

Intraparenchymal Hemorrhage

A 78-year-old male with a past medical history of multiple myeloma presents to the ED by EMS with complaints of left sided weakness and last known normal 1 hour ago. He reports weakness in his left extremities and trouble finding words. Patient's vitals show he is hypertensive, but no other alarming abnormalities. He denies any recent trauma, surgeries, or abnormal bleeding. On physical exam, patient has left-sided facial droop, slurred speech, weakness in his left extremities, and a gaze to the right.

Which of the following is the best next step in management for this patient's condition?

- A. CT scan
- B. MRI
- C. Surgical decompression
- D. TPA
- E. Nicardipine

Vitals:

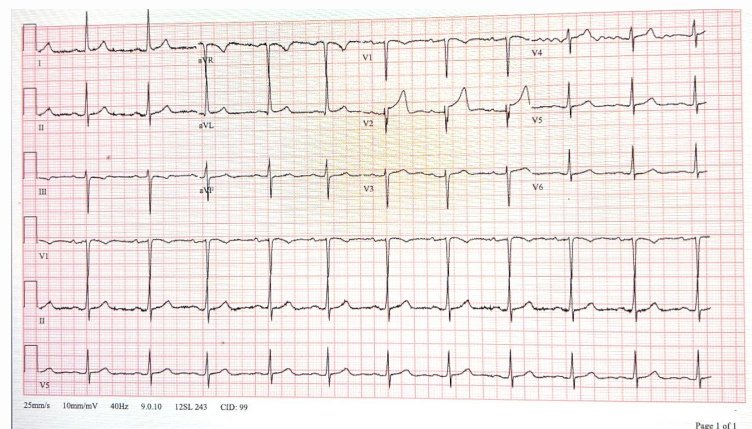
BP: 200/117 mmHg
HR: 66 bpm
SpO2: 95%
RR: 16 BPM

Labs:

Na 140	Cl 105	BUN 13	Gluc
K 4.2	HCO3 28	Cr 1.0	100

WBC	HGB	PLT	PT: 14.4
3.31	14.8	114	INR: 1.2
	44.9		PTT: 29.3
	HCT		

Figure 1. EKG: Sinus Rhythm with 1st degree A-V block.



Answer: A - CT Scan

As soon as the patient's medical stability is achieved, a CT of the head without contrast should be performed. An acute intraparenchymal hemorrhage (IPH) should show a hyperdense lesion within the parenchyma.¹

Discussion

Intraparenchymal hemorrhages not due to trauma are mainly caused by hypertensive damage to the cerebral blood vessels.² The vessels are placed under a great amount of pressure and over time can burst causing a brain bleed to occur. Patients who suffer a brain bleed commonly present with the acute onset of stroke symptoms: focal neurological deficits, lethargy, weakness, slurred speech, syncope, vertigo, and a change in sensation.²

When a patient presents with a suspected intracerebral hemorrhage, a brain attack alert should be activated. Begin with stabilization of the patient (the "ABCs"). A physical and neurological exam should be performed as soon as possible to determine the severity of the stroke. The NIH Stroke Scale (NIHSS) score can be used to quickly assess the cognitive effects the stroke has caused the patient. The score can help determine the course of action and treatment. The NIHSS score should be repeated at regular intervals to monitor for changes in the patient's symptoms and guide treatment.¹

The patient should undergo a non-contrast CT scan as soon as possible to identify the location and size of the hemorrhage. Elevated blood pressure is typically seen in patients with a brain bleed, which can increase the patient's risk for hematoma expansion, neurologic deterioration, and poor outcome.³ Blood pressure should be lowered enough to escape injury and reduce IPH.⁴ However, it needs to stay high enough to sustain cerebral perfusion.⁴ In patients with SBP <220 mmHg, the American Heart Association (AHA) advises lowering SBP to <140 mmHg after ICH is confirmed.⁴ Patients with SBP >220 mmHg may be considered for acute lowering of blood pressure if found to be safe and effective; it should be done with caution.⁴

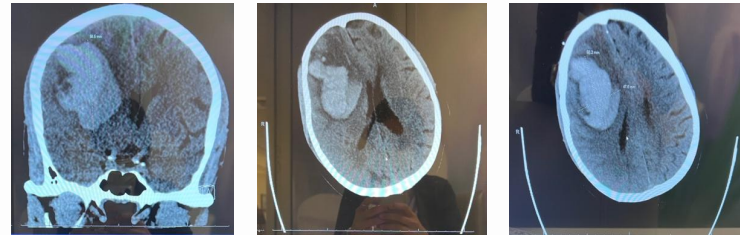


Figure 2. Patient's CT of the brain without contrast: Large intra-axial approximately 97 cc right frontal lobe intraparenchymal hemorrhage, causing right to left midline shift of 1 cm and significant mass effect upon the adjacent cortical sulci and right frontal horn/right lateral ventricle.

