Advanced Neurointerventional Radiology Coding with Case Studies

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Agenda

- Discuss diagnosis code assignment and ICD-9 versus ICD-10 as it affects IR procedures.
- Discuss CPT codes used for diagnostic imaging of neck and head.
- Discuss CPT codes used for transcatheter therapy procedures of the neck and head.
- Discuss common questions encountered when assigning these codes.
- Review dictated report examples to illustrate CPT code assignment.
ICD-9 versus ICD-10

The Deadlines

- January 1, 2011: 5010 External Testing
- January 1, 2012: 5010 Mandated Use
- October 1, 2013 and 2014: ICD-10 Go Live (Delayed)
- October 1, 2015: NEW Go Live Date
Partial Code Freeze

- Last regular update to ICD-9 and ICD-10 were made on Oct. 1, 2011.
  - New technologies and diseases
- No more updates on ICD-9.
- Regular, annual updates on ICD-10 starting Oct. 1, 2016.


Greater Specificity in ICD-10

- The biggest benefit is also perceived as the biggest burden:
  - Approximately 13,600 codes in ICD-9-CM
  - Approximately 70,000 codes in ICD-10-CM

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>ICD-9</th>
<th>ICD-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fx Patella</td>
<td>2 codes</td>
<td>480 codes</td>
</tr>
<tr>
<td>Pathological Fx</td>
<td>8 codes</td>
<td>886 codes</td>
</tr>
<tr>
<td>Non-union of Fx</td>
<td>1 code</td>
<td>&gt;2,500 codes</td>
</tr>
</tbody>
</table>
Laterality

- Right
- Left
- Bilateral

- If no bilateral code is provided, code both right and left
- If the side is not indicated in the documentation, code unspecified

Laterality - Examples

- C43.11 Malignant melanoma of right eyelid
- C50.112 Malignant neoplasm of central portion of left female breast
- H65.06 Acute serous otitis media, recurrent, bilateral
Unspecified Codes

- Unspecified codes should be reported when they most accurately reflect what is known about the patient’s condition at the time of that particular encounter.
- When sufficient clinical information isn’t known or available about a particular health condition to assign a more specific code, it is acceptable to report the appropriate “unspecified” code.
- It would be inappropriate to select a specific code that is not supported by the medical record documentation or conduct medically unnecessary diagnostic testing in order to determine a more specific code.

Orders from Referring Physicians

- Order from the referring physician must be specific
- Use the time between now and October 1, 2015 to educate your referring physicians.
  - LCD/NCDs
  - Uncertain diagnoses
  - Appropriate complete clinical indication
- We recommend you ask them to give you a narrative description in addition to a diagnosis code.
  - Are you sure they are coding right?
- Query the ordering physician when documentation is unclear, incomplete, or conflicting
Assigning a Code

The process is the same as in ICD-9-CM:
- Look up main term in the Alphabetic Index
  - Are there any instructional notes?
- Verify code in the Tabular
  - Are there any instructions in the tabular?
    - Includes/Excludes1 and Excludes 2 notes
    - Sequencing guidelines
    - Coding guidelines
    - Instructional notes (chapter/subchapter/code level)
- Assign Code

Start Preparing Now

- Only 76 days left to prepare!
- Start or continue your implementation process:
  - Documentation readiness
  - Software readiness
  - Process/Operations readiness
Create Documentation Coding Tools

- Make a list of your top 50 most frequently used ICD-9-CM diagnosis codes.
- Convert the ICD-9 codes to ICD-10.
- For each code, highlight documentation and coding requirements unique to ICD-10.
- Create education tools for your referring providers.

CPT Coding
## CPT Codes - Diagnostic Imaging

The following CPT codes are most typically assigned when performing diagnostic imaging of the arch, carotid and/or vertebral arterial circulation:

<table>
<thead>
<tr>
<th>CPT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>36221</td>
<td>Non-selective catheter placement, thoracic aorta, with angiography of the extracranial carotid, vertebral, and/or intracranial vessels, unilateral or bilateral, and all associated radiological supervision and interpretation, includes angiography of the cervicocerebral arch, when performed</td>
</tr>
<tr>
<td>36222</td>
<td>Selective catheter placement, common carotid or innominate artery, unilateral, any approach, with angiography of the ipsilateral extracranial carotid circulation and all associated radiological supervision and interpretation, includes angiography of the cervicocerebral arch, when performed</td>
</tr>
<tr>
<td>36223</td>
<td>Selective catheter placement, common carotid or innominate artery, unilateral, any approach, with angiography of the ipsilateral intracranial carotid circulation and all associated radiological supervision and interpretation, includes angiography of the extracranial carotid and cervicocerebral arch, when performed</td>
</tr>
<tr>
<td>36224</td>
<td>Selective catheter placement, internal carotid artery, unilateral, with angiography of the ipsilateral intracranial carotid circulation and all associated radiological supervision and interpretation, includes angiography of the extracranial carotid and cervicocerebral arch, when performed</td>
</tr>
<tr>
<td>36225</td>
<td>Selective catheter placement, subclavian or innominate artery, unilateral, with angiography of the ipsilateral vertebral circulation and all associated radiological supervision and interpretation, includes angiography of the cervicocerebral arch, when performed</td>
</tr>
<tr>
<td>36226</td>
<td>Selective catheter placement, vertebral artery, unilateral, with angiography of the ipsilateral vertebral circulation and all associated radiological supervision and interpretation, includes angiography of the cervicocerebral arch, when performed</td>
</tr>
</tbody>
</table>
CPT Codes - Diagnostic Imaging

The following CPT codes are most typically assigned when performing diagnostic imaging of the arch, carotid and/or vertebral arterial circulation:

<table>
<thead>
<tr>
<th>CPT</th>
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</thead>
<tbody>
<tr>
<td>+36227</td>
<td>Selective catheter placement, external carotid artery, unilateral, with angiography of the ipsilateral external carotid circulation and all associated radiological supervision and interpretation (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>+36228</td>
<td>Selective catheter placement, each intracranial branch of the internal carotid or vertebral arteries, unilateral, with angiography of the selected vessel circulation and all associated radiological supervision and interpretation (eg, middle cerebral artery, posterior inferior cerebellar artery) (List separately in addition to code for primary procedure)</td>
</tr>
</tbody>
</table>

Use 36228 in conjunction with 36223, 36224, 36225 or 36226.

Other S&amp;I codes that may also be used for diagnostic imaging in this territory:

<table>
<thead>
<tr>
<th>CPT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>75710</td>
<td>Angiography, extremity, unilateral, radiological supervision and interpretation</td>
</tr>
<tr>
<td>75716</td>
<td>Angiography, extremity, bilateral, radiological supervision and interpretation</td>
</tr>
<tr>
<td>75774</td>
<td>Angiography, selective, each additional vessel studied after basic examination, radiological supervision and interpretation (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>75756</td>
<td>Angiography, internal mammary, radiological supervision and interpretation</td>
</tr>
</tbody>
</table>
2015 CPT Changes Relative to Codes for Diagnostic Imaging of the Arch, Carotid and Vertebral Arterial Circulation

- Code **36228** is an add-on code to report unilateral selective arterial catheter placement and diagnostic imaging of the initial and each additional intracranial branch of the internal carotid or vertebral arteries. Code **36228** is reported in conjunction with **36223, 36224, 36225** or **36226**. This includes any additional second or third order catheter selective placement in the same primary branch of the internal carotid, vertebral, or basilar artery and includes all the work of accessing the additional vessel, placement of catheter(s), contrast injection(s), fluoroscopy, radiological supervision and interpretation. It is not reported more than twice per side, regardless of the number of additional branches selectively catheterized. (Source: Narrative instructions, 2015 AMA CPT Manual)

- Do not report **36218** or **75774** as part of diagnostic angiography of the extracranial and intracranial cervicocerebral vessels. It may be appropriate to report **36218** and **75774** for diagnostic angiography of upper extremities and other vascular beds of the neck and/or shoulder girdle performed in the same session as vertebral angiography (eg, workup of a neck tumor that requires catheterization and angiography of the vertebral artery as well as other brachiocephalic arteries). (Source: Narrative instructions, 2015 AMA CPT Manual)

Catheter Placement Codes

- Most diagnostic imaging codes are already bundled to include selective or non-selective catheter placements, however these choices may on occasion be correctly submitted.

