Radial artery access anatomy: considerations for neuroendovascular procedures

Kazim H Narsinh,1 Mohammed H Mirza,2 Madhavi Duvvuri,1 M Travis Caton Jr,1 Amanda Baker,1 Ethan A Winkler,3 Randall T Higashida,1 Van H Halbach,1 Matthew R Amans4,5,6, Daniel L Cooke,1 Steven W Hetts,1 Adib A Abla3, Christopher F Dowd1

ABSTRACT
Although enthusiasm for transradial access for neurointerventional procedures has grown, a unique set of considerations bear emphasis to preserve safety and minimize complications. In the first part of this review series, we will review important anatomical considerations for safe and easy neuroendovascular procedures from a transradial approach. These include normal and variant radial artery anatomy, the anatomic snuffbox, as well as axillary, brachial, and great vessel arterial anatomy that is imperative for the neuroendovascular surgeon to be intimately familiar prior to pursuing transradial access procedures. In the next part of the review series, we will focus on safety and complications specific to a transradial approach.

INTRODUCTION
Interest has burgeoned in the use of the radial artery as an access site for neurointerventional procedures because it has been associated with fewer complications, shorter hospital stays, and patient preference. Nevertheless, transradial access (TRA) presents a unique set of considerations to preserve safety, including intimate knowledge of the anatomical variations of the upper extremity arterial supply. Here, we aim to review normal anatomy and variants that bear relevance to neuroendovascular procedures performed via radial artery access.

RADIAL ARTERY ANATOMY
Anatomic relationships
In the forearm, the radial artery’s first segment descends along the pre-axial border accompanied by a pair of radial veins (venae comitantes). The radial artery is covered by superficial and deep fasciae throughout the forearm, except in the upper segment where it is overlapped by the belly of the brachioradialis muscle (figure 1A). The radial artery’s middle segment runs in close proximity to the superficial branch of the radial nerve. Inferiorly, it runs between the brachioradialis laterally and pronator teres medially, then passes inferolaterally between the brachioradialis and flexor carpi radialis to reach the anterior surface of the distal end of the radius where the radial pulse is felt against bone (figure 1B). The presence of bone posteriorly should be verified sonographically when choosing the puncture site, because it significantly aids in radial artery puncture as well as manual compression to achieve patent hemostasis during closure (figure 1C).

The lower aspect of the middle segment of the radial artery curves over the radial aspect of the wrist joint, just beyond the styloid process to the first interosseus space. It passes under the long abductor (abductor pollicis longus) tendon and then travels between the long and short extensor of the thumb (extensor pollicis longus and extensor pollicis brevis) in the anatomic snuffbox (figure 1D,E). There, it is abutted dorsally by the distal scaphoid and trapezium, where the distal radial pulse can be palpated for anatomic snuffbox access, and is crossed superficially by the commencement of the cephalic vein (to be avoided during distal radial artery access) and superficial branches of the radial nerve.

In the hand, the last radial artery segment enters the palm by passing between the two heads of the first dorsal interosseous muscle. Then it turns medially, passes between the transverse and oblique heads of the adductor pollicis, continues across the base of the metacarpals, and joins with the deep branch of the ulnar artery to form the deep palmar arch.

Radial artery branches
From the first segment in the forearm:
1. The recurrent radial artery (RRA) arises laterally just beyond the radial artery’s origin, passes between the superficial and deep branches of the radial nerve, then ascends posteriorly to the brachioradialis and anteriorly to the supinator and brachialis, and ends by anastomosing with the branches of the deep brachial (profunda brachii) artery around the elbow joint. This branch is of particular relevance given its association with the brachioradial artery’s cubital crossover as well as the radial artery loop variant, both of which are further discussed below. As such, the RRA can be easily catheterized inadvertently when attempting to advance a wire from the proximal radial artery into the distal brachial artery, and is a common site of perforation.
2. The palmar carpal branch arises at the lower border of the pronator quadratus and anastomoses with the palmar carpal branch of the ulnar artery, anterior interosseous artery, and...
New devices and techniques

recurrent branches from the deep palmar arch to form the cruciate anastomosis over the anterior aspect of the carpal joint thereby providing collaterals in cases of radial artery occlusion/thrombosis. joint providing collaterals, in addition to the ulnar artery, in cases of radial occlusion/thrombosis.

From the second segment in the wrist:
1. The superficial palmar branch arises as the radial artery curves laterally around the wrist. It courses forward over the thenar muscles and anastomoses with the analogous branch of the ulnar artery to complete the superficial palmar arch. Of note, the superficial palmar branch arises proximal to the anatomic snuffbox used for distal radial access discussed in greater detail at the end of this section.
2. The deep palmar branch arises as the terminal part of the radial artery, anastomosing with the deep palmar branch of the ulnar artery to form the deep palmar arch that courses between the bases of the metacarpal bones and the long flexor tendons of the digits.

