

Femoral anastomotic false aneurysm.

Ethiologic and therapeutic patterns

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Anastomotic pseudoaneurysm in the crural region, following arterial reconstructive surgery with femoral anastomosis, is a well known vascular surgery complication.

The elimination of some of the causes that determined its appearance, such as the use of biologic material for the anastomotic suture execution and the improvement of the currently usable prosthetic material, have reduced, in this last decade, its incidence to a large degree. (From 16.9 - 19% to 4.8 - 6%)^{2 5 10 11}.

Regardless to the etiologic factors the pathologic evolution of the lesion is always the same: the loss of the anastomotic suture line integrity determines blood loss with hematoma formation, which is partly lized and partly organized, due to a connective tissue growth, whose lumen is kept in direct communication with the artery where the anastomosis was performed, (pseudoaneurysm).

In this article we report the incidence of this pathology in our experience and discuss the etiology, the therapeutic patterns and the results which we obtained.

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Clinical material

Following 785 arterial reconstructive surgery using an aorto-bifemoral by-pass and 67 femoro-popliteal by-passes performed between January 1967 and January 1980 in our Institute we observed 42 subjects affected by femoral anastomosis pseudoaneurysm.

In other 2 cases the primitive surgery was performed in another hospital. The total of patients is 44 (43 M - 1 F), whose ages ranged between 42 and 76 years, with 55 anastomotic suture aneurysms, 9 of which were bilateral and 2 were recidivo.

Considering the surgery performed in our Institute, the incidence of the lesion is 6,2% calculated on the number of surgical cases and 3.25% on the total number of surgical cases of the femoral anastomoses (tab. I).

The period of time between diagnosis and primitive surgery varies from 2 months and 7.5 years, with an average percentage of 28 months.

A pseudoaneurism took place 54 times following prosthetic material graft and once following autologous saphenous vein graft. One patient also presented anastomotic deiscence proximally.

In all the cases non absorbable suture material was performed during primitive surgery (dacron, prolene).

In 2 patients the reintervention was performed under extremely emergent conditions due to fissuration of the pseudoaneurysmatic lesion. In 20 cases (36%) local infection signes were evidenced either preoperatively (13 cases with local pain and reddishment) or during surgery (7 cases with infected material in the aneurismal sac).

TABLE I.
Lesion incidence.

Primitive surgical procedure	N.	Pseudo aneurysms	Percentage
Aorto-bifemoral by-pass	785		6,2% on total surgical procedures
Femoro-popliteal by-pass	67	53	3,2% on total femoral anastomoses
Total	852		

TABLE II.
Corrective surgical procedures:
aneurysmectomy +.

Graft interposition	23	43,4%
Patch on the anastomosis	9	16,9%
New direct anastomosis	1	1,8%
Graft removal	5	9,4%
Graft removal + trans obturator popliteal reconstruction	11	20,7%
Graft removal + axillo-bi-popliteal by-pass	2	7,5%

The appearance of the lesion in these occasions was earlier, varying between 2 months and 3 years from primitive surgery, with an average of 15 months.

The micro-organisms that developed in the material cultured were: staphylococcus aureus, streptococcus, proteus and mixed flora.

Treatment and results

Two patients in whom the lesion, having the size of a nut, was diagnosed after 4 and 6 years from primitive surgery respectively, and that did not give any signs evolution, did not undergo surgical correction and are being checked periodically.

In 53 cases corrective surgery took

place. Table two shows the techniques used.

The most widely used technique (23 cases) was aneurysmectomy with graft reconstruction (dacron knitted velour), 15 times with an end to side anastomosis and 8 times with an end to end anastomosis in the femoral region.

In 10 cases aneurysmectomy with direct suture was performed (1 case) or with a patch (9 cases).

In the cases that presented with typical signes of infection (20 cases) the aneurysmectomy was followed by complete removal of the infected graft.

In 5 cases peripheral reconstruction was not possible due to the absence of a sufficiently valid run off.

A new prosthesis was inserted at the level of the popliteal artery 11 times, with passage through a non infected territory crossing the obturator foramen.

An extra-anatomic bypass from the axillary artery to the popliteal arteries was performed twice because of the presence of an infected bilateral pseudo-aneurysm that extended throughout the graft.

After surgery 4 deaths occurred due to myocardial infarction, uncontrollable sepsis, renal insufficiency and gastroin-

testinal hemorrhage respectively. This last case was secondary to and acute fistula between the graft and the duodenum due to the spreading of infection from the aortic anastomosis.

2 patients in which no reconstruction was possible were amputated in the third and tenth day following the removal of the infected graft due to the appearance of severe peripheral ischemic lesions.

Of the remaining 38 patients 9 died due to causes not related to surgery and 21 are periodically followed in our clinic.

