



## Hemorrhagic Stroke in 2021

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### Abstract

Spontaneous cerebral bleed is a life threatening condition and should be managed as an emergency, Mortality in the first 30 days are extremely high, although there is no significant progress in treatment, Patient should be treated actively in the first 72 hours, and no orders not for recuses should be made, Early diagnosis and treatment is of paramount importance to arrest rapid expansion of bleed, prevent neurological deterioration, morbidity and death. Controlling blood pressure, reversing anticoagulation, endovascular treatment for subarachnoid bleed, decompression of posterior fossa in cerebellar bleed. Can prevent mortality and morbidity.

**Keywords:** Spontaneous Cerebral; Hemorrhagic Stroke; Neurology

### Literature Review

We searched PubMed and google scholar, using the words, primary spontaneous cerebral bleed, hemorrhagic stroke, non-ischemic stroke, we got a result of 3000 articles, we have chosen 30 review articles from lancet, new England journal, American academy of neurology, practical neurology, BMJ, Neurology, frontiers in Neurology, European Journal of Neurology, JAMA Neurology and others.

Acute hemorrhagic stroke is a medical emergency and the same principle of time is brain still apply to all patients with cerebral bleed [1].

Although hemorrhagic stroke is a life-threatening disorder with worse prognosis and have increased and early thirty days fatality than ischemic stroke, it should be treated very actively at least in the first 48-72 hours [2], every effort should be done to avoid not for recuses orders [3].

Although there are not crystal-clear guidelines for effective medication during the acute stage, there is moderate level of evidence that prognosis can't be predicted in the first 72 hours [4].

Clinical diagnosis of hemorrhagic stroke on bed site is extremely difficult because most of the patients have reduced level of consciousness [5], some patients will present with seizure, few patients may present with only confusion if the bleed in the frontal lobe, hemorrhagic stroke account for 20% of all strokes in the world [6].

Despite dramatic progress that had been made in treating ischemic stroke, there is limited progress in treating cerebral bleed or preventing fatality and complications, Hemorrhagic stroke is a very heterogeneous disease, around 80% of Hemorrhagic stroke [HS] are due to deep perforating small vessel vasculopathy due to hypertension and cerebral amyloid angiopathy [7]. The remainder 20% includes macrovascular vasculopathy due to artery-venous malformation [8].

Ruptured aneurysm, Cavernoma, venous stroke, carcinoma, uncontrolled anticoagulation, trauma, dissection, 5% of hemorrhagic stroke occur in the cerebellum, the rest affect the cortical, subcortical areas and cerebral convexities, 20% due to amyloid angiopathy, 40% is due to combination of atherosclerosis and amyloid angiopathy [9].

Careful history taking is essential. If patient can't provide history because of impaired level of consciousness, every effort should be done to get a collateral history from the household.

Important information which affects the management plan should include, if patient is taking anticoagulants, or antiplatelet medications, type and dose, time of onset of symptoms, history of fall. Imaging of head should take the precedence of any other investigation or even detailed history taking, time is brain still apply [1], uncontracted CT head is the standard of care in Australia followed by CT Angio. If CTA is negative, patient should have MR/MR Angio if still negative, patient should go for Digital subtraction Angio especially if underlying macrovascular disease was not ruled out.

Patient with lobar hemorrhage needs to have a repeat digital subtraction Angio in 6 weeks. Standard of care in Australia is on call registrar will discuss the image with the neurosurgeon for advice. Hemorrhage due to ruptured aneurysm or amyloid angiopathy will be looked after by neurosurgeon in tertiary hospital, shape and density of the bleed predicts expansion of hematoma and grave prognosis [10]. Detection of spot sign in imaging predict active bleed. It also identifies the location and rate of bleed. Spot sign is of paramount importance for the neurosurgeon. Surgically treated bleeding with spot sign leads to lower mortalities than conservatively treated ones as per few retrospective studies [11]. Spot sign can be missed if the image is acquired before the contrast material has had sufficient time to reach the leaking point. Detection of spot sign needs imaging capture the late arterial and early venous or delayed phases of CTA examined [12]. Few studies suggested that the predictive ability of spot sign is of high yield if CTA done very early after cerebellar bleed [13].

