Posttraumatic Pseudoaneurysm of Internal Carotid Artery: Endovascular Treatment: Case Report

Milena P. Roganović1, Luka B. Borovinić1,2, Aleksandar M. Vulić3, Olga G. Davidović Vulić4, Nikola V. Jovičević5, Damir N. Peličić2,6

1 Clinic for Neurosurgery, Clinical centre of Montenegro, Podgorica, Montenegro
2 Faculty of Medicine, University of Montenegro, Podgorica, Montenegro
3 Center for vascular surgery, Clinical centre of Montenegro, Podgorica, Montenegro
4 Clinic for anesthesiology and resuscitation and pain therapy, Clinical centre of Montenegro, Podgorica, Montenegro
5 Clinic for Neurosurgery, Clinical centre of Serbia, Belgrad, Serbia
6 Center of science, Clinical centre of Montenegro, Podgorica, Montenegro

SUMMARY

Introduction: The occurrence of Internal Carotid Artery (ICA) pseudoaneurysm after trauma is rare. According to the literature, most cases of ICA pseudoaneurysms were associated with vehicle accidents and males were most affected. The treatment of traumatic ICA pseudoaneurysm (TICAP) with open surgery poses excess risk, thus endovascular treatment strategies have been applied during last decade.

Case report: In this manuscript, we presented a patient, a twenty-year-old young man who was injured in a traffic accident and was admitted to the Clinical Center of Montenegro. After the, the final angiographic control showed the symmetry of the arterial and venous timing in both hemispheres of the brain. The patient was discharged from the hospital seven days after the endovascular procedure and did not complain of further bleeding episodes or any neurological deficit during the 24-month follow-up.

Conclusion: CTA or MRA are commonly used imaging modalities to evaluate aneurysm involving carotid arteries, but gold standard tool is digital subtraction angiography. Given our case experience, trauma patients who have persistent epistaxis associated with a midface fracture must be monitored for a longer postoperative period.

Keywords: Pseudoaneurysm, Epistaxis, Endovascular Treatment
origin, size and localization of the pseudoaneurysm. Reason for delayed epistaxis could be attributed to the time taken for the arterial pulsatile pressure to weaken the injured vessel wall and erode through the sphenoid sinus. In pseudoaneurysm is a lack a true wall, so, the size of the sac would also usually increase with time [8,9]. Therefore, a high index of suspicion diagnosis for this condition is warranted. Carotid angiography is gold standard. CT angiography is rapid and non invasive method for detecting a pseudoaneurysm, and good way to start planning further management (open surgery or endovascular embolization) [10,11,12].

CASE REPORT

Academic research was approved by the Ethic Committee of The Clinical Center of Montenegro, number 03/01-1231. The patient gave consent for his case to be published anonymously in a scientific journal Hospital Pharmacology – International Multidisciplinary Journal.

We present a case of 20-years old man who was injured in a traffic accident and admitted to the Clinical Center of Montenegro. The patient had no comorbidities and received no therapy before the injury. The patient was hospitalized due to profuse bleeding from the right nasal passage, headaches and disorder of consciousness. On CT scan, he had a fracture of the frontal bone, the base of the skull and the base of the right orbit, and a small amount of hemorrhagic content in the maxillary sinuses on both sides (Figure 1). The ORL and maxillofacial surgeon performed osteoplasty of the frontal sinus and base of the orbit. No immediate complication was observed. During hospitalization, about 48 hours later of surgery, he started to complain about active and intense epistaxis and headaches. MSCT angiography of the brain verified a bisacral pseudoaneurysm of the final part of the cavernous segment of the right ICA (Figure 2a). Initially, embolisation of pseudoaneurysm was performed with coils, however, within a few days, epistaxis recurred. We perform control DSA of the brain, which indicated the impaction of coils, so the decision was made to close the right internal carotid artery (Figure 2b). We did not perform balloon occlusion test (BOT) first, because the patient had good cross flow across anterior/posterior communicating arteries, so he showed good collateral circulation with prompt appearances of angiographic phases (Figure 3). To perform embolisation, we use microcatheter with a coil through the femoral route under general anesthesia, and we occluded right ICA. The final angiographic control showed symmetry in arterial and venous times in both brain hemispheres (Figure 4).

DISCUSSION

Head trauma is the number one injury in Montenegro in traffic accidents after chest injuries and bleeding [13]. In past several technical approaches have been advocated for the management of traumatic ICA pseudoaneurysms, including sacrificing the main artery either surgically or by endovascular technique [14]. Endovascular techniques have an advantage over surgical treatment of cavernous ICA.

