Aneurysmal subarachnoid hemorrhage (aSAH)

- Growth Factors and the Choroid Plexus: Their Role in Posthemorrhagic Hydrocephalus
- Perimesencephalic Subarachnoid Hemorrhage Bleeding Patterns Are Not Always Benign: Prognostic Impact of an Aneurysmal Pathology
- Aquaporins in Acute Brain Injury: Insights from Clinical and Experimental Studies
- Worthwhile or Not? The Pain-Gain Ratio of Screening Routine cMRIs in a Maximum Care University Hospital for Incidental Intracranial Aneurysms Using Artificial Intelligence
- Japanese Nationwide Questionnaire Survey on the Treatment and Management of Subarachnoid Hemorrhage Due to Ruptured Cerebral Aneurysm
- Clinical Management of Cerebral Amyloid Angiopathy
- Non-Saccular Aneurysm Shape as a Poor Prognostic Factor in Younger Patients with Spontaneous Subarachnoid Hemorrhage
- Regional Differences in Presentation, Cause, and Outcome of Reversible Cerebral Vasoconstriction Syndrome

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Aneurysmal subarachnoid hemorrhage (aSAH) is a severe subtype of stroke occurring at a relatively young age with a significant socioeconomic impact. Treatment of aSAH includes early aneurysm exclusion, intensive care management, and prevention of complications. Once the aneurysm rupture occurs, blood spreading within the subarachnoid space triggers several molecular pathways causing early brain injury and delayed cerebral ischemia. Pathophysiologic mechanisms underlying brain injury after aSAH are not entirely characterized, reflecting the difficulties in identifying effective therapeutic targets for patients with aSAH. Although the improvements of the last decades in perioperative management, early diagnosis, aneurysm exclusion techniques, and medical treatments have increased survival, vasospasm, and delayed cerebral infarction are associated with high mortality and morbidity. Clinical practice can rely on a few specific therapeutic agents, such as nimodipine, a calcium-channel blocker proven to reduce severe neurologic deficits in these patients. Therefore, new pharmacologic approaches are needed to improve the outcome of this life-threatening condition, as well as a tailored rehabilitation plan to maintain the quality of life in aSAH survivors. Several clinical trials are investigating the efficacy and safety of emerging drugs, such as magnesium, clazosentan, cilostazol, interleukin 1 receptor antagonists, deferoxamine, erythropoietin, and nicardipine, and continuous lumbar drainage in the setting of aSAH [1].

Aneurysmal subarachnoid hemorrhage algorithm

see Aneurysmal subarachnoid hemorrhage algorithm.

Classification

Aneurysmal subarachnoid hemorrhage classification.

Miscellaneous facts about SAH

Subarachnoid hemorrhage (SAH) following aneurysm bleeding accounts for 6% to 8% of all cerebrovascular accidents.

The anterior communicating artery aneurysm cause aneurysmal subarachnoid hemorrhage, about 21.0%~25.5% of percent of spontaneous subarachnoid hemorrhage [2) 3) 4)].

The peak age for aneurysmal subarachnoid hemorrhage aSAH is 55-60 years, about 20% of cases occur between ages 15-45 yrs.

30% of aSAHs occurs during sleep

50% of patients with aneurysms have warning symptoms, usually 6-20 days before SAH

headache is lateralized in 30%, most to the side of the aneurysm.

soft evidence suggests that rupture incidence is higher in spring and autumn

patients > 70 yrs age have a higher proportion with a severe neurologic grade.

Epidemiology

see Aneurysmal subarachnoid hemorrhage epidemiology.

Risk factors

The causes of aneurysmal SAH are often related to a rupture of a cerebral aneurysm.

see Aneurysmal subarachnoid hemorrhage risk factors.

Meteorological influence

The inherent variability in the incidence and presentation of ruptured cerebral aneurysms has been investigated in association with seasonality, circadian rhythm, lunar cycle, and climate factors.

Rosenbaum et al., aimed to identify an association between solar activity (solar flux and sunspots) and the incidence of aneurysmal SAH, all of which appear to behave in periodic fashions over long time periods. The Nationwide Inpatient Sample (NIS) provided longitudinal, retrospective data on patients hospitalized with SAH in the United States, from 1988 to 2010, who underwent aneurysmal clipping or coiling. Solar activity and SAH incidence data were modeled with the cosinor methodology and a 10-year periodic cycle length. The NIS database contained 32,281 matching hospitalizations from 1988 to 2010. The acrophase (time point in the cycle of highest amplitude) for solar flux and for sunspots were coincident. The acrophase for aneurysmal SAH incidence was out of phase with solar activity determined by non-overlapping 95% confidence intervals (CIs). Aneurysmal SAH incidence

peaks appear to be delayed behind solar activity peaks by 64 months (95% CI; 56-73 months) when using a modeled 10-year periodic cycle. Solar activity (solar flux and sunspots) appears to be associated with the incidence of aneurysmal SAH. As solar activity reaches a relative maximum, the incidence of aneurysmal SAH reaches a relative minimum. These observations may help identify future trends in aneurysmal SAH on a population basis. [5)].