From the third segment in the hand:
1. The arteria princeps pollicis arises from the radial artery in the palm and gives rise to the nutrient artery to the first metacarpal bone.
2. The arteria radialis indicis arises from the proximal part of the arteria princeps pollicis.

Distal transradial access
While conventional radial artery access has been shown to have advantages over the transfemoral approach,1–3,7 its benefits may be further augmented by accessing the vessel within the anatomic snuffbox. This technique was introduced as a method to facilitate retrograde radial artery recanalization and has been increasingly adopted by interventional cardiology and radiology in recent years,3–6 with neurointerventional procedures now starting to show similar promise.7–12

Because distal TRA (dTRA) involves puncture within the anatomic snuffbox distal to the origin of the superficial palmar arch branch, the risk of hand ischemia resulting from radial artery occlusion is substantially reduced. If the radial artery occludes at the dTRA puncture site, the superficial palmar branch, arising proximally, continues to provide blood supply to the hand. Also, compared with the more proximal radial artery, the distal radial artery is more superficial relative to the skin, allowing for more rapid postoperative hemostasis. In addition, the puncture site location facilitates access with the wrist pronated (rather than supinated in conventional radial artery access), thereby enhancing patient comfort. dTRA access also permits wrist mobility during postprocedural hemostasis, while conventional radial access typically requires slight wrist extension during the postprocedural period.13

The anatomic snuffbox is formed by the abductor pollicis longus and extensor pollicis brevis tendons laterally and the extensor pollicis longus tendon medially. The carpal bones—namely, the scaphoid and trapezium—constitute the deep border. It contains the radial artery and vein(s), cephalic vein, and superficial branches of the radial nerve (figure 1D,E). The superficial branches of the radial nerve are typically not readily seen unless using a high frequency linear transducer probe, and inadvertent puncture can result in self-limiting pain. However,
care should be taken to identify and avoid the cephalic vein as its
double wall puncture en route to the distal radial artery increases
the risk of developing an arteriovenous fistula.

Ultrasound guidance is strongly recommended over blind
puncture. Radial pulsation is frequently more palpable distal to
the snuffbox floor formed by the carpal bones, and puncture
therein may hinder appropriate hemostasis given the lack of
underlying bone to adequately compress against. Furthermore,
ultrasound guidance allows assessment of distal radial artery size
and avoidance of tendon puncture as well as double wall puncture
causing hematoma formation and/or irritation of the under-
lying periosteum. A linear high frequency (>10 MHz) transducer
is suggested to provide adequate spatial resolution, as the vessel
is quite superficial. An ultra high frequency (6–18 MHz) ‘hockey
stick’ type probe can be easily placed in the anatomical snuffbox
due to its small size and allows excellent imaging of the distal
radial artery, although one must be cognizant that because of its
narrow field of view and built-in ‘step-off’, initial visualization
of the needle as it traverses skin can be more difficult.

Radial artery size
The radial artery at its conventional access site has a mean diam-
eter of 2.69±0.40 mm in men and 2.43±0.38 mm in women
(range 1.15–3.95 mm).14 The ulnar artery is usually larger than
the radial artery, contributes more blood flow to the palmar
arch, and can provide a feasible access site in the context of
radial artery occlusion. However, due to a deeper course and the
wrist flexor muscles, hemostasis of the ulnar artery can be more
difficult to achieve because of difficulty compressing it against
the underlying ulna.13 16

Compared with the transfemoral approach, TRA is associated
with a higher rate of access site arterial spasm and thrombosis/oc-
clusion. Thus pharmacologic prophylaxis is typically used consisting of ‘cocktails’ containing calcium channel blockers
(ie, verapamil), nitrates (ie, nitroglycerin), and heparin. TRA
should be considered relatively contraindicated for patients
with safe transfemoral access options whose radial artery diam-
eter measures <2.0 mm or whose interventions require sheath
sizes >6 French owing to high rates of radial artery spasm and
occlusion.17 Access site decisions are best made on a patient-
by-patient basis by assessing the size of the radial artery diameter
using ultrasound, the sheath/catheter size needed for interven-
tion, the anatomy and tortuosity of the aortic arch and great
vessels, the indications for treatment, and the patient’s anti-
thrombotic regimen. Of particular note, the distal radial artery
in the anatomical snuffbox is only slightly smaller than its more
proximal site. Although statistically significant, this minute
difference does not typically require downsizing of sheath size
to facilitate dTRA.18

RADIAL ARTERY ANATOMIC VARIANTS
Anatomic variations of the radial artery derive from the embry-
ological development of upper limb arteries from an initial capil-
lar plexus in a proximal-to-distal fashion, and result from the
maintenance, enlargement, and differentiation of certain vessels
with the regression of others. Table 1 summarizes the variants
discussed in this review within the context of neuroendovascular
procedures.

