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Case Report:
Transradial Neurointerventional Approach to Basilar Tip Aneurysm: Case Report and Technical Note

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ABSTRACT

Cerebral angiography through transfemoral approach is preferred in most of the situation though in cardiovascular surgery transradial angiography is accounted as the superior standard. The present study aimed at presenting our early experience of transradial approach to cerebral angiography and intervention of a patient with basilar tip aneurysm that had inappropriate vasculature to perform routine transfemoral approach. The patient was a 65 year-old man with a large basilar tip aneurysm that was candidate for endosacular coiling through transfemoral route. But due to very tortuous iliac artery, aortic arch and its branches, navigation transfemorraly via both vertebral arteries was impossible. Therefore we decided to do the procedure through right transarterial route. The procedure was started by doing Allen`s test to confirm good perfusion of right hand by collateral arteries. After that cerebral angiography and neurointervention was done transradially without any complication. As a result, although a transradial approach is not a routine way for cerebral angiography and intervention, it can be used safely as an alternative way in specific cases.

1. Introduction

Cerebral angiography remains the gold standard method for cerebrovascular diseases. The femoral artery is the most common puncture site used for cerebral angiography. However, a transfemoral approach is not possible in all patients, and there are several limitations to this approach. Majority of studies have discussed the advantages of transradial approach since patient find it comfortable and economically advantageous [1-7]. Today, there is no doubt that a huge number of interventional cardiologists prefer transradial angiography. Yet, some doubt it due to some cases of futile application [5, 8-12]. In this paper we present our first case of transradial approach for cerebral angiography and intervention for large basilar tip aneurysm.

2. Methods & Materials/Patients

A 65-year old man with headache referred to our center. He was conscious and had a normal neurologic

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examination, without any concomitant disease. In brain CT (Computed tomography) scan, a round lesion was found in prepontine cistern without evidence of SAH (subarachnoid hemorrhage). In cerebral angiography, a large saccular basilar tip aneurysm was found with superior orientation. We decided to treat him by endovascular coiling by routine transfemoral approach. After general anesthesia and during the navigation of aortic arch, we observed very tortuous of iliofemoral, aortic arch and both vertebral arteries that deploying guiding catheter and microcatheter were impossible. Therefore, we changed the approach to the right radial artery. At first we checked radial and ulnar arteries pulsations with Allen`s test and confirmed the good collateral perfusion of the hand and safety of radial artery access. The wrist of our patient was extended on a small roll in 30 degree abducted position of the hand. After preparation and draping, the radial artery was punctured at the maximum point of pulsation using. A 20-gauge needle with Seldinger technique by 5F radial sheath. After injection of a cocktail solution [comprising a mixture of heparin (5,000 IU/mL), verapamil (2.0 mg), nitroglycerine (200 µg/mL; 0.25 mL)] to prevent radial artery spasm and thrombosis, we started transradial, transaxillary, transsubclavian, transvertebral artery approach (Figures 1, 2 and 3). A 5-F BER guiding catheter with a 0.035-inch hydrophilic Guidewire was used for the procedure. After inserting the microcatheter in the aneurysm sac in the proper position, coiling was done and the embolization completed (Figure 4).

After completing the procedure, the catheters and sheath were removed, and a superficial pressure dressing using a radial pressure band was immediately applied to the puncture site, without further manual hemostasis. Pulsation of the radial and ulnar arteries was re-evaluated after adequate homeostasis. Bed rest was not required following the procedure.

3. Results

Although transradial artery neurointerventional approach to this cerebral aneurysm was our first experience, fortunately it was performed with success and the basilar tip aneurysm was treated completely without any complication and also our patient had a good post-operative period.

4. Discussion

In this study, we described our first experience of coiling the cerebral aneurysm via right hand transradial artery. Although the transradial approach is used for cerebral diagnostic angiography, its usage for therapeutic purposes is unusual. For our patient, we used transradial approach due to unfavorable vascular anatomy and the aneurysm was treated successfully. Our patient reported a good post-operative period.

