Insights from the ATACH Trial

Acute Blood Pressure Management: the North American Perspective

What is the most appropriate treatment of acute hypertensive response after intracerebral hemorrhage (ICH)? Over time, two schools of thought have emerged: one that thinks blood pressure (BP) should not be treated because hematoma expansion is uncommon and perihematoma ischemia is a concern, and one that takes the opposite position. "The debate has been going on for 25 years," commented Adnan I. Qureshi, MD, Zeenat Qureshi Stroke Research Center, University of Minnesota, Minneapolis, MN.

Observational studies suggest that when BP is lowered more aggressively in ICH, hematoma enlargement is reduced (Ohwaki et al. *Stroke* 2004; Qureshi et al. *Crit Care Med* 2006). The goal of the open-label Antihypertensive Treatment of Acute Cerebral Hemorrhage trial (ATACH) was to determine the tolerability and safety of three different systolic blood pressure (SBP) goals using IV nicardipine. The study was funded by the National Institute of Neurological Diseases and Stroke and was conducted in the United States. Subjects with ICH and systolic BP>200 mm Hg were enrolled within 6 hours of symptom onset. The following three tiers were employed in sequential order after data safety monitoring board review: SBP of 170-200 mm Hg, 140-170 mm Hg, or 110-140 mm Hg. Study stopping rules were derived from rates of neurological deterioration from the literature (Qureshi. *Neurocrit Care* 2007).

A total of 58 subjects were enrolled in the trial. The safety stopping rule was not employed in any tier, and adjudicated events were not higher than what was anticipated based on the natural history of ICH as determined by an independent Data Safety Monitoring Board. The characteristics of the subjects were equivalent across all tiers in terms of age, initial Glasgow Coma Scale score, initial SBP, time from symptom onset, and initial hematoma volume. The safety endpoints are summarized below by target SBP tier:

Characteristic	170-200 mm Hg (n=18)	140-170 mm Hg (n=20)	110-140 mm Hg (n=20)
Neurological deterioration	1	2 (both related to hematoma expansion)	2 (2 related to hematoma expansion)
Serious adverse events	0	1 (unrelated to treatment)	3 (unrelated to treatment)
In-hospital mortality	3	1	2
3-month mortality	3	2	3

Of all three tiers, the second tier demonstrated the best BP control within the target ranges. "Blood pressure reduction in intracerebral hemorrhage appears to be safe," said Dr. Qureshi, but the question of whether BP reduction reduces hematoma expansion needs to be addressed in an efficacy trial. New areas for exploration include treating patients within 3 hours of symptom onset, determining how much prevention of hematoma expansion is needed to produce clinical benefit, and investigating the effect of BP reduction on brain edema.