Carotid and Vertebral Stenting in Acute Stroke

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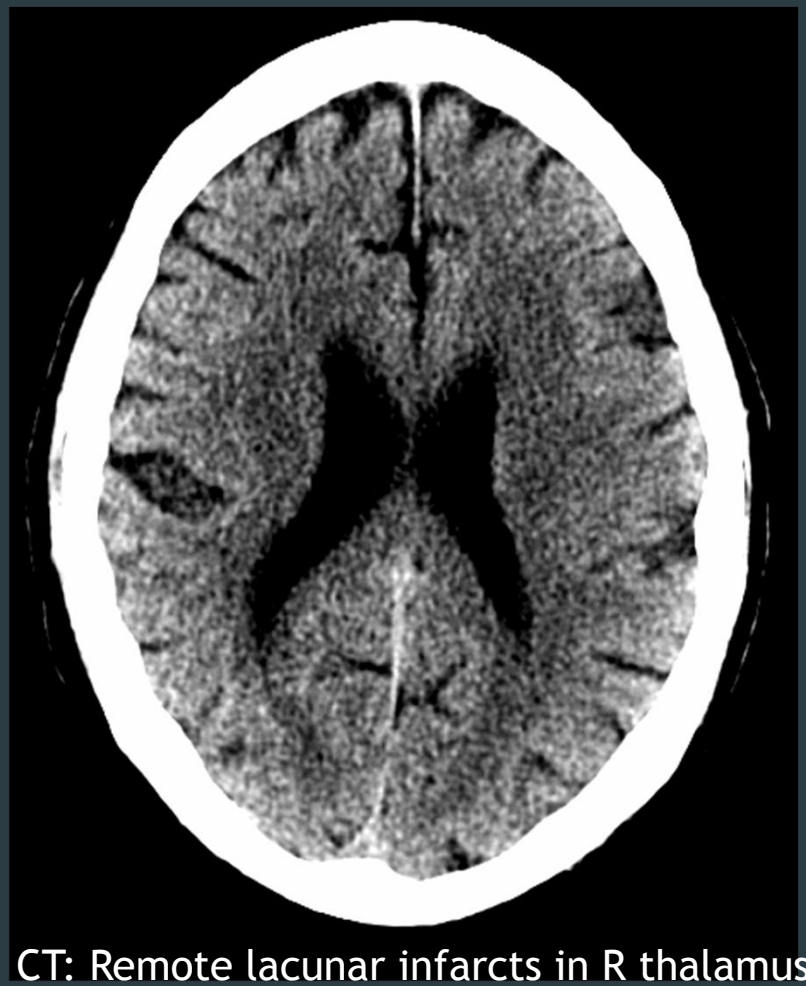
Our experience with flow significant carotid/vertebral stenosis without intracranial thrombus but with intracranial infarcts due to decreased flow/emboli.

- Difficult diagnosis as fluctuating course as they are dependent on blood pressure/hydration.
- Aggressive imaging is key. We perform CT Angio head and neck and CT perfusion even in NIH score is very low or normal. Our ratio
- If CT Angio/Perfusion is not performed, MRI/MRA within 24 hrs of presentation.
- Look out for watershed/embolic infarcts.
- Evaluation of extracranial neck vasculature is key

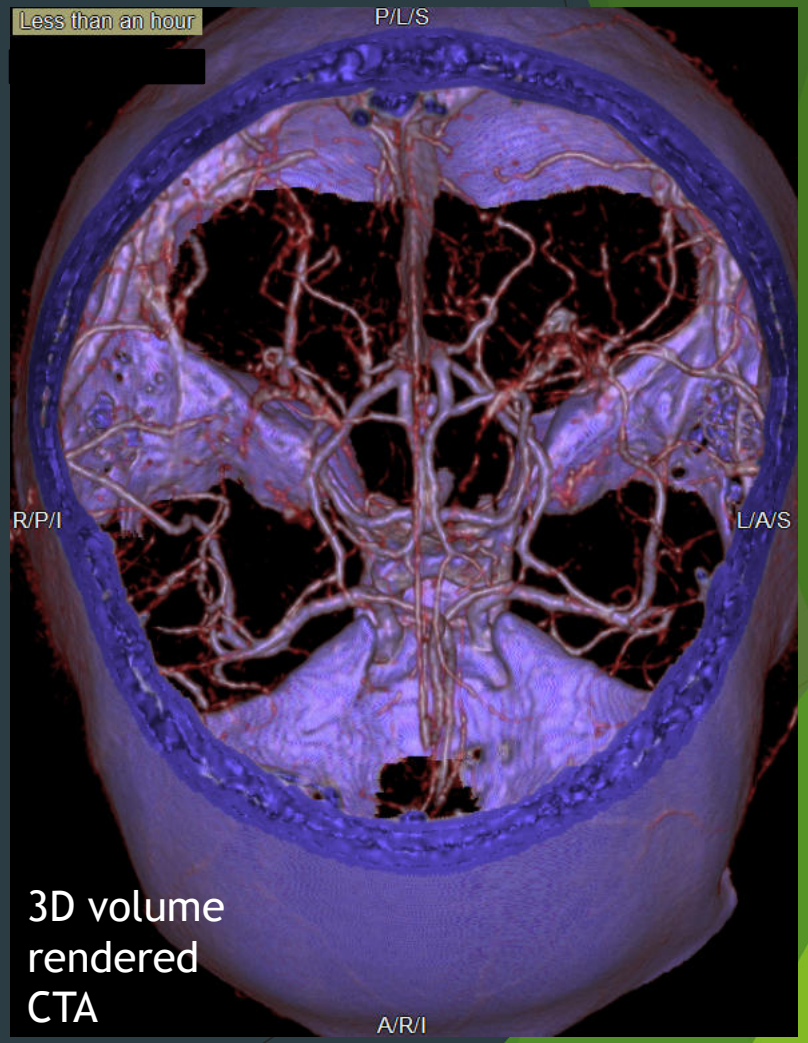
CASE 1

- 65 y/o R handed M was driving his car when he developed L UE pain followed immediately by weakness and numbness described as a “floppy arm”.
- In the ED he developed improvement in L arm weakness but found developed difficulty ambulating his L leg.
- Onset at 15:00 and received TPA at 17:03
- Similar symptoms occurred 3 weeks ago and lasted for 25 minutes
- Past hx significant for:
  - HTN, dyslipidemia, tobacco abuse, DM
  - >70% stenosis of R proximal ICA and a moderate 50-79% stenosis of R mid ICA
  - CAD s/p stent
  - Takes ASA daily

