

Surgical/IR Interventions in Stroke Care

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Disclosures

□ None

DISCLAIMER

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Everything Surgical/IR to the Future



□ In 45 minutes.

History way back

- First Noted 460 to 370 – Hippocrates
 - ▣ Apoplexy
- Galen – Recommended Prevention for Apoplexy
 - ▣ Balanced diet and sport
- 1658 – Johann Jacob Wepfer

Introduction

- Ischemic Stroke
- Indications for Care (Multi-disciplinary)
- Highlights of Techniques & Cases
- Pre and Post Op management
- Peer over the Horizon

Types of Stroke

- Ischemic
 - ▣ 87%

Indications for Care (Multidisciplinary)

- Prevention, Prevention, Prevention
 - ▣ An ounce of Prevention is worth a lb of cure.
- HTN, Diabetes, A-fib, Cholesterol*, Nicotine, Sedentary, Nutrition, Awareness

Indications for Thrombectomy

- Timing, Size Stroke, Anatomy, Patient Baseline function

2015 Trials

- MR CLEAN, ESCAPE, EXTEND-IA, REVASCAT, SWIFT PRIME
 - ▣ Standard of care for thrombectomy
 - ▣ NNT 3-4
 - ▣ 6-8 Hour Time Frame

<https://www.nejm.org/doi/full/10.1056/nejmoa1411587>

<https://pubmed.ncbi.nlm.nih.gov/25546514/>

<https://www.nejm.org/doi/full/10.1056/nejmoa1414792>

<https://pubmed.ncbi.nlm.nih.gov/24206399/>

2017 Trials

- DAWN Trial, DEFUSE 3 Trial
 - ▣ Extended past 6 hours with Imaging showing penumbra
 - ▣ Up to 24 hours

<https://pubmed.ncbi.nlm.nih.gov/28946832/>

<https://pubmed.ncbi.nlm.nih.gov/29129157/>

2023 Trials

- RESCUE Japan LIMIT, SELECT 2, ANGEL-ASPECT
 - ▣ Benefit of Thrombectomy in Setting of Large Core Infarctions
 - ▣ NNT 7 and 5 for MRS 0-2 and 0-3
 - ▣ Across all studies – Decreased MRS 5

<https://pubmed.ncbi.nlm.nih.gov/35138767/>

<https://pubmed.ncbi.nlm.nih.gov/36762852/>

<https://pubmed.ncbi.nlm.nih.gov/36762865/>

Techniques in Stroke Intervention

Ischemic - Occlusion

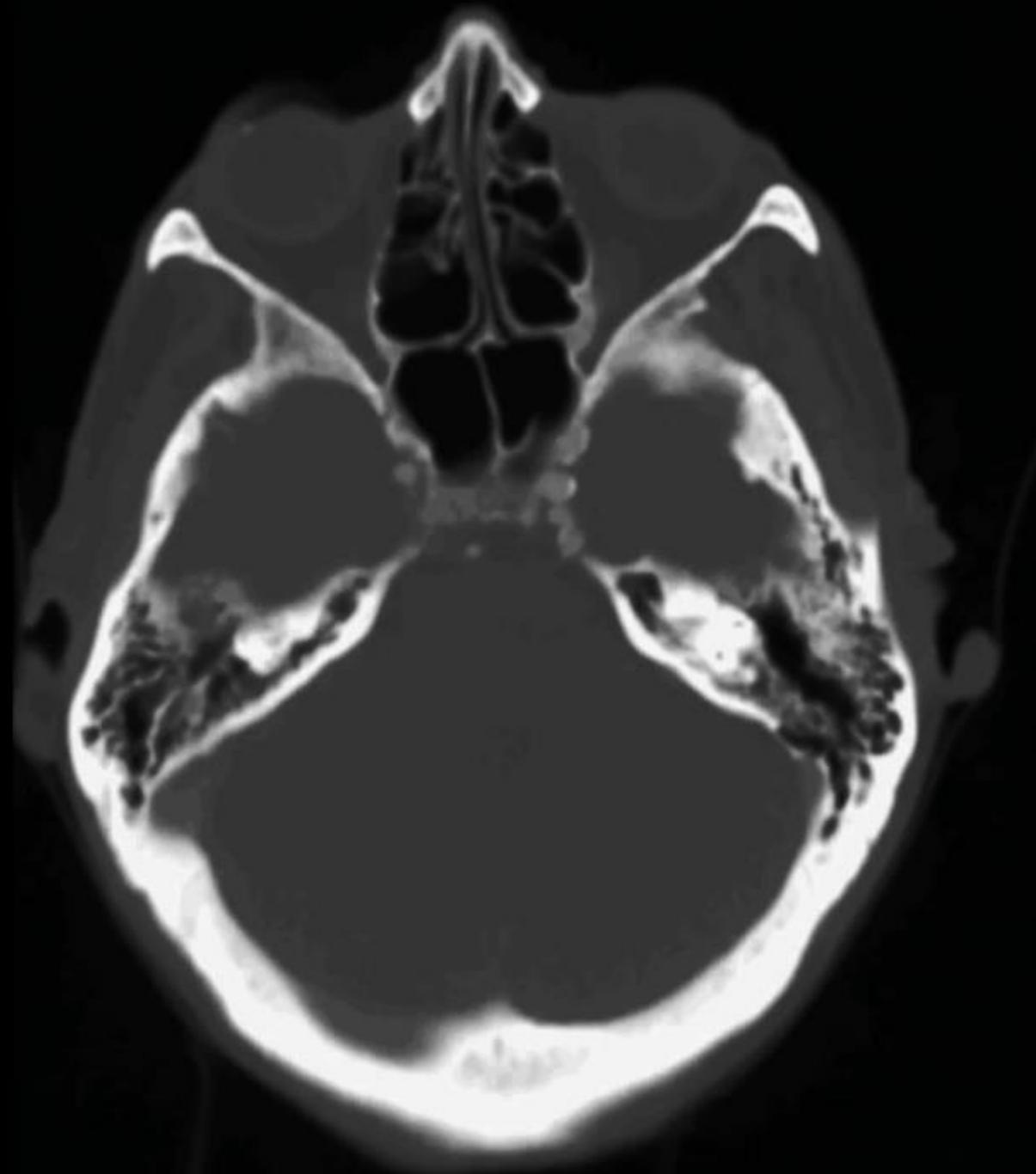
- IA Thrombolytic Infusion
- Aspiration Thrombectomy
- Stent-Retriever
- Any combination of the above