- The following two slides show non-selective and selective arterial code choices that could potentially be used (rarely) when studies are performed in the neck and/or head.
### Surgical Coding - Arterial Catheter Placement Codes

<table>
<thead>
<tr>
<th>CPT</th>
<th>Non-Selective</th>
</tr>
</thead>
<tbody>
<tr>
<td>36100</td>
<td>Direct Stick, Carotid</td>
</tr>
<tr>
<td>36120</td>
<td>Retrograde Brachial</td>
</tr>
<tr>
<td>36200</td>
<td>Aorta by Intracatheter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPT</th>
<th>Selective-Above Diaphragm</th>
</tr>
</thead>
<tbody>
<tr>
<td>36215</td>
<td>Selective catheter placement, arterial system, each first order thoracic or brachiocephalic branch, within a vascular family</td>
</tr>
<tr>
<td>36216</td>
<td>Selective catheter placement, arterial system, each second order thoracic or brachiocephalic branch, within a vascular family</td>
</tr>
<tr>
<td>36217</td>
<td>Selective catheter placement, arterial system, each third order thoracic or brachiocephalic branch, within a vascular family</td>
</tr>
<tr>
<td>36218</td>
<td>Selective catheter placement, arterial system, additional 2nd or 3rd order or beyond, thoracic, brachiocephalic branch within a vascular family (Use in addition to codes 36216 or 36217 as appropriate)</td>
</tr>
</tbody>
</table>
CPT Codes - Transcatheter Therapy Procedures

- Embolization

<table>
<thead>
<tr>
<th>CPT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>75894</td>
<td>Transcatheter therapy, embolization, any method, radiological supervision and interpretation</td>
</tr>
<tr>
<td>61624</td>
<td>Transcatheter permanent occlusion or embolization (e.g., for tumor destruction, to achieve hemostasis, to occlude a vascular malformation), percutaneous, any method; central nervous system (intracranial, spinal cord)</td>
</tr>
<tr>
<td>61626</td>
<td>Transcatheter permanent occlusion or embolization (e.g., for tumor destruction, to achieve hemostasis, to occlude a vascular malformation), percutaneous, any method; non-central nervous system, head or neck (extracranial, brachiocephalic branch)</td>
</tr>
</tbody>
</table>

- Codes are submitted per operative field treated, not per vessel treating same field.
  - 2015 SIR Guide (page 66) states the following:
    - “Please note that the embolization code may only be reported once per surgical field, regardless of the number of vessels embolized on that surgical field. A surgical field is the area immediately surrounding and directly involved in a treatment/procedure. In embolization, different organs typically represent different surgical fields. In some cases, the same organ may consist of more than one surgical field, such as the lungs, where the right and left lung are separate surgical fields”.
    - Codes are differentiated by “in the skull or CNS” (61624) vs. “on the skull/head/neck” (61626).
    - Codes do not include true diagnostic imaging or other interventions performed at the same time on the same patient.
    - Codes do not include completion angiography (i.e., CPT 75898) although there are specific rules governing the number of units that can be charged.
CPT Codes - Transcatheter Therapy Procedures

Balloon Occlusion Testing (CPT 61623)

61623  Endovascular temporary balloon arterial occlusion, head or neck (extracranial/intracranial) including selective catheterization of vessel to be occluded, positioning and inflation of occlusion balloon, concomitant neurological monitoring, and radiologic supervision and interpretation of all angiography required for balloon occlusion and to exclude vascular injury post occlusion

- This code includes the following portions of the study:
  - Selective catheterization of vessel to be occluded
  - Positioning and inflation of occlusion balloon
  - Concomitant neurological monitoring
  - RS&I/S&I of all angiography for balloon occlusion and post occlusion

As stated above, selective catheter placement cannot be submitted in addition to code 61623 when performed at the same session.

- If arteries other than the artery to be occluded is performed, appropriate catheterization and RS&I/S&I codes are reported (assuming true diagnostic imaging is performed).

- It is important to remember if full and complete pre-procedural diagnostic angiography of vessel occluded is performed, this is separately reportable as is catheterization and diagnostic RS&I/S&I of all other vessels studied.

- Remember, these codes are now bundled/packaged, so modifier assignment most likely will be necessary as well.
CPT Codes - Transcatheter Therapy Procedures

- Infusion Therapy (Non-Thrombolytic)

<table>
<thead>
<tr>
<th>CPT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>75896</td>
<td>Transcatheter therapy, infusion, other than for thrombolysis, radiological</td>
</tr>
<tr>
<td></td>
<td>supervision and interpretation</td>
</tr>
<tr>
<td>37202</td>
<td>Transcatheter therapy, infusion other than for thrombolysis, any type (e.g.,</td>
</tr>
<tr>
<td></td>
<td>spasmolytic, vasoconstrictive)</td>
</tr>
</tbody>
</table>

AMA February 2013 CPT Assistant definition of an infusion:

- From a CPT coding perspective, *an injection is* the introduction of a medicinal substance or nutrient material into subcutaneous tissue, a muscle, vein, artery, or other canal or cavities of the body. *An infusion is* the continuous introduction of a fluid, medicinal substance, or nutrient material into a vein or artery by a motorized pump.
### CPT Codes - Transcatheter Therapy Procedures

#### Infusion Therapy (Non-Thrombolytic)
- Codes do not include true diagnostic imaging or other interventions performed at the same time on the same patient.
- Codes do not include completion angiography (ie., CPT 75898) although there are specific rules governing the number of units that can be charged.
- This procedure is site/vessel specific and may also be known as “flow-directed” therapy.
- Physician must clearly describe an “infusion” as opposed to “slow injection”, “push”, “drip” etc. to support application of this code.
- This code set should not be used for prophylaxis.
- Not typically done as a stand-alone procedure, so there usually are diagnostic imaging codes assigned as well. (be aware of “bundled” codes for arch, carotid and vertebral imaging).
- Be aware of State-specific policies (ie., LCD’s) that may also specify the amount of “time” that the infusion must entail (although CPT itself is silent on this issue).

### CPT Codes - Transcatheter Therapy Procedures

#### Infusion Therapy – Thrombolytic, Arterial

<table>
<thead>
<tr>
<th>CPT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>37211</td>
<td>Transcatheter therapy, arterial infusion for thrombolysis other than coronary, any method, including radiological supervision and interpretation, initial treatment day MAI =2 MUE-1</td>
</tr>
<tr>
<td>37213</td>
<td>Transcatheter therapy, arterial or venous infusion for thrombolysis other than coronary, any method, including radiological supervision and interpretation, continued treatment on subsequent day during course of thrombolytic therapy, including follow-up catheter contrast injection, position change, or exchange, when performed MAI =2 MUE-1</td>
</tr>
<tr>
<td>37214</td>
<td>Transcatheter therapy, arterial or venous infusion for thrombolysis other than coronary, any method, including radiological supervision and interpretation, continued treatment on subsequent day during course of thrombolytic therapy, including follow-up catheter contrast injection, position change, or exchange, when performed; cessation of thrombolysis including removal of catheter and vessel closure by any method MAI =2 MUE-1</td>
</tr>
</tbody>
</table>
CPT Codes - Transcatheter Therapy Procedures

- Infusion Therapy – Thrombolytic, Arterial
  - 37201 (thrombolysis) deleted (2013)
  - 37209 and 75900 (exchange thrombolysis catheter) deleted (2013)
  - 75896 is still around
  - Codes include
    - Any follow-up angiography / venography on same date (i.e., 75898 included).
    - Any catheter position or exchange on same date (old 37209 & 75900 exchange codes).
  - Fluoroscopic guidance
  - S&I codes

- The following are all separately reportable
  - Catheter placement (i.e., selective cath codes)
  - Diagnostic studies (i.e., S&I codes)
  - Ultrasound guidance for access (76937)
  - Other percutaneous interventions (i.e., angioplasty or stent)

- Codes are unilateral
  - Report only ONE code per date of treatment (Problem- what if treating bilaterally?).

