2015 Stroke Advances:
A Chance to Cut is a Chance to….

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Case 1

• A 75 year old man presents with a 10 minute episode of R hand weakness that has since completely resolved
• He takes only ASA as an outpatient

CT Angiogram: 95% L ICA stenosis

When to Fix the Carotid?

• NASCET in early 1990s
  – Benefit of endarterectomy in patients with symptoms ipsilateral to 70-99% stenosis
    • Comparison: best medical management at the time
  – 50-69% symptomatic stenosis revascularization has limited benefit, especially in women
• No better predictor of who to fix than simple stenosis measurements
How to Fix the Carotid?

- Stenting +/- distal protection
  - SAPPHIRE (NEJM 10/04 and 4/08) in high-risk patients as good as endarterectomy
  - Became widely practiced: NeuroIR, vascular surgeons, BodyIR, Cardiologists
  - Unique risks: Hypotension, Bradycardia

CREST Trial

- 4-year study of 1321 symptomatic and 1181 asymptomatic patients randomized to CEA or carotid stenting
- Combined endpoint of stroke, MI, death not significantly different
  - More strokes in first 90 days in stenting group, more MIs in surgical group
  - After 90 days, similar endpoints


ICSS Long Term Results

- ~1700 symptomatic (>50%) patients randomized 1:1 to stenting vs CEA
  - Median follow up of 4.2 years
- Primary results
  - Fatal and non-disabling strokes not different
  - Total strokes more common in stenting group
    - Excess risk in those >70
  - mRS scores not different between the groups at 1 or 5 years

Bonati et al: Lancet [Early View Online], 2015
What We Do:
Carotid Revascularization

- Revascularize all patients with >70% symptomatic stenosis
- Timing key: in non-disabling stroke, move very quickly (Guidelines <2 weeks)
- Continue ASA periprocedure
- If >70 years old, favor CEA
- If <70 years old, take your pick

Timing: Guideline Based?

- 125 TIA patients in Japan with symptomatic carotid stenosis
- Only 41.9% underwent revascularization within 90 days
- Not particularly different from other reported experiences

Hayakawa M et al: JSC 2015

Case 2

- A 42M presents with an abnormal MRI scan that was obtained for recurrent headaches
Management of Unruptured AVMs: ARUBA

- Adult patients with unruptured AVMs were randomized to:
  - 1. Medical management
  - 2. Intervention (surgery, embo, radiation, or combination)
- Primary outcome was composite endpoint of death or symptomatic stroke
- Trial stopped early after 223 patients enrolled and a mean follow up of 22 months


Management of Unruptured AVMs: Scottish Study

- Adult patients with unruptured AVMs in Scotland followed for 12 years
- Primary outcome was death or sustained disability
- 204 patients, 103 underwent intervention
- Primary outcome significantly lower with conservative management in first 4 years and then became similar afterwards
  - Bias should be in the other direction

What We Do: Unruptured AVMs

- Conservative management of unruptured AVMs that are incidentally found
- Once an AVM has had a clinical bleed, treatment is necessary

Case 3

- A 55F presents with an abnormal MRI scan that was obtained for seizures

Cavernous Malformations

- Cavernous Angioma
- Cavernoma
- Cavernous Hemangioma
- Cavernous Malformation
- “Cav Mal”
**Cavernous Malformations**

- Described in 1850s and 1860s by Rokitansky, Luschka and Virchow
- Definition:
  - A hamartoma consisting of abnormally enlarged capillary cavities without intervening brain parenchyma
- "Cryptic Malformation"
  - Technically many entities, but cav mal the most common
- 0.1%-0.5% of population, M=F
- Location: 80% supratentorial
  - Brainstem common in infratentorial lesions

**Epilepsy and Cavernous Malformations**

- Seizures likely due to blood products not malformation itself
- More likely to cause seizures than AVM or gliomas
- 1.5% per person per year incidence
- Medical therapy first choice
  - Surgical options often successful if localized correctly
  - Gamma Knife controversial

**ICH and Cavernous Malformations**

- Wide variety in type of hemorrhage
  - Microhemorrhages ubiquitous
  - Typically small parenchymal ICH
- Annualized ICH risk
  - 988 adults with 3,232 person years of follow up
  - 5 year risk was 2.4% in asymptomatic (outside brainstem)
- Risk Factors
  - Clinical ICH, focal deficit, brainstem location
  - Age, sex*, multiple cav mals NOT associated

