

TREATMENT OF ACUTE HEMORRHAGIC STROKE

5TH QSVS NEUROVASCULAR CONFERENCE

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SEPT 14, 2012

DISCLOSURE OF POTENTIAL CONFLICTS OF INTEREST
QUEBEC SOCIETY OF VASCULAR SCIENCES PRESENTS :
THE 5TH QSVS NEUROVASCULAR CONFERENCE
HEMORRHAGIC STROKE
SEPTEMBER 14, 2012

Dr. Dar Dowlatshahi, Guest speaker

Guest speaker (2011), Travel support (2012): Boehringer Ingelheim

Moderating speaker (2012): Octapharma

Advisory board (2010): Bayer Canada

- All copyrighted material have been removed from the notes, and will only be shown during the presentation

OUTLINE

1. Hematoma expansion & hemostasis
2. Indications for ICH surgery
3. Preventing complications of ICH

LEVELS OF EVIDENCE

AHA/ASA Guideline

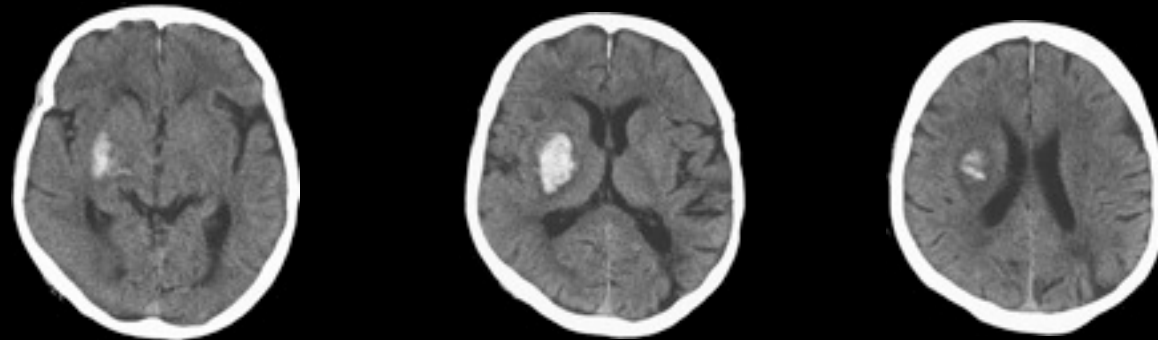
The American Academy of Neurology affirms the value of this guideline as an educational tool for neurologists.

The American Association of Neurological Surgeons and the Congress of Neurological Surgeons have reviewed this document and affirm its educational content.

- Class I: benefit > risk
- Class II: benefit may > risk
- Class III: risk > benefit

PART 1: ICH EXPANSION

3 h



6 h



0% mortality
70% independence

30% mortality
35% independence

HEMOSTASIS

1. rFVIIa
2. Reversal of antiplatelet activity
 - platelets
 - ddAVP
 - TXA
3. Coagulopathy correction / anticoagulant associated ICH
 - PCC / Vit K
 - FFP