Table III shows the results following surgery.

TABLE III.
Results.

Corrective surgery	53
Favorable	47 (88,6%)
Postoperative deaths	4 (7,5%)
Amputations	2 (3,7%)

Discussion

The physical signs of a pulsing tumescence in the crural region, which dimensions vary, from case to case, from those of a nut to those of a grapefruit, have brought all our observations to the diagnosis of the lesion.

The clinical symptomatology such as local pain or tenderness or showing compression of the adjacent structures (vein, nerve) accompanied the presence of infection of the soft tissues surrounding the lesion (13 cases) or the fissuration of the pseudoaneurysm (2 cases).

Translumbal aortography was performed in 35 cases not in order to obtain a diagnostic confirmation, but for the purpose of studying the aortic ana-

stomosis, to rule out the association of a high anastomosis deiscence and to assess the arterial situation distally to the lesion.

This study was practically useful in order to decide the type of reconstruction in the distal territories.

An etiologic interpretation was only possible in those cases in which the loss of integrity of the suture line was due to bacterial causes, in presence of typical local infection signs. It is however certain that such an etiology, even in absence of clear cut inflammatory signs, cannot be ruled out completely³.

To confirm this statement we have observed 2 patients in which a local reconstruction was performed since there was no sign of infection, following 4 and 6 months primary surgery respectively, they developed again pseudoaneurismatic lesion. These patients presented with inflammatory signs at later stage and this etiology, not diagnosed during the first surgery, is presumed to have been responsible of the lesion.

There are however other factors that may play a rule in the etiology of mentation and to the formation of a pseudoaneurysm².

The early appearance may be consequent to a faulty technique in the anastomosis execution. The use of biologic material (silk) which we abandoned many years ago, lead to a possible fragmentation and to the formation of a pseudoaneurysm².

The current use of synthetic material (dacron, prolene) has almost totally eliminated these factors as an etiologic cause¹¹.

One must not damage the suture thread however during execution with manipulations that may weaken its re-

sistence and thus lead to its fragmentation.

Artery degeneration where the anastomosis is performed, due to atherosclerosis evolution, or due to an endoarterectomy performed during surgery, may lead to a weakening of its wall that predisposes to a breakage of the suture line¹.

Ample dissections of the periavventitial connective tissues, that often occur following repeated surgery in the same location, contribute to determine the devascularization of the arterial wall with possible local necrosis that lead to anastomotic deiscence^{1 11}.

« Mechanical causes » may play a role in determining the lesion. The positioning of the graft under tension⁴, direct or indirect trauma to the suture line and forced movements of the graft in the proximity of an articulation are regarded as such^{7 9 10}.

Certainly an important mechanical stress is arterial hypertension⁸.

One must also consider the importance of a proper flow hemodynamic at the level of the anastomosis⁶. The high incidence angle of an end to side anastomosis generate a remarkable turbulence that is reflected into an increase of lateral pressure at the level of the anastomosis itself⁵.

We therefore tried to individuate the causes that could be responsible of the appearance of the pseudoaneurysms we observed.

In 9 out of the 20 infected cases, during the post-operative course following primitive surgery, healing problems of the surgical wounds presented, due to the presence of a subcutaneous hematoma or linforrhea or superficial cutaneous inflammation.

It is therefore certain that these causes play a strong leading rule in the following infection of the graft.

In 23 out of 35 cases where no inflammatory signes were present, a femoral endoarterectomy was performed and in 5 of these cases reintervention was necessary due to branch obliteration where the pseudoaneurysmatic lesion later on developed.

An hypertensive state, uncontrolled pharmacologically, was found during the diagnosis in 31 out of 44 observed patients.

It is anyhow likely that very often the lesion is not caused by a single factor but by the interreaction of many different causes^{4 8 11}.

We feel that in those cases in which the pseudoaneurysm occurs years after primitive surgery, and which dimensions do not exceed 2.5 cm., in absence of inflammatory signes, corrective surgery can be reserved only in those cases where the lesion shows an evolutionary tendency. Such conservative attitude was chosen in 2 cases.

On the contrary when facing an earlier lesion or a lesion of pretty dimensions or with an evolutionary tendency, and, obviously, when infection is suspected, therapy must be surgical.

Surgery must not be delayed in time due to the terrible complications which, together with all the ordinary aneurysms, the lesion may evolve into.

In those cases in which no signs of infection are present, reconstruction may occur in situ.

If there is suspicion of infection, or if this is clear, aneurysmectomy must be followed by removal of the infected graft.

Whenever possible the reconstruction of the prosthesis must be perform-

ed in a non-infected territory distal to the lesion. With the impoiment of these methods pseudoaneurysms in the femoral region can be corrected with great success possibilities.

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