Samir Sur et al. described the transradial approach for mechanical thrombectomy in anterior circulation large-vessel occlusion [13]. In 1989, Lucien Campeau introduced the transradial approach for coronary angiography

Figure 1. Right Radial Artery Access and Image of the Aneurysm in the Monitor

Figure 2. Guiding Catheter through Radial Artery

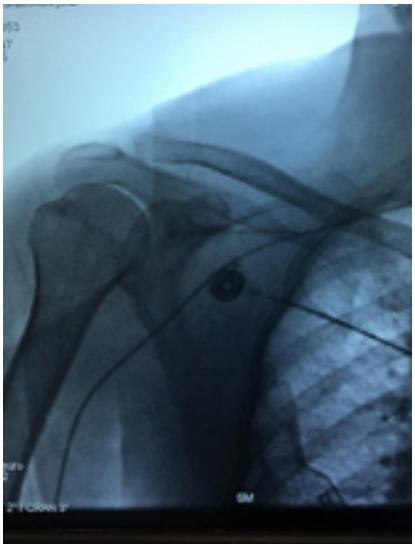

Figure 3. Guiding Catheter through Radial Artery

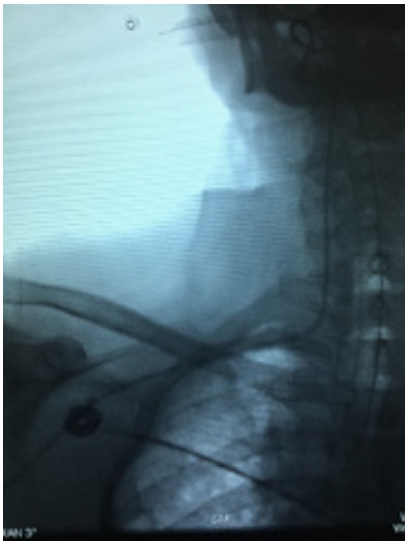

Figure 4. Guiding Catheter through Right Subclavian and Vertebral Artery

for the first time [14]. The success rate of transradial cerebral angiography is reportedly 92.7-99% [5, 9, 11, 12, 15].

Mendiz OA et al., described their initial experience with transradial access for carotid artery stenting [16]. It has many potentials over the transfemoral approach for cerebral angiography. The radial artery is compressible, therefore the risk of hemorrhage is very low. It has no nearby important vessels or nerves and due to relatively fixed position of the radial artery, risks of injury to these structures are minimal [17, 18]. Also this approach does not need bed rest, allowing for immediate ambulation [1, 9, 19]. On the other hand, the transradial approach has caused controversies due to its level of success compared to the other method. Besides, according to prior reports extensive atherosclerotic diseases, atypical anatomy of aortic or brachiocephalic vessels and iliofemoral diseases, etc limit the transfemoral approach [2, 8] which is likely to cause groin compression and longer bed rest [15, 20-22].

Some researchers have concluded that radial artery is vasoreactive which makes the first successful puncture important. Post-surgical recommendations include taking spasmolytic medication namely isosorbide dinitrate. Importantly, 2 to 10% of patients may face complications after transradial coronary angiography due to radial artery occlusion so it should be taken seriously [14, 23-26] as prolonged cannulation, the small diameter of the radial artery, the ratio of the radial artery diameter to the sheath outer diameter, and to the anticoagulation used during arterial cannulation may be the potential causes [25, 27, 28]. In transradial cerebral angiography, if a navigation into the left ICA (difficult to catheterize in patients with high tortuosity) or left VA (difficult to capture) is required, a right transradial procedure may be more challenging. In our case we selected right vertebral artery instead of the left one due to the reasons mentioned above.

5. Conclusion

The results of our study suggested that a transradial approach for cerebral angiography and neurointervention was a suitable way, especially for patients with anatomically tortuous vessels as an alternative route. It seems that this route is safe and can be considered as a routine practice in cerebral angiography and neurointervention. Yet, we believe that more studies should be carried out to confirm this finding.

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Conflict of Interest

The authors declare that they have no conflicts of interest. Authors' Contribution is as follows: Conception and Design: Both authors; Data Collection: Both authors; Drafting the Article: Both authors; Critically Revising the Article: Both authors; Reviewing Submitted

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Version of Manuscript: Both authors; and Approving the Final Version of the Manuscript: Both authors.

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