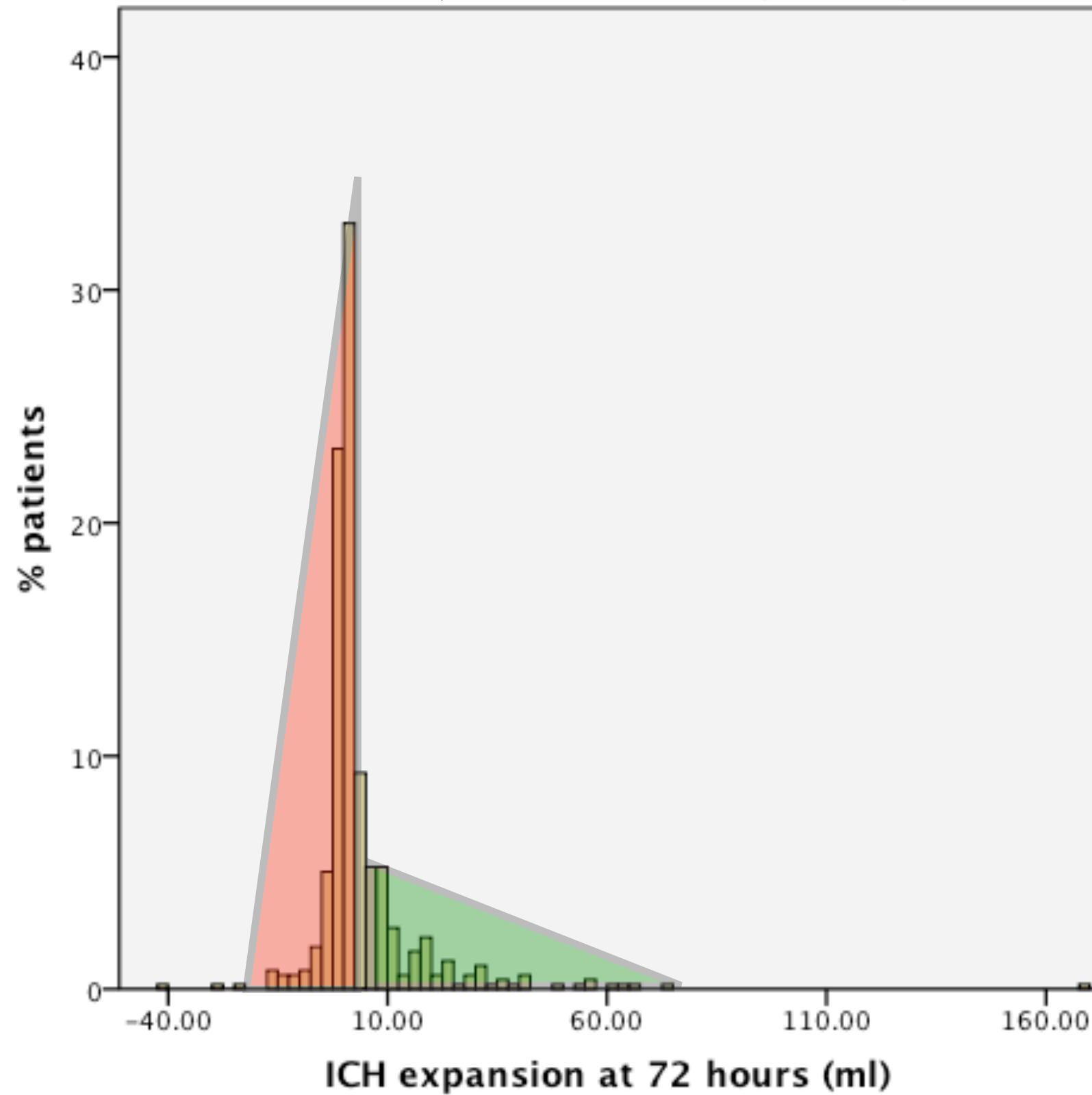
BIOLOGICAL EFFECT OF RFVIIA

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Efficacy and Safety of Recombinant Activated Factor VII for Acute Intracerebral Hemorrhage

©

VISTA data (n=496)



72 hr ICH growth
Mean = 4.3 ml
Median = 0.91 ml
SD = 13.48 ml

IMAGING MARKER OF ICH GROWTH IDENTIFIED

CT Angiography “Spot Sign” Predicts Hematoma Expansion in Acute Intracerebral Hemorrhage

Ryan Wada, MD; Richard I. Aviv, MBChB; Allan J. Fox, MD; Demetrios J. Sahlas, MD;
David J. Gladstone, MD; George Tomlinson, PhD; Sean P. Symons, MD



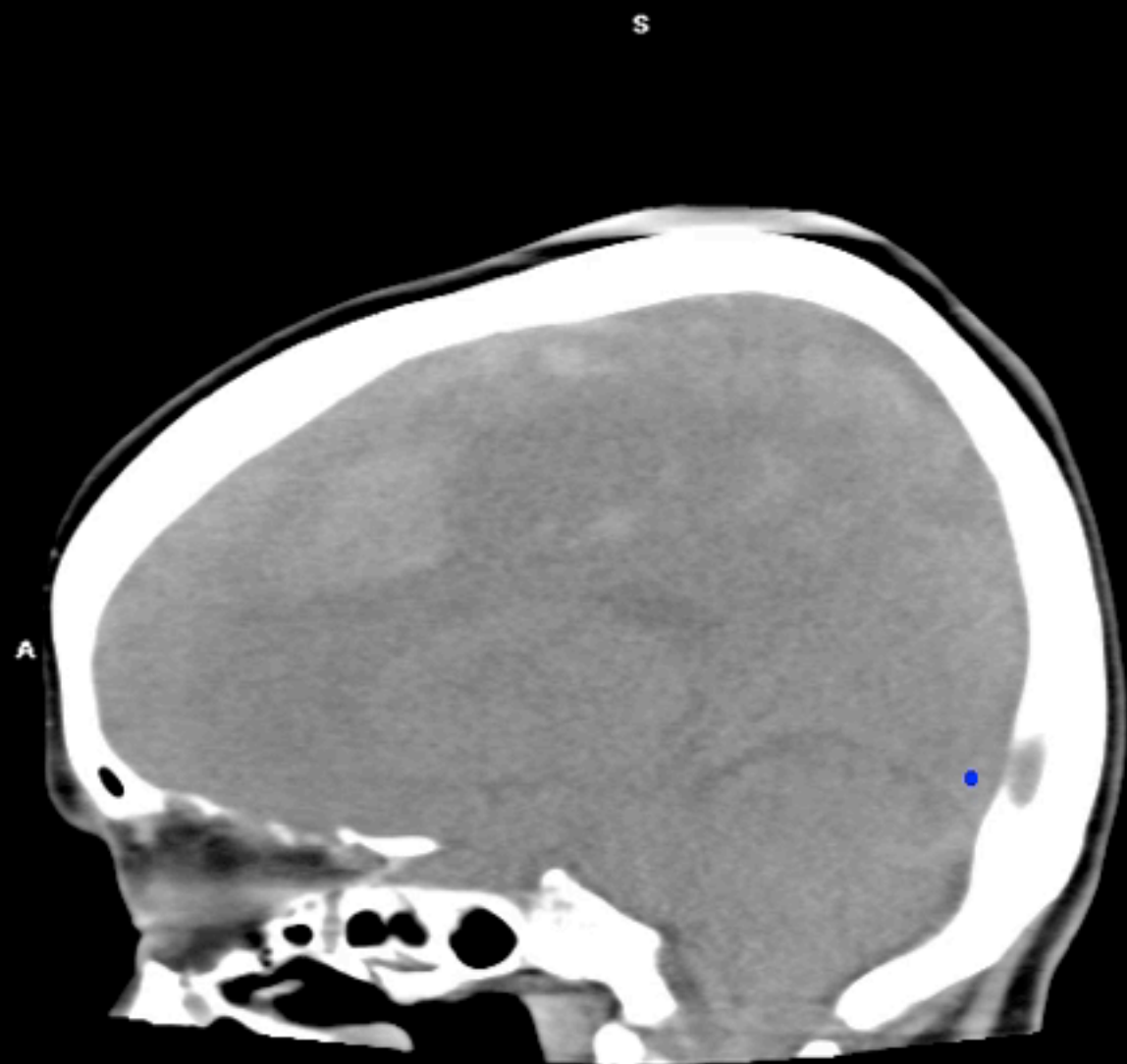
**Contrast extravasation on CT
angiography predicts hematoma
expansion in intracerebral hemorrhage**