IV Thrombolytic

- ❑ Anecdotally seeing more with changes in medications
- ❑ 90s Patient
- ❑ Inpatient Rehab
- ❑ 1 Hour presentation
- ❑ IV thrombolytic and transferred

Case Study

- Aphasia
- Rt side weakness
- NIHSS 17
- Left M1 occlusion
- Large PTA



Typical Stroke Case - Aspiration

- 60s Patient – Acute Lt Weak, Slurred speech
- Received tPA – NIHSS 23
- Risk – HTN, DM, HLD,
- Right M1 occlusion



Post Procedure

Exam at discharge:

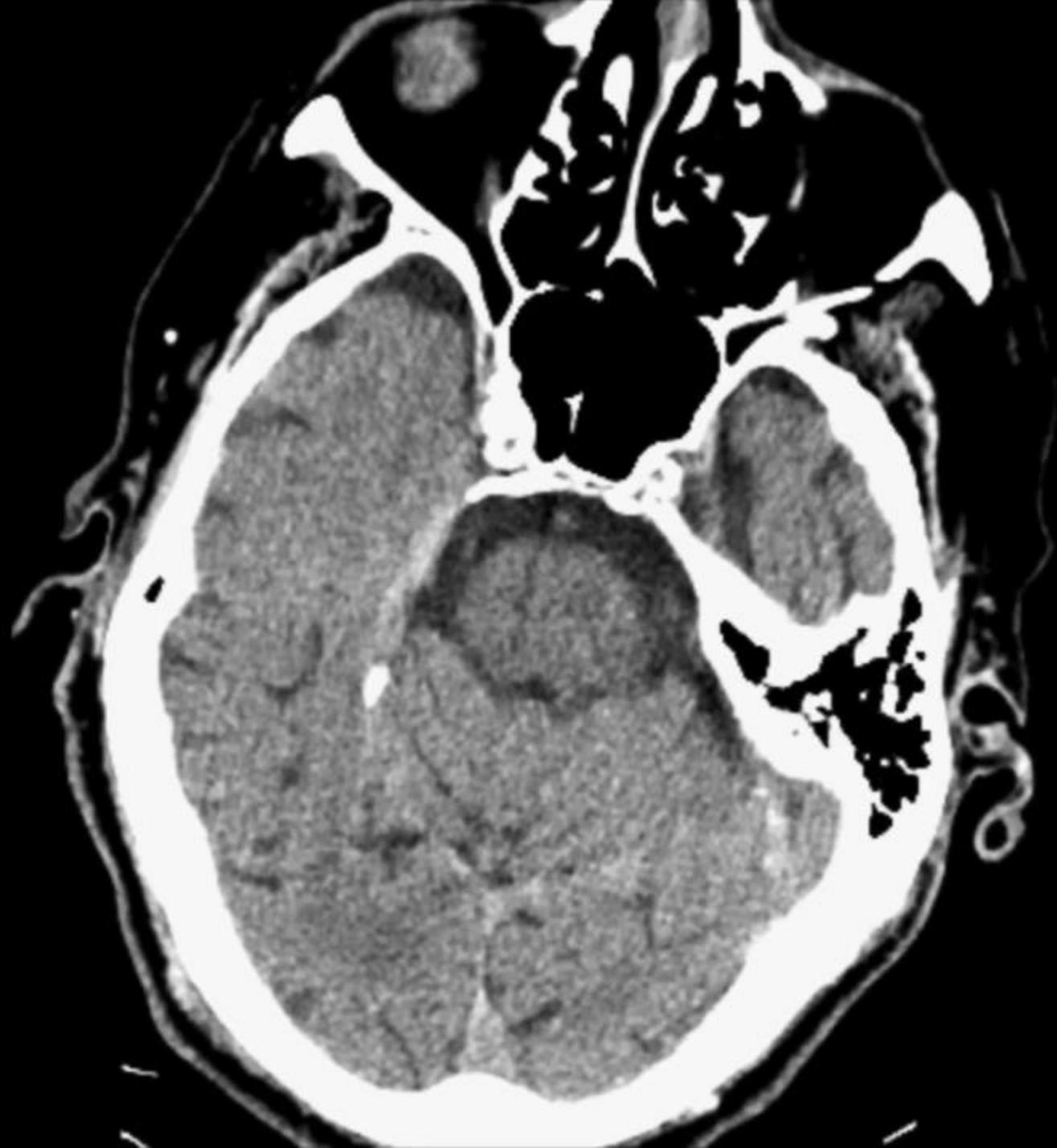
Alert, Normal Language

No drift in extremities

4/5 weakness Left upper and lower
extremity

Easier Cases – Single Cath – Single pass

- 70s Patient
- Hx Afib, Lt SDH, DM, HTN
- Acute Lt Side Weakness, Rt Gaze
- No IV lytics with SDH hx
- CTA rt M1 Occlusion



Follow-up

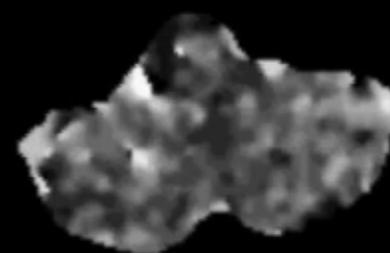
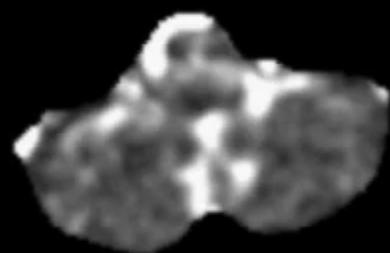
- Post Thrombectomy MRI
 - ▣ Minimal Stroke Burden
- IPR – progressed to OP therapy
- 2 Months
 - ▣ Walking on own, advanced diet

Distal MeVO – Stent retriever

- 90s Patient
- NIHSS 8
- Rt – Large Rolandic M2 Occlusion
- CTP – 80cc Pneumbra – no core