**Untreated Course of Cavernous Malformations**

- Population-based study in Scotland
- Primary outcome was ICH or persistent focal deficits
  - 5% in year 5
  - No difference in location, higher in women
- 5-year risk of first hemorrhage was 2.4%
- 5-year risk of recurrent hemorrhage was 29.5%


Surgical vs. Conservative Management of Cavernous Malformations

- Adult patients with unruptured cav mals in Scotland followed for 5 years
- Primary outcome was functional status
- 134 patients, 25 underwent excision
- Primary outcome significantly better with conservative management
- Less symptomatic ICH and new focal deficits with conservative management


What about seizure control?

- Poor and conflicting data for resection to control intractable seizures
  - Should be considered but only after failing standard trials of AEDs

What we do: Cavernous Malformations

- Indications for surgery except clinical ICH
  - Treatment-resistant epilepsy?
  - Focal deficit?
- Careful to preserve DVA in the process if present
Case 4

- A 60M presents with the sudden onset of severe headache and collapse
- His examination is normal

International Subarachnoid Aneurysm Trial (ISAT): Long-Term

- 1644 patients in follow up randomly assigned to clipping versus coiling
- Followed 10-18 years
- Patients with coiling significantly more likely to be alive and independent at 10y
  - More rebleeds in the endovascular group but risk was small and disability-free survival still better in the endovascular group

Molyneux A et al: Lancet [Epub Ahead of Print], 2014
What We (Should) Do: Aneurysm Treatment

- In those aneurysms amenable to either modality, prefer endovascular treatment

Case 5

- A 52F presented after being found down (last normal 16 hours prior) with a massive R MCA infarction

Surgical Decompressive Hemicraniectomy

- “Malignant MCA infarction” carries an 80% mortality historically
  - No medical therapy has been proven effective
  - Deterioration from 2-5 days (some in 24 hours)
  - No good predictors of deterioration on imaging

Surgical Decompressive Hemicraniectomy

- Three randomized trials (Lancet Neur. 3/07)
  - DECIMAL, DESTINY, HAMLET
  - Similar end points and trial design
  - Pooled analysis of all individual patients pre-planned
- Age less than 60
- Mild decrease in LOC, NIHSS > 15
- Infarct more than 1/2 MCA territory
- Irrespective of hemisphere involved
- Early surgery: less than 48 hours from onset
12-month survival: 78% vs. 29% (NNT=2)
12-month mRS<4: 43% vs. 21% (NNT=4)
No subgroups where surgery not beneficial


**What We Do:**
**Surgery in Malignant MCA Stroke**

- In patients with malignant MCA infarction showing signs of edema, offer early surgery
  - Irrespective of...
    - Age
    - Hemisphere of Injury

**Age Cutoff?**

- 112 patients > 60 years old randomized to either hemicraniectomy or conservative management
- Primary outcome “good” mRS 0 to 4
- Significantly more patients achieved the primary outcome in the hemicraniectomy group (38% vs. 18%; P=0.04)
- Hemicraniectomy increased survival without severe disability
- Still: 62 percent had mRS 5 or 6


**Effect of Acupuncture Combined with Blood-letting by a Three-edged Needle on 50 cases of Bell’s Palsy at the Acute Stage**

*Journal of Traditional Chinese Medicine, June 2010, Vol. 30, No. 2*

Objectives: To observe clinical effects of acupuncture combined with blood-letting by a three-edged needle for treating Bell’s palsy of wind-heat syndrome at the acute stage. *Methods*: One hundred patients were randomly divided into a treatment group (50 cases) treated by acupuncture plus blood-letting and a control group (50 cases) treated by simple acupuncture. Four courses of treatments were given in both groups. The main symptoms and signs were observed and clinical effects evaluated with scores after one week, 2 weeks and one month of treatments respectively. *Results*: After treatment, the scores for symptoms and signs were significantly different from those before treatment in both groups (P<0.05 or P<0.01). After one month of treatment, the improvement of the symptoms and signs in the treatment group was more than that in the control group with a significant difference (P<0.05). *Conclusion*: Acupuncture plus blood-letting can produce good therapeutic effects on Bell’s palsy of wind-heat syndrome at the acute stage.

Key words: acupuncture; blood-letting with a three-edged needle; acute Stage of Bell’s Palsy