

Vascular Access Sheath

A [retrospective evaluation](#) of [transfemoral neuroendovascular procedures](#) in children <18 years, using long [sheaths](#) was undertaken analyzing procedure type, fluoroscopic times, technical success, access site and systemic complications. Twenty-seven consecutive procedures were included over a two-year period. Mean age was 8.4 years (standard deviation [SD] 6.3) (range 17.0 months-16.3 years).

Patients were 44% female and mean weight was 35.0 kg (SD 22.8) (range 9.8-72.2 kg). A third of the procedures were performed in ≤ 15 kg children. The most common procedure was for embolization (n=13, 48.1%) and the most common indication was dual microcatheter technique (52%). The most common device used was the 5 Fr Cook Shuttle sheath. Mean fluoroscopy time was 61.9 minutes (SD 43.1). Of these procedures, 93% were technically successful. Femoral vasospasm, when present, was self-limiting. Complications (3/27, 11.1%) included groin hematoma (n=1), neck vessel spasm that resolved with verapamil (n=1), and intracranial thromboembolism (n=1), with no significant difference between the ≤ 15 kg and > 15 kg subcohorts. There were no aorto-femoro-iliac or limb-ischemic complications.

Long vascular sheaths without short femoral sheaths can be safely used for pediatric neuroendovascular procedures as they effectively increase inner diameter access without increasing the outer sheath diameter. This property increases the range of devices used and intracranial techniques that can be safely performed without arterial compromise, thus increasing the repertoire of the neurointerventionalist ¹⁾.

2: Essibayi MA, Cloft H, Savastano LE, Brinjikji W. Safety and efficacy of Angio-Seal device for transfemoral neuroendovascular procedures: A systematic review and meta-analysis. *Interv Neuroradiol*. 2021 Feb 18;1591019921996100. doi: 10.1177/1591019921996100. Epub ahead of print. PMID: 33601976.

3: Hanaoka Y, Koyama JI, Fujii Y, Ogiwara T, Ito K, Horiuchi T. Bilateral Transradial Approach for Coil Embolization of Basilar Artery Aneurysms Associated with an Unfavorable Vertebral Artery Anatomy : Initial Experience with Role-sharing Technique. *Clin Neuroradiol*. 2020 Nov 17. doi: 10.1007/s00062-020-00971-6. Epub ahead of print. PMID: 33201247.

4: Muraoka K, Hirotsune N, Kegoya Y, Sotome Y, Matsuda Y, Sato Y, Kidani N, Nishino S. [A Case of Giant Cerebral Aneurysm Treated with Multiple Sheaths Directly Punctured into the Carotid Artery]. *No Shinkei Geka*. 2020 Nov;48(11):1029-1033. Japanese. doi: 10.11477/mf.1436204316. PMID: 33199660.

5: Dossani RH, Waqas M, Tso MK, Rajah GB, Popoola D, Rai HH, Levy EI, Siddiqui AH, Davies JM. Safety and feasibility of ulnar artery access for neuroangiography and neurointervention: a case series. *J Neurointerv Surg*. 2021 Feb;13(2):109-113. doi: 10.1136/neurintsurg-2020-016416. Epub 2020 Jul 20. PMID: 32690759.

6: Hanaoka Y, Koyama JI, Ogiwara T, Fujii Y, Ito K, Horiuchi T. Feasibility and Safety of Radial-First Approach with a Radial-Specific Neurointerventional Guiding Sheath for Intracranial Aneurysm Coiling in the Anterior Circulation. *World Neurosurg*. 2020 Oct;142:e297-e306. doi: 10.1016/j.wneu.2020.06.205. Epub 2020 Jul 1. PMID: 32622061.