CBF

Tmax



● CBF < 30%: 0 ml

● Tmax > 6.0s: 81 ml

Mismatch volume: 81 ml

Mismatch ratio: infinite

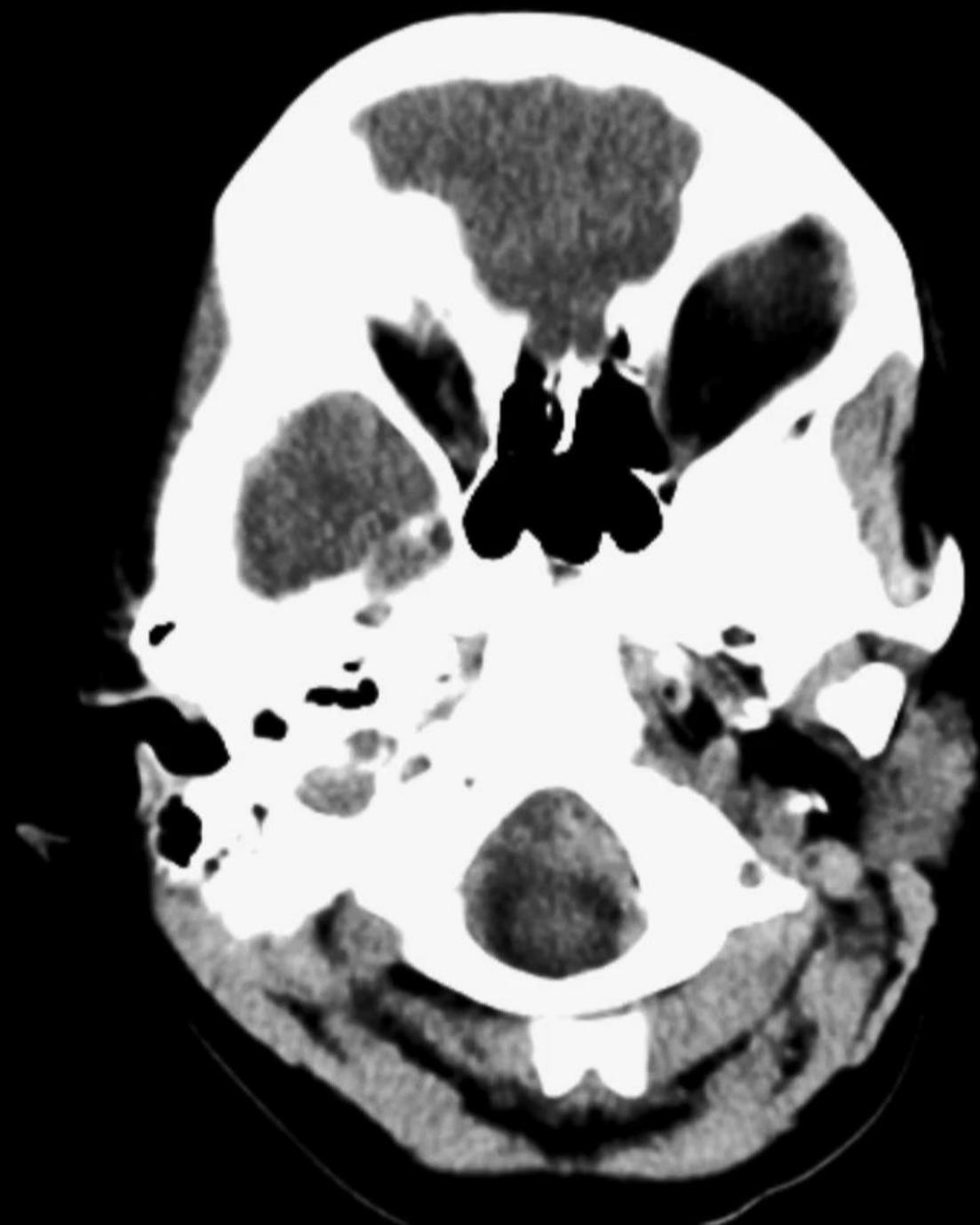
Newer Select 2 Criteria

- 40s Patient
- Found Down – Unknown amount of time
- LKN – 2days ago
- ASPECTS 6
- CTA – Lt M1 occlusion
- NIHSS - 20



Pediatric Strokes

- <10 Year Old
