

## CASE REPORT

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### A SUCCESSFUL EMBOLIZATION OF A VERTEBRAL ARTERIOVENOUS FISTULA

*João Martins Pisco and Erich Lang*

Department of Radiology, Louisiana State University Medical School., U.S.A.

#### SUMMARY

Selective arterial embolization of arteriovenous fistula has been used as an alternative approach to surgical repair.

In one case that was twice surgically treated without success, catheter embolization was performed with good result. Our case offers additional proof of the efficacy of this form of treatment.

As both congenital (AVM) and acquired arteriovenous malformations (fistulas) may cause congestive heart failure and aneurysm formation, they should be repaired. The surgical management of a traumatic arteriovenous fistula (AVF) is the surgical division of the fistula and primary repair of the involved artery and vein<sup>1</sup> or the ligation of the main feeding and draining vessels.<sup>2</sup> The anatomic location of an AVF and its extent, may make surgical repair hazardous and difficult. In such cases, nonsurgical arteriographic embolization techniques may be used to clog such AVF.<sup>1</sup>

Various materials have been used for therapeutic embolization such as Gelatin (Gel foam), polyvinyl alcohol (Ivalon), autogenous cloths, muscle, detachable balloons, silastic beads,<sup>3</sup> steel tubing to which are attached cotton or wool threads,<sup>4</sup> nylon brushes with a stainless steel<sup>5</sup> and stainless-steel pellets or coils.<sup>6</sup>

#### *Case*

This is a 25 year old black male who suffered a knife wound on the left side of his neck. He was admitted to the accident room on shock and there was some blood loss. A wound of about 3 cm was to be seen on the left side of the neck. A thrill could be felt and a systolic-diastolic murmur was heard on the upper third of the left cervical region.

A left vertebral arteriogram done at the time showed an arteriovenous fistula. The left vertebral artery distal to the fistula was never visualized. The flow within the left vertebral artery was very high and all the contrast medium entered the venous system. The patient was explored and the left vertebral artery was ligated. On recovering the patient referred a *Pulsatile noise* in the left ear. On physical examination the previous thrill and the systolic murmur were still present, and the pulse rate was 90 per minute.

The patient was reexplored and the ligation of the vertebral artery was performed at its middle third, at a lower level than previously. The early symptoms and signs persisted as before.

A repeated left vertebral arteriogram was done through right axillar approach, using a n.º 6 French H 1 catheter. Early during the injection of contrast media there was extensive filling of the venous cervical plexus, through extensive collateral circulation and the vertebral artery hardly could be visualized (Fig. 1, 2). Subsequent to that, embolization of the vertebral artery was done, using two wire coils and *gelfoam*. In the meantime the patient referred that the *pulsatile bruit* had disappeared. An injection of contrast was then done through the catheter and the initial segment of the vertebral artery could be visualized, though the cervical veins had no further visualization (Fig. 3, 4). The previous thrill and murmur were not present any longer.

In the following days, the patient complained of some discomfort on the left side of his neck which resolved.

One week later the patient was discharged without any symptoms or signs. The patient has been followed in out-patients clinic for one year without any symptoms or signs. A control radiograph of the neck showed the two metallic wire coils in situ.

Angiography was not repeated since he is completely asymptomatic.



Fig. 1 — Subtraction of left vertebral arteriogram (lateral view) — Metallic clips from previous surgical ligation of the vertebral artery. Cervical venous plexus visualized through extensive arterio-venous communication. The left vertebral only visualized proximally to the fistula.