Stroke 2007

J.N. Goldstein, MD, PhD; L.E. Fazen, BA; R. Snider, BA; K. Schwab, BA; S.M. Greenberg, MD, PhD;
E.E. Smith, MD; M.H. Lev, MD; and J. Rosand, MD, MS

NEUROLOGY 2007





P R
3 cm

Vitrea®
Batch #1
W/L:400/50
R-Sagittal 3.53mm Average Registered
1 of 19 at 0.0 sec LA011 CRA4



Vitrea®
W/L:166/161
Segmented
1 of 19 at 0.0 sec
VR: Vessels Only

SPOT SIGN

	Spot positive	Spot negative	P-value
Absolute ICH growth (ml, median [IQR])	10.1 [22]	0.4 [2.8]	<0.001
Absolute ICH growth (ml, mean±SD)	18.3 +/- 24.7	3.0 +/- 9.9	--
Relative ICH growth (% , median [IQR])	41.2 [86.4]	5 [27.1]	<0.001
Absolute IVH growth (ml, median [IQR])	0.6 [13.3]	0 [0]	<0.001
Absolute Total growth (ml, median [IQR])	12.9 [37.6]	0.3 [2.8]	<0.001
Met 6 ml significant growth criteria (%)	35 (57.4%)	22 (13.2%)	<0.001
Met 12.5 ml significant growth criteria (%)	29 (47.5%)	11 (6.6%)	<0.001
Met 33% significant growth criteria (%)	34 (55.7%)	30 (18.0%)	<0.001
Met either 6ml or 33% growth criteria (%)	38 (62.3%)	35 (21.0%)	<0.001
Met either 12.5ml or 33% growth criteria (%)	35 (57.4%)	31 (18.6%)	<0.001

Prediction of haematoma growth and outcome in patients with intracerebral haemorrhage using the CT-angiography spot sign (PREDICT): a prospective observational study



Andrew M Demchuk, Dar Dowlatshahi, David Rodriguez-Luna, Carlos A Molina, Yolanda Silva Blas, Imanuel Dzialowski, Adam Kobayashi, Jean-Martin Boulanger, Cheemun Lum, Gord Gubitz, Vasantha Padma, Jayanta Roy, Carlos S Kase, Jayme Kosior, Rohit Bhatia, Sarah Tymchuk, Suresh Subramaniam, David J Gladstone, Michael D Hill, Richard I Aviv, for the PREDICT/Sunnybrook ICH CTA study group

Lancet Neurology 2012



SPOT SIGN HEMOSTATIC TRIALS



STOP-AUST

FACTOR VII: BOTTOM LINE

- rFVIIa in unselected patients: Class III, Level A (**Harm**)
- If you have CTA for acute ICH: Spotlight Trial

ANTIPLATELETS AND HEMATOMA EXPANSION

Prior antiplatelet use does not affect
hemorrhage growth or outcome after ICH

L.H. Sansing, MD
S.R. Messe, MD
B.L. Cucchiara, MD
S.N. Cohen, MD
P.D. Lyden, MD
S.E. Kasner, MD
For the CHANT
Investigators

Neurology 2009



Prior antiplatelet therapy and outcome following
intracerebral hemorrhage
A systematic review