Brachioradial artery
The brachioradial artery (BRA) has been used as the clear and
unifying nomenclature for previously described terminology: ‘high
origin of the radial artery’, ‘radial artery originating from the
axillary artery’, ‘high bifurcation of the brachial artery’, ‘continu-
ance of the superficial brachial artery as the radial artery’, and ‘double brachial artery’. ‘Brachioradial artery’ is a
uniform term used for the colloquial ‘high origin of the radial
artery’ proximal to the elbow from either the brachial or, less
frequently, the axillary artery.19–21 An anastomosis can frequently
be observed between the BRA and conventional brachial arteries
in the cubital fossa known as a ‘cubital crossover’ or ‘cubital
connection’, which has several variations19:

1. Conventional anatomy (figure 2A) with no BRA.
2. Dominant type of cubital crossover (figure 2B) with a hy-
poplastic pre-anastomotic part of the BRA (~9% of BRAs).
3. Balanced type of cubital crossover (figure 2C): anastomos-
sis characterized by a similar diameter to that of the BRA
(~27% of BRAs).
4. Arterial island (figure 2D): in rare cases, two arteries (BRA
and brachial artery) may create an arterial complex (like an
island) at the level of the radial neck, which ends in a division
into radial and ulnar arteries. This extremely rare form lacks
a reported incidence and is limited to isolated case reports.
5. Minimal type of cubital crossover (figure 2E): anastomosis
narrower in diameter than the BRA (~18% of BRAs).
6. Absence of the cubital crossover (figure 2F): no anastomosis
between the BRA and the conventional brachial artery within
the cubital fossa (~45% of BRAs).

The BRA presents as a risk factor for developing vascular
complications of TRA.22 Thus the interventionist using the TRA
route must discern these variants in order to perform catheteri-
zation and intervention in a safe and efficacious manner. Given
the high prevalence of BRA at nearly 10%,19 subtraction angiog-
raphy and roadmap guidance should always be performed at this
location to avoid inadvertent wire perforation during retrograde
catheterization of the brachial artery (figure 2G–L).

Radial artery loop
Radial artery loops represent a less common anatomic variant
with a prevalence of approximately 1%.23 Just distal to the origin

**Table 1** Anatomic considerations for transradial catheterization

<table>
<thead>
<tr>
<th>Anatomic variant</th>
<th>Incidence</th>
<th>Importance</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radial artery loop</td>
<td>1% (n=997)</td>
<td>Can cause artery avulsion if straightened; increases conversion from radial to femoral access</td>
<td>26</td>
</tr>
<tr>
<td>High origin of the radial artery/brachioradial artery</td>
<td>9.2% (n=120)</td>
<td>Increases risk of spasm due to small size of artery, can risk dissection when exchanging from a hydrophilic to stiff guidewire</td>
<td>22</td>
</tr>
<tr>
<td>Aberrant right subclavian artery</td>
<td>0.47% (n=6833)</td>
<td>Difficulty entering the ascending aorta when using a transradial approach</td>
<td>31</td>
</tr>
<tr>
<td>Tortuous right brachiocephalic artery</td>
<td>25% (n=52)</td>
<td>Increases difficulty in vessel selection due to loss of distal catheter control in tortuous vessel</td>
<td>32</td>
</tr>
<tr>
<td>Bovine aortic arch</td>
<td>13.6% (n=23 882)</td>
<td>Eases catheterization of left common carotid artery from right transradial approach, may increase difficulty of left common carotid artery catheterization from transfemoral approach</td>
<td>32</td>
</tr>
</tbody>
</table>

Radial artery loops can often be straightened with a hydrophilic guidewire and 5 F catheter. If unsuccessful, a microcatheter system can be used with a stiff microwire to reduce the loop with the assistance of manual compression at the antecubital fossa, while taking care to avoid injuring or avulsing the less mobile RRA. Such maneuvers, however, may induce severe spasm and pain rendering successive catheter manipulation and advancement impossible. If a radial artery loop cannot be straightened, the RRA may be used to access the brachial and axillary arteries, provided that the RRA measures >2 mm, or an alternate access site can be chosen.23–28

Radial artery origin
The radial artery originates 1 cm distal to the flexor crease of the elbow as a terminal branch of the brachial artery in the cubital fossa at the level of the neck of the radius (figure 3). Although the figures used throughout this review illustrate right sided anatomy as the default access option, left sided access is feasible with proper room setup depending on the patient’s anatomy.29 The radial artery continues in the same direction as its parent trunk and extends from the cubital fossa to the palm, ending as an anastomosis with the ulnar artery to form the deep palmar arch, as described above.

