

# A rare case of multiple unruptured intracerebral aneurysms

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## ABSTRACT:

**Aim:** To present a rare case of a patient with multiple unruptured intracranial aneurysms.

**Case report:** A 82-year-old female patient with acute onset of headache without pain relief after taking analgesics. Non-Enhanced Multi-slice Computed Tomography (MSCT) of brain was performed and multiple vascular anomalies were suspected. Diagnostic procedures were completed with cerebral MSCT angiography which proved presence of multiple unruptured intracranial aneurysms. Aneurysms are of asymmetric localization, probably due to acquired causes and usually smaller than 10 mm.

**Conclusions:** This case describes patient with the biggest number of multiple unruptured intracranial aneurysms (MUIA) so far known in literature in a single patient.

**KEYWORDS:** Multiple unruptured intracranial aneurysms; MSCT angiography; subarachnoid hemorrhage.

## SAŽETAK:

**RIJEDAK SLUČAJ MULTIPLIH NERUPTURIRANIH INTRAKRANIJSKIH ANEURIZAMA**

**Cilj:** Prezentirati rijedak slučaj pacijentice s multiplim nerupturiranim intrakranijskim aneurizmama.

**Prikaz slučaja:** 82-godišnja pacijentica s akutno nastalom glavoboljom bez poboljšanja na analgetsku terapiju. Na učinjenoj nativnoj višeslojnoj kompjutoriziranoj tomografiji (MSCT- Multi-slice Computed Tomography) mozga postavljena je sumnja na multiple vaskularne anomalije. Obrada je upotpunjena cerebralnom MSCT angiografijom kojom se potvrdi postojanje multiplih nerupturiranih intrakranijskih aneurizama. Aneurizme su asimetrične lokalizacije, vjerojatno posljedica stečenih uzroka i većinom manje od 10 mm.

**Zaključci :** Ovo je prikaz slučaja dosad najvećeg broja multiplih nerupturiranih intrakranijskih aneurizama (MUIA) poznatih u literaturi u pojedinačnog pacijenta.

**KLJUČNE RIJEČI:** Multiple nerupturirane intrakranijske aneurizme; MSCT angiografija ; subarahnoidalna hemoragija.

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**INTRODUCTION**

Intracerebral aneurysms are pathological local expansions of the walls of cerebral arteries, caused by structural changes in the arterial wall and hemodynamic factors. About 90% of cerebral aneurysms are saccular and belong mainly to the anterior brain circulation. Only 15% of aneurysms affect the posterior cerebral circulation and are often fusiform<sup>1</sup>. Prevalence of unruptured intracranial aneurysms (UIA) is 5%, and the incidence of multiple aneurysms in the general population is 20-30%<sup>2</sup>. In the largest number of patients there are two aneurysms and up to eleven cases of UIA are described in the literature so far<sup>3</sup>. Multiple aneurysms are most commonly localized on the internal carotid artery (ICA) - 40%, then on the anterior communicating artery (ACoA) - 30% and about 20% on the middle cerebral artery (MCA)<sup>1</sup>. The largest number of aneurysms are manifested by spontaneous intracranial bleeding (90%). UIA are discovered accidentally during neuroradiological examination or are symptomatic before rupture<sup>3</sup>. The significance of UIA treatment is best reflected in the fact that 40-60% of patients die during the first subarachnoid bleeding (SAH)<sup>4</sup>. In the case of multiple aneurysms, the higher probability of rupture is with those located on the vertebrobasilar junction and the posterior cerebral artery (PCA), especially if they have a larger diameter, more irregular shape and proximal localization<sup>5</sup>. Selection of the treatment modality depends on the patient's age, clinical condition, size and morphology of the aneurysm. The treatment of UIA still remains a controversial issue and the success of the treatment of multiple aneurysms is smaller than in the case of solitary aneurysms<sup>6,7</sup>.

**CASE REPORT**

A 82-year-old female patient was admitted to the hospital due to an acute headache without improvement on analgesic therapy. She reported already suffering from chronic headaches and hypertension. The neurological findings were normal. Results of laboratory tests including coagulogram and immunological tests were within normal limits. Non-enhanced head CT showed expansive hyperdense formations in the area of the left cavernous sinus (diameter 18 mm) and suprasellar cistern (diameter of 6 mm) (Figures 1 and 2). Multiple unruptured intracranial aneurysms (MUIA) were suspected. MSCT angiography was performed which confirmed the existence of a large aneurysm (16 x 20 x 14 mm) of the left ICA affecting the entire C3 and C4 segment (Figure 3). An aneurysm (8.6 x 4.6 x 6.1 mm) is also visible at the transition between C6 to C7 segment of the right ICA (Figure 4) and at the AcoA (6.9 x 6.9 x 6.0 mm) (Figure 5). Multiple smaller aneurysms were located at the junction of C5 and C6 segment of the left ICA, in the M1 segment of the left MCA, at the crossing point of the basilar artery to the PCA, at the crossing point of the right posterior communicating artery (PCoA) to the right P2 segment of the PCA and in the M2 segment of both MCAs. Dolichoectasia of the intracranial part of the right ICA was also seen (Figure 6). Regression of headache occurred after application of analgesic therapy and regulation of blood pressure. In consultation with the neurosurgeon, neuroradiological control was recommended prior to treatment, but due to the patient's non-agreement to endovascular treatment conservative therapy with the recommendation of further monitoring was applied.

