

Incidental angiographic finding of extended chronic brachial artery occlusion: an uncommon but unavoidable cause of transradial catheterisation failure

Antonio Zingarelli

Interventional Cardiology Unit, Clinic of Cardiovascular Diseases, Department of Internal Medicine, University of Genoa, IRCCS AOU San Martino - IST, Genoa, Italy

Correspondence to: Antonio Zingarelli, MD. Interventional Cardiology Unit, Clinic of Cardiovascular Diseases, Department of Internal Medicine, University of Genoa, IRCCS AOU San Martino – IST, Largo R. Benzi, 10-16132 Genoa, Italy. Email: antonio.zingarelli@yahoo.it.

Submitted Oct 9, 2016. Accepted for publication Nov 30, 2016.

doi: 10.21037/qims.2017.01.03

View this article at: <http://dx.doi.org/10.21037/qims.2017.01.03>

The recent widespread adoption of radial access in performing percutaneous coronary interventions has determined a greater reduction of vascular complications and related bleedings than traditional femoral access, even leading to favourable impact on clinical outcome through a significant reduction of combined efficacy and safety clinical end-point in a recent large randomised trial (1). Besides, the progressive diffusion of slender radial approach with dedicated vascular sheaths and small diameter catheters have almost always allowed to accomplish coronary procedures even in case of adults with small radial artery, such in elders, in females or in subjects of small body surface, particularly prevalent in some racial population (South-East Asians). However, in rare cases, anatomical variants of radial calibre and course and anomalies of brachio-cephalic trunk are responsible of failure of radial access or may determine difficult catheter manipulation even inducing to abandon vascular access.

In cases of palpable radial artery successfully cannulated, the presence of severe obstruction or chronic occlusion of arm and forearm vascular axis, that might prohibitive transradial retrograde catheterisation, is very exceptional. Hereby I describe a case of forced cross-over of radial access due to an occasional and unexpected angiographic finding of extended chronic brachial artery occlusion (CBAO).

A 72-year-old woman referred to our laboratory to perform coronary artery catheterisation before planned cardiac surgery. A left transradial access was electively chosen because, although left radial pulse was slight

at palpation, it was however more detectable than contralateral one. Besides, inspective modified Allen's test was not pathologic and left arm and forearm appeared normally perfused without any functional limitation. The employed radial kit consisted of 21-Gauge open needle for artery puncture, 0.021 "straight metallic mini guidewire and 4-French/10 cm length sheath for cannulation. After successful positioning of introducer, however, the retrograde arterial catheterisation with 0.035" metallic angiographic J-tip wire was hampered at few centimetres above the elbow because the wire did not pass. In addition, attempts with the use of hydrophilic straight-tip wire proved ineffective.

An angiographic injection was then performed with the visualization of "organised" chronic occlusion of distal brachial artery, extended to proximal and mid segments. Compensatory perfusion of distal territory of forearm and hand was supplied by well developed anastomotic collateral flow starting from auxiliary artery (*Figure 1*). The extended brachial occlusion, moreover asymptomatic, disappointed any potential attempt of recanalization, whilst probing the extremely tortuous collateral anastomosis appeared unfavourable to tackle. Therefore, left radial access was abandoned and coronary procedure was completed via contralateral ulnar access without any complication.

CBAO disease, mainly of atherosclerotic pathogenesis, is uncommon, constituting a negligible percentage of symptomatic upper extremity ischemia (2). Moreover, the optimal endovascular treatment is unknown, whereas, in selected cases with focal or not extended brachial occlusion,

