SCCEP 2013 LLSA Course Article 10
AHA/ASA Guidelines for the Management of Spontaneous ICH

Morgenstern LB, Hemphill JC. Stroke July 2010;41:2108-2129.

Article: This article presents guidelines whose "aim is to present current and comprehensive recommendations for the diagnosis and treatment of acute, spontaneous ICH." Policy adopted by AHA/ASA 2010. Due to updated 2013

Conflicts reported: Pages and pages detailed in article. Half of writers and 1/6 reviewers.

Introduction

Methods: Formal English language MEDLINE search. Data were synthesized with use of evidence tables. Writers teleconferenced to discuss data-derived recommendations, which were graded using the AHA Stoke Council's Levels of Evidence grading algorithm. Draft guidelines were reviewed by 6 expert peer reviewers, and by the members of the both the Stroke Council Scientific Statements Oversight and Leadership Committees.

Evidence Classification: (Differs significantly from ACEP and others)

Class I: Treatment/Procedure is **useful, effective, SHOULD be performed**

Level A: Multiple RCTS or meta-analyses of RCTs.
Level B: Single RCT or cohort and case controlled studies (non-random)
Level C: Case studies and reports, standard of care, expert opinions.

Class IIa: It is REASONABLE to perform Treatment/Procedure (need focused studies)

Level A: Some conflicting evidence from multiple RCTS or meta-analyses of RCTs.
Level B: Some conflicting evidence from single RCT or non-randomized studies
Level C: Only diverging expert opinion, case studies or standard of care.

Class IIb: Treatment/Procedure MAY BE CONSIDERED (need broad studies, registry data)

Level A: Greater conflicting evidence from multiple RCTS or meta-analyses of RCTs..
Level B: Greater conflicting evidence from single RCT or non-randomized studies
Level C: Only diverging expert opinion, case studies or standard of care.

Class III: Treatment/Procedure SHOULD NOT be done: not helpful/harmful

Level A: Multiple RCTS or meta-analyses of RCTs.
Level B: Single RCT or cohort and case controlled studies (non-random)
Level C: Case studies and reports, standard of care, expert opinions.

Scope of Guidelines: From diagnosis to rehab, guidelines are offered. Authors acknowledge that there are NO SPECIFIC TARGERTED THERAPIES but state that there are successes with aggressive surgical and medical care.

Included: Adult ED Patients presenting with symptoms or signs of ICH.

Excluded: Pediatrics, since a recent guideline has been published

Emergency Diagnosis and Assessment of ICH and Its Causes

- 20% of Pts have a decrease in GCS $\geq$2 between EMS and initial ED assessment
- Average decrease in this 20% is 6 on GCS and mortality is 75% (i.e. dying people do poorly right before they die)
- 15% of Pts in ED have decrease in GCS $\geq$2
- Prehospital Management:
    - Provide ventilatory and CV support
    - Obtain focus history, med list, any drug use
    - Advanced notice to ED of incoming stroke
- ED Management:
    - "UTMOST" importance that every ED have a plan to treat or transfer ICH
        - Neurosurgical evacuation or drainage, pressure monitoring
        - BP management, Intubation
        - Reversal of coagulopathy (ed note...increasingly not possible)

A. Neuro-Imaging: Early CT or MRI imaging in mandatory, as symptoms of ICH and ischemic stroke are non-specific and overlapping with other clinical conditions as well.

1. **Class I** (Level A): **Rapid Neuroimaging to distinguish ischemia and ICH**
2. **Class IIb (Level B)**: CT Angiography and Contrast CT may identify patients at risk for hematoma expansion
3. **Class IIa (Level B):** Advanced CT and MRI techniques may help identify underlying tumors and AVMs when there is clinical or radiologic suspicion

Medical Treatment for ICH

B. **Hemostasis** by reversal of OACs, **correction** of acquired or congenital factor deficiencies**, transfusion of platelets**, and **DVT prophylaxis**. There are many ongoing trials of newer factor replacement products such as rFVIIa and Prothrombin Complex Concentrates(PCC), compared with FFP and Vitamin K IV. Unfortunately, many newer agents(e.g. Pradaxa), unlike wafarin, lack reversal agents