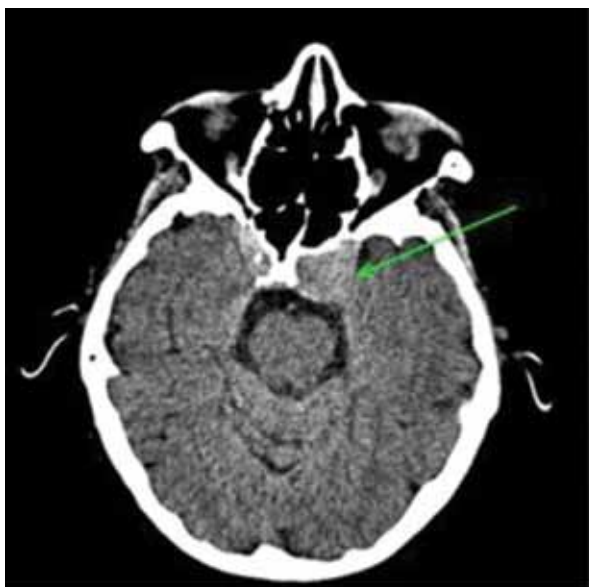


Figure 1. NECT: Hyperdense expansive lesion in the left cavernous sinus.



Figure 2. NECT: Expansive oval lesion in suprasellar area.

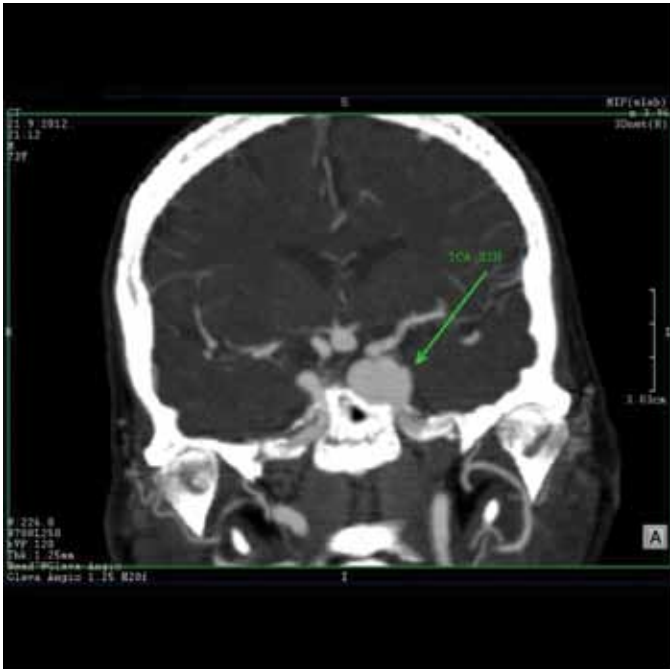


Figure 3. MSCT angiography: Aneurysm in C3 and C4 segments of the left ICA – coronal (a) and transverse (b) plane.

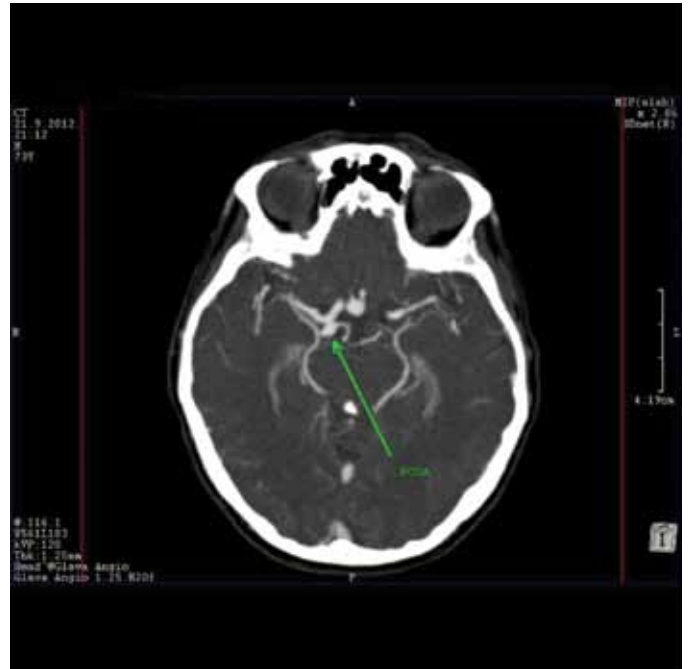


Figure 4. MSCT angiography: Aneurysm in the transition between C6 and C7 segment of the right ICA. From this aneurysm leaves the right PCoA.