Intravenous calcium channel blockers (i.e., nifedipine) and β -blockers (i.e., labetalol) are preferred for prompt BP reduction.² Elevating the bed can help lower intracranial pressure. If the patient is taking any anticoagulation medication, reversal agents should be used as soon as possible. Osmotic therapies such as mannitol and hypertonic saline may be used to relieve elevated intracranial pressure. Other options include surgical evacuation, craniectomy, and catheter-based hematoma dissolution.³ Smaller or non-operable hemorrhages are managed by controlling blood pressure, reversing anticoagulation or antiplatelets and utilizing neuroprotective strategies.³ Repeat CT scans of the brain are performed to monitor the bleed and any changes that occur.

In our case, the patient was started on hypertonic saline, however continued to deteriorate. A repeat CT scan showed worsening midline shift. Neurosurgery performed a decompression craniotomy after which the patient's condition improved.

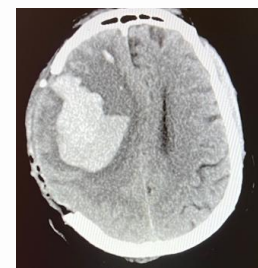


Figure 3. Patient's CT of the brain without contrast: post-craniotomy.

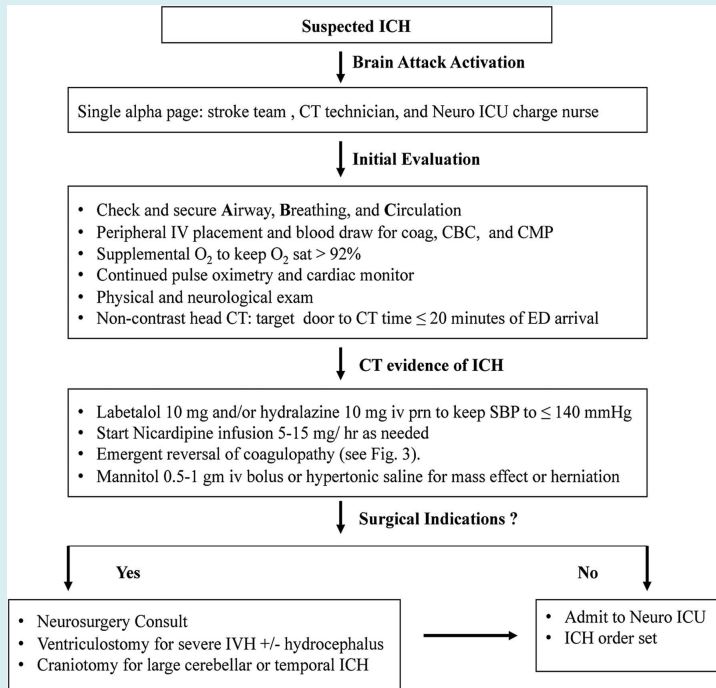


Figure 4. Intracerebral Hemorrhage - Diagnosis, Management, and Treatment Flowchart²

Take Home Points

1. Patients with intraparenchymal hemorrhage typically present with stroke-like symptoms and high blood pressure.
2. A non-contrast CT scan should be obtained within 20 minutes of patient arrival to find the location and size of the bleed.
3. Elevated intracranial pressures should be decreased to reduce risk of hematoma expansion and poor outcomes.³ Management includes elevating the head of the bed and giving the patient osmotic fluids.
4. Additionally, the AHA recommends lowering SBP to <140 mmHg in patients with SBP <220 mmHg. In patients with SBP >220 mmHg, acute lowering of SBP may be considered if found to be safe and effective. This can be done through medications such as nicardipine.
5. Neurosurgery should be consulted as soon as IPH is suspected to determine management and treatment. Surgical treatment may include craniotomy, hematoma evacuation, and ventriculostomy.

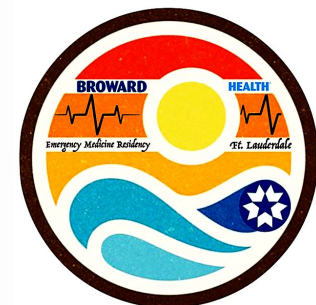


About the Author

This month's case was written by Miranda Bingham. Miranda is a 4th year medical student from AUC. She did her emergency medicine rotation at BHN in August 2022. Miranda plans on pursuing a career in Emergency Medicine after graduation.

References

- [1] Hoffman, H. (2021, September 10). What is the NIH stroke scale (NIHSS)? Retrieved from <https://www.saebo.com/blog/nih-stroke-scale-nihss/>
- [2] Tenny S, Thorell W. [Updated 2022 Feb 21]. Intracranial Hemorrhage. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. Retrieved from: <https://www.ncbi.nlm.nih.gov/books/NBK470242/>
- [3] Dastur, C. K., & Yu, W. (2017). Current management of spontaneous intracerebral haemorrhage. *Stroke and vascular neurology*, 2(1), 21-29. <https://doi.org/10.1136/svn-2016-000047>
- [4] Krel M, Brazdzionis J, Wiginton JG 4th, Miulli DE, Wacker MR, Cortez V. Tight Control of Systolic Blood Pressure in Spontaneous Intraparenchymal Brain Hemorrhage. *Cureus*. 2019 Jul 23;11(7):e5215. doi: 10.7759/cureus.5215. PMID: 31565619; PMCID: PMC6758991.



@browardem