

How do we treat ICH patients with an elevated INR

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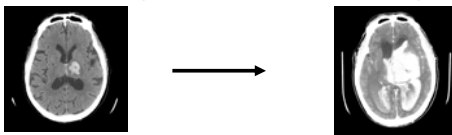


Disclosures

- Astra Zeneca, NovoNordisk, UCB Pharma Advisory Boards
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- Executive Board, Foundation for Education and Research in Neurologic Emergencies



Common Etiologies of ICH Acquired Coagulopathy — Anticoagulation



- Incidence of anticoagulant-associated ICH rose from 5% to 18% of cases of spontaneous ICH in 1990s
- INR 2.5-4.5 increases risk of ICH 10X
- ICH expansion in over 50% of patients on warfarin
- Doubles ICH mortality



Treatment

- ICH in patients with INR > 1.5 is life-threatening
- Time until initiation of warfarin reversal is predictive of outcome
- Reversal may not occur in 1 of 6 patients

Goldstein JN, et al. *Stroke*. 2006;37:151-155.



Reversal Options

- Fresh frozen plasma (FFP)
 - Administration time
 - Response time
- Recombinant factor VIIa
 - Limited experience
- Prothrombin complex concentrates (PCC)
 - Not available
- Vitamin K



Trauma Model

Tx of trauma patients with ICH on preinjury warfarin. *J Trauma* 2006; 61:318-321

- "Coumadin protocol" in place
- Mean time until FFP administration was 4.3 hours +/- 4.4 hours
 - No difference from the preprotocol group
- Reasons for delay:
 - Failure to recognize urgency
 - Delay in delivery from blood bank
 - Delay in initiation of infusion
 - Delay in completion of infusion



Stroke Model

Timing of FFP administration. *Stroke* 2006; 37:151-155

- CT to FFP time: 60 – 375 min
- FFP: 1 – 6 units
- Vit K: 0 – 10 mg
- 12 / 57 patients INR did not reverse at 24 hours
- Rapid correction of INR did not correlate with outcome
 - Delay in presentation
 - Delay in administration
 - Delay in reversal

Conclusions

- Protocols need to exist to facilitate rapid reversal of warfarin induced coagulopathy
- Protocol:
 - 2 - 4 units FFP; begin with 2 units of universal donor FFP
 - 10 mg Vit K slowly IV over 10 minutes
- Need for further research on the role of rFactor VII and PCC