- For declotting of central line
  - Use 36593
- For declotting of AV shunt
  - Use 36870
CPT Codes - Transcatheter Therapy Procedures

- Thrombectomy - Mechanical, Arterial – Primary & Secondary

<table>
<thead>
<tr>
<th>CPT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>37184</td>
<td>Primary percutaneous transluminal mechanical thrombectomy, noncoronary, arterial or arterial bypass graft, including fluoroscopic guidance and intraprocedural pharmacological thrombolytic injection(s); initial vessel</td>
</tr>
<tr>
<td>37185</td>
<td>Primary percutaneous transluminal mechanical thrombectomy, noncoronary, arterial or arterial bypass graft, including fluoroscopic guidance and intraprocedural pharmacological thrombolytic injection(s); second and all subsequent vessel(s) within the same vascular family (List separately in addition to code for primary mechanical thrombectomy procedure)</td>
</tr>
<tr>
<td>37186</td>
<td>Secondary percutaneous transluminal thrombectomy (e.g., nonprimary mechanical, snare basket, suction technique), noncoronary, arterial or arterial bypass graft, including fluoroscopic guidance and intraprocedural pharmacological thrombolytic injections, provided in conjunction with another percutaneous intervention other than primary mechanical thrombectomy (List separately in addition to code for primary procedure)</td>
</tr>
</tbody>
</table>

What's separately codeable:
- Code(s) for catheter placement(s).
- True diagnostic angiography.
- Other percutaneous interventions (e.g., transluminal balloon angioplasty, stent placement) performed at the same time on the same anatomic area.
- US guidance for vascular access

Codes are unilateral
Report only ONE code per date of treatment (Problem- what if treating bilaterally?).
CPT Codes - Transcatheter Therapy Procedures

Thrombectomy- Mechanical, Arterial – Primary & Secondary

- What’s included?
  - There are no separate radiological supervision and interpretation codes to report imaging services provided in conjunction with mechanical thrombectomy.
  - Arteriography and/or venography related to guidance and monitoring of the mechanical thrombectomy.
  - Completion study(ies).
  - Any intra-operative injection(s) of thrombolytic. If however subsequent or prior continuous infusion of thrombolysis is performed/provided, this is not an included service and is separately reportable (See codes 37211-37214).

For declotting of central line
  - Use 36593

For declotting of AV shunt
  - Use 36870
Frequently Asked Questions: Surgery: Cardiovascular System

Question: CPT guidelines state that a primary mechanical thrombectomy is reported per “vascular family” using code 37184, Primary percutaneous transluminal mechanical thrombectomy, noncoronary, arterial or arterial bypass graft, including fluoroscopic guidance and intraprocedural pharmacological thrombolytic injection(s); initial vessel, for the initial vessel, and code 37185, Primary percutaneous transluminal mechanical thrombectomy, noncoronary, arterial or arterial bypass graft, including fluoroscopic guidance and intraprocedural pharmacological thrombolytic injection(s); second and all subsequent vessel(s) within the same vascular family (List separately in addition to code for primary mechanical thrombectomy procedure), for the second or all subsequent vessels within the same “vascular family.” Are “vascular families” and “vascular territories” interchangeable terms when referencing peripheral arteries?

Answer: No, the term “vascular territory” is not used when reporting arterial mechanical thrombectomy. The CPT definition of a vascular family is, in essence, any arterial branch off the aorta and its subsequent distal branches. Code 37184 is reported for treatment by endovascular mechanical thrombectomy in the initial artery. Code 37185 is used to report any and all subsequent distal branches of the initial vessel. Therefore, the term “second and all subsequent vessel(s)” means that 37185 is reported only once, no matter how many subsequent vessels are treated in a given vascular family (i.e., only one vessel treated by arterial mechanical thrombectomy in a given vascular family is reported by 37184, two vessels treated by arterial mechanical thrombectomy in a given vascular family is reported by 37184, and 37185, three or more vessels treated by arterial mechanical thrombectomy in a given vascular family is reported by 37184 and 37185, as 37185 is reported only once).
### CPT Codes - Transcatheter Therapy Procedures

#### Intracranial Vasospasm Treatment

<table>
<thead>
<tr>
<th>CPT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>61640</td>
<td>Balloon dilatation of intracranial vasospasm, percutaneous; initial vessel</td>
</tr>
<tr>
<td>61641</td>
<td>Balloon dilatation of intracranial vasospasm, percutaneous; each additional vessel in same vascular family (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>61642</td>
<td>Balloon dilatation of intracranial vasospasm, percutaneous; each additional vessel in different vascular family (List separately in addition to code for primary procedure)</td>
</tr>
</tbody>
</table>

Codes 61640–61642 include:
- All selective catheterization of the ipsilateral target vessel (of treatment).
- Ipsilateral contrast injections for positioning, road mapping and guidance.
- Do not bill separately for contrast injections post intervention (ie., completion angiography).

If true separate and complete infusion therapy for vasospasm is also performed, this is additionally separately codeable (See codes 75896 and 37202).
- Contralateral procedures are not included in codes 61640-61642.
CPT Codes - Transcatheter Therapy Procedures

- Intracranial Angioplasty and/or Stent Placement

<table>
<thead>
<tr>
<th>CPT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>61630</td>
<td>Balloon angioplasty, intracranial (e.g., atherosclerotic stenosis), percutaneous</td>
</tr>
<tr>
<td>61635</td>
<td>Transcatheter placement of intravascular stent(s), intracranial (e.g., atherosclerotic stenosis), including balloon angioplasty, if performed</td>
</tr>
</tbody>
</table>

- Codes 61630 & 61635 include:
  - All selective vascular catheterization of the target vascular family.
  - All diagnostic imaging for arteriography of the target vascular family.
  - All related RS&I.

- But remember:
  - When a diagnostic arteriogram [including S&I and selective cath codes] confirms the need for angioplasty or stent placement, ipsilaterally, codes 61630 and 61635 are inclusive of these services.
  - However, if angioplasty or stenting are not indicated, then the appropriate codes for selective catheterization and imaging should be reported in lieu of codes 61630 and 61635.
  - Contralateral procedures are not included in codes 61630-61635.
CPT Codes - Transcatheter Therapy Procedures

- Extracranial Carotid Stent Placement- Percutaneous Approach
  - Codes 37215 and 37216 represent stenting in the cervical portion of the common carotid.

<table>
<thead>
<tr>
<th>CPT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>37215</td>
<td>Transcatheter placement of intravascular stent(s), cervical carotid artery, open or percutaneous, including angioplasty, when performed, and radiological supervision and interpretation; with distal embolic protection</td>
</tr>
<tr>
<td>37216</td>
<td>Transcatheter placement of intravascular stent(s), cervical carotid artery, open or percutaneous, including angioplasty, when performed, and radiological supervision and interpretation; without distal embolic protection</td>
</tr>
</tbody>
</table>

- Include all ipsilateral selective carotid catheterization.
- Include all diagnostic imaging for ipsilateral, cervical and cerebral arteriography.
- There are no corresponding S&I codes for this procedure.
- Do not include stenting of the vertebral, innominate or intrathoracic carotid artery. (Category I and III codes 37217, 37218, 0075T and 0076T exist to describe these procedures).
- If imaging confirms the need for carotid stenting, these services (i.e., cath placement and imaging) are included in the codes 37215 and/or 37216.
- If imaging does not confirm the need for carotid stent placement these services are reported separately (see codes in 3622x series).
CPT Codes - Transcatheter Therapy Procedures

- Extracranial Carotid Stent Placement - *Percutaneous Approach*
  - The AMA CPT An Insiders View states the following:
    - An “each additional vessel” add-on code was not established for the cervical carotid artery system.
    - Since the typical carotid stent application results in deployment with one end of the stent in the common carotid and the other end in the internal carotid with the stent spanning the external carotid origin, there is no “additional vessel” in the cervical carotid system that could be treated.
    - Occasionally, a patient will require an additional stent in the more distal internal carotid artery. In this unusual circumstance, this rarely required additional work is inherent within the scope of a single carotid stent code.
    - In the equally unusual situation where bilateral carotid stents are deployed at the same session, the procedure can be reported with modifier -50.