B.B. Thompson, MD, Y. Béjot, MD, V. Caso, MD, J. Castillo, MD, PhD,
H. Christensen, MD, PhD, DMSci, M.L. Flaherty, MD, C. Foerch, MD,
K. Ghandehari, MD, FSLP, M. Giroud, MD, S.M. Greenberg, MD, PhD, H. Hallevi,
MD, J.C. Hemphill III, MD, MAS, P. Heuschmann, MD, S. Juvela, MD, PhD,
K. Kimura, MD, P.K. Myint, MD, Y. Nagakane, MD, H. Naritomi, MD, S. Passero,
MD, M.R. Rodríguez-Yáñez, MD, PhD, J. Roquer, MD, PhD, J. Rosand, MD, MSc,
N.S. Rost, MD, P. Saloheimo, MD, PhD, V. Salomaa, MD, PhD, J. Sivenius, MD,
T. Sorimachi, MD, M. Togha, MD, K. Toyoda, MD, W. Turaj, MD, K.N. Vemmos,
MD, C.D.A. Wolfe, MD, D. Woo, MD and E.E. Smith, MD, MPH

Neurology 2011

“Increased mortality”

OPTION 1: PLATELET INFUSION

- Thrombocytopenia: platelet replacement (Class I, Level C)
- On antiplatelet agent: platelet infusion (Class II, Level B)

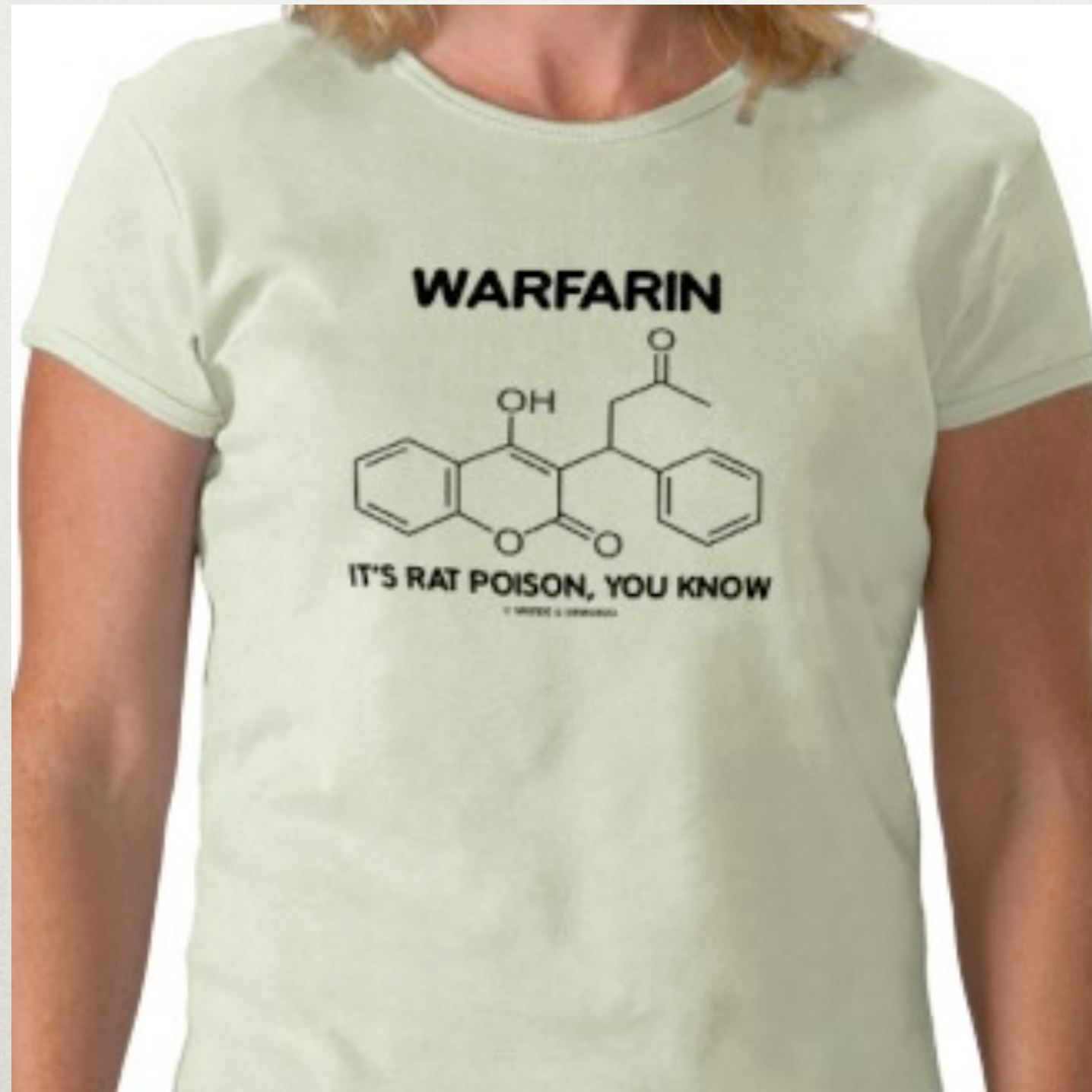
OPTION 2: DDAVP / DESMOPRESSIN

- releases endothelial vWF: platelet activator
- 0.3 mcg/kg over 30 minutes
- Currently no evidence or guidelines; consider for Plavix, uremia
- IMPACT study, phase 2 safety ddAVP for acute ICH, results due Dec 2012.