INITIAL IMAGING

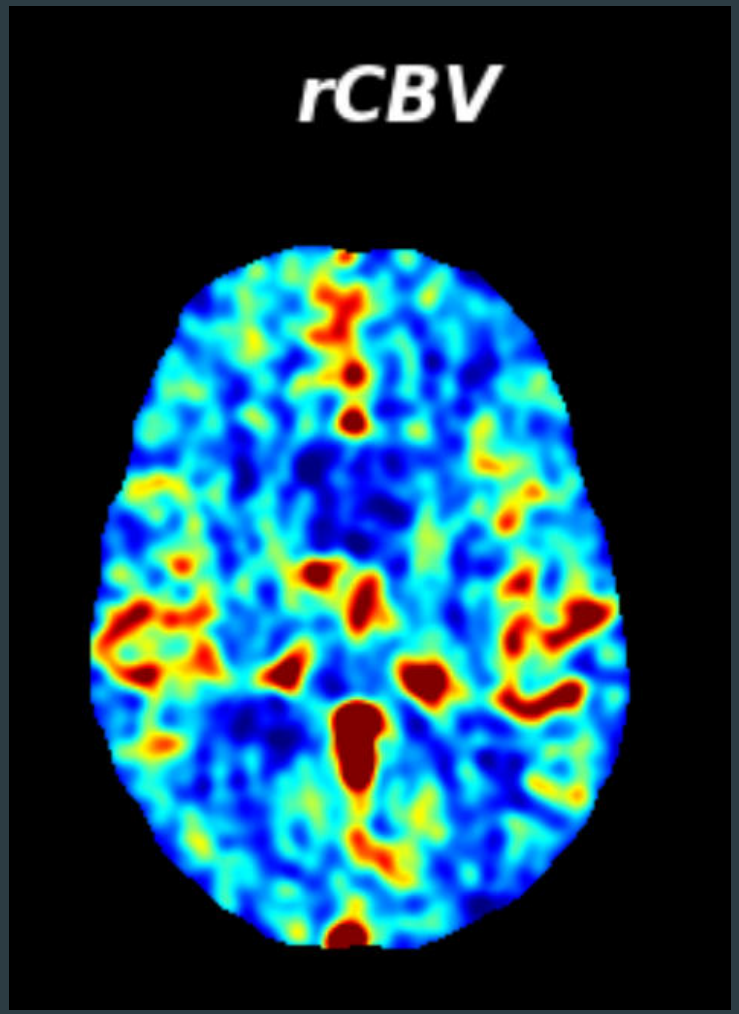


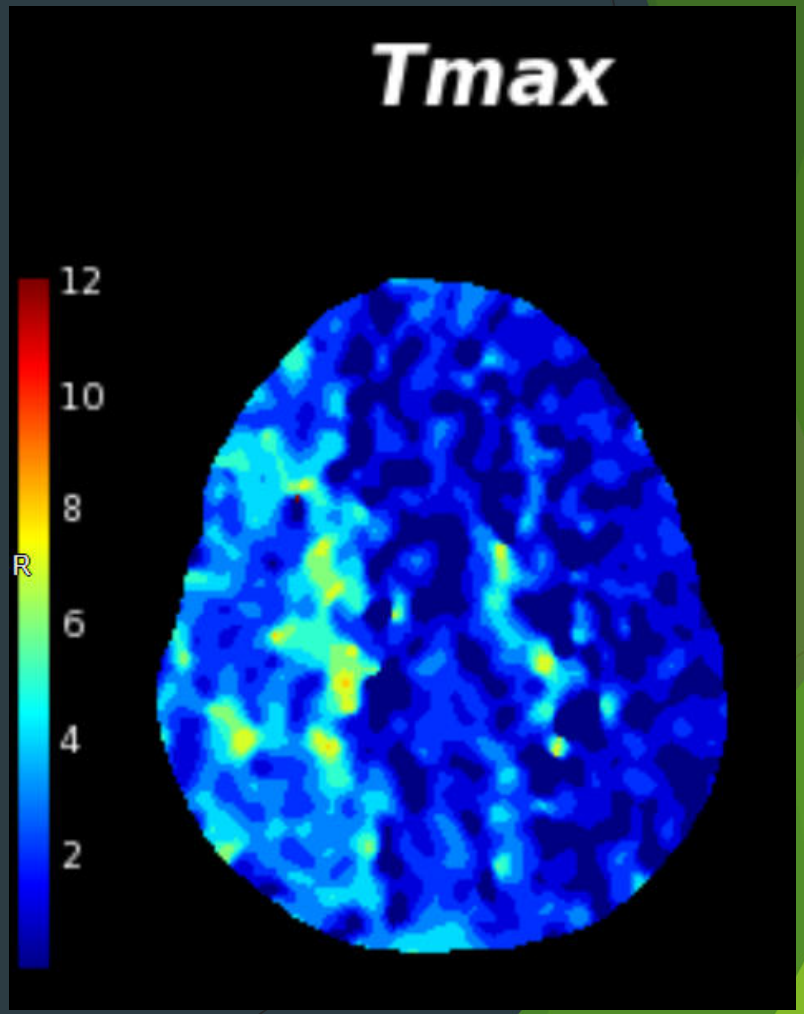
CT: Remote lacunar infarcts in R thalamus, R caudate, and anterior limb of R internal capsule