- Extracranial Carotid Stent Placement - *Open Approach, Retrograde Treatment*
  - Code 37217 Transcatheter placement of intravascular stent(s), intrathoracic common carotid artery or innominate artery by retrograde treatment, open ipsilateral cervical carotid artery exposure, including angioplasty, when performed, and radiological supervision and interpretation
  - Do not confuse with 37215, 37216 or 37218 as these codes represent an antegrade percutaneous approach.
  - Code 37217 is the only code in this series that represents an open as well as a retrograde approach
Intrathoracic or Innominate Artery Stent Placement (CPT 37218)

- 37218: Transcatheter placement of intravascular stent(s), intrathoracic common carotid artery or innominate artery, open or percutaneous antegrade approach, including angioplasty, when performed, and radiological supervision and interpretation.

- New for 2015, this code is similar to codes 37215, 37216, 0075T and 0076T in what is included or excluded.

- This code replaces the “combined use” of codes 0075T and 0076T as it now specifically defines treatment of the ipsilateral intrathoracic common carotid or innominate artery.

Extracranial Carotid Stent Placement- Percutaneous Approach

- Codes 37215 and 37216:
  - Include all extracranial ipsilateral selective carotid and/or innominate artery catheterization.
  - Include all diagnostic imaging for ipsilateral extracranial carotid and innominate arteriography.
CPT Codes - Transcatheter Therapy Procedures

Intrathoracic or Innominate Artery Stent Placement (CPT 37218)

That is:

- There are no corresponding S&I codes for this procedure.
- Do not include stenting of the vertebral or intrathoracic carotid artery. (Category III codes 0075T and 0076T exist to describe these procedures).
- If imaging confirms the need for innominate or intrathoracic carotid stenting, these services (i.e., cath placement and imaging) are included in the code 37218.
- If imaging does not confirm the need for innominate or intrathoracic carotid stent placement these services are reported separately (see codes in 3622x series).

CPT Codes - Transcatheter Therapy Procedures

- Intrathoracic Carotid or Extracranial Vertebral Artery Stent Placement

Category III Codes 0075T and +0076T represent stenting in the vertebral artery or proximal portion of the common carotid.

<table>
<thead>
<tr>
<th>CPT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0075T</td>
<td>Transcatheter placement of extracranial vertebral artery stent(s), including radiologic supervision and interpretation, percutaneous; initial vessel</td>
</tr>
<tr>
<td>0076T</td>
<td>Transcatheter placement of extracranial vertebral artery stent(s), including radiologic supervision and interpretation, percutaneous; each additional vessel (List separately in addition to code for primary procedure)</td>
</tr>
</tbody>
</table>
Selected Surgical and S&I Codes Affecting Radiology (Carotid / Vertebral)

- Category III codes 0075T and +0076T
  - Represent emerging technology and are not usually reimbursed unless provider has an IDE (Investigational Device Exemption).
  - Allows for data collection by the AMA.

Codes 0075T and 0076T:
- Include all ipsilateral extracranial vertebral artery selective vessel catheterization.
- All diagnostic imaging for ipsilateral extracranial vertebral arteriography.
- If imaging confirms need for stent placement these services (i.e., cath placement and imaging) are included in the codes 0075T and 0076T.
- If imaging does not confirm the need for stent placement these services are reported separately (see codes in the 3622x series).
Selected Surgical and S&I Codes Affecting Radiology (Carotid / Vertebral)

- So what's the difference between codes 61635, 37215, 37216, 37217, 37218 and 0075T/0076T?
  - Code 61635 represents placement of a stent (with or without angioplasty) *intracranially*.
  - Codes 37215/37216 define stenting in the cervical portion of the common carotid (near the bifurcation into the internal / external carotids).
  - Code 37217 defines an open, retrograde placement of an intrathoracic common carotid or innominate artery stent via a cervical carotid access (includes angioplasty when performed).
  - Code 37218 defines stenting in the innominate or intrathoracic carotid artery.
  - Codes 37215-37218 and 61635 all include angioplasty when performed.
  - Codes 0075T/+0076T define stenting of the extracranial vertebral artery.

CPT Codes - Transcatheter Therapy Procedures

- Stent Placement- Non Coronary, Non-Carotid, Non-Vertebral, Non-Intracranial, Non Lower Extremity

<table>
<thead>
<tr>
<th>Arterial</th>
<th>CPT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>37236</td>
<td>Transcatheter placement of an intravascular stent(s) (except lower extremity artery(s) for occlusive disease, cervical carotid, extracranial vertebral or intrathoracic carotid, intracranial, or coronary), open or percutaneous, including radiological supervision and interpretation and including all angioplasty within the same vessel, when performed; initial artery</td>
</tr>
<tr>
<td></td>
<td>37237</td>
<td>Transcatheter placement of an intravascular stent(s) (except lower extremity artery(s) for occlusive disease, cervical carotid, extracranial vertebral or intrathoracic carotid, intracranial, or coronary), open or percutaneous, including radiological supervision and interpretation and including all angioplasty within the same vessel, when performed; each additional artery (List separately in addition to code for primary procedure)</td>
</tr>
</tbody>
</table>
CPT Codes - Transcatheter Therapy Procedures

- Stent Placement- Non Coronary, Non-Carotid, Non-Vertebral, Non-Intracranial, Non Lower Extremity

Venous

**CPT** | **Description**
--- | ---
37238 | Transcatheter placement of an intravascular stent(s), open or percutaneous, including radiological supervision and interpretation and including angioplasty within the same vessel, when performed; initial vein
37239 | Transcatheter placement of an intravascular stent(s), open or percutaneous, including radiological supervision and interpretation and including angioplasty within the same vessel, when performed; each additional vein (List separately in addition to code for primary procedure)

Follow-Up Angiography

- Completion Angiography

**CPT** | **Description**
--- | ---
75898 | Angiography through existing catheter for follow-up study for transcatheter therapy, embolization or infusion, other than for thrombolysis

- MUE = 1
- MAI = 1

From the 2015 SIR Guide (page 113):

- "If appropriately indicated and documented, multiple follow up angiograms performed intermittently during embolization of the CNS, are reportable.
- Very few codes allow the separate reporting of this code to test the efficacy of the treatment (37202, 61624 and 61626).
- Be cognizant of the amount of times that this code may be submitted on the same patient at the same encounter.
- Think intracranial vs. extracranial
Case #1 - Diagnostic Cerebral Angiography and Intervention

Clinical history:
84-year-old woman past medical history significant for hypertension and hyperlipidemia and small ischemic stroke in the right MCA vascular territory. Noninvasive imaging is workup for her symptoms showed cervical right ICA stenosis and a right MCA bifurcation aneurysm. She then proceeded to have endovascular stent assisted coil embolization repair of her right MCA bifurcation aneurysm as well as stented angioplasty of her cervical right ICA stenosis. Recently, she presents with symptoms of intermittent left extremity weakness and TIA. Recent CTA of the neck showed cervical right internal carotid artery stenosis. Today she presents for endovascular evaluation of her cervical right internal carotid artery including diagnostic catheter-based angiography with possible angioplasty of this re-stenosis.

Diagnosis: symptomatic cervical right internal carotid artery stenosis

Technique:
Diagnostic angiography with superselective catheterization of the following vessels:
1. Right common carotid artery, cervical frontal lateral views of the neck.
2. Right common carotid artery, frontal and lateral views of the head.
3. Right common carotid artery, cervical frontal lateral +20° oblique views of the neck.
4. Right common carotid artery, cervical frontal and lateral views -17° oblique views of the head.
5. Right common carotid artery, 3-D rotational angiogram of the head. Data was postprocessed on a separate workstation. Selected images were sent to PACs.
6. Right common carotid artery, magnified angiograms of the head centered upon the right MCA bifurcation.
7. Right common femoral artery, frontal view, for pre-closure device placement.