- 7: Gross BA, Dolia J, Tonetti DA, Stone J, Brown M, Shah K, Desai SM, Lang M, Jadhav AP. Ballast and NeuronMax in stroke thrombectomy. *J Neurointerv Surg*. 2020 Dec;12(12):1205-1208. doi: 10.1136/neurintsurg-2020-016039. Epub 2020 Jun 23. PMID: 32576703.
- 8: Girdhar G, Epstein E, Nguyen K, Gregg C, Kumar T, Wainwright J, Liu AY, Linfante I. Longer 6-mm Diameter Stent Retrievers Are Effective for Achieving Higher First Pass Success with Fibrin-Rich Clots. *Interv Neurol*. 2020 Jan;8(2-6):187-195. doi: 10.1159/000499974. Epub 2019 Jun 18. PMID: 32508901; PMCID: PMC7253866.
- 9: Akamatsu Y, Kubo Y, Chida K, Matsumoto Y, Ogasawara K. Combined Surgical and Endovascular Treatment of an Intraorbital Arteriovenous Fistula Drained Into a Basal Vein of Rosenthal: A Technical Case Report. *World Neurosurg*. 2020 Sep;141:15-19. doi: 10.1016/j.wneu.2020.05.198. Epub 2020 May 29. PMID: 32479909.
- 10: Hanaoka Y, Koyama JI, Yamazaki D, Miyaoka Y, Fujii Y, Nakamura T, Ogiwara T, Ito K, Horiuchi T. Transradial Approach as the Primary Vascular Access with a 6-Fr Simmons Guiding Sheath for Anterior Circulation Interventions: A Single-Center Case Series of 130 Consecutive Patients. *World Neurosurg*. 2020 Jun;138:e597-e606. doi: 10.1016/j.wneu.2020.03.003. Epub 2020 Mar 9. PMID: 32165342.
- 11: Rajan JE, Kannath SK, Sarma S, Kapilamoorthy TR. Prospective Evaluation of Factors Affecting the Safety and Efficacy of Perclose Proglide Vascular Closure Device in Neurovascular Interventions. *Neurol India*. 2019 Sep-Oct;67(5):1305-1309. doi: 10.4103/0028-3886.271252. PMID: 31744964.
- 12: Patel P, Haussen DC, Nogueira RG, Khandelwal P. The Neuro Radialist. *Interv Cardiol Clin*. 2020 Jan;9(1):75-86. doi: 10.1016/j.iccl.2019.08.008. PMID: 31733743.
- 13: Hanaoka Y, Koyama JI, Ogiwara T, Miyaoka Y, Fujii Y, Nakamura T, Horiuchi T, Hongo K. Usefulness of a Novel Technique to Make Up for a Deficiency in Transradial Neurointervention with a 6Fr Simmons Guiding Sheath: Original Experience with the Subclavian Artery Anchoring Technique. *World Neurosurg*. 2019 Nov;131:e362-e370. doi: 10.1016/j.wneu.2019.07.162. Epub 2019 Jul 27. PMID: 31362101.
- 14: Yilmaz A, Topcu A, Erdogan C, Sahin B, Abban G, Coskun E, Ozkul A. The Effect of Vascular Graft and Human Umbilical Cord Blood-Derived CD34+ Stem Cell on Peripheral Nerve Healing. *Open Access Maced J Med Sci*. 2018 Oct 29;6(11):1946-1952. doi: 10.3889/oamjms.2018.417. PMID: 30559841; PMCID: PMC6290437.
- 15: Brunozzi D, Shakur SF, Alaraj A. Pipeline Embolization of Giant Cavernous Internal Carotid Artery Aneurysm with Direct Carotid Puncture and Arteriotomy Closure Device: Neuroendovascular Surgical Video. *World Neurosurg*. 2019 Mar;123:40. doi: 10.1016/j.wneu.2018.11.230. Epub 2018 Dec 7. PMID: 30529526.
- 16: Miao TL, Figueroa EL, Bajunaid K, Mayich M, de Ribaupierre S, Pandey SK. Use of a radial artery 'slender' sheath for facilitating transfemoral arterial access for neuroendovascular embolization in a very young infant. *Interv Neuroradiol*. 2019 Jun;25(3):353-356. doi: 10.1177/1591019918813212. Epub 2018 Nov 21. PMID: 30463500; PMCID: PMC6547204.
- 17: Storey C, Barry J, Adkins W, Nanda A, Saenz-Cuellar H. A Morphometric Analysis for the Feasibility of Percutaneous Translacrurum Access of the Internal Carotid Artery Based on Computed Tomography Angiography. *World Neurosurg*. 2019 Jan;121:e925-e930. doi: 10.1016/j.wneu.2018.10.017. Epub 2018 Oct 12. PMID: 30321677.
- 18: Koge J, Iwata T, Hashimoto T, Mizuta S, Nakamura Y, Tanaka E, Kawajiri M, Matsumoto SI, Yamada

