Case report

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A CASE REPORT ON GIANT CAROTID – OPHTHALMIC ARTERY ANEURYSM

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Ophthalmic artery (OA) is a potential origin of aneurysms. We present a patient with a giant OA aneurysm, with a sudden onset of psychomotor agitation at the admission. Digital subtraction angiography showed an aneurysm originating from the ophthalmic segment of the left internal carotid artery of irregular shape, with diameters up to 6.5 x 4.5 mm, while the neck of the aneurysm was 4 mm wide. On computed tomography angiography, the aneurysm was seen as much larger and round, up to 4.7 cm in diameter and with a calcified wall. In the further course of treatment, the microcatheter was placed in the lumen of the aneurysm and the embolization spirals were set within. This resulted in a complete exclusion of the aneurysm from the circulation. Endovascular treatment for the giant OA aneurysm, such as coil embolization technique, might be successful for the complete exclusion from circulation of a giant and partially thrombosed aneurysm.

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Key words: *ophthalmic artery, giant aneurysm, mass effect, embolization*

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Introduction

The part of the internal carotid artery (ICA), running from the distal dural ring to the posterior communicating artery is a potential origin of aneurysms. The incidence of these aneurysms is estimated to be between 0.5% and 11% of all brain aneurysms. One of the most common symptoms of ophthalmic artery (OA) aneurysms is gradual loss of vision, so the goal of the chosen treatment modality should be both exclusion of the aneurysm and preservation or restoring of the sight (1).

Giant intracranial aneurysms, which have diameter greater than 25 mm, make up to 5% of all brain aneurysms (2). Even when performed by an experienced neurosurgeon, the techniques of microsurgical clipping of aneurysm or vessel anastomosis result in high morbidity and pose a high mortality risk because of their complexity (3). Moreover, progress made in the field of endovascular surgery, like the more frequent application of flow diverters, has decreased the number of patients which need an open brain surgery (4). Although the endovascular surgery of OA aneurysm is less invasive, it has lower rate of total exclusion of the aneurysm, it may also not mitigate the visual problems, and the recurrence is more common compared to the microsurgical treatment (4).

In this case report, we present a patient with a giant OA aneurysm, producing mass effect on the surrounding tissue, which was treated with coil embolization, which later led the patient to reaching a full recovery.

Case report

This 64 years old man was presented with a sudden onset of psychomotor agitation which started at the day of the admission. Before being examined by a neurosurgeon, the patient was already examined by neurologist, who stated that the patient had altered mental status and that it was impossible to perform an adequate neurological examination due to the patient's uncooperativeness. Moreover, the neurologist also noted that the patient had no gross neurological deficits on cranial nerves and pyramidal tract. The patient then underwent a brain computerized tomography scan (CT), which showed frontally, on both sides parasagittal, an oval

heterodense, marginally calcified mass, measuring 18 x 43 x 43 mm in diameter, with central calcifications, perifocal edema, and moderate postcontrast enhancement (Figure 1). Therefore, the patient was examined by a neurosurgeon, neurologically assessed again, when it was determined that Glasgow Coma Score (GCS) was 14 at the time of admission, and digital subraction angiography was performed the following day.

Digital subtraction angiography showed an aneurysm originating from the ophthalmic segment of the left ICA of irregular shape, with maximum diameters up to 6.5 x 4.5 mm, while the neck of the aneurysm was 4 mm wide (Figure 2).

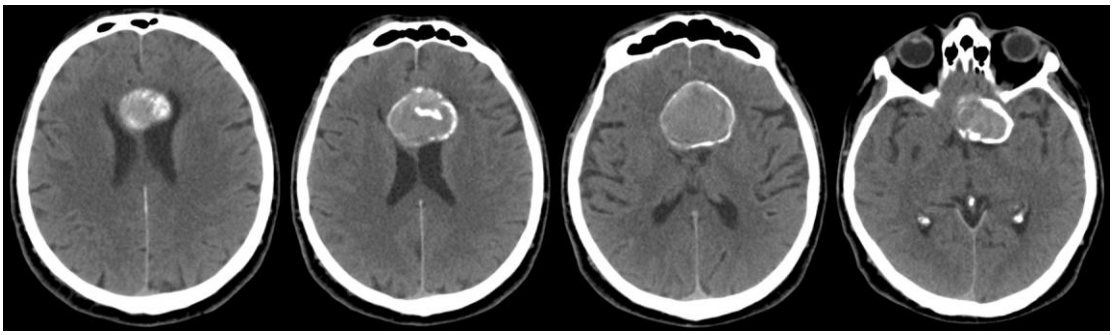

Figure 1. Axial view, brain Computerized tomography (CT) scan study with intravascular contrast agent applied, demonstrating an oval heterodense, marginally calcified mass, measuring 18 x 43 x 43 mm in diameter, with central calcifications, perifocal edema, and moderate postcontrast enhancement

Figure 2. Digital subtraction angiography anteroposterior and lateral view demonstrating an aneurysm originating from the ophthalmic segment of the left ICA before the embolization

In the further course of treatment, the patient was prepared for coiling of the previously detected aneurysm on the ophthalmic segment of the left ICA (Figure 2). The procedure consisted of placing the microcatheter selectively with the tip in the lumen of the aneurysm and setting the embolization spirals within. This resulted in complete exclusion of the aneurysm from the circulation (Figure 3). On the day of the procedure, the patient received 5,000 international units of heparin subcutaneously at 19:00 hours, and from the next day he took regularly acetylsalicylic acid of 75 milligrams dose per day. Patient was admitted to the intensive care unit for overnight observation.