**AXILLARY AND BRACHIAL ARTERY ANATOMY**
Roadmap angiography is often of limited use in the brachial and axillary artery because significant retrograde opacification of these larger arteries can be difficult without power injection through 4 F catheters. Therefore, knowledge of the branches of the brachial and axillary arteries and their expected origins (figure 3A) is paramount to avoid wire perforation during retrograde catheterization. Fortunately, the branches of the brachial and axillary arteries have a relatively constant anatomic course, and the branch vessel origins are easily predictable in relationship to the underlying osseous anatomy. The axillary artery is divided into three segments. The first part of the axillary artery begins distal to the lateral border of the first rib and serratus anterior. The second part begins at the upper border of the pectoralis minor muscle, ending at the lower border of the pectoralis minor muscle. The third part begins at the lower border of the pectoralis minor muscle and ends at the lower border of the teres major (figure 3B).

1. Thoraco-acromial trunk: short artery arising from the second part of the axillary artery posterior to the pectoralis minor muscle that divides into clavicular, acromial, pectoral, and deltoid branches.
2. Lateral thoracic artery: travels along the lateral border of the pectoralis minor, then branches into perforators to supply the axillary lymph nodes, the serratus anterior, pectoral muscles, and subscapularis muscle, as well as breast tissue, often anastomosing with branches of the internal thoracic artery.
3. Subscapular artery: largest branch of the axillary artery arising from the third part and anastomoses with the lateral thoracic and intercostal arteries.
4. Circumflex humeral: wrapped around the surgical neck of the humerus and formed by an anastomosis between the anterior and posterior humeral circumflex arteries to supply the glenohumeral joint and head of the humerus. The posterior circumflex humeral artery courses through the ‘quadrangle’ space created by the teres major and minor, the long head of the triceps brachii, and the surgical neck of the humerus.
5. Deep brachial (profunda brachii): the first and largest branch of the brachial artery originating from the posterior portion;
after giving off an ascending branch to supply the deltoid muscle, the deep brachial artery courses along the long and medial heads of the triceps brachii to supply the posterior upper extremity.

6. Superior and inferior ulnar collateral branches: anastomose with the anterior and posterior ulnar recurrent arteries to supply the elbow joint.

BRACHIOCEPHALIC ARTERY TORTUOSITY

Normally, the brachiocephalic artery arises from the anterior part of the aortic arch and courses upward and to the right, bifurcating into the right subclavian and common carotid artery at the sternoclavicular junction. A tortuous course of the brachiocephalic artery may be seen in 25% of cases (table 1), with the artery coursing posteriorly and inferiorly before coursing anteriorly and bifurcating into its branches. The presence of multiple curves in the anatomy of the brachiocephalic artery, as seen in figure 4A,B, makes vessel selection of the carotid arteries more difficult because of a reduction in torquability of the wire or catheter.

ABERRANT RIGHT SUBCLAVIAN ARTERY

The right subclavian artery usually arises as a branch of the right brachiocephalic artery. However, in about 0.47% of cases, the artery may arise directly from the aortic arch posterior or distal to the origin of the left subclavian artery. The aberrant right subclavian artery courses posterior to the esophagus and courses anteriorly and upward towards the right upper extremity. In the case illustrated in figure 4C,D, the right common carotid arises from the aortic arch, and the right vertebral artery arises from the right subclavian artery. Occasionally, the right vertebral artery may arise from the right common carotid artery. The presence of an aberrant right subclavian artery significantly increases the difficulty of performing a right transradial catheterization of the great vessels, forming a relative contraindication, and should often prompt consideration of conversion to transfemoral access.

GREAT VESSEL ANATOMY

In normal aortic arch anatomy, the arch gives rise to three vessels, the brachiocephalic trunk, the left common carotid artery, and the left subclavian artery.
the left subclavian artery. A ‘bovine’ aortic arch variant gives rise to only two branches, with a common origin of the right brachiocephalic artery and left common carotid artery, accounting for 13.6% of aortic arches. The presence of a ‘bovine’ configuration of the aortic arch can significantly ease catheterization of the left common carotid artery from a right transradial approach. Understanding such arch anatomy is therefore important in preprocedural planning in determining the approach and tools.

Preprocedural review of neck CT angiography or MR angiography in coronal and sagittal plane with 5–10 mm maximum intensity projection reformats can be helpful in this regard. If time permits, a three-dimensional volume rendering reformat of neck CT angiography or MR angiography data with 0.5–1.0 mm slice thickness can further facilitate catheter choice and preprocedural planning.

CONCLUSION

The radial artery provides an alternative, and in some ways more favorable, access site for the neurointerventionalist. However, certain anatomic features can relatively contraindicate TRA, particularly when patients have transfemoral access options or are not taking antithrombotic medication (that could increase the risk of an access site bleeding complication). Therefore, correct radial artery access demands the physician be well versed in identifying anatomical variants, weighing the risks and benefits of different closure techniques, and recognizing access site complications. Important anatomic features include a radial artery diameter <2 mm, radial artery loops, a tortuous brachiocephalic artery, or an aberrant right subclavian artery. While the advantages of transradial over transfemoral catheterization have been established in the field of interventional cardiology with randomized controlled clinical trials, further study is warranted to directly establish its advantage in specific realms of interventional neuroradiology/neurointerventional surgery.