- Delay diagnosis (20-30 Hr)
- Mid Basilar Occlusion
- Transferred for thrombectomy
- Fluctuating Exam



Techniques in Stroke Intervention

Ischemic – Stenosis

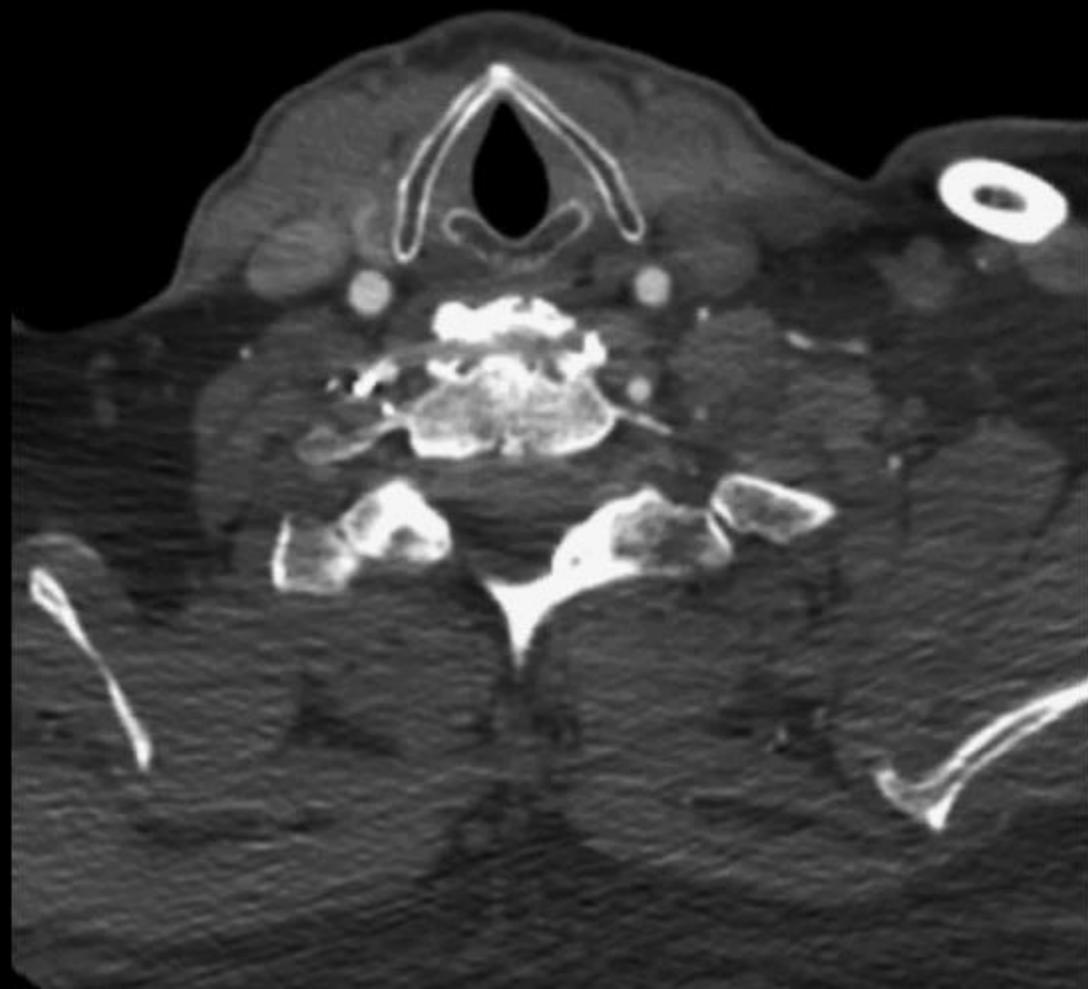
- Carotid Artery Stenting-Angioplasty
- Carotid Endarterectomy
- Intracranial Angioplasty or stenting
- Extracranial to Intracranial Bypass

