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Embolization of Wide Neck Cerebral Aneurysms using pConus Stent – Our Experience

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1. Introduction

Bifurcation aneurysms with wide neck present a challenge to the traditional endovascular procedures even nowadays. (1)Various modified endovascular approaches are being used to maintain the patency of vital artery vessels and to stabilize the web of coils, placed into the aneurysm. The most commonly used methods in treating this type of aneurysm are stent-assisted coiling, balloon-assisted coiling, use of two stents in Y configuration, 'double micro-catheter technique', etc.(2-5)

A new device type for endovascular treatment of this pathology is the aneurysmal stent pCONus (phenoh, Bohum, Germany). It has been recently developed deliberately to enhance the safety of endovascular treatment in this aneurysm type and comes as a reliable alternative to Y stenting and balloon-assisted coiling in the majority of cases. (6-7) The pCONus implant is in fact a'stent – like'intracellular device for wide neck intracranial aneurysm management. It is designed so that via its most distal segment to allow the stable placement of coils in complex aneurysms creating mechanical barrier at the level of the aneurysmal neck, while the most proximal segment or its intracellular portion acts like an anchor and keeps the stent in the afferent arterial vessel.

2. Aim

The aim of thisstudyis to shareauthorsexperience with pConus stent. We are Starting 2014 up to 20179 such devices have been placed in the Radiology department in University Hospital'St. Ivan Rilski', Sofia.

3. Our experience with pConusstents

35year old female was admitted in the clinic for headache and vertigo. The conducted MRT visualized an aneurysm in the area of the basilar artery apex.

Following consultation with a radiologist and neurosurgeon the endovascular embolisation was adopted as most safe for the characteristic anatomy of this pathology.Before the procedure the female patient was subject to double antithrombotic therapy with 100mg of acetylsalicylic acid and 75 mg Clopidogrel5 days prior to procedure.The patient was put under general anesthesia and was preventively medicated with 2500 units of heparin for increasing the activated partial thromboplastin time (aPPT).

After Seldinger catheterization of the right femoral artery a preoperative diagnostic 3D angiography was carried out to get the precise aneurysmal configuration.It displayed that the aneurysmal sac was widely open to arteria basilaris, i.e. clearly formed neck is lacking. In an immediate proximity to the aneurysmal sac were also the two posterior cerebral arteries.

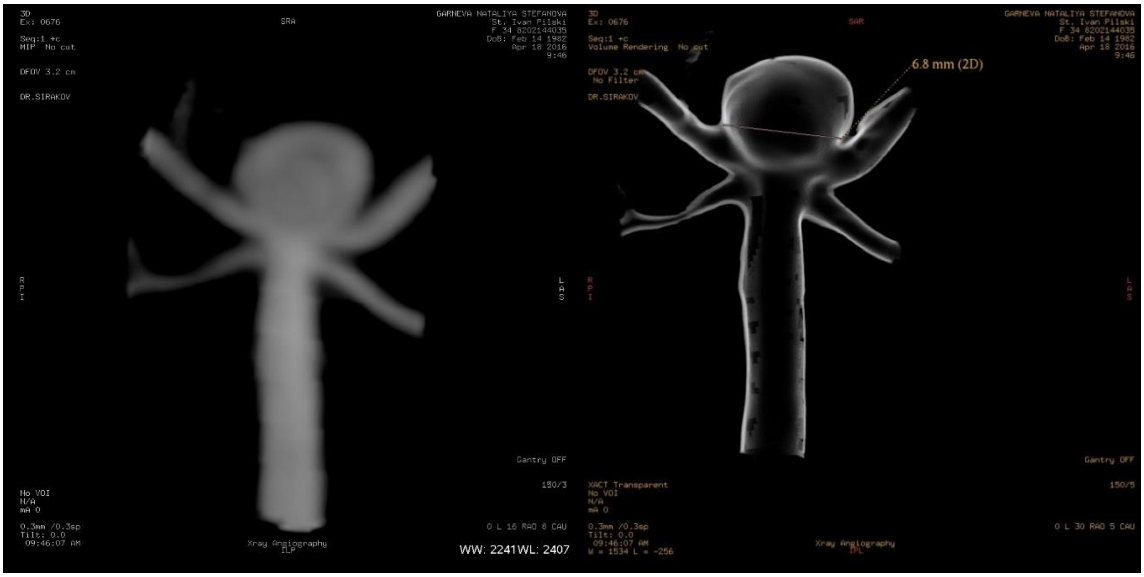

Figure 1: 3D angiography featuring the anatomic structure of aneurysm

Due to the complicated anatomy of the aneurysmal neck we decided that the endovascular treating by means of balloon-assisted procedure would not be appropriate because of the high risk of rechanneling or prolapsing of part of the coils in direction of the vital vessel lumens. And due to the small size of the posterior cerebral arteries the application of Y stenting by placing two stents in their lumen would have higher percentage of intra-procedural risks.