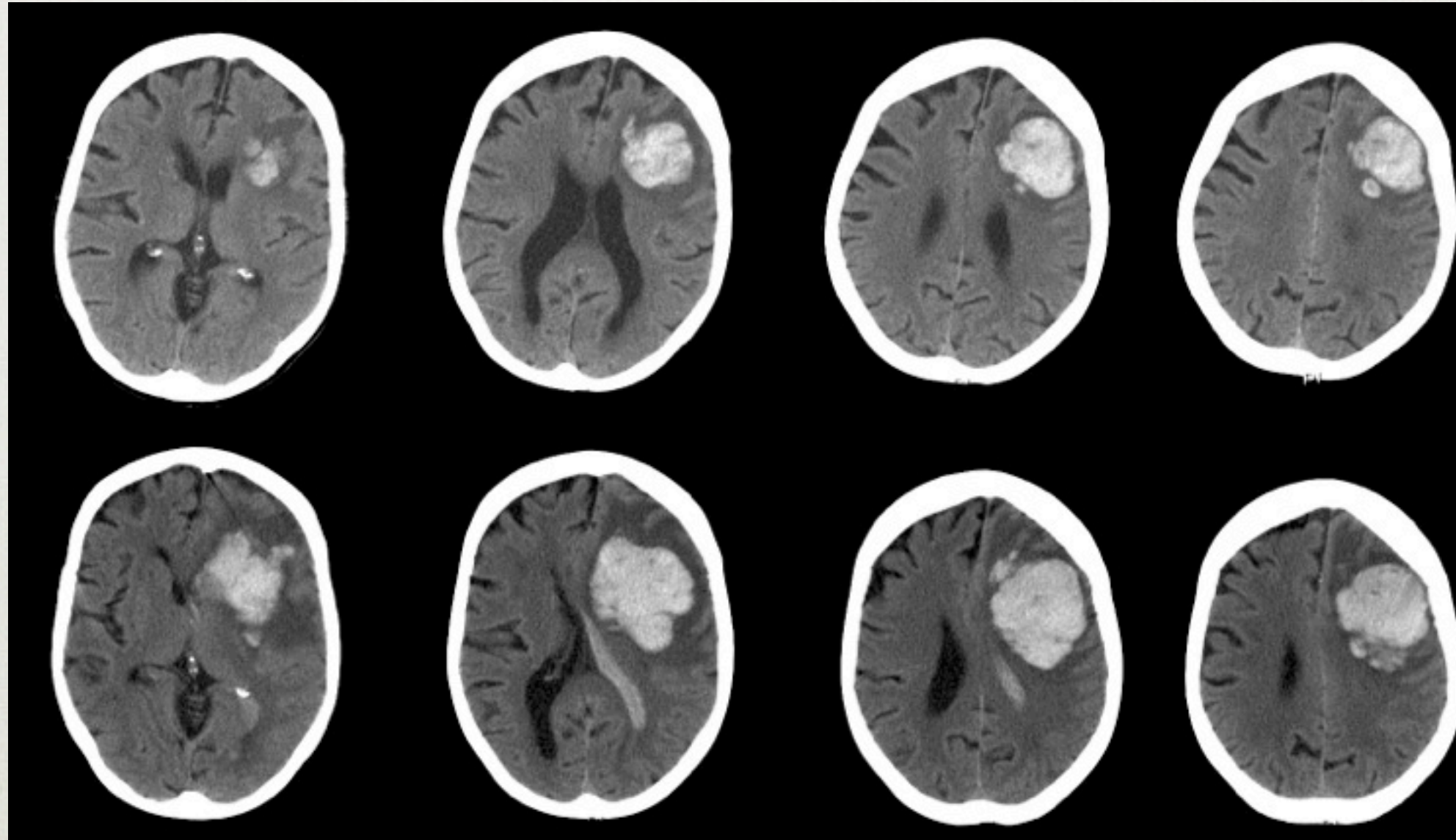
OPTION 3: TRANEXAMIC ACID

- anti-fibrinolytic: clot-stabilization
- No evidence
- Consider: intra-operative, tPA bleeds

INR CORRECTION IN ANTICOAGULANT ASSOCIATED HEMORRHAGE



11h



24h

FRESH FROZEN PLASMA

- Time: Blood typing & thaw
- 15 ml/Kg: >1L on average in patients with pre-existing cardiac disease
- Inconsistent Factor concentrations

PROTHROMBIN COMPLEX CONCENTRATE

©

PCC

- small volumes (40-80 mL)
- reversal within 10-15 minutes
- requires Vit-K 10mg IV co-administration

ADVERSE EVENTS

©

CLINICAL OUTCOMES

©

INR reversal may be necessary but not sufficient to alter the natural history of warfarin-associated ICH.