1. **Class I** (Level C): **Pts with severe coagulation factor deficiency or severe thrombocytopenia should respectively receive appropriate factor replacement therapy or platelets**
2. **Class I** (Level C): **Pts with elevated INR due to wafarin should have it withheld and receive therapy to replace Vit-K dependent factors and correct the INR and receive IV Vit K**
   Class IIa (Level B): PCCs have not been shown improved outcomes compared with FFP, but may have fewer complications and are reasonable to consider as an alternative to FFP
   Class III (Level C): rFVIIa does not replace all clotting factors and although the INR may be lower, clotting in vivo may not be restored; therefore **rFVIIa is NOT routinely recommended as a sole agent for OAC reversal in ICH**
3. **Class III** (Level A): Although rFVIIa can limit the extent of hematoma expansion in NONCOAGULOPATHIC ICH, there is an increase in thromboembolic risk and no clear benefit in unselected patients**. Therefore, rFVIIa is NOT recommended in unselected patients**
4. **Class IIb** (Level B): The usefulness of **platelet transfusions in ICH** patients on antiplatelet therapy is unclear and is **considered investigational**
5. **Class I** (Level B): **Patients should have intermittent pneumatic compression for prevention of DVT in addition to elastic stockings**
6. **Class IIb** (Level B): After documentation of the cessation of bleeding, low dose SQ LMWH may be considered for the prevention of DVT in patient with lack of mobility 1-4 days after onset

C. Blood Pressure: ICH patients who present with SBP > 150 do worse. Two recent studies, one Chinese, one smaller and done with nicardipine as the agent showed no worse outcomes when acutely lowering SBP in ICH from > 180 mm Hg towards 140 mm Hg . Note that there was no benefit shown beyond a "relatively" smaller hematoma size.

1. **Class IIb** (Level C): Physicians must manage BP on the basis of incomplete efficacy evidence**.** Recommendations are summarized in Table 6**.**

   1. If SBP is > 200 mm Hg or MAP is > 150 mm Hg, then consider aggressive reduction of BP with continuous IV infusion, with BP monitoring every 5 min.
   2. If SBP is > 180 mm Hg or MAP is > 130 mm Hg and there is the possibility of **elevated ICP, then consider monitoring ICP** and reducing BP
   using intermittent or continuous IV meds **while maintaining a CPP > 60 mm Hg.**
   3. If SBP is > 180 mm Hg or MAP is > 130 mm Hg and there is not evidence of elevated ICP, then consider a modest reduction of BP (eg, MAP of 110 mm Hg or target BP of 160/90 mm Hg) using intermittent or continuous IV meds BP and clinically reexamine the patient every 15 min.

2. **Class IIb** (Level B): **In pts with SBP of 150-220 mm Hg, acute lowering to 140 mm Hg is probably safe.** (Single Chinese Study)

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D. Monitoring ICH Patients Acutely

1. **Class I** (Level B): **initial monitoring and management of ICH Pts should take place in an ICU with physician and nursing neuroscience ICU expertise**

E. Management of Glucose: a single study from 2001 in surgical ICU patients demonstrated improved outcomes with very tight glucose control (80-110 mg/dL) Multiple studies since then have shown possible increased in mortality, and hypoglycemic events.

1. **Class I** (Level C): Monitored glucose and normoglycemia is recommended.

F. **Management of Temperature:** Incidence of fever in basal ganglion and lobar ICH is high, and fever, especially after 72 hours portends a worse outcome, but there is no data on therapeutic cooling in ICH.

G. Management of Seizures and Antiepileptics: Seizures are common after ICH and EEG abnormalities even more common, even in patients on prophylactic antiepileptics. However, in prospective and population-based studies, seizures are not associated with a worse outcome or mortality. One population based study and a single are or a randomized study showed increased mortality at 90 days for phenytoin.

1. **Class I** (Level A): **Treat clinical seizures with antiepileptic drugs**
2. **Class IIa** (Level B): Continuous EEG monitoring is probably indicated in pts with depressed mental status out of proportion to brain
3. **Class I** (Level C)**: Patients with change in mental status who are found to have electrographic seizures on EEG should be treated with antiepileptics**
4. **Class III** (Level B): **Prophylactic anticonvulsants should NOT be used**

Procedures/Surgery

H. ICP Monitoring and Treatment: Elevated ICP usually due to hydrocephalus from IVH, or mass effect or edema, so patients with small hematomas usually don't require ICP monitoring. Parenchymal or ventricular catheters can be inserted at bedside using fiberoptic techniques. A ventricular catheter can be used to drain CSF and lower ICP. Coagulation status of patient should be assessed before placing and coagulopathies corrected. **There is a lack of published studies showing that ICP management improves outcomes.**

1. **Class IIb** (Level C): Pt with GCS <8, clinical evidence or transtentorial herniation or those with significant IVH or hydrocephalus might be

considered for ICP monitoring and treatment. A CPP of 50-70 is reasonable to maintain depending on cerebral autoregulation status.