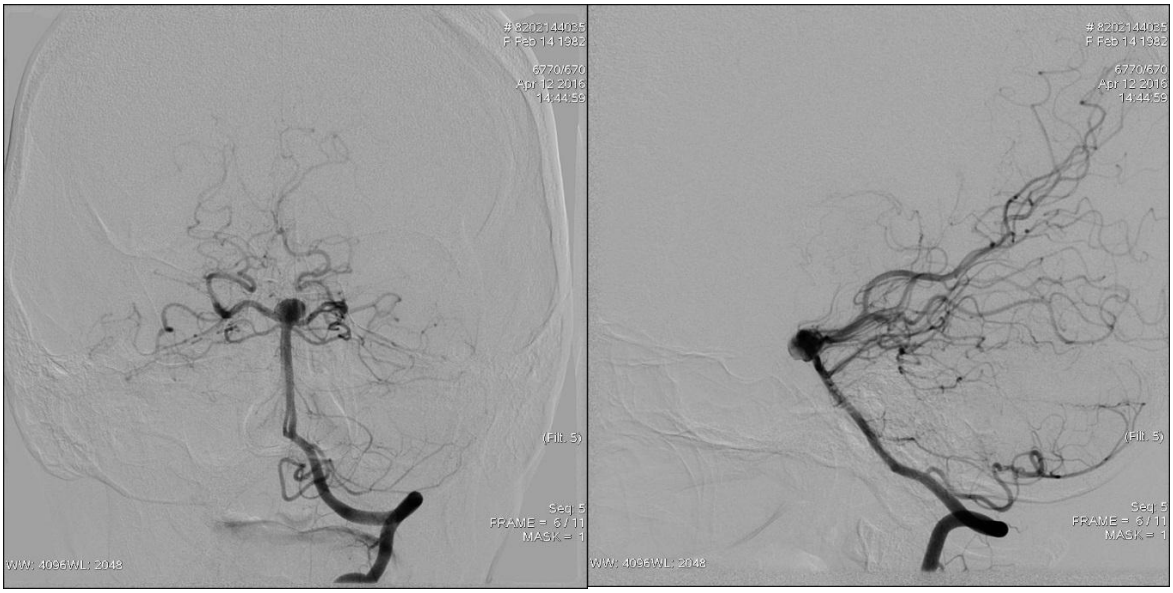

Figure 2: Frontal and lateral angiography displaying the aneurysm in the area of bifurcation of a.Basilaris

Appropriate for this case was the placement of pCONus device with a follow-up coiling of the aneurysmal sac.The diameter of the aneurysmal mouth was measured just a little over the apex of the basilar artery and was used as a reference size in selecting the device.

The aneurysmal sac was catheterized using 0,016 inchesmicro guide wire and 0.027 inches micro-catheter, the latter being positioned in its center. The device was introduced and additionally centered under continuous angiographic management, thus creating a stable borderline between the vital vessel and the aneurysmal sac.

A second micro-catheter Echelon 10was placed within the aneurysm by careful navigation through the intracellular part of pCONus, followed by compact coiling of the aneurysm.

Figure 3: Frontal and lateral angiographic image of an already placed bifurcation stent and compactly embolized aneurysm by means of coils

After a checkup angiography proving the lack of filling out with contrast matter in the area of the aneurysm, the micro-catheter was withdrawn and pCONus carefully detached.The patient was discharged without any data for neurological deficiency. The post-procedural drug therapy prescribed taking 75 mg Clopidogrel for 6 months and acetylsalicylic acid 100 mg for a period of 12 months.

6 months later another checkup angiography was done, not manifesting any data for rechanneling of the targetaneurysm.

