Direct Carotid Access for Acute Stroke Intervention

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Disclosure Statement of Financial Interest

Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

<table>
<thead>
<tr>
<th>Affiliation/Financial Relationship</th>
<th>Company</th>
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<tbody>
<tr>
<td>• Grant/Research Support</td>
<td>• Company Names</td>
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<td>• Consulting Fees/Honoraria</td>
<td>• Northwind, Setigone, Medtronic</td>
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<td>• Major Stock Shareholder/Equity</td>
<td>• Boston Scientific, St. Jude, Setigone, Access Closure</td>
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<td>• Royalty Income</td>
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<td>• Ownership/Founder/PST</td>
<td>• Northwind, Setigone,</td>
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<tr>
<td>• Intellectual Property Rights</td>
<td>• Filter Wire, Wholey Wire,</td>
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Access at C-5 and pass 5 or 6 fr sheath to Internal carotid

All interventional procedures are done through the sheath
Puncture with 21g needle at C5 level

Position 10 cm 6fr sheath
21 g needle at C5
Remove wire, filter to internal carotid followed by pre dil and stent
What have we learned

ELIMINATE THE COMPLEX AORTIC ARCH AND IT’S RISK OF STROKE

IMPROVED PROCEDURE TIME . .

IN THE CAROTID CHOICE TRIAL 18% OF STROKES CAME FROM AORTIC ARCH
DENSELY CALCIFIC VULNERABLE PLAQUE IN THE AORTIC ARCH
Shower Emboli

DWI Embolic stroke from atherosclerotic Arch following carotid intervention
OCTOGENARIAN TYPE 3 ARCH

Best managed by trans carotid access -

EMBOLIC SOURCE
Vulnerable plaque
PROBLEMS OF THE AORTIC ARCH

Complexities of the aortic arc are responsible for almost all technical failures.

Ideal

Trouble

More Trouble
ADVANTAGES of TRANS CAROTID

- **SPEED**
- MCA /IC only 10, 12 cm distance from sheath
  - Less contrast media
- Thrombectomy and Aspiration Devices are only 30 cm length
- Improved torque control
- Improved aspiration
- Percutaneous closure

- **Disadvantage** Radiation
CASE PRESENTATION

- 36 year old female
- Lengthy history of dilated cardiomyopathy
- Pt is on coumadin with an INR of 2.37
- Initially admitted to vascular surgery with episode of acute lower extremity ischemia secondary to an embolic event
- During prep for the peripheral embolic event pt had sudden onset of acute right-sided weakness
- Neurological exam demonstrated right-sided hemiparesis and right-sided hemianovpsia
- Speech difficulty with slight motor aphasia and NIH score: 18
DIFFUSION MRI
Early ischemic changes occurring in left lenticulostriate and periventricular site region
LEFT MCA

M1 occlusion is demonstrated on the TOF – MRA images
Ultrasound for localization at C 5 site

10 cm 6 fr SHEATH in position
At the common carotid and passed to the internal carotid
5FR ASPIRATION CATH AND THROMBECTOMY DEVICE SHORTENED TO -30CM
ASPIRATION 5 FR CATHETER CONNECT TO ASPIRE
TOTAL OCCLUSION Lt. M 1 DISTAL TO LENTICULO STRIATES
Collaterals are intact
Solitaire with clot removed
Post Recanalize with Aspire aspiration and thrombectomy
ASPERATION, THROMBECTOMY, PERCUTAEOUS CLOSURE 30’.
ASPERATION, THROMBECTOMY, PERCUTAEOUS CLOSURE 30’
PROGRESSIVE TIMING OF ENTIRE PROCEDURE

- Stroke Onset: 1300
- Neurologic Exam: 1320
- Imaging Exam: 1330
- Direct Carotid Puncture: 1400
- Device Aspiration & Thrombectomy: 1415
- Successful Reperfusion & Percutaneous Closure: 1445
Novel "balloon on stick" system whereby a weeping balloon is mounted directly on the distal end of 0.014" designed guidewire.

- 3-4F aspiration catheter
- 2.1F or 2.7F microcatheter
- 2-2.5mm OD x 2cm long, compliant weeping balloon
- Lytics weeping into thrombus
- 2.5 ID mm blocked artery
- 0.010" or 0.014" modified guidewire
Novel system whereby a novel stentriever is mounted directly on the distal end of a triever designed 0.014 wire.

Different sizes

THE STENTWIRE

- cut through the clots more effectively yet still be atraumatic to the vessel
- provide much larger resistive cross sectional area so that the clot may be removed more easily
Conclusion

• Mechanical aspiration and thrombectomy from a trans carotid access may be a useful addition to the endovascular treatment for acute stroke
• 30 cm shortened devices are more efficient
  Avoids the aortic arch
• Reduced procedure time and percutaneous closure
• Will require further evaluation and ultimately RCT f
Despite all current controversies, CAS has excellent and preferential indication for some symptomatic and asymptomatic patients.

Cervical puncture was the routine access for carotid angiography before the diffusion of the Seldinger technique.

The femoral access remains the first choice.

The cervical access is not to compete with the femoral access but allows to enlarge CAS possibilities avoiding surgical conversion.

It must be learned by vascular surgeons facing difficult accesses.
Percutaneous puncture

The patient's neck is draped like for surgery and the C arm is placed under the operating table in a profile view.

The needle is advanced about 2 finger's breadth from the clavicle, guided on the arterial pulse.
TRANS CAROTID INTERVENTION FOR ACUTE ISCHEMIC STROKE

THE ISTANBUL STROKE TRIAL

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HOW TO DO IT

• Percutaneous puncture is safer with the use of preclosing device: "Starclose" system from Abbott
• General anesthesia is more comfortable for both patients and surgeons; allowing to focus only on the procedure
• A short cut down (2 cm) for reluctant surgeons is acceptable and allow patient discharge at Day 2
• Low dose of Heparin (2000 iu) and its reversal
• 5 or 6 F short introducer in CCA
• Placement of PCD and stenting is easier by this way
## Benefits of avoiding arch anomalies

|                  | Total sample  
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<tr>
<td></td>
<td>Normal arch</td>
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<tr>
<td></td>
<td>Arch anomalies</td>
</tr>
<tr>
<td>N=214</td>
<td>N=189</td>
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<tr>
<td></td>
<td>N=25</td>
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<tr>
<td>Technical failure</td>
<td>(26) 12%</td>
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<td></td>
<td>(20) 10.5%</td>
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<tr>
<td></td>
<td>(6) 24%</td>
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<tr>
<td>Neurological complications</td>
<td>(14) 6.5%</td>
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<td>(9) 4.7%</td>
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<td>(5) 20%</td>
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**Faggioli** (EJVS 2007)

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<td>0.005</td>
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<tr>
<td>Neurological complications</td>
<td>0.026</td>
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**Kastrup** New DWI lesions in elderly: 85% vs 47% -- *p* < .05

(JVS 2008):  
1. **Ulcerated lesions** is an independent predictor of any **new ipsilateral DWI lesion**.  
2. **Severe aortic arch calcification** is a predictor of **new DWI lesions outside the territory treated**
ADVANTAGES

- Quick procedure
- Lower dose of contrast
- No arch manipulation
- No risk of contralateral or vertebral embolisation
The Aspire Aspiration catheter