Role of Intra-Aortic Balloon Pump in Aneurysmal Subarachnoid Hemorrhage

Michael Abraham, MD1,2,4, Manoj K. Mittal, MD1,3, Abhijit Lele, MD2,3, Paul Camarata, MD3
Department of Neurology1, Department of Anesthesia2, Department of Neurosurgery3, Department of Radiology4 University of Kansas Medical Center, Kansas City, KS

Introduction: Vasospasm following aneurysmal subarachnoid hemorrhage (aSAH) affects approximately 30,000 patients each year with 15-20% having a poor outcome despite treatment (IV fluids, vasopressors, and endovascular treatment). Cardiomyopathy, another complication of aSAH, may lead to lower cerebral perfusion pressure (CPP) despite treatment. Intra-aortic balloon pump (IABP) is used for cardiogenic shock and may be an alternative approach to maintain adequate cerebral perfusion in the setting of aSAH with vasospasm and cardiomyopathy.

Methods: We report two cases with aSAH, vasospasm, and cardiomyopathy who were treated with IABP.

Results:
Case 1
A 16-year-old girl admitted for aSAH (modified Fisher grade 4) due to a ruptured anterior communicating artery (ACOM) aneurysm and underwent clipping. She had refractory intracranial hypertension (on Pentobarbitone coma) and severe cerebral vasospasm. Patient developed cardiomyopathy (ejection fraction 30%) with low CPP despite phenylephrine, norepinephrine, and vasopressin. IABP was placed with improvement in CPP. At 3-month follow-up she had modified Rankin score (mRS) of 3.

Case 2
A 36-year-old woman admitted for aSAH (modified Fisher grade 4) due to a ruptured ACOM aneurysm and underwent coiling. Patient had refractory intracranial hypertension (on mannitol and 23.4% hypertonic saline) and severe cerebral vasospasm. Patient developed acute respiratory distress syndrome and cardiomyopathy (ejection fraction 20%) and was not maintaining adequate CPP despite norepinephrine, and vasopressin. IABP was placed with improvement in CPP. At 13 month follow up she had a mRS of 1.

Conclusion: Our two cases demonstrate that IABP is safe and effective in aSAH patients with co-existing severe vasospasm and cardiomyopathy.