3D volume rendered CTA

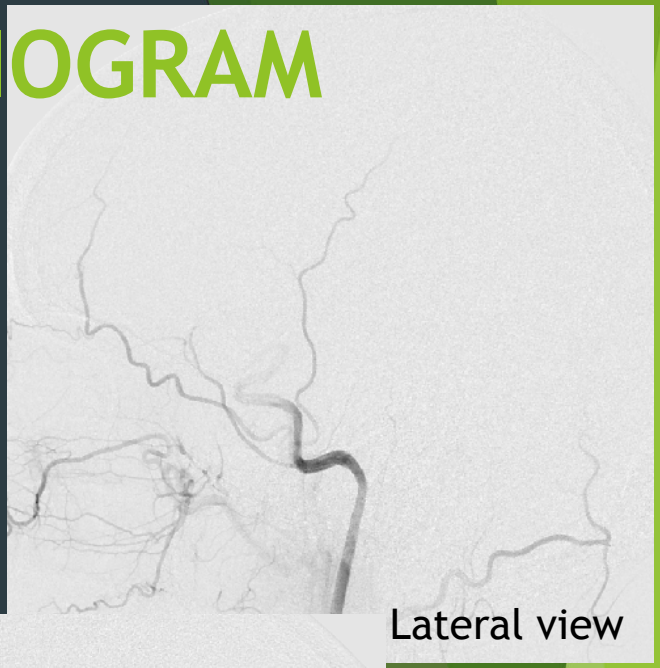
CT Perfusion



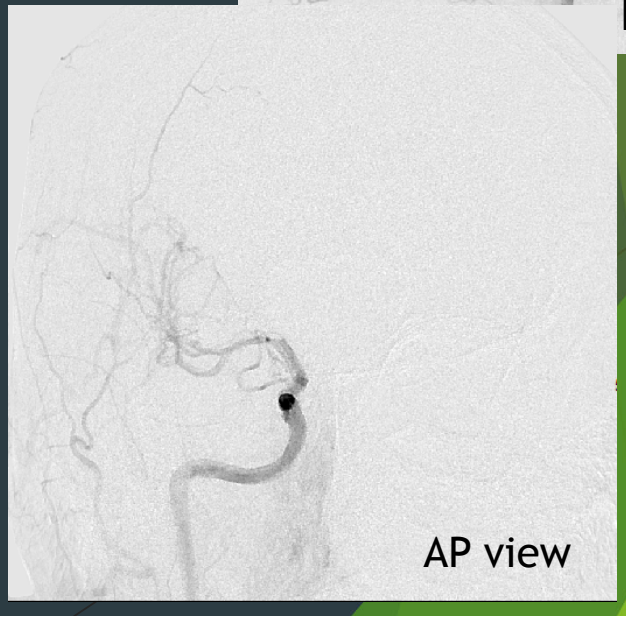


PRE-INTERVENTION ANGIOGRAM

Cerebral Angiography demonstrated an atherosclerotic plaque just distal to the R carotid bulb causing 90% stenosis of R ICA