Figure 1. Initial CT scan show fracture of the scall base and bleeding in the maxillary sinus.
pseudoaneurysm, because the location of the blood vessel at the base of the skull, surrounded by the adjacent sphenoid bone, cavernous sinus and cranial nerves, makes direct surgical access to the patient difficult. Sacrificing the artery may not be tolerated by the patient and may lead to cerebral hypoperfusion and ischemia [15]. Endovascular ICA occlusion with coils has a low risk of thromboembolic stroke due to slow blood flow through the incompletely occluded artery [16,17]. Several new study articles on the use of flow diverting stents and covered stents as sole treatment, or with coils as treatment for pseudoaneurysms [18]. Trauma victims who have severe and late bleeding should be investigated for the presence of pseudoaneurysms. CTA or MRA are commonly used imaging modalities to evaluate aneurysm involving carotid arteries, but gold standard tool is digital subtraction angiography. Data from the literature indicate a high success rate of about 96%, and complications occur in 1.9% to 21% of cases. Given our case experience, trauma patients who have persistent epistaxis associated with a midface fracture must be monitored for a longer postoperative period [19,20]. The patient was discharged from the hospital seven days after the endovascular procedure, and he did not complain of further episodes of bleeding or any neurological deficit on his 24-month follow-up.
CONCLUSION

CTA or MRA are commonly used imaging modalities to evaluate aneurysm involving carotid arteries, but gold standard tool is digital subtraction angiography. Regarding our experience, trauma patients who have persistent epistaxis associated with a midface fracture must be monitored for a longer postoperative period.

CONFLICTS OF INTEREST

All authors declare no conflict of interest.

ACKNOWLEDGEMENT

Research was approved by the Ethic Committee of The Clinical Center of Montenegro. Number 03/01-1231

The patient gave consent for his case to be published anonymously in a scientific journal HoPh.

REFERENCES


5. Wu SC, Chen RJ, Lee KW, Tung CC, Lin WP, Yi P. Angloembolization as an effective alternative for hemostasis in intractable life-threatening maxillo-


Posttraumatic Pseudoaneurysm of Internal Carotid Artery: Endovascular Treatment:
Case Report

Milena P. Roganović¹, Luka B. Borovinić¹², Aleksandar M. Vulić³, Olga G. Davidović Vulić⁴, Nikola V. Jovičević⁵, Damir N. Peličić²⁶

¹ Klinika za Neurohirurgiju, Klinički centar Crne Gore, Podgorica, Crna Gora
² Medicinski Fakultet, Univerzitet Crne Gore, Podgorica, Crna Gora
³ Centar za vaskularnu hirurgiju, Klinički centar Crne Gore, Podgorica, Crna Gora
⁴ Klinika za anesteziju reanimaciju i terapiju bola, Klinički centar Crne Gore, Podgorica, Crna Gora
⁵ Klinika za neurohirurgiju, Klinički centar Srbije, Beograd, Republika Srbija
⁶ Centar za nauku, Klinički centar Crne Gore, Podgorica, Crna Gora

KRATAK SADRŽAJ

Uvod: Pojava pseudoaneurizme unutrašnje karotidne arterije (ICA) nakon traume je veoma retka. Prema literaturi, većina slučajeva ICA pseudoaneurizme bila je povezana s saobraćajnim nesrećama, a najviše su pogođeni muškarci. Lečenje traumatske pseudoaneurizme ICAP (TICAP) otvorenom operacijom predstavlja višak rizika, pa su se tokom poslednje decenije decenije primjenjive strategije endovaskularnog lečenja.

Prikaz slučaja: U ovom rukopisu želeli smo da predstavimo pacijenta, dvadesetogodišnjeg mladića koji je povređen u saobraćajnoj nesreći i hospitalizovan je u Kliničkom centru Crne Gore. Nakon hirurške intervencije, konačna angiografska kontrola pokazala je simetriju arterijskog i venskog vremena u obe hemisfere mozga. Pacijent je otpušten iz bolnice sedam dana nakon endovaskularne procedure i nije se žalio na dalje epizode krvenja ili bilo kakav neurološki deficit tokom 24-mjesečnog praćenja.

Zaključak: CTA ili MRA su najčešće korišteni modaliteti snimanja za procenu aneurizme, koji uključuje karotidne arterije, ali je zlatni standard digitalna subtrakciona angiografija. S obzirom na naše iskustvo, pacijente nakon traume koji imaju persistenitu epistaksu kod preloma srednjeg dela lica, potrebno je pratiti duži postoperativni period.

Ključne reči: pseudoaneurizma, epistakska, endovaskularno lečenje

Received: January 15, 2024
Accepted: January 25, 2024