Postoperatively, during the next 4 days of hospitalization, the patient gradually recovered. On the day of discharge, the patient was conscious, oriented with GCS 15 and Glasgow Outcome Score (GOS) was 5, indicating a normal neurological status. Control Magnetic resonance angiography (MRA) was scheduled for 3 months after the day of the procedure.

Figure 3. Digital subtraction angiography lateral view demonstrating the complete exclusion from the circulation, with the embolization spirals within the aneurysm

Discussion

It is estimated that giant aneurysms account for about 5% of total number of verified intracranial aneurysms. Although the most of the patients have signs of mass effect lesions due to the diameter of these aneurysms, it is thought that giant intracranial aneurysms have a low risk of rupture (5). In about 50% of cases with giant aneurysms occurs an intra-aneurysmal thrombosis (6). In the present case, the patient probably had an altered mental status due to mass effect of the aneurysm.

If massive mural thrombosis of a sac of giant aneurysm occurs, it does not protect the aneurysm from rupture and bleeding. About one third of the recently ruptured giant intracranial aneurysms had mural thrombosis of a sac (7). Most cases of aneurysms are presented to neurosurgeons after they rupture and cause subarachnoid hemorrhage, but in some cases the size of bigger aneurysms results in mass effect, in which case we should consider neurosurgical procedure where the aneurysm needs to be clipped and the sac starts coagulating, addressing this problem more adequately (8). The patient presented here had no clinical or radiological signs of aneurysm rupture and consequent subarachnoid hemorrhage.

There are a lot of treatment modalities which could be used for patients with giant OA aneurysm, such as clipping, coiling, stenting, external-internal carotid artery bypass with proximal vessel ligation, balloon occlusion (9-12). Surgery of OA aneurysms is challenging even for the most experienced neurosurgeons because these aneurysms are often large and tend to involve the cavernous part of the internal carotid artery (7). It was first planned that the patient would undergo microsurgical clipping due to the favorable dimensions of the neck, and that the thrombosed blood from the aneurysmal sac would be surgically evacuated in order to alleviate the mass effect of on the surrounding structures. Since this intervention would have been very demanding and complicated, and the potential risks to the patient's health would have been high, the other, more suitable treatment was required. Furthermore, more than 50% of the microsurgical vascular operations of the giant aneurysms require occlusion of the proximal, parent artery, accompanied by necessary advanced bypass operation (13).

It has been noted that up to one third of the patients with giant OA aneurysm experience visual deterioration after coil embolization (14). The factors which predict negative outcome in terms of visual deterioration are the size of an aneurysm, previous rupture and visual loss, as well as aneurysm re-treatment (15). Therefore, the appropriate and suitable treatment modality for these patients seems difficult to choose. In our case, we chose endovascular coil embolization, mostly because of the favorable sac–neck ratio, also because it is less invasive and in order to avoid direct optic nerve disturbance. This resulted in the complete exclusion of the aneurysm from the circulation and the patient made a full recovery.

It is considered that if the aneurysm sac has started clotting, with none or mild visual deterioration, then it should be treated with semipermeable stents and coiling, or therapeutic internal carotid artery closure. Guided by the experiences of other eminent neurosurgical centers, and having in mind the current neurological status of the patient, we agreed that the suitable treatment modality for this patient should be endovascular coil embolization. Other possible treatment for this patient could be closing of the ICA with or without a high-flow excimer laser anastomosis, without occlusion, bypass for flow replacement, depending on the balloon test occlusion tolerance (15-17).

As for the follow up of the patient, control MR angiography scheduled for 3 months after the embolization is in accordance with the recommendations and experiences of other neurosurgical centers (15-18).

Conclusion

Endovascular treatment for the giant OA aneurysm, such as coil embolization technique, might be successful for the complete exclusion from circulation of the giant and partially thrombosed aneurysm.

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Prikaz bolesnika

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PRIKAZ SLUČAJA DŽINOVSKE ANEURIZME OFTALMIČKOG SEGMENTA UNUTRAŠNJE KAROTIDNE ARTERIJE

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Oftalmička arterija (OA), koja potiče od unutrašnje karotidne arterije, potencijalno je mesto nastanka aneurizmi. U ovom prikazu slučaja opisujemo bolesnika sa džinovskom aneurizmom OA, kod koga se psihomotorna agitacija javila iznenada, na dan prijema na bolničko lečenje. Digitalnom subtrakcionom angiografijom detektovana je aneurizma, koja potiče iz oftalmičkog segmenta leve unutrašnje karotidne arterije, koja je bila nepravilnog oblika, maksimalnog prečnika do 6,5 mm x 4,5 mm, dok je vrat aneurizme bio širok 4 mm. Na prethodnoj CT angiografiji, aneurizma je viđena kao mnogo veća i okruglog oblika, maksimalnog prečnika do 4,7 cm i sa kalcifikovanim zidom. U daljem toku lečenja, postavljen je mikrokateter u lumen aneurizme, a potom su embolizacione spirale postavljene unutar lumena aneurizme. Usledilo je potpuno isključivanje aneurizme iz moždane cirkulacije. Endovaskularno lečenje džinovske aneurizme OA, poput tehnike embolizacije spiralama, može dati potpuno isključenje iz moždane cirkulacije džinovske i delimično trombozirane aneurizme.

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Ključne reči: *oftalmička arterija, džinovska aneurizma, efekat mase, embolizacija*