Chapter 5
Demographic, Clinical, and Imaging Predictors of Outcomes in Aneurysmal Subarachnoid Hemorrhages

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ABSTRACT

Aneurysmal subarachnoid hemorrhage (aSAH) outcomes depend on demographic, clinical, and imaging features, as demonstrated through examination of an 82-patient series. Demographically, the series' mean age was 49.7 years (range: 30–70) with a female predominance (65.8%). Clinically, there were lower Glasgow Coma Scale (GCS) scores (mean: 13.3) and increased Hunt and Hess grades (mean: 1.87, range: 1–3), while hydrocephalus requiring intervention was encountered in 6.1% of cases. Imaging predictors were an overall CT-confirmed subarachnoid hemorrhage, 18.3% of which developed cerebral infarction and 6.2% required ventricular-peritoneal shunting. Large interventions such as surgical clipping (100% of patients) and external ventricular drainage (8.5% use) were associated with management outcomes. Despite limited by the fineness of outcome information, this assessment delineates the prognostically significant contribution of acute clinical state (GCS, Hunt and Hess grade) and secondary complication (infarction, hydrocephalus) in a SAH.

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1. INTRODUCTION

Aneurysmal subarachnoid hemorrhage (aSAH) and intracerebral hemorrhage (ICH) are life-threatening vascular disorders that comprise two critical subtypes of hemorrhagic stroke associated with significant morbidity, mortality, and long-term disability. While aSAH and ICH are relatively rare, they are important components of the acute stroke epidemic as they can present substantial challenges for not only immediate management of the acute phase, but importantly for long-term and chronic clinical intervention related to a number of complications that can arise post-bleed including delayed cerebral ischemia, hematoma expansion, and cognitive and functional decline. A great deal of research has been undertaken in the last 30 years to better understand the epidemiology, pathophysiology, associations/ predictors of outcomes, and prognostic models of aSAH and ICH with respect to improving clinical decision making and decreasing risk for developing long-term disability. Aneurysmal subarachnoid hemorrhage (aSAH) and intracerebral hemorrhage (ICH) are life-threatening vascular disorders that comprise two critical subtypes of hemorrhagic stroke associated with significant morbidity, mortality, and long-term disability. While aSAH and ICH are relatively rare, they are important components of the acute stroke epidemic as they can present substantial challenges for not only immediate management of the acute phase, but importantly for long-term and chronic clinical intervention related to a number of complications that can arise post-bleed including delayed cerebral ischemia, hematoma expansion, and cognitive and functional decline. A great deal of research has been undertaken in the last 30 years to better understand the epidemiology, pathophysiology, associations/ predictors of outcomes, and prognostic models of aSAH and ICH with respect to improving clinical decision making and decreasing risk for developing long-term disability.

Zacharia et al. (2010) provided an introductory overview of the epidemiology of aSAH and risk factors (hypertension, smoking, and family history); emphasizing the considerably younger age of aSAH morbidity as compared to ischemic stroke and clinical implications of early identification and preventative measures might be effective in decreasing morbidity; Lanzino et al. (1996), foreshadowed the consequences of older age on outcomes from aSAH in regularly demonstrating poor prognoses with older patients displaying decreased physiologic reserve and mortality, comorbidities increasingly limit age-adjusted treatment.

Further to exploring the understandings of complications associated with aSAH, Dodd et al. (2021), explored the pathophysiologic processes of delayed cerebral ischemia (DCI), which is a common cause of secondary brain injury. They described the conditions of cerebral vasospasm, microthrombosis, and neuroinflammation acting together and interfering with cerebral perfusion following the initial hemorrhage and indicated targeted therapies as a means of reducing the effects of delayed onset of DCI.

Noise Removal in Lung LDCT Images by Novel Discrete Wavelet-Based Denoising With Adaptive Thresholding Technique

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