

RUPTURE OF ANASTOMOTIC PSEUDOANEURYSM OF BRACHIOCEPHALIC ARTERIOVENOUS FISTULA: A CASE FROM WEST JAVA

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ABSTRACT

Background: Post-traumatic pseudo aneurysm development is very rare in the peripheral arteries and is generally a late sequela of trauma. Their diagnosis and surgical treatment are extremely important, because they can cause severe disability, including loss of upper extremity and hand. **Objective:** To describe the clinical presentation, intervention, and outcome of ruptured anastomotic pseudoaneurysm of brachiocephalic arteriovenous fistula which has undergone surgical procedure. **Methods:** A 29-years-old man presented with arm swelling and extreme pain in his right arm since 3 days ago. He had undergone AVF procedure 3 weeks ago. His right arm was accidentally squeezed by his mother 1 week after surgery had been done. This patient underwent operation with general anesthesia. Proximal control was taken by tourniquet that maintained to inflate at 300 mmHg. The brachial artery is repaired using great saphenous vein patch plasty. **Results:** Patient's postoperative course went well and there was no sign of complication, such as ischemia. Arm swelling were reduced after 2 weeks follow up. **Conclusion:** In our center, most of the cases of brachiocephalic AVF pseudoaneurysm are caused by trauma. MSCT angiography is sufficient for the diagnosis of this anomaly. All cases were managed by open surgery and resulted a good outcome.

Keyword: Pseudoaneurysm, brachiocephalic arteriovenos fistula, vein patch plasty

ABSTRAK

Latar belakang: Perkembangan pseudo-aneurisma pasca trauma sangat jarang terjadi pada arteri perifer dan umumnya merupakan gejala sekuel dari trauma. Diagnosis dan terapi bedah dari keadaan tersebut sangatlah penting, karena dapat menyebabkan kecacatan, termasuk kehilangan ekstremitas atas dan tangan. **Tujuan:** Mendeskripsikan gambaran klinis, intervensi, dan luaran dari ruptur pseudo-aneurisma anastomotik dari fistula arteriovenosa brakiosefalika yang telah menjalani prosedur pembedahan. **Metode:** Seorang pria 29 tahun mengalami pembengkakan lengan dan mengeluhkan rasa sakit yang luar biasa di lengan kanannya sejak 3 hari yang lalu. Pasien telah menjalani prosedur AVF 3 minggu lalu. Lengan kanannya secara tidak sengaja diremas oleh ibunya 1 minggu setelah operasi dilakukan. Pasien kemudian

menjalani operasi dengan anestesi umum. Kontrol proksimal dilakukan menggunakan tourniquet yang dipertahankan untuk memberikan tahanan sebesar 300 mmHg. Arteri brakialis diperbaiki dengan *vein patch plasty* dari vena safena magna. **Hasil:** Perjalanan pasca operasi pasien berjalan dengan baik dan tidak ada tanda-tanda komplikasi, seperti iskemia. Pembengkakan lengan berkurang setelah 2 minggu *follow up*. **Kesimpulan:** Pada senter kami, sebagian besar kasus pseudo-aneurisma AVF brakiosefalika disebabkan oleh trauma. Angiografi MSCT cukup untuk mendiagnosis anomali tersebut. Semua kasus ditangani dengan operasi terbuka dan memberikan hasil yang baik.

Kata kunci: Pseudoaneurisma, fistula arteriovenosa brakiosefalika, *vein patch plasty*

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INTRODUCTION

Post-traumatic pseudoaneurysm development is very rare in the peripheral arteries and is generally a late sequela of trauma. The frequency of peripheral artery pseudoaneurysms is lesser in the upper extremities as compared to the lower extremities.¹ Their diagnosis and surgical treatment are extremely important, because they can cause severe disability, including loss of upper extremity and hand. Peripheral artery pseudoaneurysms in distal locations, particularly in the brachial artery with localization at the forearm, cause thromboembolic complications in the hands and fingers.²

Anastomotic pseudoaneurysm is an emergency and must be repaired immediately. Brachiocephalic AVF

pseudoaneurysm imposes severe technical challenges due to severe adhesion. Brachial artery ligation might threaten the hand; therefore, brachial artery repair must be done. Here we reported a case to describe the clinical presentation, intervention, and outcome of ruptured anastomotic pseudoaneurysm of brachiocephalic arteriovenous fistula which has undergone surgical procedure, in Sentral Medika Hospital Cisalak, West Java, on June 29, 2020.