Contrast material: a total of 250 mL of Omnipaque 240 was utilized.

Fluoroscopy time: 19.6 min. (6045F)
Case #1 - continued

Informed consent:
The details of the procedure including the risks and benefits were discussed with the patient and her family, including risk of minor/major stroke as well as major bleeding necessitating surgical intervention. In addition contrast reaction, groin hematoma and death were described. Written informed consent was obtained and placed in the patient’s medical record.

Diagnostic angiography:
The right groin was draped and prepped in a sterile fashion. Using the modified Seldinger technique in a micropuncture system, a 6 French long femoral sheath was placed in the right common femoral artery. Then a 5 French Berenstein 2 catheter was next navigated over Terumo 0.035 glide wire into the aortic arch under fluoroscopic guidance. Under fluoroscopy, the catheter was selectively placed into the right common carotid artery. Cervical frontal lateral angiograms of the neck were performed. Then frontal and lateral angiograms of the head were acquired via the right common carotid injection. The frontal lateral flat panel detectors were rotated clockwise 20°. Subsequent cervical frontal and lateral +20° oblique angiograms of the neck were obtained. Then the frontal and lateral flat panel detectors were rotated counterclockwise to -17°. Then frontal and lateral -17° oblique angiograms of the head were performed.

Findings:
Right common carotid artery angiograms:
Cervical angiograms show approximately 60% in stent stenosis at the origin of the right internal carotid artery. This lesion measures approximately 12.5 mm in length. Intracranial angiograms show prior stent assisted coil embolization of the right MCA bifurcation aneurysm. There is an inferiorly projecting residual aneurysm measuring approximately 3.1 mm AP and 3.3 mm TR in size. The neck of this residual aneurysm measures 3.0 mm AP and 4.1 mm TR in size. There also may be some in stent stenosis, not well evaluated on this exam secondary to motion artifact. There is otherwise, brisk vascular contrast filling in the MCA vascular tree. There is a widely patent right posterior communicating (PCOM) artery supplying the right PCA vascular territory. There is a hypoplastic A1 segment of the right ACA therefore the right ACA vascular tree does not rapidly fill from the ipsilateral right ICA. Please note on prior exam dated 6/20/2014 that there was a widely patent anterior communicating artery. No abnormally high – flow or early draining veins are seen. No regions of abnormal hypervascularity are noted. The visualized dural sinuses are patent.

Case #1 - continued

A 3-D rotational angiogram of the head was acquired. Data was post processed on a separate workstation. Selected images were sent to PACs. Using the 3-D rotational angiogram exam, the best working projection was selected. Then a magnifying angiogram of the head centered upon the right MCA bifurcation was obtained. The catheter was subsequently removed.

A right common femoral artery angiograms performed prior to placement of a 6 French Perclose percutaneous suture in the right common femoral artery access site. Adequate hemostasis was achieved.

Findings:
Right common carotid artery angiograms:
Cervical angiograms show approximately 60% in stent stenosis at the origin of the right internal carotid artery. This lesion measures approximately 12.5 mm in length. Intracranial angiograms show prior stent assisted coil embolization of the right MCA bifurcation aneurysm. There is an inferiorly projecting residual aneurysm measuring approximately 3.1 mm AP and 3.3 mm TR in size. The neck of this residual aneurysm measures 3.0 mm AP and 4.1 mm TR in size. There also may be some in stent stenosis, not well evaluated on this exam secondary to motion artifact. There is otherwise, brisk vascular contrast filling in the MCA vascular tree. There is a widely patent right posterior communicating (PCOM) artery supplying the right PCA vascular territory. There is a hypoplastic A1 segment of the right ACA therefore the right ACA vascular tree does not rapidly fill from the ipsilateral right ICA. Please note on prior exam dated 6/20/2014 that there was a widely patent anterior communicating artery. No abnormally high – flow or early draining veins are seen. No regions of abnormal hypervascularity are noted. The visualized dural sinuses are patent.
Case #1 - continued

Findings, cont.
Right common femoral artery angiogram: The level of groin puncture is of the common femoral artery and thus adequate for Perclose device utilization.

Endovascular treatment – Angioplasty of symptomatic cervical right internal carotid artery stenosis.
A 6French envoy guide catheter was placed in the right common femoral artery. Follow-up magnified frontal and lateral angiograms of the neck by of the right common carotid artery injection of contrast were performed. Then, using coaxial technique, real-time fluoroscopy and biplane road mapping technique a 5 mm Angioguard distal cerebral protection device was deployed within the high cervical right internal carotid artery. Next, a therapeutic infusion of 10 mg of verapamil was performed into the right common carotid artery over 10 min. time for vasospasm

Next, a Sterling monorail 4.5 mm x 20 mm balloon was navigated over the wire to the site of focal stenosis within the cervical right internal carotid artery stent balloon angioplasty was then performed within the stent utilizing the Sterling balloon system (75962 & 35475) under real time fluoro and biplane roadmapping techniques. The balloon was subsequently deflated and removed. Follow-up magnified frontal lateral angiograms of the head by the right common carotid artery contrast injection showed residual cervical right internal carotid artery in stent stenosis.

Next a Sterling monorail 5 mm x 20 mm balloon was navigated over the wire to the site of focal residual stenosis within the cervical right internal carotid artery stent. Balloon angioplasty with the Sterling monorail 5 x 20 balloon was performed under real-time fluoroscopy and byplay road mapping technique.

Follow-up magnified frontal lateral angiograms of the head via the right common carotid artery contrast injections demonstrated no evidence for thromboembolic complications.

Impression:
1. Successful angioplasty of symptomatic cervical right internal carotid artery in stent stenosis. There is approximately 5% residual in stent intraluminal diameter stenosis by NASCET criteria on post angioplasty angiographic injections.
2. Prior stent assisted coil embolization of a right MCA bifurcation aneurysm. There is an inferiorly projecting residual aneurysm measuring approximately 3.1 mm AP and 3.3 mm TR in size the neck of this residual aneurysm measures 3.0 mm AP and 4.1 mm TR in size. This residual aneurysm may be amenable for endovascular treatment.
3. Possible right MCA bifurcation in stent stenosis. This is not well evaluated on this exam secondary to motion artifact. However, the right MCA vascular tree appears to briskly fill.
4. Suggest continuing Plavix 75 mg daily and aspirin 81 mg daily unless there is a contraindication to dual antiplatelet treatment.

Fluoroscopy time: 19.6 min.
Case #1 - Procedure Codes

- **36224** - RT Selective catheter placement in internal carotid artery and intracranial imaging
- **75962** - Peripheral artery angioplasty, S&I code
- **35475** - PTA of thoracic or brachiocephalic artery, surgical code
- **75896** - Infusion therapy, non-thrombolytic, S&I code
- **37202** - Infusion therapy, non-thrombolytic, surgical code
- **6045F** - Radiation exposure or exposure time in final report for procedure using fluoroscopy, documented (RAD)

Some payers may require CPT 37799 instead of codes 75962 and 35475 for carotid angioplasty, so be certain to verify state-specific payer guidelines when coding for this service.

The AMA in their adjunct publication, CPT Assistant state the following:

September 2008 page 10

**Surgery: Cardiovascular, 35475 (Q&A)**

**Question:** Is it appropriate to report CPT code 35475, Transluminal balloon angioplasty; percutaneous; brachiocephalic trunk or branches, each vessel, for left subclavian angioplasty?