Other uncommon causes of hemorrhagic stroke include infective endocarditis, Dural arteriovenous fistula, cerebral angitis, metastasis, hemorrhagic transformation of ischemic infarction, posterior reversible encephalopathy, coagulation defects, cortical vein thrombosis, Modified Rankin stroke could not be done for patients with reduced level of consciousness.

## Medical treatment includes

### Reversal of anticoagulation

This group of patients have worse outcome, bleeding due to warfarin is worse than due to direct anticoagulant, coagulation screen includes INR, APTT, the concept of time is brain is very relevant to this group [14], patients with INR>1.4 should be treated with IV Vitamin K and prothrombin Complex.

Patient on Thrombin inhibitor [Dabigatran], should be treated with active charcoal if last dose is less than 4 hours in addition to Idarucizumab as an antidote except if the thrombin time is normal.

Patients on factor X inhibitor [apixaban, rivaroxaban, endoxan, and Betrixaban] should be treated with active charcoal if last dose is less than 4 hours, Adexanent alpha as an antidote and prothrombin complex.

Patients on heparin and low molecular heparin treated with protamine zinc if APTT is prolonged and heparin given less than two hours [15].

### Hypertension is very common after cerebral bleed

INTERACT2 trial examined 2829 patients with cerebral bleed and showed that lowering of blood pressure to less than 140mm had been associated with improvement in functional outcome, and health related quality of life without any substantial harm, this was not confirmed in other studies.

But confirmed that there was decrease in hematoma expansion, currently the standard of care is control blood pressure 130-140mm in the first 6 hours with no harm.

3-patients on antiplatelet did not benefit from platelet transfusion in contrast with patients who had thrombocytopenia will benefit from platelet transfusion [16].

Few studies demonstrated that Hematoma growth occurred very early but infusion of Hemostatic drugs like activated factor seven, prothrombin complex, tranexamic acid could decrease hematoma expansion if given early but did not translate in functional benefit [17].

### Cerebral oedema

Standard of care is patients should be managed in surgical intensive care, patients need invasive intracranial monitoring for the

following group, Trans tentorial herniation, Hydrocephalus, Comatose patients, large intraventricular hemorrhage. Sitting position is recommended as it reduces intracranial pressure [18].

### Seizures

Although the risk of seizure is about 10% but prophylaxis anti-convulsant is not advised. Patient who develop seizure early, should stay on anticonvulsant for 6 months, patients who experienced more than one seizure, should be treated as epilepsy [19]. Patient should receive thromboprophylaxis in the form of intermittent compression in the first 48 hours, followed by prophylaxis low molecular weight heparin [20].

### Neurosurgery Craniotomy

Meta-analysis advised the predictive factors for benefit from surgery are patient with lobar Hemorrhage no extension of bleed into ventricles, patients with hematoma larger than 50 ml, patients received treatment in the first 8 hours, patients with Glasgow Coma Score from 9 -12, patients in the age group between 50-68 years [21].

### Minimal invasive surgery

It is almost a standard of care for high-income countries using a catheter or stereotactic surgery to decompress intracerebral hematoma especially for deep intracerebellar hematomas as it avoids cerebral injury from that occurs during evacuation of the hematomas [22].

Patients who survive hemorrhagic stroke and were on antiplatelet are at risk of ischemic stroke and the benefit of resuming antiplatelet to prevent ischemic outweigh the harm of causing the bleed.

Patients who develop hemorrhagic stroke on antiplatelet and diagnosed with amyloid angiopathy should not resume antiplatelet awaiting further research [23,24].

### Conclusion

Hemorrhagic stroke is a medical emergency and every effort should be made for early diagnosis and management, early involvement of neurosurgeon as the main multidisciplinary team for managing subarachnoid bleed will save life and prevent serious neurological complication, detailed collateral history is vital for treatment

specially for patients on anticoagulation, or patients who have history of familial aneurism.

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