1. INR correction for patients with oral-anticoagulant associated ICH: Class I, Level C
2. PCC may have fewer complications to FFP and is a reasonable alternative: Class II, Level B

PART 2: INDICATIONS FOR SURGERY

1. Cerebellar
2. IVH
3. Hemispheric

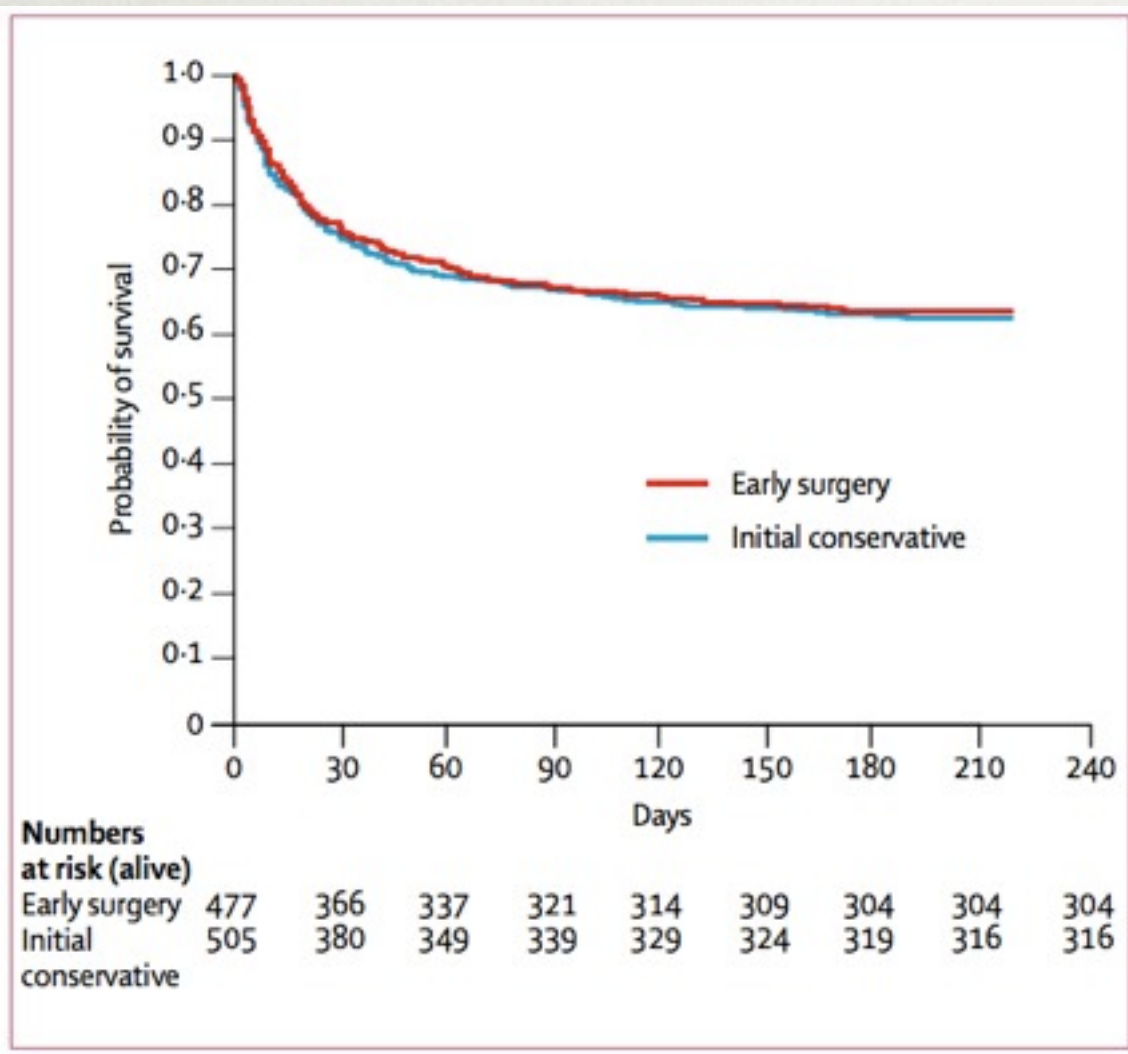
CEREBELLAR

- Evacuation for clinical deterioration or brainstem compression or hydrocephalus: Class I, Level B
- Ventricular drainage alone not recommended: Class III, Level C

IVH

- Drainage for hydrocephalus with decreased LOC: Class II, Level B

Early surgery versus initial conservative treatment in patients with spontaneous supratentorial intracerebral haematomas in the International Surgical Trial in Intracerebral Haemorrhage (STICH): a randomised trial