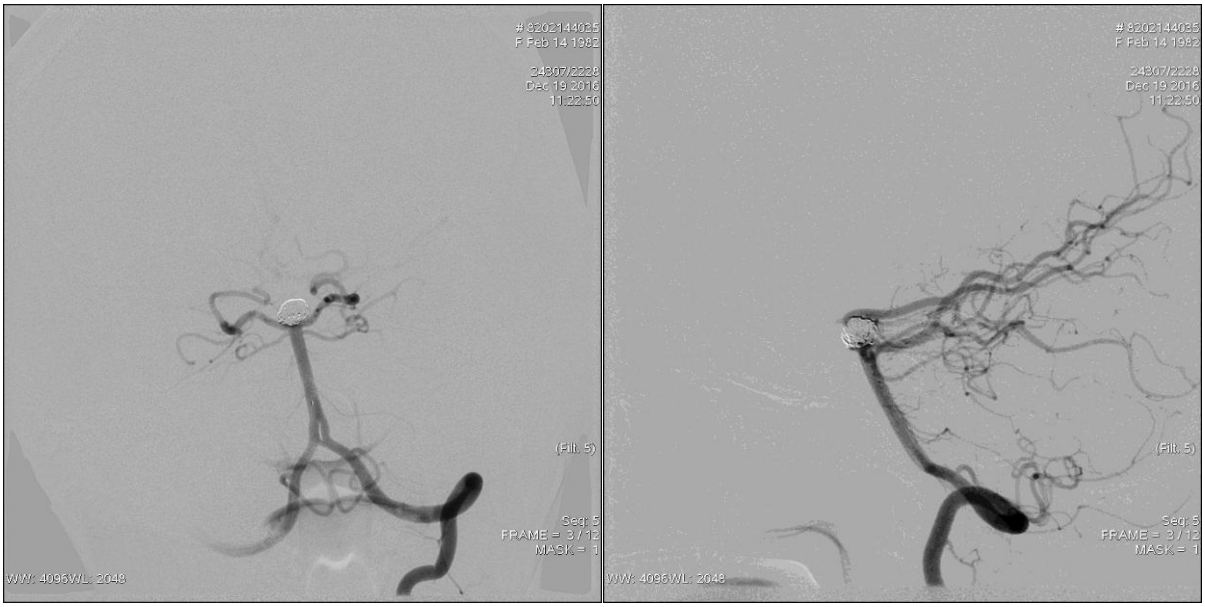

Figure 4: Checkup angiography 6 months after treating; No data for rechanneling of the embolizedaneurysmal sac

54 year old male was admitted in our clinic 6 days after subarachnoid hemorrhage Fisher 3. The CT angiography visualized sacciformaneurysm on anterior communicant artery with complex neck anatomy. Both anterior cerebral arteries stemmed out from the aneurysmal sac, the anterior communicant artery being engaged by the aneurysm.

After consulting a multidisciplinary team of neurosurgeons and radiologists decision for endovascular treatment of this aneurysm was taken due to more favorable prognostic result for the patient. The decision was to embolize by means of pConus stent and platinum coils because of the very complex aneurysm anatomy.

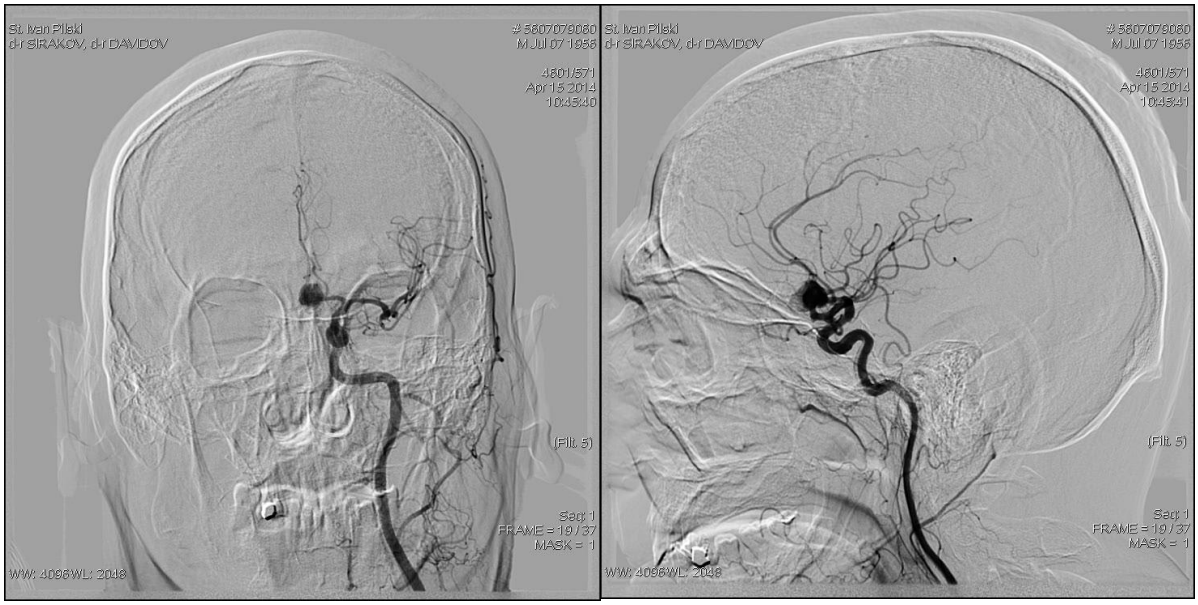

Figure 5: Conventional angiography featuring the aneurysm at anterior communicant artery

The embolization goal was to preserve the contrast fill out of anterior communicant artery and the two anterior cerebral arteries after the conducted intervention.