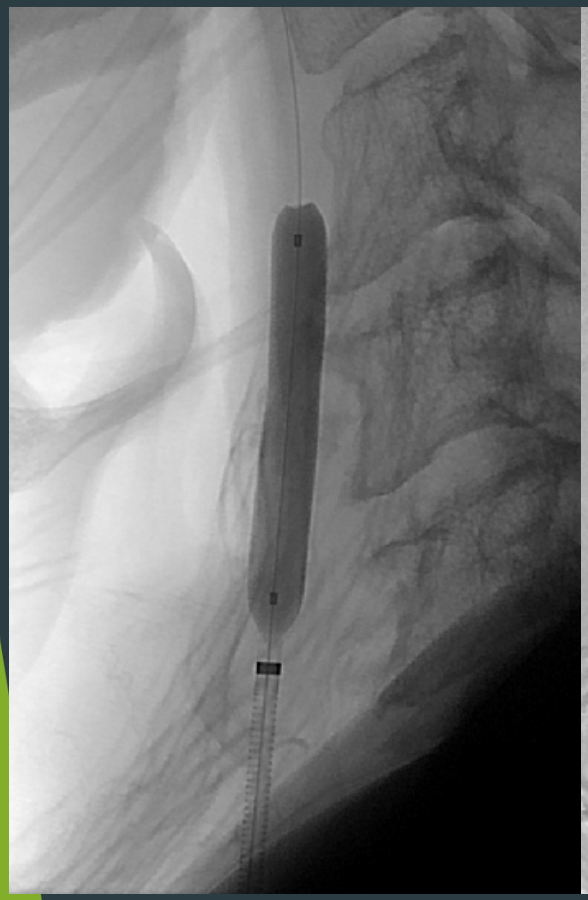


Lateral view

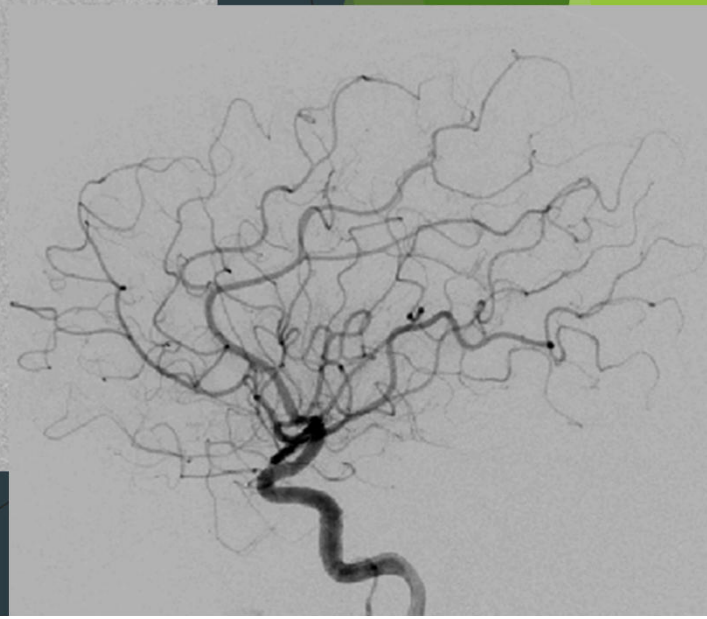


AP view

INTERVENTION



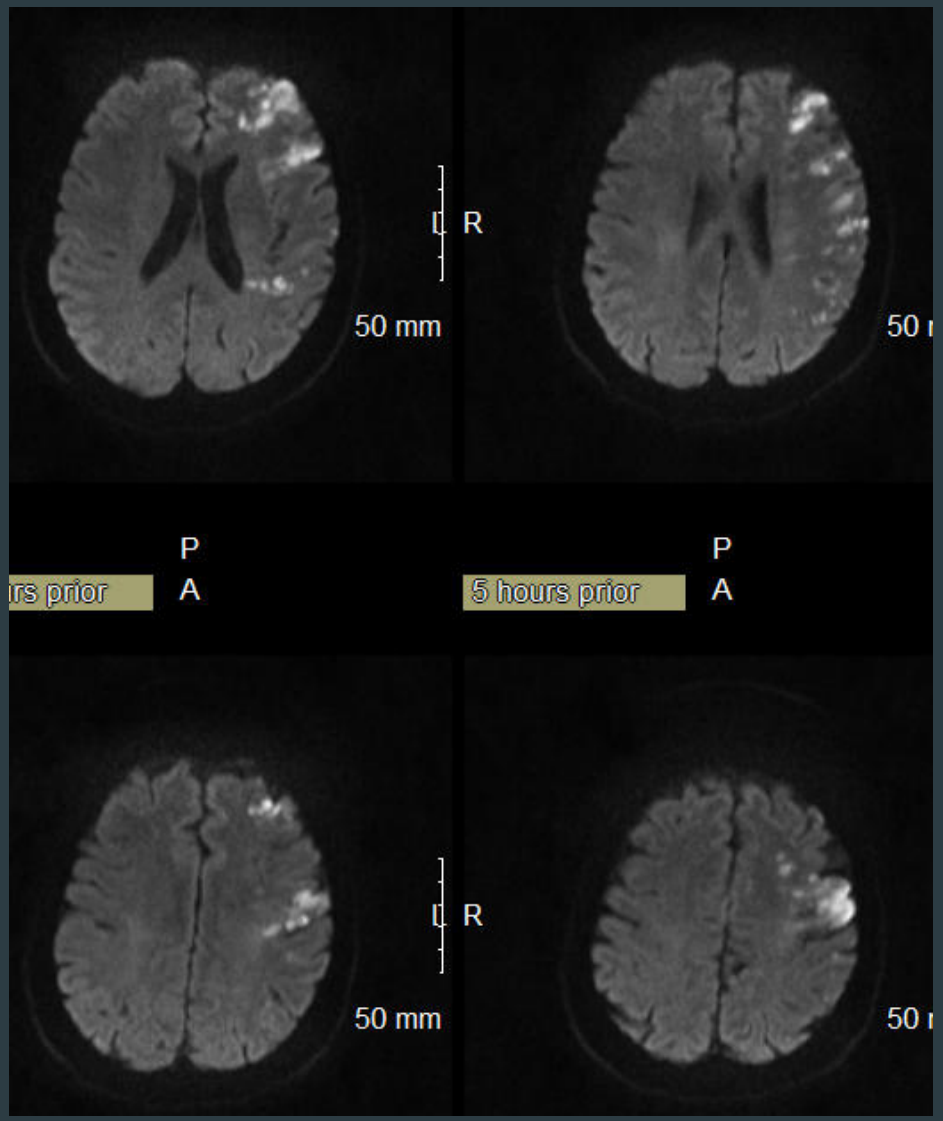
Post stent
Lateral view



9x40 mm Precise stent was advanced with DEP

CASE 2

- 60 y/o F presented to ED:
  - RUE paresthesias and aphasia
  - Had dental procedure 1 week ago, and noted slurred speech and R cheek numbness at the time
  - Her symptoms progressed and on day of presentation developed new RUE weakness and dysarthria
- PMH was significant for tobacco abuse, hyperlipidemia, and HTN