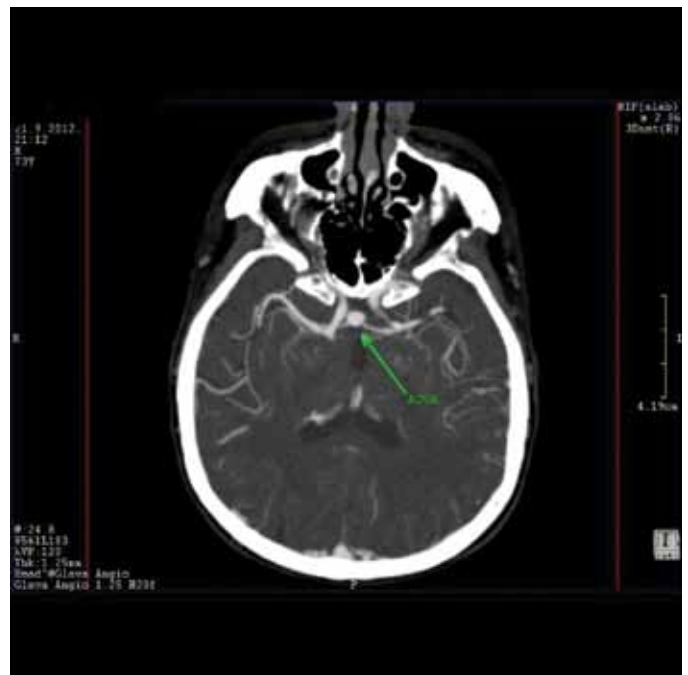


Figure 5. Aneurysm of ACoA.



Figure 6. MSCT angiography, volume rendering: multiple intracranial aneurysms.

## DISCUSSION

MUIA occur most often on the ICA (43%) and MCA (27%). They are often linked with arterial hypertension and more frequently noted in women<sup>2</sup>. All of the described characteristics were manifested in our patient.

A third of pericallosal artery aneurysms are associated with aneurysm of another localization, and it is similar with the ophthalmic, anterior choroidal artery and ICA. Localization of MUIA in area PCoA is sporadic, localization in ACoA is rare and there is almost no occurrence in the basilar artery. In this case report, smaller aneurysms appeared in a rarely registered localization in the posterior circulation.

In more than 90% of MUIA cases there are two aneurysms, 3.5% of patients have three, and only 1.4% four or more aneurysms<sup>3</sup>. In our patient neuroradiological examination determined the existence of 13 UIA.

UIA greater than 10 mm are more likely to produce clinical symptoms before rupture. Such aneurysms are most often localized on the ICA (40-70%) and occur in middle-aged women<sup>2</sup>. In our patient, only one aneurysm was larger than 10 mm and it was localized on ICA. Due to the proximity of the cranial nerves it was a probable cause of neuralgic pain. More than 90% of UIA on angiography and biopsy are less than 10 mm in diameter. Prevalence of rupture is 7-15% in aneurysm with a diameter of less than 3 mm<sup>3</sup>. Aneurysms with a diameter of less than 10 mm have a negligible risk of rupture, and those smaller than 5 mm are complicated for invasive management<sup>9,10</sup>.

The choice of treatment method depends on the patient's age, clinical picture, size and morphology of aneurysms. Due to the numerous risks associated with surgical treatment, brain aneurysms are a challenge, especially when they are multiple and distant from each other. Most often one larger aneurysm is

symptomatic and the others are diagnosed by chance<sup>11</sup>.

The prevailing opinion is that MUIA should be managed operatively because of the risk of later rehemorrhage (11.5% after 16 years), which is significantly higher than operative mortality for unruptured aneurysms (1%) with the usage of modern techniques. Depending on the anatomical distribution of aneurysms operative care can be performed in one or more surgical procedures. Postoperative complications are mostly ischemic, and the number of aneurysms is a risk factor for postoperative ischemia<sup>4</sup>.

## CONCLUSION

The number of diagnosed UIA is increasing with the development of neuroradiological imaging. Knowledge of the risk of rupture is important for the treatment decision. UIA are discovered accidentally during neuroradiological examination or when they cause neurological symptoms and outbursts. Symptomatic UIA are more common in women. When it comes to MUIA, in the majority of cases two aneurysms are confirmed in the patient, and exceptionally rarely four or more aneurysms. The largest number of MUIA described in the literature so far is 11. In this paper we reported patient with 13 aneurysms. MUIA are most often located on the ICA and MCA with asymmetric localization. They are associated with arterial hypertension and are more common in women, which is confirmed by the example from our case. Localization of MUIA in the PCoA area is sporadic, while the occurrence in the basilar artery is almost non-existent. In our patient aneurysms of those rare localizations have also been proven. MUIA are generally smaller than solitary aneurysms and in the presented case the majority were with a diameter of less than 10 mm. The success rate of surgical management of MUIA is lower than in the case of solitary aneurysms.

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