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Hemorrhagic Transformation of Left M1 Ischemic Stroke: Multidisciplinary Management and Outcomes

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Abstract This case report details the management of a 55-year-old male presenting with an ischemic stroke involving the left middle cerebral artery (MCA) and subsequent hemorrhagic transformation (HT). The patient underwent stent-assisted angioplasty for left M1 stenosis and experienced post-procedural complications, including intraparenchymal hemorrhage, intraventricular hemorrhage acute hydrocephalus, and ventilator-associated pneumonia. A multidisciplinary approach, involving neurology, neurosurgery, and critical care teams, enabled stabilization and transfer to a referral center for continued rehabilitation. This case highlights the complexities of managing ischemic stroke with HT and the role of timely interventions, including external ventricular drainage and tailored antibiotics.

Introduction

Hemorrhagic transformation (HT) is one of the recognized ischemic stroke complications, particularly in patients undergoing reperfusion therapies. The management of HT poses significant clinical challenges due to the risk of neurological deterioration, increased intracranial pressure (ICP), and secondary complications, such as infection. This report discusses a case of HT managed with stent-assisted angioplasty, external ventricular drainage, and comprehensive ICU care.

Case Presentation

Patient Profile:

A 55-year-old male, former smoker, with a history of bilateral occupational hearing loss and hypertension managed with atenolol and losartan. Presented to the emergency department following an acute onset of right upper limb paresthesia, aphasia, and altered consciousness.

Clinical Course:

Initial Evaluation and Management:

CT and multimodal imaging suggested left M1 occlusion with ischemic penumbra (ASPECTS 10).

Emergency angiography confirmed M1 stenosis, treated with angioplasty and stent placement.

Neurological Deterioration and Hemorrhagic Transformation:

The patient developed right hemiplegia, aphasia, and decreased consciousness. CT revealed an intraparenchymal hematoma with ventricular extension and subarachnoid hemorrhage.

External Ventricular Drain for Hydrocephalus Following Intraventricular Hemorrhage was performed

Intensive Care Unit Management:

Sedation with propofol and midazolam; mechanical ventilation initiated. HT managed with ICP monitoring and controlled hypertension. Ventilator-associated pneumonia by Enterobacter cloacae and Serratia marcescens treated with meropenem and ceftolozane/tazobactam. Percutaneous tracheostomy was performed for prolonged respiratory support. Neuroimaging Findings:

Serial CT scans demonstrated resolving hematoma and ventricular hemorrhage, with no new ischemic lesions.

The EVD was removed after confirming stable ventricular size.

Discussion

Hemorrhagic transformation of ischemic stroke represents a critical event requiring coordinated management. In this case, stent-assisted angioplasty successfully addressed the underlying vascular stenosis but was followed by HT, necessitating surgical and critical care interventions. Key management strategies included:

Prompt recognition and surgical management of hydrocephalus with EVD placement. Strict ICP monitoring and permissive hypertension to maintain cerebral perfusion pressure. Multidisciplinary collaboration for managing respiratory complications, including ventilator-associated pneumonia and subsequent tracheostomy. This case underscores the importance of early recognition, aggressive management, and individualized care for ischemic stroke complicated by HT.

Conclusion This case highlights the challenges and complexities of managing ischemic stroke with hemorrhagic transformation. Successful outcomes hinge on early diagnosis, a multidisciplinary approach, and tailored therapeutic strategies. Future research should focus on refining intervention protocols to minimize complications in similar clinical scenarios.

Key Points Challenges: HT, acute hydrocephalus, and infection in a critical care setting. Interventions: Angioplasty with stenting, EVD placement, and targeted antimicrobial therapy. Outcomes: Neurological stabilization and successful transition to rehabilitation.

Conflicts of Interest: None declared.

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Ethics Approval: Informed consent was obtained from the patient for the publication of this case report.