- T. Carotid artery stenting with proximal embolic protection via the transbrachial approach: sheathless navigation of a 9-F balloon-guiding catheter. *Neuroradiology*. 2018 Oct;60(10):1097-1101. doi: 10.1007/s00234-018-2085-2. Epub 2018 Aug 22. PMID: 30136121.
- 19: Maki Y, Kurosaki Y, Ishibashi R, Morita T, Chin M, Yamagata S. The Use of the Carotid Sheath as a Rotation Anchor to Detect an Anomalous Ascending Pharyngeal Artery in Carotid Endarterectomy. *Ann Vasc Surg*. 2018 Nov;53:273.e1-273.e5. doi: 10.1016/j.avsg.2018.05.073. Epub 2018 Aug 6. PMID: 30092422.
- 20: Froehler MT, Chitale R, Magarik JA, Fusco MR. Comparison of a pressure- sensing sheath and radial arterial line for intraoperative blood pressure monitoring in neurointerventional procedures. *J Neurointerv Surg*. 2018 Aug;10(8):784-787. doi: 10.1136/neurintsurg-2018-013769. Epub 2018 Feb 27. PMID: 29487193; PMCID: PMC6204936.
- 21: Prezerakos GK, Sayal P, Kourliouros A, Pericleous P, Ladas G, Casey A. Paravertebral tumours of the cervicothoracic junction extending into the mediastinum: surgical strategies in a no man's land. *Eur Spine J*. 2018 Apr;27(4):902-912. doi: 10.1007/s00586-018-5512-5. Epub 2018 Feb 14. PMID: 29445946.
- 22: Yoon W, Kim H, Kim YW, Kim SR, Park IS. Usefulness and Stability of Intraoperative Digital Subtraction Angiography Using the Transradial Route in Arteriovenous Malformation Surgery. *World Neurosurg*. 2018 Mar;111:e799-e805. doi: 10.1016/j.wneu.2017.12.164. Epub 2018 Jan 5. PMID: 29309977.
- 23: Goto S, Ohshima T, Ishikawa K, Yamamoto T, Nishizawa T, Shimato S, Kato K. Suitability of a 7-F ExoSeal Vascular Closure Device for Femoral Artery Punctures Made by 8-F or 9-F Introducer Sheaths. *J Endovasc Ther*. 2017 Aug;24(4):516-520. doi: 10.1177/1526602817716642. PMID: 28743227.
- 24: Nossek E, Chalif DJ, Buciuc R, Gandras EJ, Anderer EG, Insigna S, Dehdashti AR, Setton A. Intraoperative Angiography for Arteriovenous Malformation Resection in the Prone and Lateral Positions, Using Upper Extremity Arterial Access. *Oper Neurosurg (Hagerstown)*. 2017 Jun 1;13(3):352-360. doi: 10.1093/ons/opw034. PMID: 28521353.
- 25: Srinivasan VM, Chen SR, Camstra KM, Chintalapani G, Kan P. Development of a recalcitrant, large clot burden, bifurcation occlusion model for mechanical thrombectomy. *Neurosurg Focus*. 2017 Apr;42(4):E6. doi: 10.3171/2017.1.FOCUS16501. PMID: 28366057.
- 26: Pitcher GS, Newton DH, Amendola MF. Common Femoral Artery Access on YouTube: What Practices are Being Shown and Who is Delivering the Message? *J Surg Educ*. 2017 May-Jun;74(3):455-458. doi: 10.1016/j.jsurg.2016.11.012. Epub 2016 Dec 20. PMID: 28011261.
- 27: Takahira K, Kataoka T, Ogino T, Endo H, Nakamura H. Efficacy of a coaxial system with a compliant balloon catheter for navigation of the Penumbra reperfusion catheter in tortuous arteries: technique and case experience. *J Neurosurg*. 2017 Apr;126(4):1334-1338. doi: 10.3171/2016.3.JNS152790. Epub 2016 Jun 3. PMID: 27257836.
- 28: Kurisu K, Osanai T, Kazumata K, Nakayama N, Abumiya T, Shichinohe H, Shimoda Y, Houkin K. Ultrasound-guided Femoral Artery Access for Minimally Invasive Neuro-intervention and Risk Factors for Access Site Hematoma. *Neurol Med Chir (Tokyo)*. 2016 Dec 15;56(12):745-752. doi: 10.2176/nmc.oa.2016-0026. Epub 2016 May 17. PMID: 27194178; PMCID: PMC5221772.
- 29: Castaño C, Remollo S, García MR, Hidalgo C, Hernández-Perez M, Ciorba M. Mechanical thrombectomy with 'ADAPT' technique by transcervical access in acute ischemic stroke. *Neuroradiol J*.