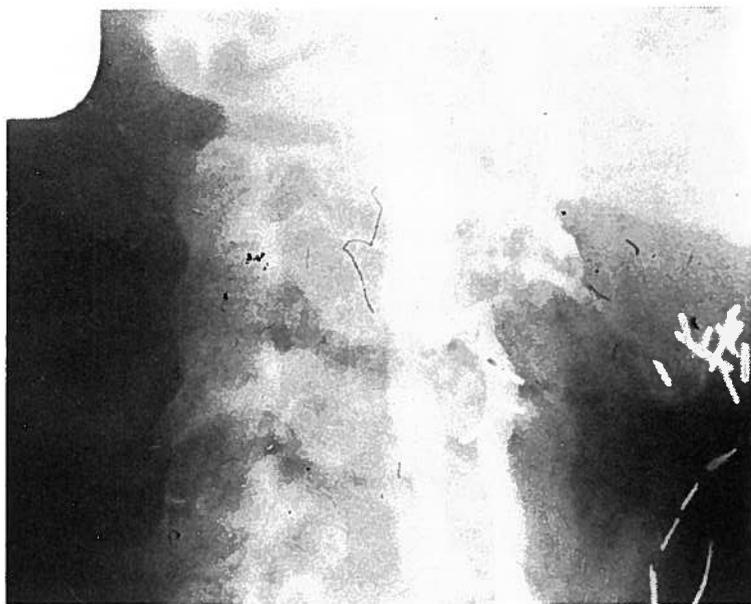


Fig. 2 — Left vertebral arteriogram (oblique view). Cervical veins visualized through arteriovenous fistula. The left vertebral only visualized proximally to the fistula.

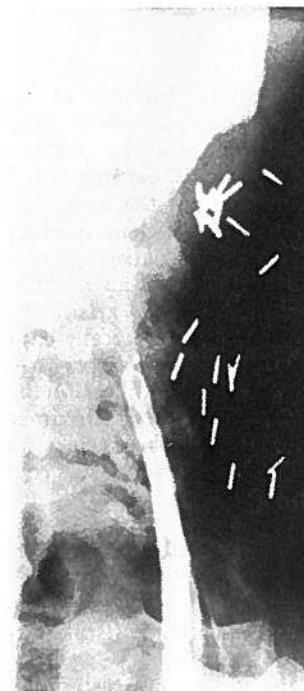
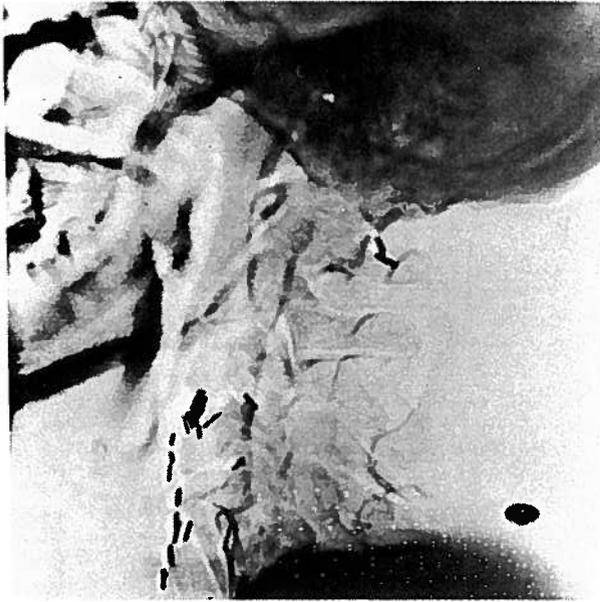


Fig. 3 — Left vertebral arteriogram after embolization. Lower segment of the vertebral artery well opacified; 2 metallic coils are visualized in the artery. Cervical veins no longer visualized.



*Fig. 4 — Subtraction of a late phase of the left vertebral arteriogram. Two wire coils are visualized in the artery. Some arterial branches are visualized posteriorly.*

## DISCUSSION

The clinical findings of an AVF are the thrill, bruit and increased heart rate. High-output cardiac failure occurs in approximately 20% of the AVF cases and is directly related to the size of the involved artery and fistula;<sup>1</sup> such rate is in the inverse ratio to the distance between the AVF and the heart.<sup>7</sup> AVF should be repaired either to prevent or to treat the hemodynamic effects.

In cases in which surgical repair is technically difficult, catheter embolization may be used as an alternative approach sometimes with better results.

After ligation of an AVM or AVF there is a propensity to reconstitute the flow through the collaterals arising from the artery.

Our case was surgically explored twice and the feeding artery was unsuccessfully ligated. The ligation was performed at the level of the middle third of the vertebral artery. Such a permeabilization of the fistula may be explained due to the development of collateral circulation, proximately to the ligated point.

Once the vertebral artery was embolized at lower level, below the origin of most of the branches, those vessels could no longer carry any blood, and the fistula was not permeabilized.

## RESUMO

A embolização de fistulas arteriovenosas tem sido usada como uma alternativa do tratamento cirúrgico.

Apresenta-se um caso de uma fistula artério-venosa vertebral que foi explorada

cirurgicamente por duas vezes sem sucesso. O nosso caso, que foi eficientemente tratado por embolização efectuada através do catéter, comprova a eficácia desta nova forma terapêutica.

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Address for reprints: João Martins Pisco  
Serviço de Radiologia  
Hospital de Santa Marta  
Lisboa-Portugal.