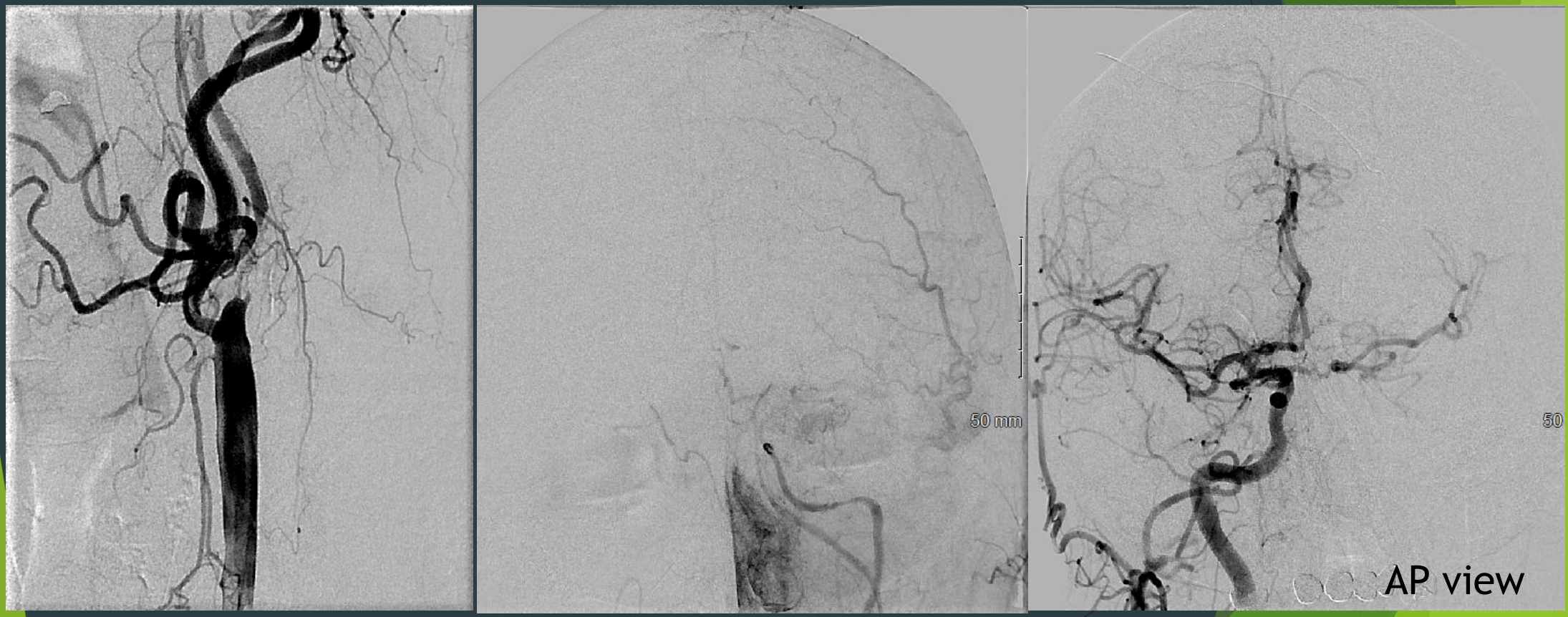

R
50 mm
50 r
P
A
rs prior
P
A
5 hours prior
R
50 mm
50 r

DW MRI


rs prior
S
100 mm

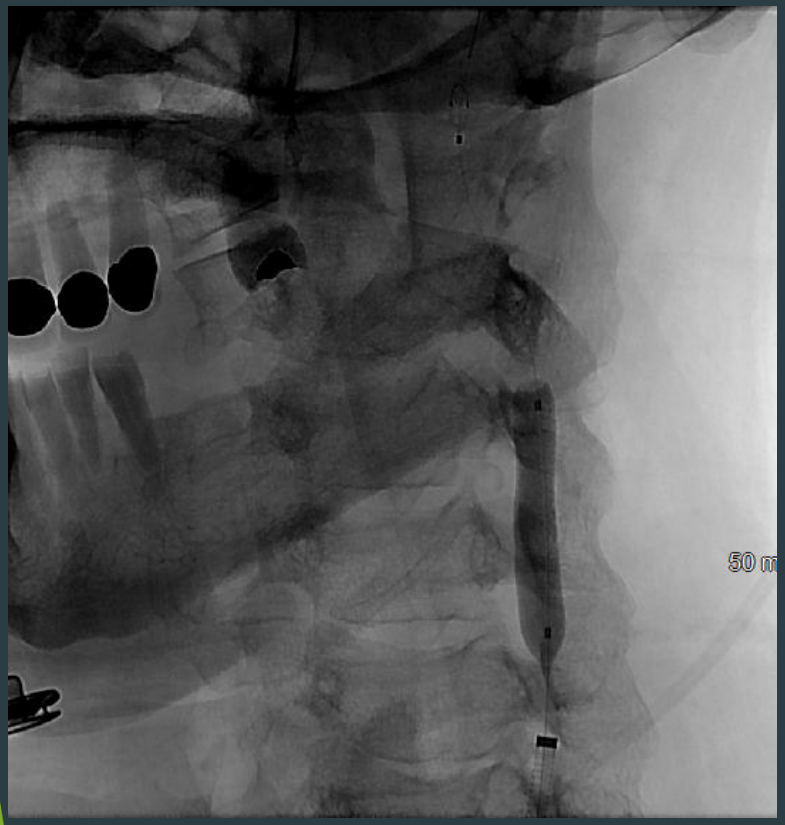
MRA

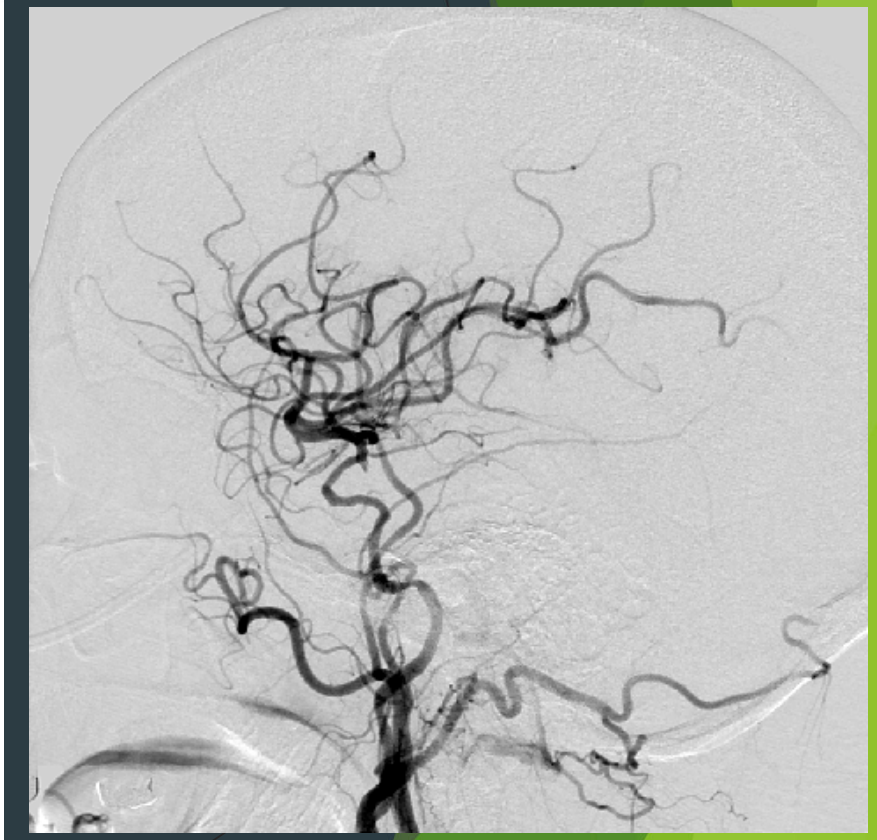
Pre-intervention Imaging



Critical L ICA stenosis

Post-Intervention





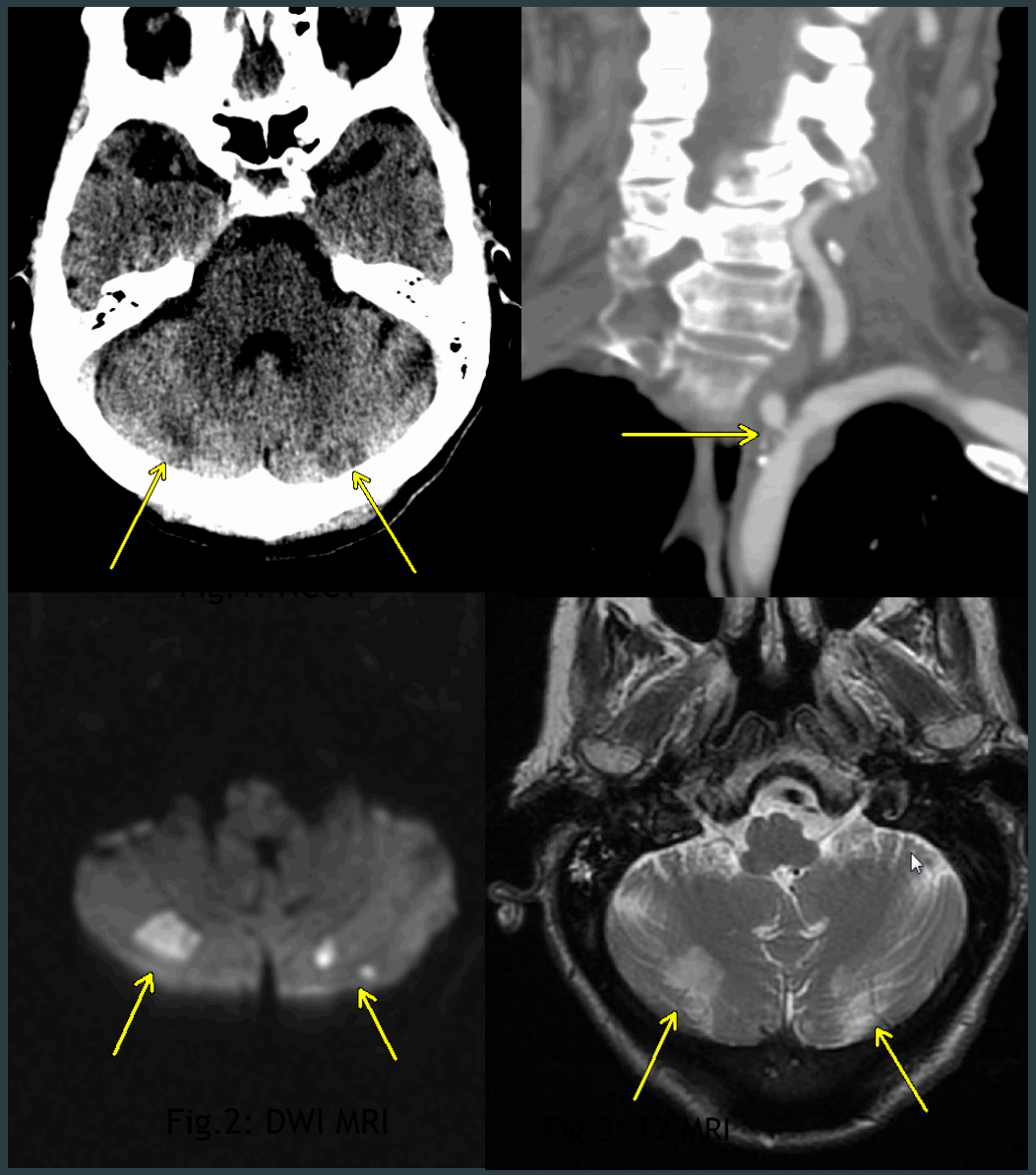


Fig.2: DWI MRI

CASE 3: PICA ischemic stroke

- 85 y/o F presents to the ED with ataxia, L sided weakness status post fall. NCCT was done in the ED:
  - Findings: Acute or subacute bilateral cerebellar infarcts and a small subdural hematoma (fig.1 arrows)
- MRI revealed multiple bilateral acute infarcts of the bilateral cerebellar hemispheres (fig.2,3 arrows)
- CTA neck:
  - Dominant L VA with 50-70% stenosis at its origin (fig.4 arrow)

Due to hypoplastic R VA and bilateral cerebellar strokes, further imaging recommended with diagnostic angiogram

Cerebral Angiogram

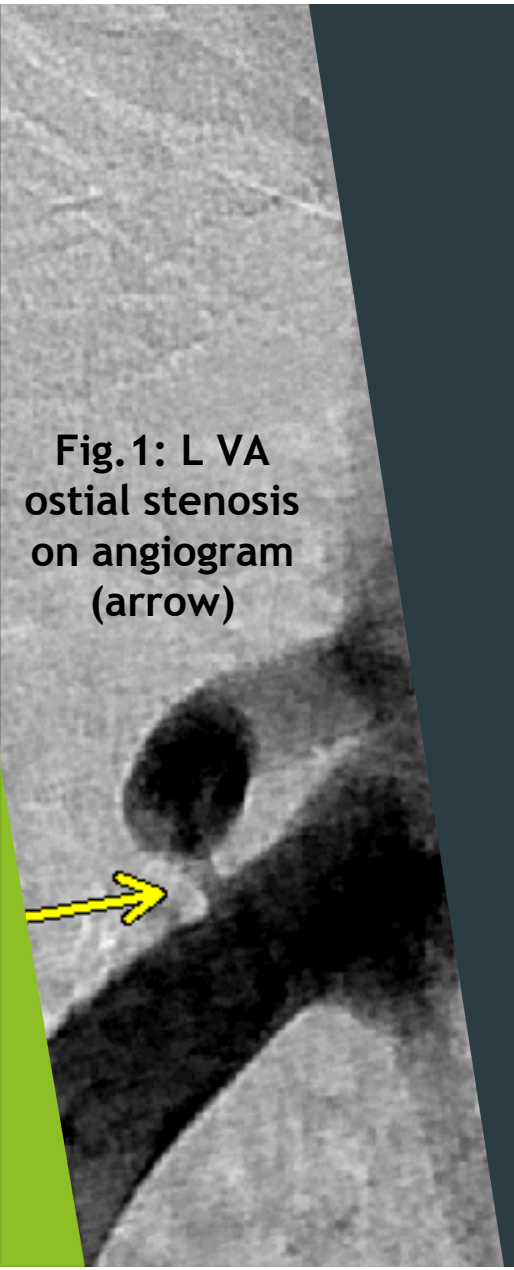


Fig.1: L VA ostial stenosis on angiogram (arrow)

- Diagnostic angiogram revealed 83% stenosis of the L vertebral artery ostium (fig.1)