2. **Class IIa** (Level B): Ventricular drainage for hydrocephalus is reasonable in patients with decreased LOC

I. **Intraventricular Hemorrhage: IVH occurs in 45% of spontaneous ICH.** May be primary, but most IVH are secondary to basal ganglion ICH. They can be drained with an intraventricular catheter, but it often clogs off, so tPA is being tested as an adjunct.

1. **Class IIb** (Level A): Although intraventricular administration of tPa in IVH has a fairly low complication rate, safety and efficacy are uncertain and it is considered investigational

J. Clot Removal: Decision to surgically remove the ICH is controversial and recommendations are uncertain as risks of surgery on a acutely bleeding ICH patient may outweigh benefits of removing the clot and limiting the mechanical compression of the brain and the toxic effects of the blood on the brain. **Craniotomy by Location of ICH: Cerebellar ICH > 3cm or with signs of brainstem compression do better with surgery**

1. **Class IIb** (Level C): **For most ICH Pts, usefulness of surgery is uncertain**
2. **Class I** (Level B): **Cerebellar ICH Pts that are deteriorating clinically or have brainstem compression or hydrocephalus should undergo surgical removal of hematoma ASAP.** Initial treatment of these PTs with ventricular drainage alone is not recommended.{ Class III (Level C)}
3. **Class IIb** (Level B)**:** Pts with supratentorial clots >30 mL and within 1 cm of surface might be considered for surgical evacuation
4. **Class IIb** (Level B)**:** Effectiveness of minimally invasive clot evacuation with or without tPA is uncertain and investigational.
5. **Class III** (Level B): No clear evidence that ultra-early removal of SUPRATENTORIAL ICH improves outcome or mortality and may be harmful due to increase bleeding risk

K. **Outcome Prediction and Withdrawal of Technological Support:** DNR orders are probably a surrogate marker for overall less-aggressive care, and probably lead to a self-fulfilling prophecy of poor outcomes. it si difficult to prognosticate early inthge course of ICH

1. **Class IIa** (Level B): **Aggressive early care and postponement of new DNR orders until at least the 2nd day of hospitalization is probably recommended**. Pts with pre-existing DNR are not included in this recommendation. DNR pts should receive all other appropriate medical and surgical interventions unless otherwise explicitly indicated by advanced directives

L. Prevention of Recurrent ICH: Recurrence rates of 2-3% per year, much higher than their risk of subsequent ischemic stroke. High risk factor for recurrence is lobar location, probably due to association of amyloid vasculopathy with lobar bleeds. Brainstem and basal ganglia stokes due to HTN occur less frequently. Age, HTN, anticoagulation, frequent ETOH use and certain genetic markers are also associated with higher risk of recurrence.

1. **Class IIa** (Level B): In stratifying a patient risk for recurrent ICH when making management decisions, it is reasonable to consider these risk factors: Lobar location, older age, ongoing anticoagulation, apolipoprotien E e2 or e4 alleles, and presence of a greater number of microbleeds on MRI.
2. **Class I** (Level A): **After the acute ICH period, BP should be well controlled, particularly in pts whose ICH location is typical of HTN bleeds.**
3. **Class IIa** (Level B**):** After the acute ICH period, BP should be < 140/90 or 130/80 if diabetic or chronic kidney disease
4. **Class IIa** (Level B): Avoidance of anticoagulation after spontaneous lobar ICH in non-valvular A Fib pts is probably recommended based on high recurrence rate. **Class IIb** (Level B) After NON-lobar ICH anticoagulation and anti-platelet therapy might be considered if there are definite indications
5. **Class IIa** (Level B): Avoidance of heavy ETOH can be beneficial.
   Class IIa (Level C**):** There is insufficient evidence to recommend restrictions on the use of statins, or restricting physical or sexual activity.

M. Rehabilitations and Recovery

1. **Class IIa** (Level B): All pts should have access to multi-disciplinary rehab
   Class IIa (Level B**):** When possible, rehab should begin as early as possible and continue at home and in the community seamlessly, with accelerated hospital discharge

N. Future Considerations

1. Community based programs to control HTN
2. **Prompt treatment, early imaging and aggressive care, since prognosticating with ICH is difficult**
3. Research Areas:
   - **i.** Early BP control in ICH**.**
   - ii. Agents to chelate iron, or prevent secondary injury from hypoxia etc.
   - iii. Minimally invasive surgical techniques to remove clot