CASE REPORT

A 29-years-old man presented with arm swelling and extreme pain in his right arm since 3 days ago. He had undergone AVF procedure 3 weeks ago. His right arm was accidentally squeezed by his mother 1 week after the surgery had been done. After

thorough physical examination the patient was diagnosed with a ruptured anastomotic pseudoaneurysm of brachiocephalic arteriovenous fistula.

This patient then underwent operation using general anesthesia (Figure

On the other hand, we also discovered that the brachial artery was sub-totally ruptured and seemed salvageable, hence, we opted to do a Vein Patch Plasty



Figure 2. Great saphenous vein harvesting (left). Vein patch plasty. (Green arrow indicates great saphenous vein) (right)

Patient's postoperative course went well and there was no sign of complication, such as ischemia. Arm swelling were reduced after 2 weeks follow up.

DISCUSSION

Pseudo aneurysms result from disruption of a vessel wall continuity resulting in bleeding into the surrounding tissues and circulating blood being contained in a cavity surrounded only by adjacent tissues, fascia, and thrombus but

1). During operation we discovered that the anastomosis was infected, causing the vein to be fragile. Additionally, the ruptured vein was irregularly shaped making the AV shunt anastomosis too far gone to salvage (Fig 2).

procedure using Saphenous Vein Graft (SVG) to repair the brachial artery (Figure 4).

not by normal arterial wall components as in true aneurysms.

Frequency of pseudo aneurysms in the upper extremities is much lower than that in the lower extremities.¹ If the only causal factor is trauma, the aneurysm takes a form of a pseudoaneurysm.³

Most traumatic arterial pseudoaneurysms are usually caused by blunt trauma.⁴ Minor blunt trauma may cause pseudo aneurysms in patients who are prone to haemorrhage.^{5,6} In our case, the

patient suffered a minor blunt trauma due to his mother accidentally squeezing his arm only 1 week after an AVF procedure. Considering the fact that maturation process following these procedures took approximately six to 12 weeks, this seemingly minor accident may have caused a rupture.⁷

In this case, the patient underwent an open surgical operation using general anesthesia. If the procedure is for a lesion in a noncritical distal vessel and does not cause severe ischemia, or if it is clear that the collateral circulation will be sufficient after ligation, then distal and proximal ligation and resection of the pseudoaneurysm can be performed.⁸ Aneurysms, or in this case a pseudoaneurysm, situated in larger branches, such as the brachial artery (which is convenient for graft interposition), can be treated by resection of the diseased part and end-to-end anastomosis or with graft interpositioning.⁸⁻¹⁰

Previous study by Luther et al., stated that pseudoaneurysm in the peripheral arteries carries a favorable prognosis if treated by surgical repair at the early instance. Their study showed that reverse saphenous vein grafting has the best conduit for repair. They also recommend to use excision and ligation as a treatment of choice for infected arterial pseudoaneurysms.¹¹ There was a rapid

progress in endovascular technique. Many reports used endovascular technique to treat femoral,^{12,13} popliteal,^{14,15} tibial^{16,17} pseudoaneurysm, and arterio-venous malformations.¹⁸ However, there was no evidence that showed a successful endovascular management on treating anastomotic pseudoaneurysm in the peripheral artery especially in brachial artery. Further, Biebl et al. reported their patient with traumatic pseudoaneurysm of the brachiocephalic artery that underwent endovascular stent graft repair initially had been failed. Their patient had to be extended to open reconstruction of the brachiocephalic artery to exclude the pseudoaneurysm.¹⁹

To maintain arterial continuity and to save the extremity, most pseudoaneurysms of the upper extremity, especially of the brachial region, should be treated with reconstruction using saphenous vein interposition.³ AVF with pseudoaneurysm which has not ruptured and without infection, an attempt should be made to salvage fistula and to repair the artery.²⁰ During operation we found that the vein was infected causing the tissue too friable to repair. On the other hand, the brachial artery was only partially (subtotal) ruptured and seemed salvageable. For these reasons, we opted to use saphenous vein graft to repair the artery.

CONCLUSIONS

Although rarely occurred, due to its possible fatal complication, a post-traumatic pseudo aneurysm in the peripheral arteries must be promptly diagnosed and treated. In our center, most of the cases of brachiocephalic AVF pseudoaneurysm are caused by trauma. MSCT angiography is sufficient for the diagnosis of this anomaly. All cases were managed by open surgery and resulted a good outcome.

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