- Median 30 hours to surgery
- > 25% cross-over rate to surgery in medical arm

SURFACE BLEEDS

STICH sub-group analysis

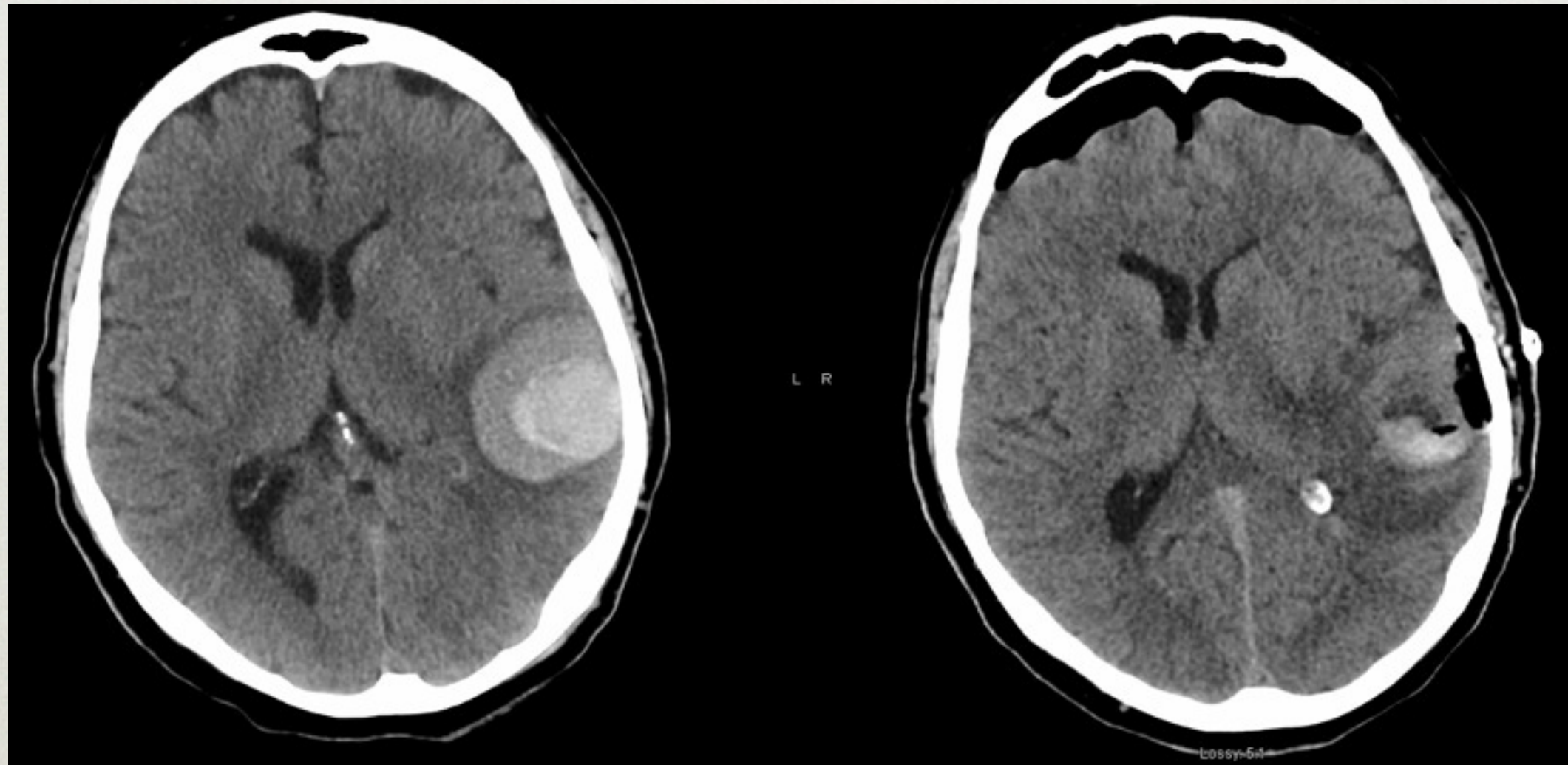
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GUIDELINES FOR SUPRATENTORAL ICH SURGERY

1. Usefulness uncertain: Grade II, Level C
2. Large lobar ICH <1cm from surface: Grade II, Level B
3. Minimally invasive evacuation investigational: Grade II, Level B