  - The R vertebral artery was hypoplastic
  - No significant collateral flow to the vertebrobasilar system was seen
- **Due to patient's posterior circulation strokes with no contralateral vertebral artery to supply the vertebrobasilar system, the decision was made to stent the L VA ostium using a balloon expandable stent (fig.2,3)**

Cerebral Angiogram

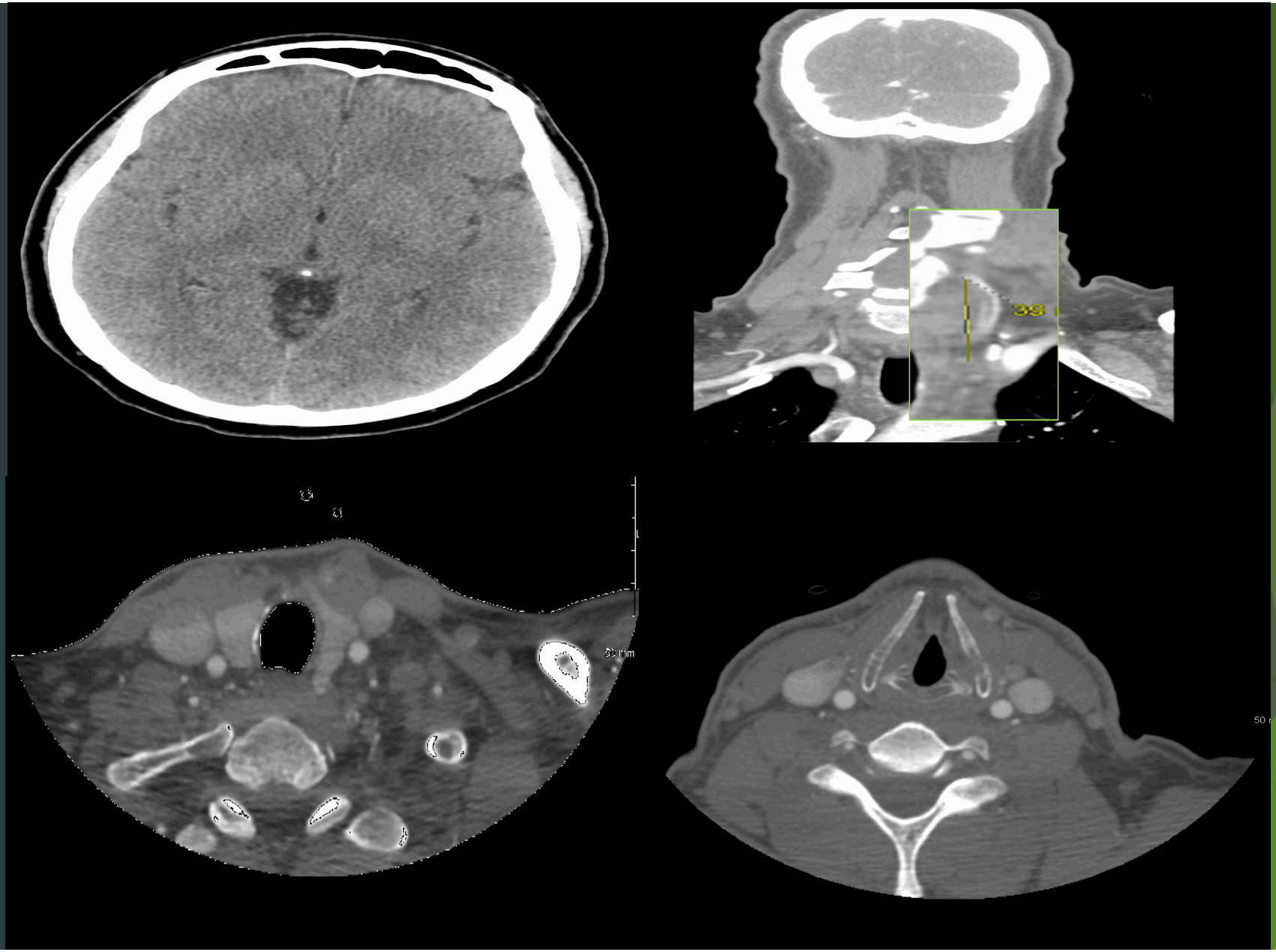
Fig.1: initial angiogram showing **83% L vertebral stenosis at ostium** (arrow)