**Answer:** Yes. CPT code 35475 would be appropriate to use for left subclavian angioplasty. Except for situations specifically described by other CPT codes (eg, carotid angioplasty and stenting), this code is intended to describe angioplasty of any neck or upper extremity artery.
Case #1 - Diagnoses Codes

ICD-9-CM
- 996.74 – Complication of other vascular device, implant, and graft
- 433.10 - Occlusion and stenosis of carotid artery, without mention of cerebral infarction
- 437.3 – Cerebral aneurysm, nonruptured
- V12.54 – Personal Hx of TIA w/o residual deficits
- 401.9 – Hypertension, unspecified
- 272.4 – Hyperlipidemia, unspecified

ICD-10-CM
- T82.858A – Stenosis of vascular prosthetic devices, implants, and grafts, Initial encounter
- I65.21 - Occlusion and stenosis of right carotid arteries
- I67.1 - Cerebral aneurysm, nonruptured
- Z86.73 – Personal Hx of TIA w/o residual deficits
- I10 – Hypertension
- E78.5 – Hyperlipidemia, unspecified

Seventh Character – Episode of Care

Initial
Receiving active treatment

Subsequent
Receiving routine care during healing or recovery (after active treatment)

Sequela
Complications or conditions arising as result of a condition
Cerebrovascular Disease

ICD-9: 433 - 434
- Occlusion and stenosis of precerebral and cerebral arteries
  - Basilar
  - Carotid
  - Vertebral
  - Multiple and bilateral
  - Cerebral thrombosis
  - Cerebral embolism
- With or without mention of cerebral infarction

ICD-10: I63-
- Precerebral and Cerebral infarction
  - Thrombosis
  - Embolism
  - Laterality

ICD-10: I65 – I66
- Precerebral and Cerebral occlusion and stenosis not resulting in infarction
  - Vertebral
  - Basilar
  - Vertebral
  - Carotid
  - Middle
  - Anterior
  - Posterior
  - Cerebellar

Additional documentation required

Case #2 - Diagnostic Cerebral Angiography and Intervention

Clinical history: Patient is a 18-year-old boy with a history of an intraosseous left frontal arteriovenous shunt and left parietal dural arteriovenous fistula. A previous transvenous coil embolization combined with liquid embolic, dated November 12, 2014 was successful to obliterate the intraosseous shunt. There was however a tiny residual fistula left training into the anterior ethmoidal vein and externally into the left facial vein. Patient underwent on January 1, 2015 a transvenous treatment via a superior sagittal sinus access of a small remnant of the arteriovenous intraosseous shunt. The additional small left parietal dural arteriovenous shunt/fistula was unchanged compared with the prior exam. Today he presents for a diagnostic cerebral angiogram with potential embolization.

Diagnosis: Left frontal intraosseous arteriovenous shunt treated with two previous embolization sessions. Stable left parietal dural arteriovenous shunt/fistula (DAVF).
Case #2 - continued

Diagnostic angiography with super selective catheterization of the following vessels:

1. Right common carotid artery, frontal and lateral views of the neck
2. Right internal carotid artery, frontal and lateral views of the head
3. Left internal carotid artery, frontal and lateral views of the head
4. Left external carotid artery, frontal and lateral views of the head
5. Left vertebral artery, Townes and lateral views of the head

Flouro time: 89.6 min.
Contrast material: 345 ml's of Omnipaque 240
The procedure was performed under general anesthesia and continuous cardiovascular monitoring.

Informed consent:
The details of the procedure including the benefits and risks were discussed with the patient and his family and included minor as well as major stroke, major bleeding necessitating surgical intervention, contrast reaction, groin hematoma and death. The signed consent form was attached to the patient's medical record.

Case #2 - continued

Procedure report:
Both groins were prepped and draped in a sterile fashion. Using the modified Seldinger technique and micropuncture system, a 6 French long femoral sheath was placed into the left common femoral artery. In a similar fashion both common femoral veins were punctured and 8 and 6 French sheets were placed respectively in the right and left groins.

Then, through the trans-arterial femoral access, a 6 French envoy guide catheter was navigated over a 0.035 Terumo glide wire into the aortic arch under fluoroscopic guidance.

Under fluoroscopy, the catheter was placed into the right common carotid artery. Cervical frontal lateral angiograms of the neck were performed. Using road mapping technique, the right internal carotid artery was then selected, frontal and lateral views of the head were acquired (36224).

The catheter was then placed in the left common carotid artery. Cervical frontal lateral angiograms of the neck were performed. Using roadmapping technique the left internal carotid artery was selected. Frontal lateral views of the head were acquired (36224).

Next the left external carotid artery was selected. Frontal lateral views of the head were then acquired (36227).

Initially the catheter was placed into left subclavian artery. The catheter was an advanced within the left vertebral artery. Townes and lateral views of the head were acquired (36226).
**Case #2 - continued**

**Findings:**
1. Status post coil combined with liquid embolization of a frontal, primarily left, intraosseous DAVF with a few tiny enlarged anterior frontal feeders originating from the right ophthalmic artery connecting to the superior medial aspect of a small residual venous intraosseous pouch located frontal/midline.
2. Early venous drainage through the arteriovenous shunt via the dural vein into the anterior aspect of the superior sagittal sinus.
3. Unchanged small left parietal arteriovenous shunt/fistula draining into the posterior part of the superior sagittal sinus and presenting with venous congestion and delayed normal venous return.
4. Unremarkable parenchymal blush of both hemispheres.
5. Patent major deep and superficial draining veins with as previously described fenestration/fusion anomaly of the sinus rectus.

**Endovascular treatment:**

After completion of the diagnostic study, a 6 French neuron guide catheter was navigated through the right common femoral vein, via the inferior/superior vena cava, brachiocephalic trunk and internal jugular vein, into the right sigmoid sinus. Via triaxial technique, a penumbr a 5 Max ACE catheter was navigated over a 3 Max microcatheter and a synchro 2.0.014 inch micro guide wire into the mid-proximal segment of the superior sagittal sinus (36012). Then a 5 French envoy guide cath was placed through this.

Through the left common femoral vein and with the same path of the neuron MAX catheter into the right internal jugular vein and via the coaxial technique a high-performance 6 x 6 mm balloon was navigated over and through the neuron MAX guide catheter. Next a flow guided marathon microcatheter was navigated over a synchro 0.010 micro guide wire into a right frontal dural vein supplying the intraosseous DAVF. The superselective angiogram shows (75870 & 36012) several tiny dural superficial veins draining from the small intraosseous venous pouch into the anterior portion of the superior sagittal sinus (SSS). All veins are moderately dilated. A safe microcatheter position is achieved for a liquid embolic infusion with balloon protection. With the hyperform balloon inflated, a transvenous superselective Onyx infusion was performed within the intraosseous DAVF pouch (75894 & 61624). Follow-up right internal carotid angiograms of the head with delayed acquisition for dural venous system visualization demonstrated (75898) a preserved patency of the right frontal ACA and ophthalmic branches as well as of the SSS.
Case #2 - continued

Endovascular treatment, cont.
In a similar fashion two additional transvenous superselective Onyx infusions were performed within the intraosseous DAVF pouch, with Transform 6 x 10 mm balloon protection into a second right frontal and medial left frontal dural vein supplying the intraosseous DAVF. Follow-up angiography demonstrated successful treatment (75898).

Final follow up right internal carotid angiogram of the head with delayed acquisition for dural venous system visualization demonstrated a complete Onyx obliteration of the remnant frontal intraosseous arteriovenous shunt pouch (75898).

The patient's parents were informed about the outcomes of the procedure.

There were no complications.

Impression:
1. Successful transvenous complete Onyx obliteration of the remnant midline frontal intraosseous arteriovenous shunt pouch after previous near complete obliteration of the shunt by double transvenous embolization treatment using coil and liquid embolic materials.
2. Unchanged delineation of the small left parietal dural arteriovenous shunt/fistula.

Fluoroscopy value: 89.6 min. (6045F)

Case #2 - Procedure Codes

- 36224 – RT Selective catheter placement in internal carotid artery and intracranial imaging
- 36224 – LT Selective catheter placement in internal carotid artery and intracranial imaging
- 36227 – LT Selective catheter placement in external carotid artery and imaging (may only submit once per side, must have ipsilateral primary code of 36222-36224)
- 36226 – LT Selective catheter placement in and imaging of vertebral artery
- 36012 Selective second order + venous catheter placement (via right common femoral vein)
- 36012 Selective second order + venous catheter placement (via left common femoral vein)
Case #2 - Procedure Codes

- 75870 Superior sagittal sinus venography, S&I code
- 75894 Embolization, any method, S&I code
- 61624 Intracranial/CNS embolization, surgical code
- 75898 x3 Angiogram through existing catheter
- 6045F - Radiation exposure or exposure time in final report for procedure using fluoroscopy, documented (RAD)

Case #2 - Diagnosis Codes

ICD-9 Codes
- 437.3 – Cerebral Aneurysm, nonruptured

ICD-10 Codes
- I67.1 – Cerebral Aneurysm, nonruptured
Query Opportunity – Is DAVF Congenital?