Tandem Stenosis/Occlusion

- 70s Patient
- Acute Rt Weakness and Aphasia
- Left Severe ICA origin Stenosis and Left M1 occlusion
- IV Thrombolytics
- Exam improved – NIHSS 1 on arrival

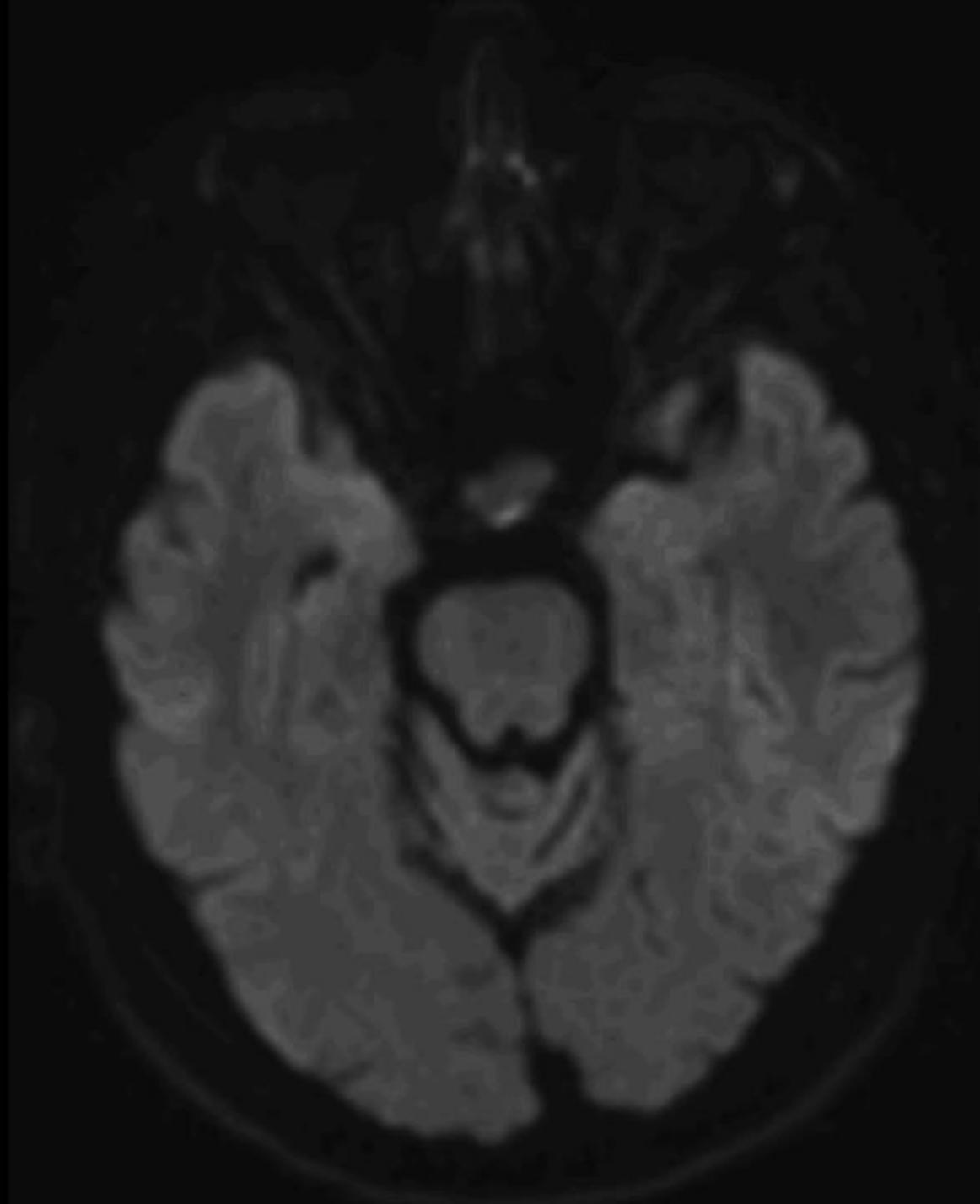
Continued

- New CTA with ICA stenosis/String sign – Lt M1 occlusion resolved
- ASA/Plavix
- In pre-op bay for dx angiogram and likely stenting.
- Acute recurrence of stroke symptoms