Correction notice

Since this article first published online some grammatical changes have been made for clarity.

Contributors

KHN conceived of, wrote, and supervised the manuscript. MHH and MD provided literature review, wrote the manuscript, and provided figures. MTC, AB, and EAW provided critical feedback and review. RTH, VHV, MRA, DLC, SWH, AAA, and CFD provided supervision and feedback.

Funding

KHN received funding from NIH NINDS U54 NS065705.

Competing interests

None declared.

Patient consent for publication

Not applicable.

Provenance and peer review

Commissioned; externally peer reviewed.

Supplemental material

This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

ORCID iDs

Kazim H Narsinh http://orcid.org/0000-0002-2019-5461
Mohammed H Mizra http://orcid.org/0000-0003-3784-5894
Matthew R Amans http://orcid.org/0000-0002-8209-0534

REFERENCES


ICMJE DISCLOSURE FORM

Date: 8/31/21

Your Name: Adib Abla

Manuscript Title: “Radial artery access anatomy: considerations for neuroendovascular procedures

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th>#</th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time frame: Since the initial planning of the work</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>None</td>
</tr>
<tr>
<td><strong>Time frame: past 36 months</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>None</td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------</td>
<td>---</td>
</tr>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td></td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x__ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/31/21

Your Name: Matthew Amans

Manuscript Title: "Radial artery access anatomy: considerations for neuroendovascular procedures"

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time frame: Since the initial planning of the work</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>___ None</td>
</tr>
<tr>
<td><strong>Time frame: past 36 months</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>___ None</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>___ None</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Answer</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td>None</td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x_ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
**ICMJE DISCLOSURE FORM**

**Date:** 8/31/21  
**Your Name:** Amanda Baker  
**Manuscript Title:** “Radial artery access anatomy: considerations for neuroendovascular procedures”  
**Manuscript number (if known):** neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time frame: Since the initial planning of the work</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 1 | All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.)  
No time limit for this item. | None |
<p>| <strong>Time frame: past 36 months</strong> | |
| 2 | Grants or contracts from any entity (if not indicated in item #1 above). | None |
| 3 | Royalties or licenses | None |</p>
<table>
<thead>
<tr>
<th></th>
<th>Financial Interests</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td>None</td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_ _ _ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: __8/31/21________

Your Name: __________M. Travis Caton Jr.__________________________________________________________

Manuscript Title: ___“Radial artery access anatomy: considerations for neuroendovascular procedures_______
Manuscript number (if known): _______ neurintsurg-2021-017871.R1___________________________________

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
</table>
| 1 | All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.)  
No time limit for this item. | ___ None |
| 2 | Grants or contracts from any entity (if not indicated in item #1 above). | ___ None |
| 3 | Royalties or licenses | ___ None |

Time frame: Since the initial planning of the work

Time frame: past 36 months
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5 Payment or honoraria for lectures, presentations, speakers bureaus,</td>
<td>None</td>
</tr>
<tr>
<td>manuscript writing or educational events</td>
<td></td>
</tr>
<tr>
<td>6 Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td>7 Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td>8 Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9 Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td>10 Leadership or fiduciary role in other board, society, committee or</td>
<td>None</td>
</tr>
<tr>
<td>advocacy group, paid or unpaid</td>
<td></td>
</tr>
<tr>
<td>11 Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12 Receipt of equipment, materials, drugs, medical writing, gifts or</td>
<td>None</td>
</tr>
<tr>
<td>other services</td>
<td></td>
</tr>
<tr>
<td>13 Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x_ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/31/21

Your Name: Daniel Cooke

Manuscript Title: “Radial artery access anatomy: considerations for neuroendovascular procedures

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time frame: Since the initial planning of the work</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>___ None</td>
</tr>
</tbody>
</table>

<p>| <strong>Time frame: past 36 months</strong> | | |
| 2 | Grants or contracts from any entity (if not indicated in item #1 above). | ___ None |
| 3 | Royalties or licenses | ___ None |</p>
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td></td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x__ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/31/21

Your Name: Christopher Dowd

Manuscript Title: “Radial artery access anatomy: considerations for neuroendovascular procedures”

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th>Time frame: Since the initial planning of the work</th>
<th>Time frame: past 36 months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.)</td>
</tr>
<tr>
<td>Name all entities with whom you have this relationship or indicate none (add rows as needed)</td>
<td>Specifications/Comments (e.g., if payments were made to you or to your institution)</td>
</tr>
<tr>
<td>____ None</td>
<td>____ None</td>
</tr>
</tbody>
</table>

BMJ Publishing Group Limited (BMJ) disclaims all liability and responsibility arising from any reliance placed on this supplemental material which has been supplied by the author(s).
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td>None</td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>Chief adjudicator for Stryker Atlas and Evolve clinical trials. Salary support paid to department.</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_ X _ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: __8/18/21________