**ICD-9-CM Code**
- 747.81 – Anomalies of cerebrovascular system

**ICD-10-CM Code**
- Q28.8 – Other specified congenital malformations of circulatory system

ICD-9/10 Guidelines: “Assign an appropriate code(s) from categories Q00-Q99… when a malformation/deformation of chromosomal abnormality is documented.”

Do not code as congenital unless it is stated by the provider as congenital. Based on documentation, it is unclear if the fistula is a residual from the previous surgical intervention or a residual of the pre-existing malformation.

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Case #3

**Clinical history:**
The **patient is a 61-year-old female** with an **acute right hemiplegia and global aphasia**. The onset of the symptoms was between 9 AM and noon when her supervisor found her in the office nonresponsive. The CTA exam from 3:25 PM demonstrated and **occlusion of the M1 segment of the left middle cerebral artery (MCA)**. The patient did not receive IV t-PA treatment a diagnostic cerebral angiogram and thrombectomy was requested by the stroke team.

**Diagnosis:** **Acute ischemic stroke, proximal left MCA occlusion**

Diagnostic angiography with superselective catheterization of the following vessels:
1. Left common carotid artery, frontal lateral views of the neck
2. Left internal carotid artery, frontal lateral views of the head

A pre-closure device angiogram was also performed of the right common femoral artery.

**Contrast material:** 150 mL of Omnipaque 240

**Sedation:** The procedure was performed under general anesthesia.
Case #3 - continued

Informed consent:
The details of the procedure including the benefits and risks were discussed with the treating stroke neurologist and the ER team not directly involved in the endovascular treatment as well as the patient family members on the phone. The risks were discussed and included minor as well as major stroke, and major bleeding necessitating surgical intervention. Contrast reaction, groin hematoma and death were also described as possibilities. The signed consent form was attached to the patient chart.

Diagnostic angiography:
Both groins were prepped and draped in the usual sterile fashion. Using the modified Seldinger technique in a micropuncture system, a 9 French long femoral sheath was placed in the right groin and a 5 French long femoral sheath was placed in the left groin serving as an arterial line. The Berenstein 2 catheter was navigated over a Terumo glide wire.

Under fluoroscopic guidance, the catheter was placed in the left common carotid artery. Cervical frontal and lateral angiograms of the neck were performed. Using roadmapping technique, the left internal carotid artery was next selected. Frontal as well as lateral and magnified LAO views of the head acquired (36224).

Findings:
1. Thromboembolic occlusion of the left middle cerebral artery M1 segment at the mid-distal portion.
2. Both anterior cerebral arteries are seen through a patent anterior communicating artery.
3. Pial collaterals originating from the left ACA are noticed to perfuse the left MCA vascular territory.

Endovascular treatment:
After the completion of the diagnostic study, the 5 French diagnostic catheter was replaced for a 9 French Cello balloon guide the catheter which was positioned in the mid-cervical segment of the left internal carotid artery. Roadmap imaging in multiple projections was obtained. Using a triaxial technique, a Penumbra 5 Max ACE clot retrieval device was navigated over and Excelsior XT – 27 micro catheter and a 0.014 Synchro to microwire through the left internal carotid artery to the left M1 segment of the left MCA adjacent to the proximal aspect of the clot (36228-52). In the meantime clot suction through the Penumbra device was initiated and stopped flow in the left ICA was obtained with the inflation of the balloon catheter. The Max ACE catheter was then withdrawn within the Cello guiding catheter followed by Cello guiding catheter extraction from the femoral sheath. Several millimeters of organized clot was removed from the tip of the Cello guiding catheter. Follow-up angiography obtained with a 5 French Berenstein 2 diagnostic catheter showed a dramatic improvement of blood flow. Follow-up angiogram of the entire left anterior circulation demonstrated now TIMI 3 flow with excellent left MCA territory perfusion. Angiogram of the right common iliac artery was acquired prior to the placement of a 8 French Angioseal closure device at the right femoral access site. Adequate hemostasis was achieved. The long 5 French femoral sheath was exchanged for short one and left in place and sutured to the groin.

Complications: No periprocedural complications are seen.
Case #3 - continued

Impression:

Left M1 segment middle cerebral artery occlusion with large hypo-perfused ipsilateral MCA territory affecting brain tissue and pial collaterals originating from the left ACA. Successful complete revascularization TIMI 3 and reperfusion of the left hemisphere using 5 Max ACE penumbra clot suction system.

Fluoroscopy time: 12.5 min. (6045F)

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Case #3 - Procedure Codes

- 36224 – LT  Selective catheter placement in internal carotid artery and intracranial imaging
- 36228 – 52  Selective catheter placement in intracranial branch of carotid or vertebral artery circulation and imaging (maximum of 2 per side per patient encounter)
- 37184      Primary arterial thrombectomy, hybrid bundled code
- 6045F      Radiation exposure or exposure time in final report for procedure using fluoroscopy, documented (RAD)
Case #3 - Diagnosis Codes

ICD-9 Codes
- 434.01 – Cerebral thrombosis, with infarction
- 784.3 – Aphasia
- 342.90 – Unspecified hemiplegia and hemiparesis, affecting unspecified side

ICD-10 Codes
- I63.312 – Cerebral infarction due to thrombosis of left middle cerebral artery
- R47.01 – Aphasia
- G81.91 – Hemiplegia, unspecified, affecting right dominant side

Case #4

Indications: Refractory pseudotumor cerebri found to have transverse sigmoid sinus stenosis with significant improvement of symptoms after primary angioplasty, but now presents with recurrence in symptoms.

Procedure performed: Cerebral angiogram, cerebral venous sinus angioplasty and stenting.

Findings: Recurrent left transverse sigmoid sinus stenosis, successful angioplasty and stenting with minimal residual stenosis.

Vessels catheterized: 3 vessel cerebral angiogram (RICA, LICA, right vertebral).

Consent: Risks including but not limited to stroke, hemorrhage and death. Benefits of the procedure were discussed with the patient and her mother and consent was obtained.

Groin access: 1% lidocaine was used for local anesthesia around the right femoral artery. Using and 18 gauge needle, the right femoral artery was punctured and a 5 French sheath was placed.

A 5 French AG catheter was then advanced over the wire under fluoroscopic guidance to the aortic arch and angiography was performed over the chest in the left oblique view. This demonstrated large vessel origin. There was no tortuosity of the main vessels. No anomaly was identified.
Case #4 - continued

Right subclavian artery:
The catheter was then advanced under fluoroscopic guidance over a wire into the right subclavian artery and angiography was performed over the upper thorax in the AP projection. This demonstrated the origin of the right vertebral artery. No stenosis was identified.

Right vertebral artery:
Under fluoroscopic guidance and using roadmapping, the 5 French catheter was advanced into the right vertebral artery and DSA imaging was obtained over the cranium in the AP and lateral projections. This demonstrated (36226) normal vertebral artery as well as basilar artery and branch flow. There was no suggestion of AVM, stenosis, aneurysm or dissection. There is left transverse sigmoid sinus stenosis. Catheter was next withdrawn into the aortic arch.

Left common carotid artery:
Under fluoroscopic guidance, and using roadmap technique the catheter was next advanced into the left common carotid artery and DSA imaging was obtained over the neck in the AP and lateral projections. This demonstrated normal left CCA bifurcation. There was no stenosis or plaque identified in the ICA. Catheter was then withdrawn into the aortic arch.

Left internal carotid artery:
Under fluoroscopic guidance and using roadmap technique, the catheter was advanced into the left internal carotid artery and DSA imaging was obtained over the cranium in the AP and lateral projections. This demonstrated (36224) normal ICA, MCA, ACA and no suggestion of stenosis, aneurysm or dissection. There is left transverse sigmoid sinus stenosis.