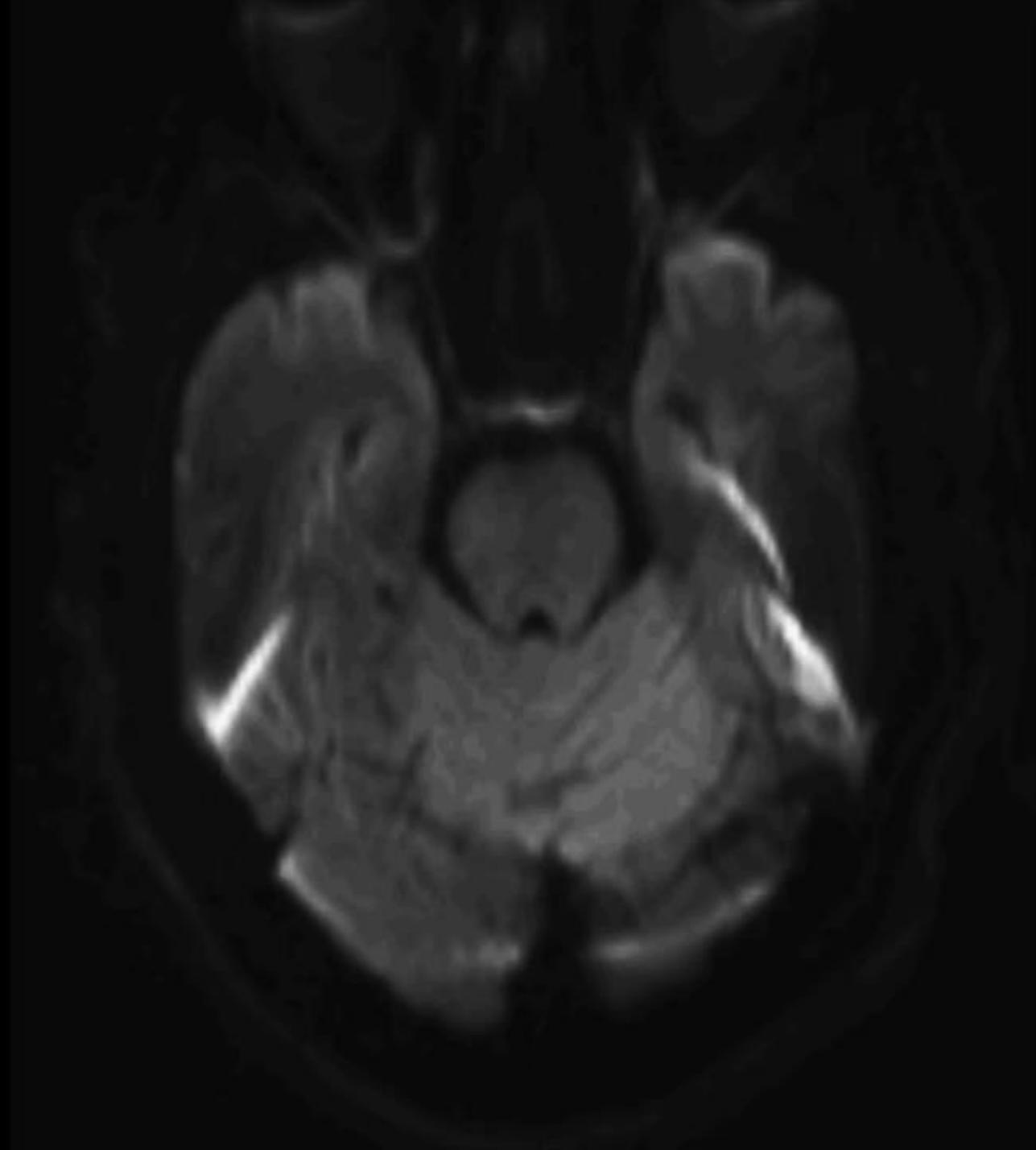
Stenosis/Web

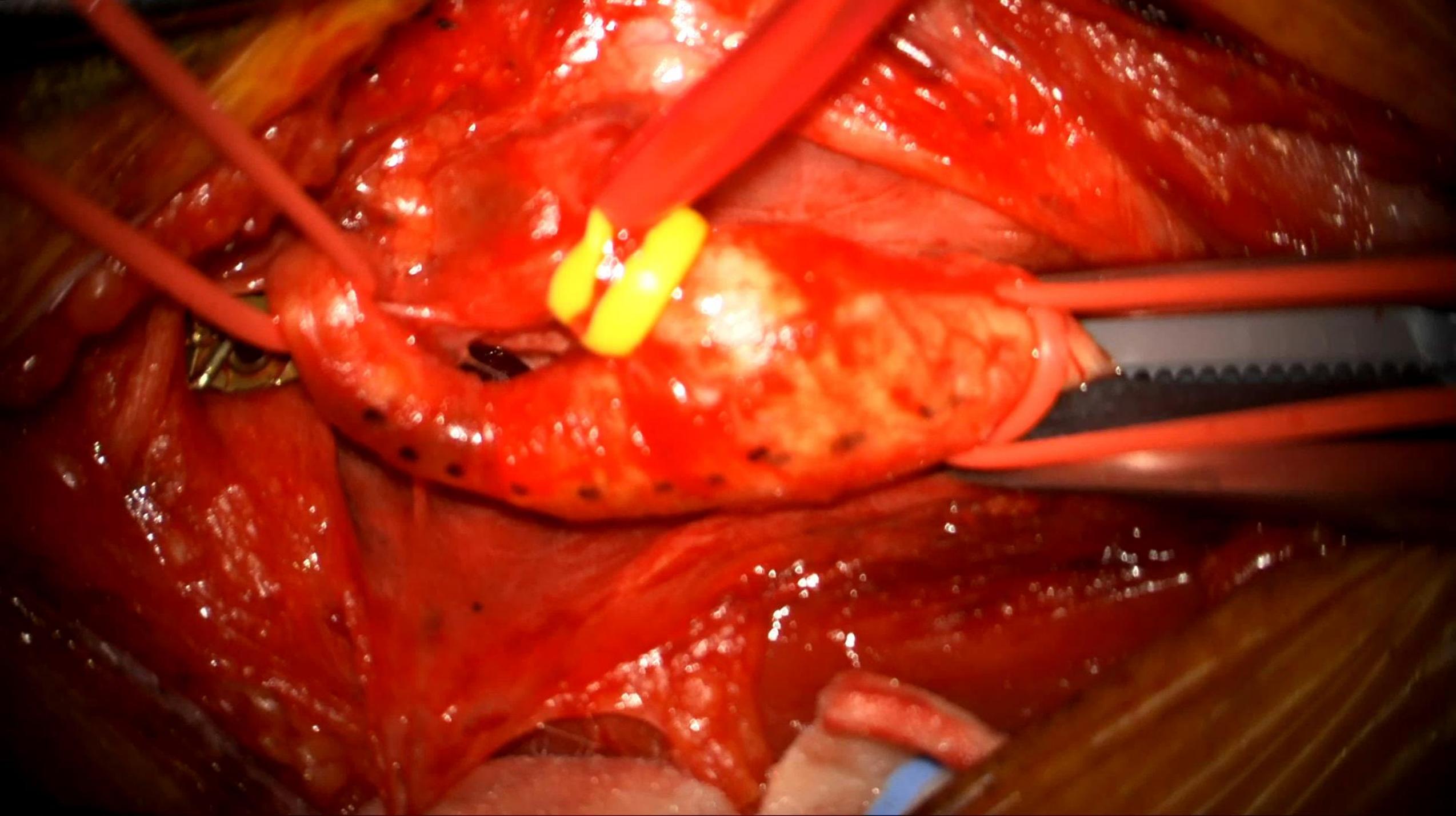
- 70s Patient
- HTN,HLD
- Lt Numbness/Weakness
- Rt side strokes
- Rt stenosis – Carotid Web



Carotid Endarterectomy

- 70s Patient
- Hx – HTN, HLD, CAD, DM, CKD
- Sudden Lt hemiparesis, Dysarthria
- Bilateral Carotid Stenosis
- ASA/Plavix

