Intraparenchymal hemorrhage

see also Traumatic intracerebral hemorrhage

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- APOE epsilon4 and Risk of Intracranial Hemorrhage in Patients With Atrial Fibrillation Taking Apixaban
- In vivo Testing of the Pressio Intracranial Pressure Monitor
- Combined Human Neural Stem Cell and Structured Treadmill Walking Therapy Enhances Recovery in a Pediatric Porcine Traumatic Brain Injury Model
- Distal anchoring techniques for reducing intra-aneurysmal (around-the-world) microcatheter loop prior to stent deployment across large wide-necked aneurysms- an educational review
- Comparative assessment of the spot sign and leakage sign as predictive factors for spontaneous intracranial hematoma expansion
- Association between coagulation biomarkers, intracranial hemorrhage types, and tranexamic acid treatments in early traumatic brain injury
- Intraparenchymal hemorrhage from infective endocarditis: A case of double trouble

Intraparenchymal hemorrhage (IPH) is one form of intracerebral hemorrhage in which there is bleeding within brain parenchyma. The other form is intraventricular hemorrhage (IVH). Intraparenchymal hemorrhage accounts for approx. 8-13% of all strokes and results from a wide spectrum of disorders.

see Intracerebral hemorrhage.

Intraparenchymal hemorrhage in the term infant is relatively uncommon.

Spontaneous intraparenchymal hemorrhage of term neonates is usually asymptomatic and does not require surgical intervention. However, there is no consensus on the management of cases with severe life-threatening symptoms, including repeated apnea, respiratory failure with severe cyanosis, severe bradycardia, or uncontrolled seizures.

Medical records of term neonates with intracranial hemorrhage who underwent surgical intervention were retrospectively reviewed. There were two cases with spontaneous parenchymal hemorrhage. Both cases were delivered vaginally without any use of forceps or vacuum devices. Neither of them showed asphyxia, hypoxic-ischemic encephalopathy, hematological abnormalities, congenital vascular anomalies, infection, or birth trauma. Common symptoms included apnea, cyanosis, bradycardia, and decreased consciousness. The original location of bleeding was the parenchyma of the right temporal lobe. The hemorrhage extended to subdural spaces in both cases. Subdural hematoma (SDH) removal was performed without manipulating the parenchymal hematoma. Only a small amount of SDH (approximately 5 ml) was drained spontaneously with irrigation, which was sufficient to decrease the elevated intracranial pressure. The patients' respiratory conditions improved dramatically after the surgery.

Tamura and Inagaki proposed that removing only a small amount of SDH would be effective and sufficient to relieve severe symptoms of increased intracranial pressure in term neonates with massive spontaneous parenchymal hemorrhage [1].

Classification

Intraparenchymal hemorrhage (IPH) refers to bleeding within the brain tissue itself, as opposed to bleeding within the spaces surrounding the brain. The classification of intraparenchymal hemorrhage often involves describing the location, size, and other characteristics of the hemorrhage. One commonly used classification system is the "ICH Score," which helps assess the severity of intracerebral hemorrhage (ICH) and predict outcomes.

ICH Score:

The ICH Score is a widely used tool for classifying and assessing intracerebral hemorrhages. It assigns points based on specific criteria, and the total score helps predict the probability of mortality at 30 days. The components of the ICH Score include:

Glasgow Coma Scale (GCS) Score: A lower GCS score indicates a more severe injury. Points are assigned based on the patient's level of consciousness.

ICH Volume: The volume of the intraparenchymal hemorrhage, measured in milliliters. This is often determined using neuroimaging studies like computed tomography (CT) scans.

Intraventricular Hemorrhage (IVH): Presence or absence of intraventricular extension of the hemorrhage. Intraventricular hemorrhage is associated with increased severity.

Age: Older age is associated with worse outcomes.

Location of Hemorrhage: The specific location within the brain where the hemorrhage has occurred. Certain locations may be associated with different clinical implications.

Each criterion is assigned a certain number of points, and the total score helps estimate the risk of mortality. The higher the total score, the higher the predicted risk.

Other Classification Considerations:

Apart from the ICH Score, clinicians may also describe intraparenchymal hemorrhages based on:

Location: Describing the specific anatomical site within the brain where the hemorrhage has occurred (e.g., basal ganglia, thalamus, cerebellum).

Size: Referring to the volume or extent of the hemorrhage, often categorized as small, medium, or large.

Underlying Causes: Identifying the underlying conditions or causes contributing to the intraparenchymal hemorrhage, such as hypertension, vascular malformations, or anticoagulant use.

The classification systems used may vary based on research studies, clinical protocols, and individual patient characteristics. It's important to note that classification systems serve as tools to assist in prognosis and treatment decisions, and their application may evolve over time as new research emerges.

Case reports

Bhanot et al. presented a patient with intraparenchymal hemorrhage due to cerebral arteriovenous malformation (AVM) who exhibited acute ST segment myocardial infarction (STEMI) after neurosurgery. Serial cardiac biomarkers and echocardiograms were performed which did not reveal any evidence of acute myocardial infarction. The patient was managed conservatively from cardiac stand point with no employment of anticoagulants, antiplatelet therapy, fibrinolytic agents, or angioplasty and recovered well with minimal neurological deficit. This case highlights that diffuse cardiac ischemic signs on the ECG can occur in the setting of an ICH after neurosurgery, potentially posing a difficult diagnostic and management conundrum [2].

1)
Tamura G, Inagaki T. Removal of a minimal amount of subdural hematoma is effective and sufficient for term neonates with severe symptomatic spontaneous parenchymal hemorrhage. Childs Nerv Syst. 2019 Mar 16. doi: 10.1007/s00381-019-04114-2. [Epub ahead of print] PubMed PMID: 30879127.

2)
Bhanot RD, Kaur J, Sriwastawa S, Bell K, Suchdev K. Postoperative 'STEMI' in Intracerebral Hemorrhage due to Arteriovenous Malformation: A Case Report and Review of Literature. Case Rep Crit Care. 2019 Apr 22;2019:9048239. doi: 10.1155/2019/9048239. PMID: 31231576; PMCID: PMC6507120.