Your Name: _____Madhavi Duvvuri__________________________

Manuscript Title: ___“Radial artery access anatomy: considerations for neuroendovascular procedures”_____

Manuscript number (if known): _______ neurintsurg-2021-017871.R1___________________________________

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Time frame: Since the initial planning of the work</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Time frame: past 36 months</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>None</td>
</tr>
</tbody>
</table>

BMJ Publishing Group Limited (BMJ) disclaims all liability and responsibility arising from any reliance on the data or information contained in this material. Supplemental material placed on this supplemental material which has been supplied by the author(s) J NeuroIntervent Surg doi: 10.1136/neurintsurg-2021-017871–6:0 2021; J NeuroIntervent Surg, et al. Narsinh KH
<table>
<thead>
<tr>
<th></th>
<th>Financial Interest Description</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td>None</td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

- [x] I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/31/21
Your Name: Van Halbach
Manuscript Title: “Radial artery access anatomy: considerations for neuroendovascular procedures
Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.)</td>
<td>Since the initial planning of the work</td>
</tr>
<tr>
<td></td>
<td>____ None</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Grants or contracts from any entity (if not indicated in item #1 above).</th>
<th>Time frame: past 36 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>____ None</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Royalties or licenses</th>
<th>Time frame: past 36 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>____ None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Financial or Nonfinancial Interests</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Other financial or nonfinancial interests</td>
<td></td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x_ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: ____8/31/21________________________
Your Name: ___Steven Hetts_________________________________________
Manuscript Title: ___“Radial artery access anatomy: considerations for neuroendovascular procedures_______
Manuscript number (if known): _______ neurintsurg-2021-017871.R1___________________________________

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td><em>x</em> None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>____ None</td>
</tr>
<tr>
<td></td>
<td>Stryker</td>
<td>Core Imaging Lab Contracts for Clinical Trials</td>
</tr>
<tr>
<td></td>
<td>Siemens</td>
<td>Grants for evaluation of angiography suites</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>____ None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Consulting fees</td>
<td><strong>x</strong> None</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td><strong>x</strong> None</td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Payment for expert testimony</td>
<td><strong>x</strong> None</td>
</tr>
<tr>
<td><strong>7</strong></td>
<td>Support for attending meetings and/or travel</td>
<td><strong>x</strong> None</td>
</tr>
<tr>
<td><strong>8</strong></td>
<td>Patents planned, issued or pending</td>
<td><strong>x</strong> None</td>
</tr>
</tbody>
</table>
| **9** | Participation on a Data Safety Monitoring Board or Advisory Board | ____ None  
Cerenovus, Imperative  
DSMB and CEC membership  
Route 92 |
| **10** | Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid | __x__ None |
| **11** | Stock or stock options | ____ None  
Filtro  
Stock grant |
| **12** | Receipt of equipment, materials, drugs, medical writing, gifts or other services | __x__ None |
| **13** | Other financial or non-financial interests | __x__ None |

Please place an “X” next to the following statement to indicate your agreement:

__x__ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: __8/31/21________________________
Your Name: __________Randall Higashida_______________________________
Manuscript Title: __“Radial artery access anatomy: considerations for neuroendovascular procedures”____________________
Manuscript number (if known): __________ neurintsurg-2021-017871.R1________________________

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

| Time frame: Since the initial planning of the work |
| Name all entities with whom you have this relationship or indicate none (add rows as needed) | Specifications/Comments (e.g., if payments were made to you or to your institution) |
| 1 | All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) | ____ None |
| No time limit for this item. | |

| Time frame: past 36 months |
| Grants or contracts from any entity (if not indicated in item #1 above). | ____ None |

<p>| Royalties or licenses | ____ None |</p>
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td>None</td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x_ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/18/21

Your Name: Mohammed Mirza

Manuscript Title: “Radial artery access anatomy: considerations for neuroendovascular procedures”

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Time frame: Since the initial planning of the work</th>
<th>Time frame: past 36 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>___ None</td>
<td>___ None</td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>___ None</td>
<td>___ None</td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>___ None</td>
<td>___ None</td>
</tr>
<tr>
<td></td>
<td>Financial or Non-Financial Relationships</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>__ None</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td>__ None</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>__ None</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>__ None</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>__ None</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>__ None</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td>__ None</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>__ None</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td>__ None</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>__ None</td>
<td></td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x__ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: __8/18/21_____________________________________________________________________________

Your Name: _____Kazim Narsinh___________________________________________

Manuscript Title: ___“Radial artery access anatomy: considerations for neuroendovascular procedures_____

Manuscript number (if known): _______ neurintsurg-2021-017871.R1___________________________________

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th>Item</th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
<th>Time frame: Since the initial planning of the work</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>____ None</td>
<td>__________________________________________________________________________________________</td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>____ None</td>
<td>__________________________________________________________________________________________</td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>____ None</td>
<td>__________________________________________________________________________________________</td>
</tr>
<tr>
<td></td>
<td>Financial or Non-Financial Interest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x__ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
**ICMJE DISCLOSURE FORM**