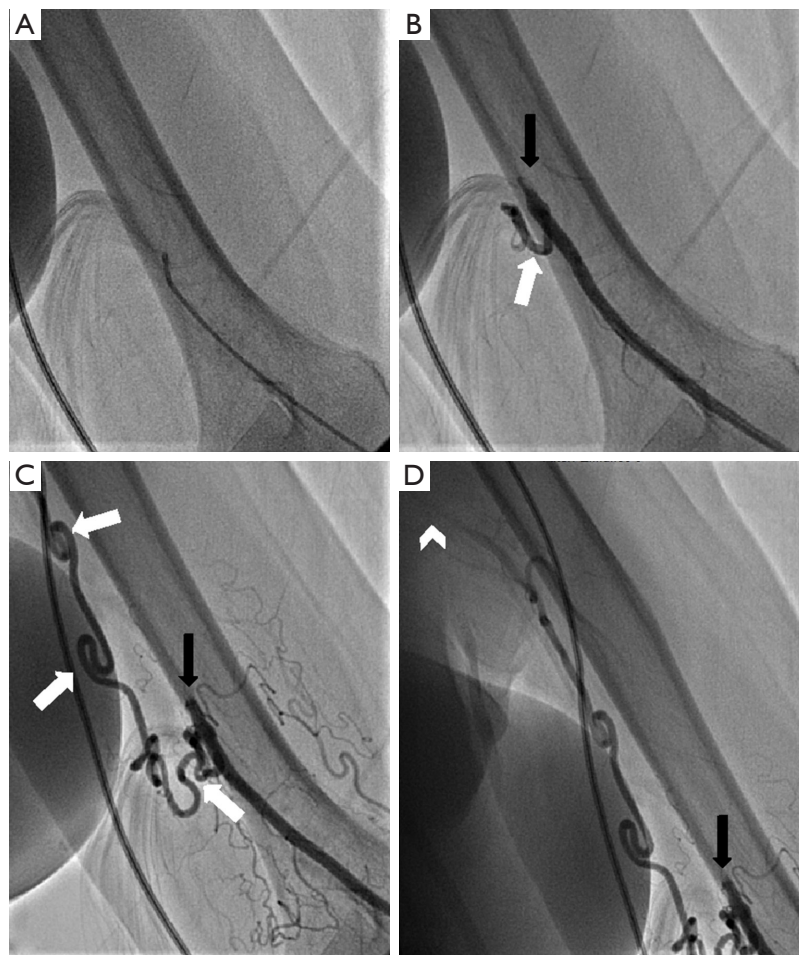


Figure 1 Angiographic 4-French catheter placed in distal brachial artery, immediately under the point of unexpected hampered wiring (A). In (B), visualization of complete obstruction of brachial artery (black arrow) with initial opacification of anastomotic arch (white arrows). In (C) and (D), well represented and extremely tortuous anastomotic vascularization arising proximally from axillary artery (white arrowheads) and supplying, distally, a fair forearm circulation.

percutaneous atherectomy may be a potential treatment option (3). Likewise, acute brachial occlusion is rarely described during transradial coronary catheterisation, and it has been sporadically reported only as an acute or impending complication related to traumatic deep intimal dissection in case of difficult wiring of vessel for anatomical tortuosity of brachial or subclavian arteries (4).

In last decade, several prospective angiographic studies analysed the feasibility of transradial approach, detecting a low frequency of failure (inferior to 5%, on average between 2.5–4.9%) (5-7), although the percentage of failure related to CBAO has never been reported. Generally, anatomical variations of radial artery are responsible of lower puncture

and procedural success (5). Other anatomical anomalies, particularly the tortuosity of brachio-cephalic trunk and aberrant origin of right subclavian artery, may hinder transradial procedure, specially using small calibre catheters (8), often obligating operators to cross-over access (9).

In conclusion, asymptomatic CBAO, occasionally diagnosed during transradial access and forcing to abandon it, as described in this case report, has not been exactly evaluated in the new age of transradial coronary catheterisation technique, but it is supposed to be an anecdotic event on the basis of clinical series of experienced operators and with trivial impact on the real-world daily practise.

Acknowledgements

None.

Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

References

1. Valgimigli M, Gagnor A, Calabró P, Frigoli E, Leonardi S, Zaro T, Rubartelli P, Briguori C, Andò G, Repetto A, Limbruno U, Cortese B, Sganzerla P, Lupi A, Galli M, Colangelo S, Ierna S, Ausiello A, Presbitero P, Sardella G, Varbella F, Esposito G, Santarelli A, Tresoldi S, Nazzaro M, Zingarelli A, de Cesare N, Rigattieri S, Tosi P, Palmieri C, Brugaletta S, Rao SV, Heg D, Rothenbühler M, Vranckx P, Jüni P; MATRIX Investigators. Radial versus femoral access in patients with acute coronary syndromes undergoing invasive management: a randomised multicentre trial. *Lancet* 2015;385:2465-76.
2. Fujitani RM, Mills JL. Acute and chronic upper extremity ischemia. I. Large vessel arterial occlusive disease. *Ann Vasc Surg* 1993;7:106-12.
3. Pride YB, Pinto DS, Garcia LA. A novel approach using atherectomy for chronic total occlusion of the brachial artery: a case report. *Vasc Med* 2007;12:207-10.
4. Ruzsa Z, Molnár L, Szabó G, Merkely B. Catheter-induced brachial artery dissection during transradial angioplasty. *J Vasc Access* 2013;14:392-3.
5. Valsecchi O, Vassileva A, Musumeci G, Rossini R, Tespili M, Guagliumi G, Mihalcsik L, Gavazzi A, Ferrazzi P. Failure of transradial approach during coronary interventions: anatomic considerations. *Catheter Cardiovasc Interv* 2006;67:870-8.
6. Lo TS, Nolan J, Fountzopoulos E, Behan M, Butler R, Hetherington SL, Vijayalakshmi K, Rajagopal R, Fraser D, Zaman A, Hildick-Smith D. Radial artery anomaly and its influence on transradial coronary procedural outcome. *Heart* 2009;95:410-5.
7. Burzotta F, Trani C, Mazzari MA, Tommasino A, Niccoli G, Porto I, Leone AM, Tinelli G, Coluccia V, De Vita M, Brancati M, Mongiardo R, Schiavoni G, Crea F. Vascular complications and access crossover in 10,676 transradial percutaneous coronary procedures. *Am Heart J* 2012;163:230-8.
8. Zingarelli A, Morelli MC, Seitun S, Bezante GP, Balbi M, Brunelli C. Aberrant right subclavian artery (arteria lusoria) challenging 4-French homolateral transradial coronary catheterisation in adulthood. *Heart Lung Circ* 2015;24:e164-8.
9. Abualayem M, Hawatmeh A, Shittu M, Shamoan F. Aberrant right subclavian artery (arteria lusoria) diagnosed during transradial coronary catheterization. *Quant Imaging Med Surg* 2016;6:328-30.

Cite this article as: Zingarelli A. Incidental angiographic finding of extended chronic brachial artery occlusion: an uncommon but unavoidable cause of transradial catheterisation failure. *Quant Imaging Med Surg* 2017;7(1):156-158. doi: 10.21037/qims.2017.01.03