2015 Dec;28(6):617-22. doi: 10.1177/1971400915609352. Epub 2015 Oct 6. PMID: 26443297; PMCID: PMC4757129.

30: Haussen DC, Nogueira RG, DeSousa KG, Pafford RN, Janjua N, Ramdas KN, Peterson EC, Elhammady MS, Yavagal DR. Transradial access in acute ischemic stroke intervention. *J Neurointerv Surg*. 2016 Mar;8(3):247-50. doi: 10.1136/neurintsurg-2014-011519. Epub 2015 Jan 5. PMID: 25561585.

31: Rajagopal R, More RS, Roberts DH. Transcatheter aortic valve implantation through a transcarotid approach under local anesthesia. *Catheter Cardiovasc Interv*. 2014 Nov 15;84(6):903-7. doi: 10.1002/ccd.25367. Epub 2014 Feb 1. PMID: 24399743.

32: Thiex R, Gross BA, Gupta R, Wyers MC, Frerichs KU, Thomas AJ. Transvenous approach to carotid-cavernous fistula via facial vein cut down. *J Clin Neurosci*. 2014 Jul;21(7):1238-40. doi: 10.1016/j.jocn.2013.11.011. Epub 2013 Dec 7. PMID: 24387933.

33: Grandhi R, Kanaan H, Shah A, Harrison G, Bonfield C, Jovin T, Jankowitz B, Horowitz M. Safety and efficacy of percutaneous femoral artery access followed by Mynx closure in cerebral neurovascular procedures: a single center analysis. *J Neurointerv Surg*. 2014 Jul;6(6):445-50. doi: 10.1136/neurintsurg-2013-010749. Epub 2013 Jul 18. PMID: 23868215.

34: Fortes MC, Jindal G, Polifka AJ, Aldrich EF, Simard JM, Gandhi D. Low-angle vascular access for neurovascular procedures using the Arstasis AXERA access device. *J Vasc Interv Radiol*. 2013 May;24(5):693-7. doi: 10.1016/j.jvir.2013.01.012. Epub 2013 Mar 13. PMID: 23489771.

35: Lawson MF, Velat GJ, Fargen KM, Hoh BL, Mocco J. Direct radial artery access with the 070 neuron guide catheter for aneurysm coiling: a novel application of the neuron catheter for cerebral interventions. *Neurosurgery*. 2012 Dec;71(2 Suppl Operative):onsE329-34; discussion onsE334. doi: 10.1227/NEU.0b013e318265a454. PMID: 22743361.

36: Khaldi A, Waldau B, Skowlund C, Velat GJ, Mocco J, Hoh BL. Delayed complication from a percutaneous vascular closure device following a neuro- interventional procedure. *Interv Neuroradiol*. 2011 Dec;17(4):495-500. doi: 10.1177/159101991101700417. Epub 2011 Dec 16. PMID: 22192557; PMCID: PMC3296513.

37: Hayashi K, Kitagawa N, Takai H, Nagata I. Carotid artery stenting via a femoral bypass graft: technical note. *Surg Neurol*. 2009 Jun;71(6):720-4, discussion 724. doi: 10.1016/j.surneu.2007.12.025. Epub 2008 Apr 18. PMID: 18423541.

38: Hayashi K, Kitagawa N, Morikawa M, Kawakubo J, Hiu T, Tsutsumi K, Nagata I. [Carotid artery stenting using the transbrachial approach: technical case report]. *No Shinkei Geka*. 2008 Mar;36(3):233-7. Japanese. PMID: 18341012.