**Date:** 8/31/21

**Your Name:** Ethan Winkler

**Manuscript Title:** “Radial artery access anatomy: considerations for neuroendovascular procedures”

**Manuscript number (if known):** neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time frame: Since the initial planning of the work</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 1 | All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.)
No time limit for this item. | ___ None |
| **Time frame: past 36 months** | |
| 2 | Grants or contracts from any entity (if not indicated in item #1 above). |
___ None |
| 3 | Royalties or licenses |
___ None |
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus,</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>manuscript writing or educational events</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>advocacy group, paid or unpaid</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>services</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_ X_ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/31/21

Your Name: Adib Abla

Manuscript Title: "Radial artery access anatomy: considerations for neuroendovascular procedures"

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>___ None</td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>___ None</td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>___ None</td>
</tr>
</tbody>
</table>

Time frame: Since the initial planning of the work

Time frame: past 36 months
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations,</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>speakers bureaus,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>manuscript writing or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>educational events</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>testimony</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Support for attending</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>meetings and/or travel</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Advisory Board</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society,</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>committee or advocacy group, paid or unpaid</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment,</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>materials, drugs, medical writing, gifts or other</td>
<td></td>
</tr>
<tr>
<td></td>
<td>services</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x__ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: __8/31/21______________________________

Your Name: __Matthew Amans________________________

Manuscript Title: __“Radial artery access anatomy: considerations for neuroendovascular procedures”____________________

Manuscript number (if known): __________ neurintsurg-2021-017871.R1____________________

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>___ None</td>
</tr>
<tr>
<td></td>
<td>Time frame: Since the initial planning of the work</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>___ None</td>
</tr>
<tr>
<td></td>
<td>Time frame: past 36 months</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>___ None</td>
</tr>
<tr>
<td></td>
<td>Financial or Non-Financial Interest</td>
<td>None</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td>None</td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x_ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
### ICMJE DISCLOSURE FORM

Date: __8/31/21______________________________

Your Name: ______Amanda Baker__________________________

Manuscript Title: ___“Radial artery access anatomy: considerations for neuroendovascular procedures_______

Manuscript number (if known): ______ neurintsurg-2021-017871.R1___________________________________

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time frame: Since the initial planning of the work</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BMJ Publishing Group Limited (BMJ) disclaims all liability and responsibility arising from any reliance placed on this supplemental material which has been supplied by the author(s).
<table>
<thead>
<tr>
<th></th>
<th>4. Consulting fees</th>
<th>_____ None</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5. Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td>_____ None</td>
</tr>
<tr>
<td></td>
<td>6. Payment for expert testimony</td>
<td>_____ None</td>
</tr>
<tr>
<td></td>
<td>7. Support for attending meetings and/or travel</td>
<td>_____ None</td>
</tr>
<tr>
<td></td>
<td>8. Patents planned, issued or pending</td>
<td>_____ None</td>
</tr>
<tr>
<td></td>
<td>9. Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>_____ None</td>
</tr>
<tr>
<td></td>
<td>10. Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td>_____ None</td>
</tr>
<tr>
<td></td>
<td>11. Stock or stock options</td>
<td>_____ None</td>
</tr>
<tr>
<td></td>
<td>12. Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td>_____ None</td>
</tr>
<tr>
<td></td>
<td>13. Other financial or non-financial interests</td>
<td>_____ None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x_ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/31/21

Your Name: M. Travis Caton Jr.

Manuscript Title: “Radial artery access anatomy: considerations for neuroendovascular procedures”

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th>Item</th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>___ None</td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>___ None</td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>___ None</td>
</tr>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>___ None</td>
</tr>
<tr>
<td>---</td>
<td>----------------</td>
<td>----------</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td>___ None</td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>___ None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>___ None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>___ None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>___ None</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td>___ None</td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>___ None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td>___ None</td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>___ None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_ X_ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/31/21

Your Name: Daniel Cooke

Manuscript Title: “Radial artery access anatomy: considerations for neuroendovascular procedures”

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time frame: Since the initial planning of the work</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>____ None</td>
</tr>
<tr>
<td><strong>Time frame: past 36 months</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>____ None</td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>____ None</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Answer</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus,</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>manuscript writing or educational events</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>group, paid or unpaid</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>services</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x__ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/31/21

Your Name: Christopher Dowd

Manuscript Title: “Radial artery access anatomy: considerations for neuroendovascular procedures

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>___ None</td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>___ None</td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>___ None</td>
</tr>
</tbody>
</table>

Time frame: Since the initial planning of the work

Time frame: past 36 months
<table>
<thead>
<tr>
<th></th>
<th>Financial or Non-Financial Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Consulting fees</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x_ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/18/21

Your Name: Madhavi Duvvuri

Manuscript Title: "Radial artery access anatomy: considerations for neuroendovascular procedures"