Right common carotid artery:
Under fluoroscopic guidance and using roadmap technique, the catheter was advanced into the right common carotid artery and DSA imaging was obtained over the neck in the AP and lateral projections. This demonstrated normal right CCA bifurcation. There was no stenosis or plaque identified in the ICA.

Right internal carotid artery:
Under fluoroscopic guidance and using roadmap technique, the catheter was advanced into the right internal carotid artery and DSA imaging was obtained over the cranium in the AP and lateral projections. This demonstrated (36224) normal ICA, MCA, ACA and no suggestion of stenosis, aneurysm or dissection. There is left transverse sigmoid sinus stenosis.
Case #4 - continued

Next, using a separate access into the right femoral vein, through a 6 French groin sheath, we introduced a 6 French MPD catheter over a stiff glide wire. Under fluoro guidance, this was advanced within the inferior vena cava, through the right atrium, through the superior vena cava and finally the left internal jugular vein was selectively catheterized. The MPD catheter was advanced over the wire to the internal jugular/sigmoid sinus junction and it was parked there. At this point, the stiff glide wire was removed from the system. A 2.3 French Prowler Select Plus micro catheter was introduced over a Synchro 2 micro wire. It was advanced through the sigmoid sinus into the left transverse sinus and the torcular was crossed (36012). We advanced the Prowler Select Plus into the torcular, then withdrew the Synchro 2 micro-wire.

A cerebral venogram was performed. Under fluoroscopic guidance and using the roadmap technique, the catheter was advanced into the torcular and DSA imaging was obtained over the cranium in the AP and lateral projections. This demonstrated normal right transverse sinus and stenosis of the transverse–sigmoid junction measuring approximately 3 mm in its maximum diameter, spanning across 10 mm. The distal and proximal vessels appear to be 6 – 8 mm in diameter. At that point to Transcend exchange link wire was introduced in advanced into the right transverse sinus and parked in the right transverse – sigmoid junction. At that point the Prowler Select Plus was exchanged off of the Transcend exchange wire in the usual fashion. A 6 x 20 balloon was introduced over the Transcend microwire. Segmental angioplasty was performed over the stenotic lesion within the left transverse and sigmoid junction.

Repeat angiogram showed increased venous flow through the left transverse and sigmoid sinuses during the venous phase.

At that point a 6 x 40 self expanding stent was introduced over the Transcend microwire. It was advanced under fluoroscopic guidance to the tip of the MPD hub. When we tried to navigate across the sigmoid sinus, the MPD herniated back and we were unable to pass a stent. Multiple attempts to pass a stent were unsuccessful.

At that point we removed the 6 x 40 stent from the system. At that point we gained venous access from the left femoral vein and placed a 6 French venous sheath. Within that, a 6 French MPD was introduced over a stiff glide wire and it was advanced in a similar fashion to the left sigmoid internal jugular junction.

A balloon expandable coronary stent was placed over the Transcend microwire and an attempt was made to crosses sigmoid sinus but this too was unsuccessful.

At that point we obtained access from the left femoral vein and placed a 6 French GS. A guide wire was advanced under fluoroscopic monitoring into the left sigmoid sinus. From there the wire was removed and microwire was inserted. Over the microwire the previously used angioplasty balloon was advanced and angioplasty was performed to straighten out the left sigmoid sinus in advance of a coronary stent.
Case #4 - continued

This was ultimately done successfully. After the stent was confirmed in satisfactory position by performance of angiography, the balloon is inflated in the stent was deployed. We performed post stent angioplasty with a 6 x 20 balloon. Post-angioplasty angiogram was performed and demonstrated improved flow.

The MPD were withdrawn. The arterial catheter was removed. Hemostasis was obtained with a 6 French Angioseal on the right manual pressure on bilateral femoral veins was performed.

Case #4 - Procedure Codes

- 36226 – RT Selective catheter placement in and imaging of vertebral artery
- 36224 – RT Selective catheter placement in internal carotid artery and intracranial imaging
- 36224 – LT Selective catheter placement in internal carotid artery and intracranial imaging
- 36012 – Selective second order + venous catheter placement (from right common femoral vein approach)
- 61635 - Intracranial stent placement, including angioplasty when performed
Case #4 - Diagnosis Codes

ICD-9-CM
- 348.2 – Benign intracranial hypertension
- 459.2 – Compression of vein

ICD-10-CM
- G93.2 – Benign intracranial hypertension
- I87.1 – Compression of vein

ICD-10-CM Index

Dx #1
- Pseudotumor
  - cerebr(G93.2)
  - Essential Modifier

Dx #2
- Stricture – see also Stenosis
  - ampulla of Vater (see)
    - anus (sphincter) K82.4
    - congenital Q55.4
  - vein IL7.1
  - vena cava (inferior) (superior) NEC IL7.1
  - vesicourethral orifice N32.0

Main Term
Subterm
Look up Main Term
Default Code
Case #5

Indications:
Patient not moving the right leg, less movement of right arm compared to left, still aphasic. Concern for vasospasm.

Procedure: Cerebral angiogram, intra-arterial infusion of verapamil, angioplasty of left A1, left M1, right M1, right distal ICA.

Findings: Greater than 50% (moderate) spasm of right A1 and distal right M1, left proximal M1, minimal residual after angioplasty.

Consent: Risks including but not limited to stroke, hemorrhage and death. Benefits of the procedure were discussed with the family consent was obtained.

Access: Right common femoral artery

Case #5 - continued

Procedure:
Via sterile prep and drape, the right common femoral artery was percutaneously accessed. Through the sheath, an MPD catheter was advanced over a Simmons catheter and a stiff glide wire. Simmons catheter was advanced into the aortic arch. The left common carotid artery was selectively engaged. The catheter was further advanced into the left internal carotid artery. Simmons catheter and stiff glide wire were withdrawn.

Diagnostic biplane angiography was performed over the cranium. This demonstrated moderate spasm of the right A1 segment and moderate spasm of the left M1 segments. The left M1 proximal segment had minimal spasm.

A balloon was advanced over the microwire and angioplasty was performed over the left A1 segment (61640). The balloon was next advanced over the wire into the left distal M1 segment and angioplasty was performed (61641).

There was minimal residual evidence of vasospasm after the angioplasty. To subsequently treat this vasospasm, therapeutic infusion of 5 mg of verapamil were slowly infused in the left internal carotid artery.
Case #5 - continued

Procedure, cont.

The MPD catheter was then withdrawn from the aortic arch and advanced into the right common carotid artery under fluoroscopic guidance and diagnostic biplane angiography was performed over the neck. This demonstrated the right internal carotid artery with no plaque or stenosis. The catheter was then advanced over the stiff guide wire into the right internal carotid artery and biplane angiography was performed over the cranium. This demonstrated severe spasm of the right M1 and right distal internal carotid artery. The balloon was then advanced over the wire into the right M1 segment and the patient at this point was very agitated and required Propofol infusion. With the balloon in the right M1 segment, angioplasty was performed of the right M1 (61642). The balloon was then withdrawn into the right distal ICA and angioplasty was performed of the right distal ICA (61642). The catheter was then withdrawn in the sheath was left in place.

Case #5 - Procedure Codes

- 61640 (left A1) Balloon inflation for treatment of intracranial vasospasm, initial vessel, bundled code
- 61641 (left M1) Balloon inflation for treatment of intracranial vasospasm, each additional vessel in same vascular family, bundled code
- 61642 (right M1) Balloon inflation for treatment of intracranial vasospasm, each additional vessel in different vascular family, bundled code
- 61642 (right ICA) Balloon inflation for treatment of intracranial vasospasm, each additional vessel in different vascular family, bundled code
- 75896 Infusion therapy, non-thrombolytic, S&I code
- 37202 Infusion therapy, non-thrombolytic, surgical code
Case #5 - Diagnosis Codes

ICD-9-CM Codes
- 435.9 – Unspecified transient cerebral ischemia

ICD-10-CM Codes
- I67.848 – Other cerebrovascular vasospasm and vasoconstriction

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