39: Hollands JK, Santarius T, Kirkpatrick PJ, Higgins JN. Treatment of a direct carotid-cavernous fistula in a patient with type IV Ehlers-Danlos syndrome: a novel approach. *Neuroradiology*. 2006 Jul;48(7):491-4. doi: 10.1007/s00234-006-0084-1. Epub 2006 May 6. PMID: 16680431.

40: Akaji K, Tanizaki Y, Hiraga K, Akiyama T, Dembo T. [A case of carotid stenting via the transbrachial approach in the bovine arch]. *No Shinkei Geka*. 2006 Mar;34(3):319-23. Japanese. PMID: 16529027.

41: Lang SS, Eskioglu E, A Mericle R. Intraoperative angiography for neurovascular disease in the prone or three-quarter prone position. *Surg Neurol*. 2006 Mar;65(3):283-9; discussion 289. doi: 10.1016/j.surneu.2005.06.040. PMID: 16488250.

42: Ross IB, Luzardo GD. Direct access to the carotid circulation by cut down for endovascular neuro-interventions. *Surg Neurol*. 2006 Feb;65(2):207-11; discussion 211. doi: 10.1016/j.surneu.2005.06.023. PMID: 16427431.

43: Wang H, Swischuk JL, Fraser K, Alvernia J, Lanzino G. Transaxillary carotid stenting: technical case report. *Neurosurgery*. 2005 Apr;56(2 Suppl):E441; discussion E441. doi: 10.1227/01.neu.0000156847.28054.66. PMID: 15794845.

44: Kai Y, Hamada J, Morioka M, Yano S, Mizuno T, Kuratsu J. Double microcatheter technique for endovascular coiling of wide-neck aneurysms using a new guiding device for the transcarotid approach: technical note. *Neuroradiology*. 2005 Jan;47(1):73-7. doi: 10.1007/s00234-004-1277-0. Epub 2005 Jan 13. PMID: 15647950.

45: Perez-Arjona E, Fessler RD. Basilar artery to bilateral posterior cerebral artery 'Y stenting' for endovascular reconstruction of wide-necked basilar apex aneurysms: report of three cases. *Neurol Res*. 2004 Apr;26(3):276-81. doi: 10.1179/016164104225013969. PMID: 15142320.

46: Levy EI, Kim SH, Bendok BR, Qureshi AI, Guterman LR, Hopkins LN. Transradial stenting of the cervical internal carotid artery: technical case report. *Neurosurgery*. 2003 Aug;53(2):448-51; discussion 451-2. doi: 10.1227/01.neu.0000073995.81018.2b. PMID: 12925267.

47: Fessler RD, Wakhloo AK, Lanzino G, Guterman LR, Hopkins LN. Transradial approach for vertebral artery stenting: technical case report. *Neurosurgery*. 2000 Jun;46(6):1524-7; discussion 1527-8. doi: 10.1097/00006123-200006000-00044. PMID: 10834658.

48: Comey CH, McLaughlin MR, Moossy J. Anterior thoracic corpectomy without sternotomy: a strategy for malignant disease of the upper thoracic spine. *Acta Neurochir (Wien)*. 1997;139(8):712-8. doi: 10.1007/BF01420043. PMID: 9309285.

49: Kawase T, van Loveren H, Keller JT, Tew JM. Meningeal architecture of the cavernous sinus: clinical and surgical implications. *Neurosurgery*. 1996 Sep;39(3):527-34; discussion 534-6. doi: 10.1097/00006123-199609000-00019. PMID: 8875483.

50: Carol M, Robinson W, Harris BS. Percutaneous placement of ventriculoatrial shunts: four-year case experience. *Neurosurgery*. 1986 Mar;18(3):348-9. doi: 10.1227/00006123-198603000-00017. PMID: 3703194.

1)

Dmytriw AA, Ha W, Bickford S, Bhatia K, Shroff M, Dirks P, Muthusami P. Long Vascular Sheaths for Transfemoral Neuroendovascular Procedures in Children. *Neurointervention*. 2021 Jun 3. doi: 10.5469/neuroint.2021.00192. Epub ahead of print. PMID: 34078026.

From:

<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**

Permanent link:

https://neurosurgerywiki.com/wiki/doku.php?id=vascular_access_sheath

Last update: **2024/06/07 02:52**

