

## The Referral Series – Stroke (Dr Leonard Yeo)

### When to call for a stroke activation (00:45)

- rTPA: Traditionally 4.5 hours; with perfusion scan up to 9 hours or longer
- EVT: Within 6 hours for large vessel occlusion, 6-24 hours if there is large vessel disease and salvageable penumbra on perfusion scan
- Bottom line, if patient has good functional premorbid, stroke activation can be called for up to 24 hours

### Initial brain imaging (02:17)

- Plain CT: Exclude bleed
- CT Angiogram: Generally done to look for large vessel occlusion (MCA, ICA, basilar artery) – unless significant concerns of contrast nephropathy
- Perfusion study: If within 6-24 hours or wake-up strokes following establishment of large vessel occlusion
- ASPECTS Score: Surrogate score to determine extent of MCA involvement
  - Lower the ASPECTS score the larger the stroke
  - For larger strokes (7 or less), increased risk of bleeding and likely less salvageable penumbra, hence less likely to benefit from thrombolysis

### Thrombolysis (09:05)

- Indications
  - Exclude ICH
  - Time window: 4.5 hours generally, with perfusion scan with demonstration of salvageable tissue, up to 9 hours (*WAKE-UP NEJM 2018, EXTEND NEJM 2019*)
- Bleeding risk ~ 6% in the context of a stroke; if there is no stroke, risk of bleeding is low – Hence may err on side of caution (if there is no other bleeding risk) even if suspicion is non organic paresis
- Monitoring
  - High dependency ward
  - Blood pressure: < 185/110 (can aim 150-160); can go even lower if vessel is recanalized
  - Low threshold to repeat CT scan if there is deterioration in neurology
  - Repeat CT scan at 22-36 hours to guide antiplatelet therapy and prognostication

### EVT (13:40)

- 2015 – 5 trials showed evidence of thrombectomy
- NNT: 2.6
- Indications: Large vessel disease
  - Within 6 hours
  - 6-24 hours: If small stroke, large penumbra and significant deficits
- rTPA and EVT given in succession if they are candidates for both
- Similar monitoring to thrombolysis
- mTICI (modified treatment in cerebral ischemia) score – where grade 0 represents no perfusion and grade 3 represents complete recanalisation
  - If 2a or less, allow for higher BP (but bear in mind bleeding risk)
  - 2b aim ~ 140 systolic
  - If 2c-3, drop BP more – normotensive

### Antiplatelet therapy (17:26)

- Generally Aspirin (NNT 111) first line
  - Plavix: Better efficacy than aspirin (NNT~50) and lower GI side effects; however there is a risk of resistance
  - Ticlopidine: Risk of agranulocytosis

- Prasugrel: Higher bleeding risk – Contraindicated
- Ticagrelor: Expensive; evidence still not the most robust
- Patient developing a stroke on SAPT
  - Can consider switching antiplatelet agent, although limited evidence
  - But important to revisit underlying etiology of stroke – if there is large vessel disease consider DAPT, if there is AF consider anticoagulation
  - Review control of CVS risk factors – optimize DM, HLD, HTN, smoking control
- Consider DAPT:
  - High risk TIA or minor stroke
    - § CHANCE Trial (Chinese population) – 3 weeks
    - § POINT Trial (Western population) – Longer duration with higher bleeding risk
    - § Fair to give DAPT for 3-4 weeks, given that stroke risk is highest at outset
  - Large vessel stenosis
    - § SAMPRIS – 3 months (arbitrary duration)
- Initiation timing of DAPT post thrombolysis/EVT – Benefit between bleeding and re-infarction risk (based on recanalisation, repeat scans etc)

#### Anticoagulation + antiplatelet for mixed etiology? (24:00)

- Currently, only advocated for patients with stent + anticoagulation indication (e.g. AF, thrombus)
- Watch space: Emerging evidence for low dose rivaroxaban + aspirin for patients with disease in multiple vascular trees (COMPASS Trial)