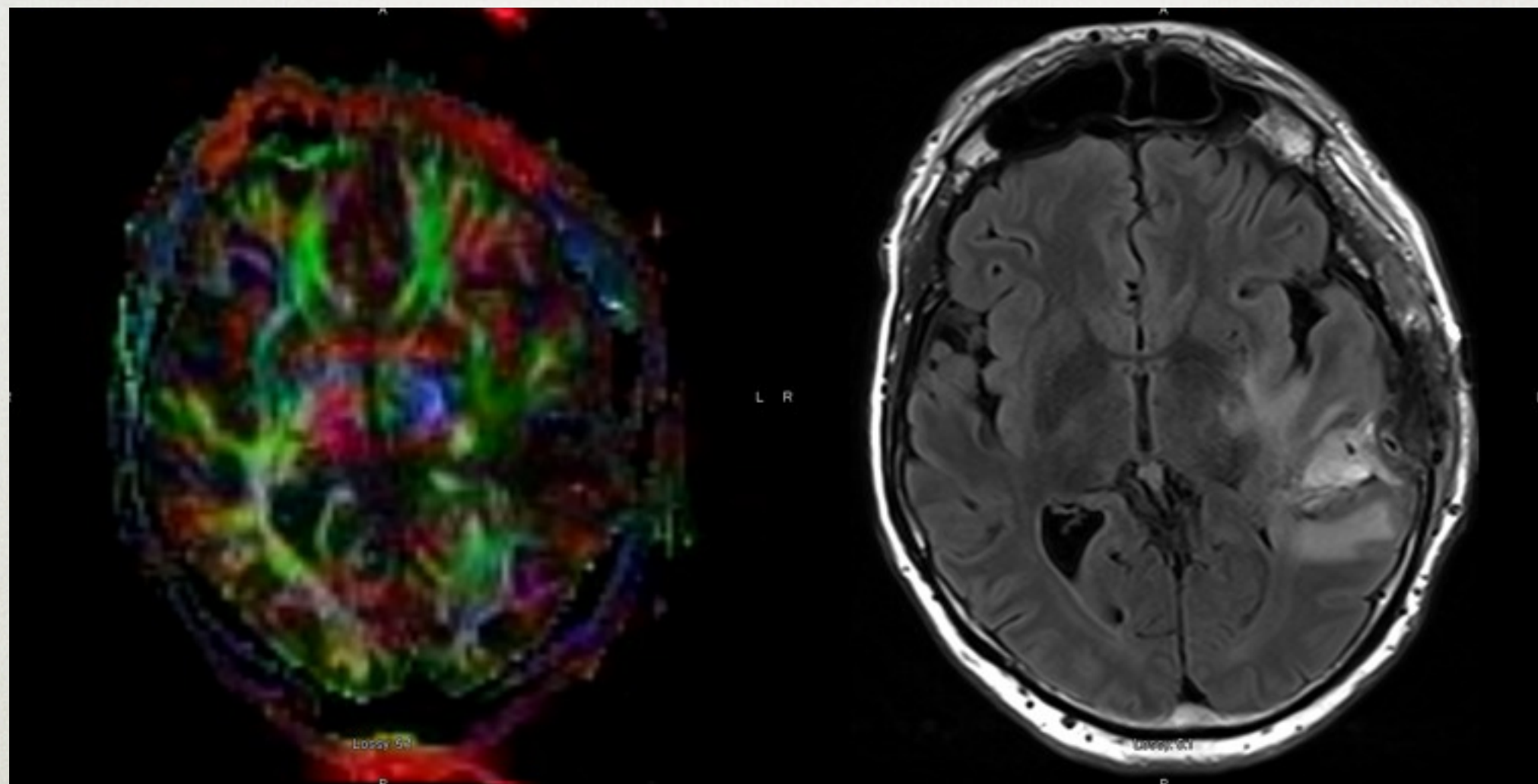
ELOQUENT CORTEX?



Global Aphasia
NIHSS 10

Post-op NIHSS 3
F/U NIHSS 0

MR-DTI GUIDED MIS



PART 3: PREVENTING COMPLICATIONS

- Hematoma Expansion
- IVH / hydrocephalus
- Hypertension
- Seizures
- Infection
- DVT / PE
- Fever / Hyperglycemia

SEIZURE

- 8% (2-20%) 30-day risk (subclinical cEEG approx 30%).
- Associated with worse outcomes, but not clearly causative.
- Prophylactic treatment associated with worse outcomes in two recent studies.
- New Guidelines:
 - Treat clinical seizures (Class I, level A)
 - Treat electrographic seizures with altered LOC (Class I, Level C)
 - No prophylactic therapy (Class III, Level B)

COMMENT

- Study 1: covariate analysis for factors associated with poor outcome
 - But only 23 patients treated with PHT
- Study 2: only 28 patients treated with PHT
 - 12 treated with LEV with no adverse outcome

INFECTION

- Aspiration / swallowing assessments

©

- Foley catheters, IV lines

DVT/PE PROPXYLAXIS

- Intermittent pneumatic compression boots (Class I, Level B)
- After repeat imaging showing cessation of bleeding, SC Heparin/LMWH starting day 1-4 (Class IIb, Level B).

METABOLIC

- Fever
- Hyperglycemia (normoglycemia Class I, Level C)

SUMMARY

1. Hemostasis

- PCC for warfarin-associated ICH
- consider platelets if low
- consider ddAVP if on antiplatelets
- No rFVIIa

2. Surgery

- cerebellar
- IVH with symptomatic hydrocephalus
- consider surgery for large superficial lobar bleeds

3. Complications

- prevent infections: aspiration, instrumentation
- normoglycemia, normothermia
- treat seizures, altered LOC with electrographic evidence
- start compression boots day 0, prophylactic anticoagulation between day 1-4 (after scan)