The aneurysmal sac was catheterized by 0,014inches micro guide wire and 0.021inches micro-catheter, the latter being positioned in its center. The device was introduced and additionally centered under uninterrupted angiographic management thus creating stable borderline between the vital vessel and the aneurysmal sac.The crown in the stent distal portion was visualized as positioned in the area of the wide neck and in this way protection of the two anterior cerebral arteries and the adjacent anterior communicant artery below the crown was ensured by the implanted coils.

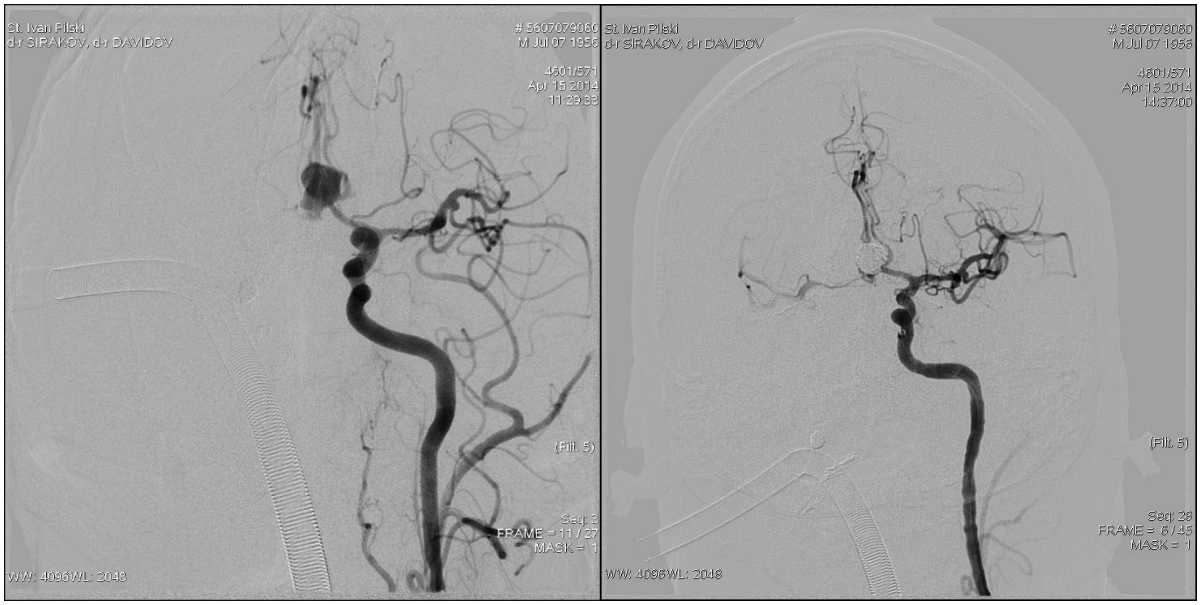

Figure 6: The operating projection, in which the aneurysmal sac was visualized prior and post embolization

The checkup angiographies after performing embolization with pConusstent and coils visualized filling out with contrast matter of the two anterior cerebral arteries and also the contralateral fill out through anterior communicantartery.

The patient overcame the acute period after the subarachnoid hemorrhage and was discharged 8 days after the intervention with no data for added neurological deficiency.

4. Discussion

A number of endovascular methodsconsider the aspect of treating complex aneurysms. Nevertheless their management still presents technical challenge for the experienced radiologists, especially in cases of existing complex pathology.

The pCONus device on its hand offers an option for a promising treatment of complex intracranial bifurcation type wide neck aneurysms. This method allows for reducing the risk of all frequent complications, observed in the standard methods such as balloon-assisted coiling, Y-stenting and stent-assisted coiling. However long-term data are needed to verify the benefits and the therapeutic effect of this approach.

5. Conclusion

The development and use of new devices in the therapy of all the complex brain aneurysms result in a significant reduction of the risks and complications in the process of endovascular therapy. The pConus stent device offers convenient and effective alternative for the therapy of wide neck intracranial brain aneurysms.

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