By using high-quality meteorological data analyzed with a sophisticated and robust statistical method no clearly identifiable meteorological influence for the SAH events considered can be found. Further studies on the influence of the investigated parameters on SAH incidence seem redundant [6)].

Pathogenesis

Aneurysmal subarachnoid hemorrhage pathogenesis.

Pathophysiology

Aneurysmal subarachnoid hemorrhage pathophysiology

Clinical features

see Subarachnoid hemorrhage clinical features

Diagnosis

see Subarachnoid hemorrhage diagnosis.

Scales

Subarachnoid hemorrhage scales.

Biomarkers

Aneurysmal subarachnoid hemorrhage biomarkers

Prognosis

see Aneurysmal subarachnoid hemorrhage prognosis

Intracerebral hematoma and aneurysmal subarachnoid hemorrhage

see Intracerebral hematoma and aneurysmal subarachnoid hemorrhage.

Complications

see Aneurysmal subarachnoid hemorrhage complications.

Prevention

Aneurysmal subarachnoid hemorrhage prevention.

Management

The management of an aneurysmal subarachnoid hemorrhage (aSAH) involves a combination of emergency medical care, neuroimaging, and neurosurgical intervention. Here are the key aspects of the management:

Emergency Medical Care:

Stabilization: Provide immediate medical attention to stabilize the patient, including airway management, ventilation support, and hemodynamic stabilization. Pain Control: Manage pain and discomfort using appropriate analgesics.

Blood Pressure Management after aneurysmal subarachnoid hemorrhage

Blood Pressure Management after aneurysmal subarachnoid hemorrhage.

Neuroimaging:

CT Scan: Conduct a non-contrast CT scan of the head to confirm the diagnosis of subarachnoid hemorrhage and identify the location and size of the aneurysm. Cerebral Angiography: Perform a cerebral angiogram (digital subtraction angiography - DSA) to visualize the blood vessels and precisely locate the aneurysm. This is crucial for surgical planning. Neurosurgical Intervention:

Aneurysm Clipping: One common method is surgical clipping, where a small metal clip is placed around the neck of the aneurysm to prevent rupture. Endovascular Coiling: Another option is endovascular coiling, a less invasive procedure where platinum coils are inserted into the aneurysm to promote blood clotting and prevent further bleeding. Monitoring:

Neurological Monitoring: Continuously monitor neurological status, including Glasgow Coma Scale (GCS), to assess the severity of brain injury and guide management decisions. Intracranial Pressure Monitoring: In severe cases, intracranial pressure may be monitored to manage elevated pressure and prevent secondary brain injury. Complications Management:

Vasospasm Prevention: Administer nimodipine to prevent or minimize cerebral vasospasm, a common complication associated with aSAH. Hydrocephalus Management: Address hydrocephalus, which can occur due to the blockage of cerebrospinal fluid flow. This may involve placing a ventriculostomy drain. Rehabilitation:

Physical and Cognitive Rehabilitation: Once the acute phase is managed, rehabilitation efforts are initiated to help patients recover physical and cognitive function. Long-Term Follow-up:

Monitoring and Surveillance: Regular follow-up with neuroimaging and clinical assessments to monitor for recurrence or other complications. The management of aSAH requires a multidisciplinary approach involving neurosurgeons, neurologists, intensivists, and rehabilitation specialists. The specific treatment plan will depend on the individual patient's condition, the location and size of the aneurysm, and other associated factors. Early intervention is crucial to improve outcomes and reduce the risk of complications.

Treatment

see Aneurysmal subarachnoid hemorrhage treatment.

Anticonvulsant in aneurysmal subarachnoid hemorrhage

Anticonvulsant in aneurysmal subarachnoid hemorrhage

Croatia

Evidence based information on the epidemiology, risk factors and prognosis, as well as recommendations on diagnostic work up, monitoring and management are provided, with regard to treatment possibilities in Croatia in the article of Solter et al. [7) 8)].

Spain

There is high variability in the election of treatment modality among centres in Spain. Endovascular treatment allows more patients to have their aneurysm treated. Guideline adherence is moderate [9)].

Guidelines

see Aneurysmal Subarachnoid Hemorrhage Guidelines.

Case series

Aneurysmal subarachnoid hemorrhage case series.

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