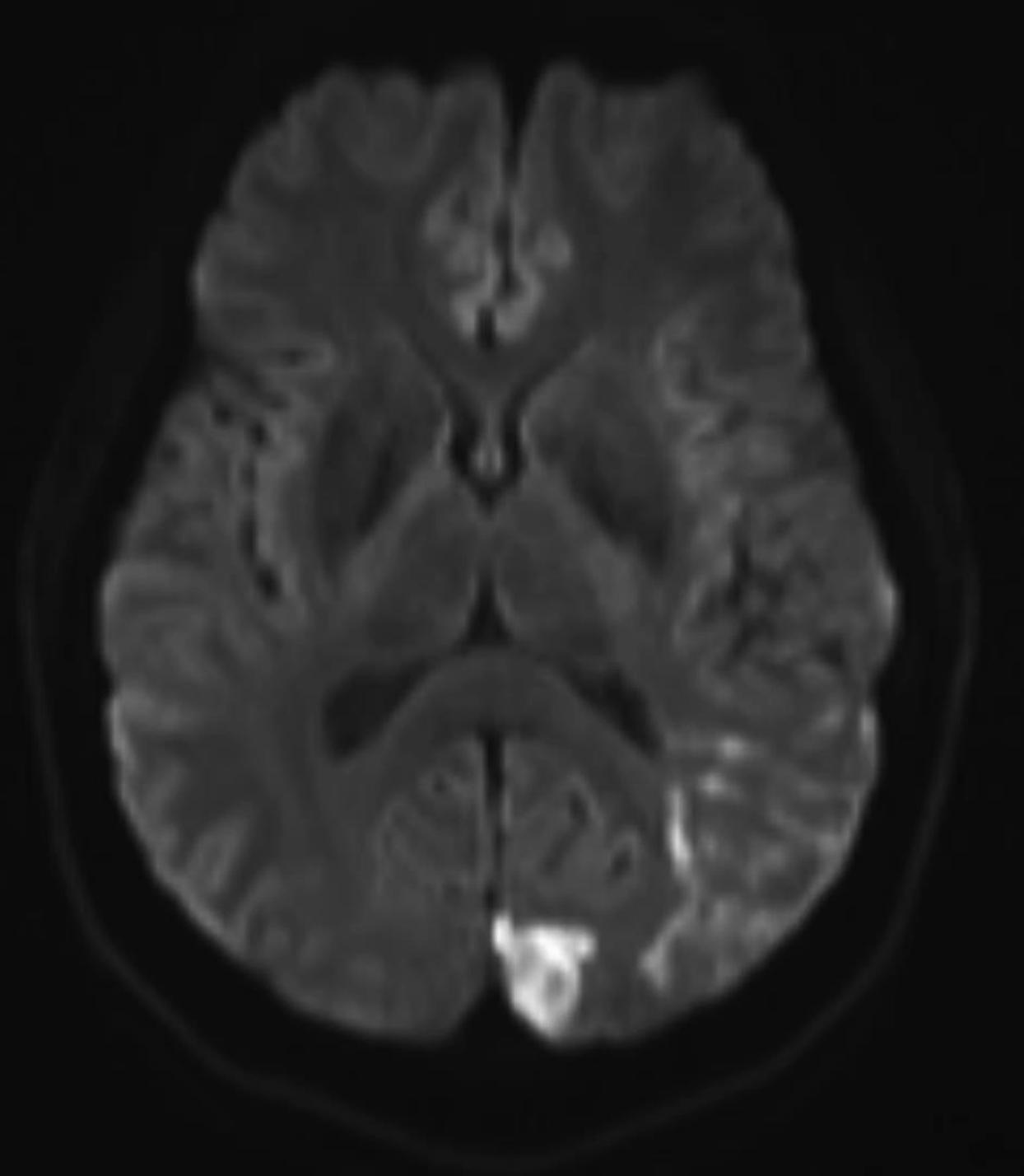


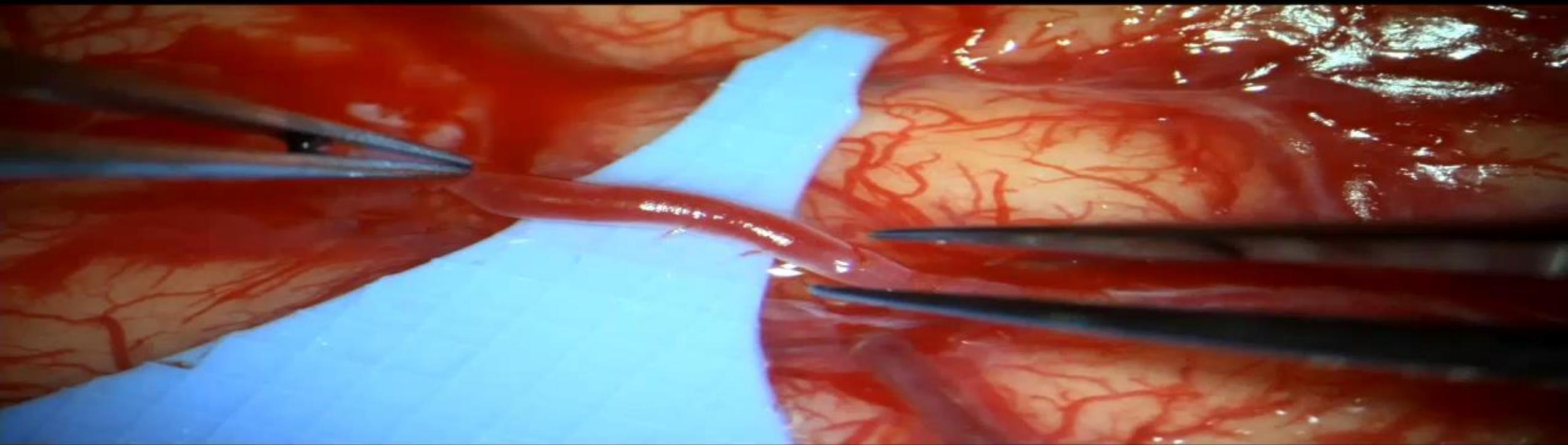




Bypass – moyamoya/ICAD

- 30s Patient
- Presented with acute Lt MCA-PCA watershed stroke
- Hx – Tob
- HTN – protective





Pre-Hospital Management

- Imaging – AI software Detection, Communication
- Transport – Air vs Ground, Nearest Facility, State-Line and Insurance
- IV Thrombolytics

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Post-Operation Management

- Rehab –
 - ▣ Neurospecificity Vs General
- Follow-up and monitoring
- Medications and Compliance

Over the Horizon

- Distal vessel occlusions
- Posterior Circulation Strokes
- Robotics – Remote access
- Neuroprotective Agents
- Stem Cells for recovery
- Brain computer interface implants
- Immersive Rehabilitation

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