distress in his right calf. At this time, the pulsation in the right posterior tibial artery was absent. After the patient had stood for two minutes, the distress in the calf disappeared and the right posterior tibial arterial pulsation was again present.

Results of routine laboratory studies, such as urinalysis, value for hemoglobin and number of leukocytes, were normal. Reaction of a serologic test (Kline) for syphilis was negative. A roentgenogram of the thorax disclosed nothing abnormal.

The content of cholesterol in the plasma was 190 mg. per 100 cc.; for cholesterol esters the value was 120 mg. per 100 cc. of plasma; for fatty acids, 342 mg. per 100 cc. of plasma; and the value for total plasma lipoids was 532 mg. per 100 cc., all within the range of normal values.

Six days later, bilateral femoral arteriography was performed by one of us (Janes), with the aid of a 35 per cent solution of iodopyracet (Diodrast). Roentgenograms revealed a sacculated aneurysm of the right popliteal artery (fig. 1a) and an apparently occluded left popliteal artery (fig. 1b). An abundant collateral circulation was noted in the region about the occluded left popliteal artery, however.

On the day after arteriography, Dr. C. S. MacCarty, of the Section of Neurologic Surgery, performed a right lumbar sympathectomy and trunk resection.1 With an anterior flank, S-shaped incision, the lumbar sympathetic chain was approached retroperitoneally through a muscle-splitting incision, and four lumbar ganglia and the intervening chain were removed. The patient was then turned face downward and the right popliteal aneurysm was extirpated by one of us (Janes). A longitudinal incision was made over the popliteal...
FIG. 1. Bilateral femoral and popliteal arteriograms: (a) lateral roentgenogram, showing a sacculated aneurysm of the right popliteal artery; (b) lateral roentgenogram, showing an apparently occluded left popliteal artery with abundant collateral circulation about the occluded artery.

FIG. 2. Gross appearance of the saccular aneurysm, showing a central cavity partially filled with a loosely organized blood clot.

The aneurysm was 3 cm. in diameter and contained a laminated clot (fig. 2). Microscopic examination of the wall of the aneurysmal sac revealed atherosclerotic plaques and disruption of muscular and elastic layers (figs. 3a and b).

COMMENT

Several authors have reported aneurysms occurring in patients in the fourth decade of life, but all of the lesions in such cases have been considered to be of syphilitic origin.

Harley reviewed 35 cases in which popliteal aneurysm was seen at Guy's Hospital from 1836 to 1893. The ages of the patients ranged from 25 to 75 years, and averaged 37 years. Pathologic data concerning these aneurysms were not reported. On a clinical basis, most of them were believed to be traumatic in origin, and in only five were there evidences of arteriosclerosis. The ages of the five patients were not mentioned.
Linton reported on 42 patients who had popliteal aneurysm, 74 per cent of which were considered to be atherosclerotic. The age range of the patients with atherosclerotic aneurysms was 43 to 82 years, and the average was 65 years.

Kimpton and Sanderson performed aneurysmorrhaphy on popliteal aneurysms of two men, 27 and 34 years old. In both, the results of serologic tests were negative, but apparently no tissue was examined by the pathologist to determine the exact causation of these aneurysms.

In a group of 69 patients with 100 popliteal aneurysms recently reported on by Hines and two of us (Gifford and Janes), the ages ranged from 17 to 88 years, and averaged 63 years. The 17 year old patient had an aneurysm that resulted from a gunshot wound in the popliteal space. The youngest patient in whom there was confirmation by the pathologist of an atherosclerotic aneurysm was 42 years of age.

From the history of the patient reported on herein, it is difficult to determine how long the aneurysm had been present. Since the age of 25 years he had had pain in the right leg when walking. At the time of our examination, we observed that the pulsation in the right posterior tibial artery temporarily disappeared when the pain was induced by having the patient walk. When the patient stopped walking, the pulsation in this artery returned and the pain disappeared. These are the classic findings in so-called arteriospastic intermittent claudication. Gage has postulated that the mere presence of an arterial aneurysm may, by irritation of the periarterial sympathetic nerves, produce spasm in the surrounding arterial tree. This may explain the finding of arteriospastic intermittent claudication in the patient we report on, and possibly could be taken as evidence that the aneurysm had been present for 10 years. It is readily recognized, however, that "arteriospastic" intermittent claudication is by no means pathognomonic of arterial aneurysm, and that it is indeed much

Fig. 3(a). Longitudinal section of aneurysmal sac, showing disruption of vessel wall (elastic van Gieson's; X10); (b) section through aneurysmal sac showing diseased arterial wall with atherosclerotic plaques containing cholesterol crystal clefts: note disruption of muscular and elastic layers (elastic van Gieson's; X60).
more frequently seen in the presence of atherosclerosis of the peripheral arteries without aneurysms.

On rather circumstantial evidence we can speculate that our patient also has an aneurysm of his left popliteal artery, and that the artery has become occluded by a thrombus. The arteriogram of that artery demonstrated definite occlusion, with a very adequate collateral circulation. Since in 45 per cent of patients with popliteal aneurysms the condition is bilateral, and since occlusion by thrombosis is the commonest complication of popliteal aneurysms, it is reasonable to suppose that there is also an aneurysm of the left popliteal artery which we were unable to demonstrate clinically.

It is interesting to consider that the patient was entirely unaware of the pulsating mass behind his right knee. Only careful physical examination disclosed it. The importance of the physical examination in the diagnosis of popliteal aneurysm cannot be overemphasized. Ninety-eight of 100 popliteal aneurysms were first detected by palpation of the popliteal space. Symptoms are absent in about a third of cases, which means that many aneurysms will be overlooked unless palpation of the popliteal space is included in every examination.

Surgical treatment of the aneurysm was advised in this case. Surgical treatment should be carried out in all cases when the operative risk is not prohibitive, because of the serious prognosis if the aneurysm is not removed. In the follow-up study of Hines and two of us (Gifford and Janes), approximately 23 per cent of legs with untreated popliteal aneurysms eventually had to be amputated, while only 8 per cent of legs were lost after surgical removal or obliteration of aneurysms.

**Summary**

A case in which a 35 year old man had an atherosclerotic aneurysm of the popliteal artery has been reported. As far as we can determine, this is the youngest patient ever reported in whom this diagnosis has been confirmed by the pathologist.

The importance of the physical examination in the diagnosis of popliteal aneurysms is emphasized and a plea is made for routine surgical treatment of these aneurysms because of the poor prognosis without treatment.

**SUMARIO Español**

Se informa el caso de un hombre de 35 años de edad con un aneurisma ateroesclerótico de la arteria poplítea. Por lo que nosotros podemos determinar, este es el paciente más joven en el cual el diagnóstico ha sido confirmado por el patólogo.

La importancia del examen físico en el diagnóstico de aneurismas de la arteria poplítea se enfatiza, y se insta a tratar estos casos quirúrgicamente debido al pronóstico pobre que existe sin tratamiento.

**REFERENCES**


Atherosclerotic Popliteal Aneurysm in a Man Thirty-five Years Old: Report of a Case
RAY W. GIFFORD, JR., THOMAS W. PARKIN and JOSEPH M. JANES

Circulation. 1954;9:363-366
doi: 10.1161/01.CIR.9.3.363

Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 1954 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/content/9/3/363

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation is online at:
http://circ.ahajournals.org//subscriptions/