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.)</td>
<td>__________ None</td>
</tr>
<tr>
<td></td>
<td><strong>Time frame: Since the initial planning of the work</strong></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>__________ None</td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>__________ None</td>
</tr>
<tr>
<td></td>
<td><strong>Time frame: past 36 months</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Answer</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus,</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>manuscript writing or educational events</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>group, paid or unpaid</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>services</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

-X- I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/31/21

Your Name: Van Halbach

Manuscript Title: "Radial artery access anatomy: considerations for neuroendovascular procedures"

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>___ None</td>
</tr>
</tbody>
</table>

Time frame: Since the initial planning of the work

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>___ None</td>
</tr>
</tbody>
</table>

Time frame: past 36 months

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>___ None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td>None</td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td><strong>7</strong></td>
<td>Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td><strong>8</strong></td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td><strong>9</strong></td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td><strong>10</strong></td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td>None</td>
</tr>
<tr>
<td><strong>11</strong></td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td><strong>12</strong></td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td>None</td>
</tr>
<tr>
<td><strong>13</strong></td>
<td>Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x_ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/31/21

Your Name: Steven Hetts

Manuscript Title: "Radial artery access anatomy: considerations for neuroendovascular procedures"

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time frame: Since the initial planning of the work</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td><em>x</em> None</td>
</tr>
<tr>
<td><strong>Time frame: past 36 months</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Stryker</td>
<td>Core Imaging Lab Contracts for Clinical Trials</td>
</tr>
<tr>
<td></td>
<td>Siemens</td>
<td>Grants for evaluation of angiography suites</td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Financial Interest</td>
<td>None</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td><strong>x</strong> None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td><strong>x</strong> None</td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td><strong>x</strong> None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td><strong>x</strong> None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td><strong>x</strong> None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None Cerenovus, Imperative DSMB and CEC membership Route 92</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td><strong>x</strong> None</td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None Filtro Stock grant</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td><strong>x</strong> None</td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td><strong>x</strong> None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x__ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/31/21

Your Name: Randall Higashida

Manuscript Title: “Radial artery access anatomy: considerations for neuroendovascular procedures”

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th>Item</th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>____ None</td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>____ None</td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>____ None</td>
</tr>
</tbody>
</table>

Time frame: Since the initial planning of the work

Time frame: past 36 months
<table>
<thead>
<tr>
<th></th>
<th>Financial or Non-Financial Interest</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td>None</td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x_ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/18/21

Your Name: Mohammed Mirza

Manuscript Title: "Radial artery access anatomy: considerations for neuroendovascular procedures"

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>____ None</td>
</tr>
<tr>
<td></td>
<td>Time frame: Since the initial planning of the work</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>____ None</td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>____ None</td>
</tr>
</tbody>
</table>

Time frame: past 36 months
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td>None</td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_✓_ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/18/21

Your Name: Kazim Narsinh

Manuscript Title: "Radial artery access anatomy: considerations for neuroendovascular procedures"

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th></th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time frame: Since the initial planning of the work</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.)</td>
<td>____ None</td>
</tr>
<tr>
<td></td>
<td>No time limit for this item.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time frame: past 36 months</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>____ None</td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>____ None</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------------------</td>
<td>---</td>
</tr>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td>None</td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

_x_ I certify that I have answered every question and have not altered the wording of any of the questions on this form.
ICMJE DISCLOSURE FORM

Date: 8/31/21

Your Name: Ethan Winkler

Manuscript Title: "Radial artery access anatomy: considerations for neuroendovascular procedures"

Manuscript number (if known): neurintsurg-2021-017871.R1

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. “Related” means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The following questions apply to the author’s relationships/activities/interests as they relate to the current manuscript only.

The author’s relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

<table>
<thead>
<tr>
<th>Item</th>
<th>Name all entities with whom you have this relationship or indicate none (add rows as needed)</th>
<th>Specifications/Comments (e.g., if payments were made to you or to your institution)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) No time limit for this item.</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>Grants or contracts from any entity (if not indicated in item #1 above).</td>
<td>None</td>
</tr>
<tr>
<td>3</td>
<td>Royalties or licenses</td>
<td>None</td>
</tr>
</tbody>
</table>

Time frame: Since the initial planning of the work

Time frame: past 36 months
<table>
<thead>
<tr>
<th></th>
<th>Financial or Non-Financial Interests</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Consulting fees</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>Payment for expert testimony</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Support for attending meetings and/or travel</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Patents planned, issued or pending</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Participation on a Data Safety Monitoring Board or Advisory Board</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>Stock or stock options</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>Receipt of equipment, materials, drugs, medical writing, gifts or other services</td>
<td>None</td>
</tr>
<tr>
<td>13</td>
<td>Other financial or non-financial interests</td>
<td>None</td>
</tr>
</tbody>
</table>

Please place an “X” next to the following statement to indicate your agreement:

- _x_ I certify that I have answered every question and have not altered the wording of any of the questions on this form.