Fig.2: **Balloon angioplasty of the L VA**

Fig.3: **Balloon expandable stent (5 x 12 mm) deployed in the L VA**

CASE 4

- 60 year old presented with hemianopia and ataxia
- CT angiogram and perfusion showed early stroke in the left occipital lobe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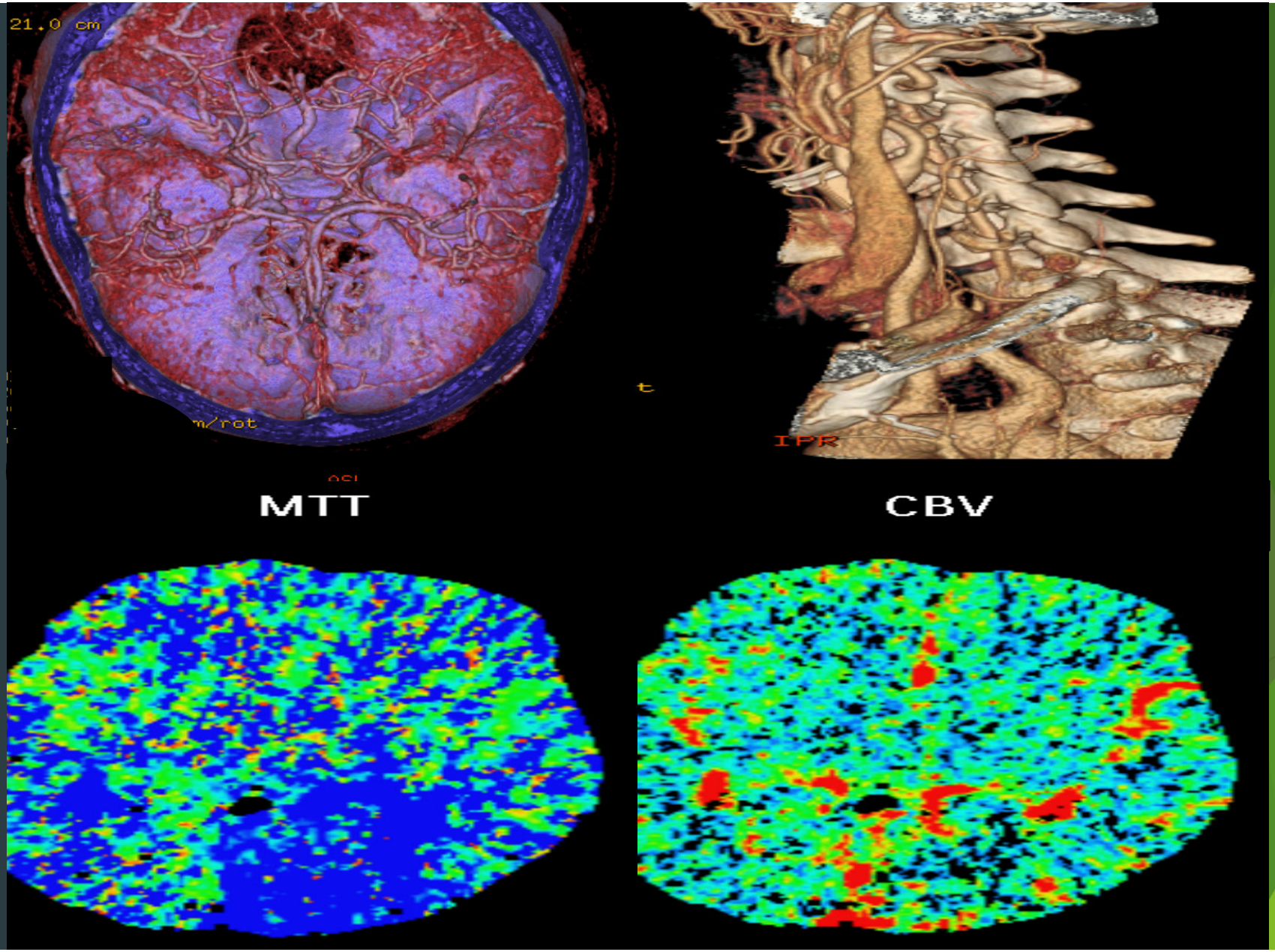
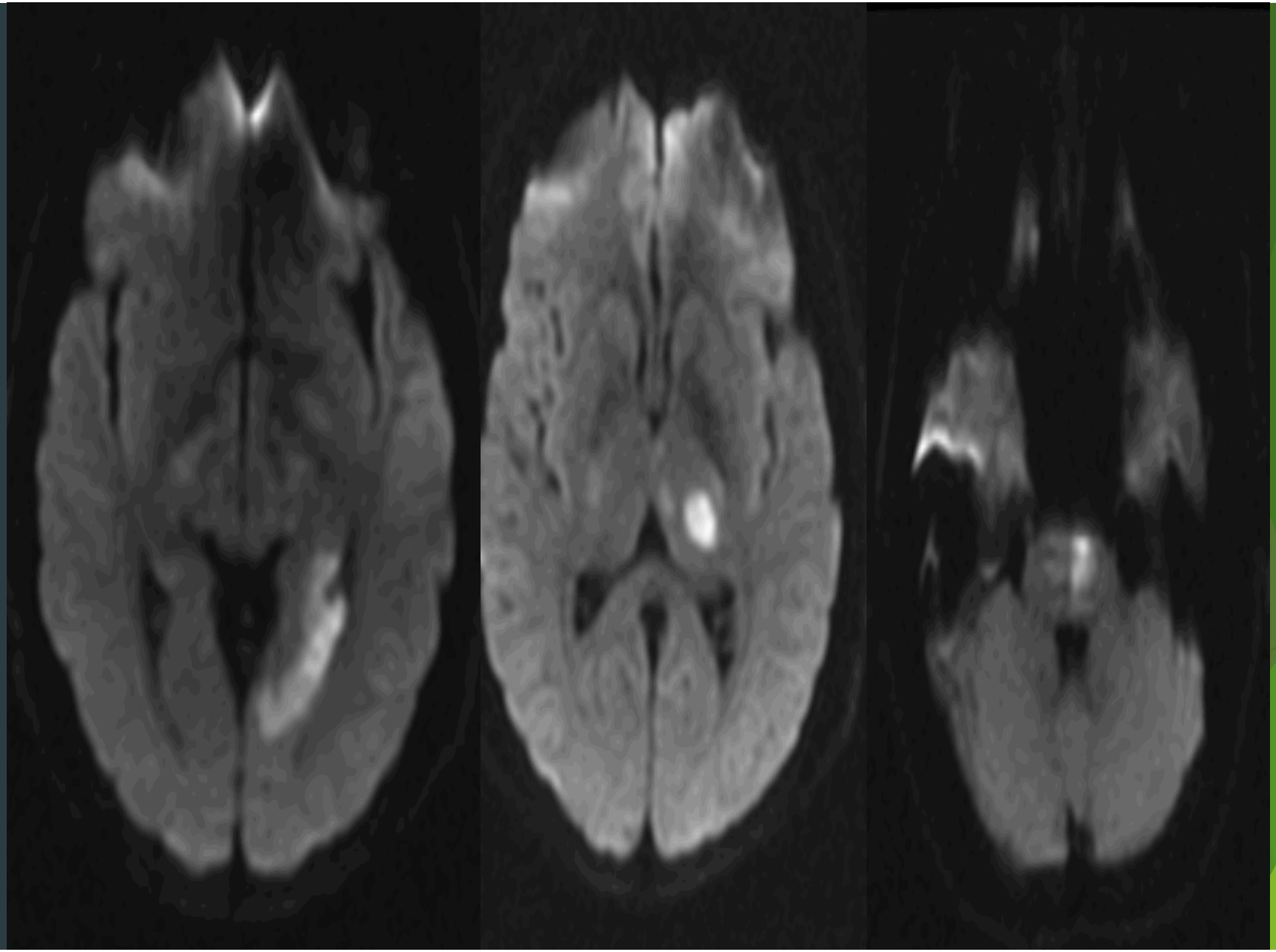
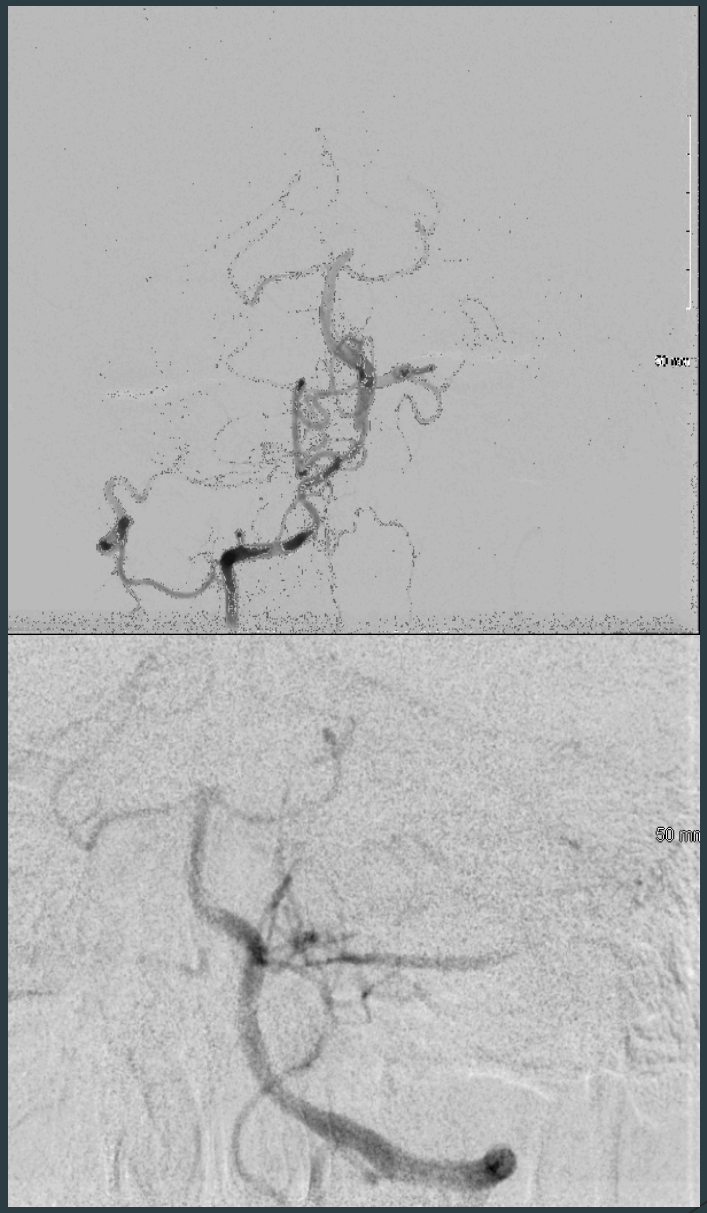

21.0 cm
IPR
MTT
CBV

- Patient was admitted to neuro ICU
- Over next day, his neurological status deteriorated with new hemiplegia




50 mm


50 mm


50 mm


50 mm


50 mm

CONCLUSIONS

- We treat flow significant extracranial carotid/vertebral stenosis as an acute stroke situation. The patient can fluctuate and end up with significant stroke
- In acute stroke situations, patient can initially be helped with medical treatment of fluid bolus, hypertension and anti platelets
- Angioplasty/Stenting is always an effective option. Our first preference is for the patient to undergo an endarterectomy for carotid stenosis if clinically feasible but do not wait for the availability of surgery if there is a delay.
- Timely restoration of flow is the key especially if the patient is showing worsening/fluctuating symptoms