#### Statins (25:41)

- SPARCL Trial (NEJM 2006): 80mg atorvastatin was given long term which was shown to reduce stroke recurrence
- Belief that there might be plaque stabilizing properties of atorvastatin in acute period
- Concern of complications (e.g transaminitis, rhabdomyolysis) in Asian population hence possibly explains the rationale for cutting back from 80mg after a few days
- Changing targets for cholesterol: < 2.6 then 50% from initial then target 1.8 – with this more aggressive target, can consider giving atorvastatin 80mg for longer periods to drop LDL first, then cut back later on

#### IV hydration (28:10)

- Purpose is to keep vessels open to optimize perfusion
- Give Normal Saline
  - Don't give dextrose saline as associated with cerebral edema that may worsen outcomes in stroke
  - Giving hartmann's may lead to acidosis if patient has MELAS
- No fixed amount, arbitrarily 1.5L/day for 1-2 days

#### Blood pressure targets: (29:46)

- Controversy surrounded optimal BP targets
- Initial 2-3 days
  - Large vessel stenosis: Permissive hypertension (consider longer if vessel is very tight)
  - No large vessel stenosis: Aim below 180-200
  - Aim for lower targets if vessel is canalised post thrombolysis/EVT
    - § GTN patch + Oral agent THEN
    - § IV GTN or labetalol
- After 2-3 days, can aim for normotension if there is no large vessel stenosis
  - In long term, BP control is paramount (NNT ~10)
  - If no large vessel disease, can start antihypertensives around D3

#### SSRI in strokes (32:52)

- Possible benefit in improving motor recovery, reduce depression
- Remains an area of controversy
- FLAME Trial – Motor scale
- FOCUS Trial – Modified Rankin Scale, Larger trial
- Watch space: Ongoing trials in the west looking at this

#### Fluctuating neurological deficits (34:56)

- Differentials include: Re-occlusion, bleed, stroke progression
- Have a low threshold to consider re-imaging

#### Etiological evaluation (36:35)

- Clinical presentation usually correlates with anatomy and etiology
- Generally all strokes will require intracranial and extracranial large vessel evaluation to confirm that there is no large vessel occlusion
  - MRA is included in an MRI stroke screen, but tends to over-estimate extent of stenosis
  - CT angiography gives good resolution but has risk of contrast induced nephropathy
  - TCD/ECD: Cheap, functional evaluation
- Sometimes imaging study reveals large vessel stenosis, may need further evaluation
  - TCD/ECD: Extent of flow limitation
  - Vessel Wall MRI: Characterise etiology of narrowing
- Cardiac Evaluation
  - Avoid routinely performing echocardiograms – target patients who are likely cardioembolic source
  - Bubble Studies
    - § Usually in young patients with embolic pattern but no obvious cardiac cause
    - § Evaluate for R to L shunts
    - § If this is positive, will need to hunt for underlying cause of clot formation (because this suggests that clot probably travelled from peripheral circulation into the heart then through the shunt to the brain)
  - Continuous ECG monitoring
    - § If clear cut subcortical, avoid doing telemetry
    - § If there is strong suspicion of cardioembolic etiology, may need more prolonged ECG monitoring (e.g. implantable loop recorder)

#### Hemorrhagic conversion (44:08)

- Hemorrhagic transformation is a spectrum
- If it is < 30% of infarct, usually not so significant and can continue antiplatelets
- Emerging automated calculation tools based on imaging to guide management of hemorrhagic conversion – yet to be fully translated into clinical practice
- If in doubt, can hold off antiplatelet therapy first and consult the stroke consultant

#### Do we always need an MRI to prove a stroke? (45:45)

- Practice dependent
- If clinical picture is concordant, an MRI is not absolutely necessary

#### CT brain TRO posterior circulation stroke: (46:58)

- Physical examination most important
- If truly concerned about a stroke, should consider doing an MRI brain instead
- CT brain may help with ruling out bleeds

#### Incidental lacunes/old infarcts (47:48)

- Grey area
- Generally no strong evidence to initiate antiplatelet therapy
- Control cardiovascular risk factors instead
- If concerned, can consider doing vessel imaging

Which TIAs need to be admitted? (49: 16)

- Patient's with background large vessel occlusion/stenosis (which can be established on the CT angiogram done in A&E)

Take Home Points (49:58)

- Respond quickly for suspicion of stroke especially in inpatient setting
- Check blood sugar level in patients with possible stroke
- Have a low threshold to consult stroke registrar on call