

# The clinical profile, management, and overall outcome of aneurysmal subarachnoid hemorrhage at the neurosurgical unit of a tertiary care center in India

Little has been published regarding the outcome of subarachnoid hemorrhage (SAH) in rural practice. That is the strongest contribution of this study to the literature. In this manuscript, a large cohort of 482 patients found to have aneurysmal SAH is investigated. The cohort was prospectively followed at a single center in India, with high rates of follow-up. A great deal can be learned from this in regard to the course of aneurysmal SAH in similar regions.

Of note, this study found a mortality rate of 45.4%.<sup>[1]</sup> This rate is higher than previously reported rates from the United States and Japan, and similar to reported rates in Europe.<sup>[2]</sup> While this rate is not unreasonable, some explanation for this number may be found in the treatment protocol.

In this study, early intervention (<24 h) was performed only in patients with initial good-grade World Federation of Neurological Surgeons (WFNS) scores, and deferred in poor-grade patients (>3). In patients with initially poor WFNS grade, intervention was never performed unless improvement to a lower-grade occurred. While this approach is a common one, it is important to note that it is also somewhat controversial. It is common in developed countries for patients with high-grade SAH to receive intervention, and early intervention. Current guidelines suggest intervention as soon as feasible to reduce re-bleeding.<sup>[2]</sup> It is possible that a more aggressive surgical approach would lead to improved early mortality. However, it is unclear what effect this change would have on long-term mortality and good outcome at this specific center.

Another important point to note is the impact of financial considerations on method of treatment seen in this study. While the results of International Subarachnoid Aneurysm Trial have been debated, developed countries will frequently perform coiling instead of clipping if the aneurysm is amenable to this technique, based largely on those results.<sup>[3]</sup> In this study due to financial restrictions only 7% of the cohort underwent coiling. Many patients who underwent clipping were deemed coiling candidates. In the limited subset of patients treated with coiling, mortality was lower, and rates of good outcome were higher.<sup>[1]</sup> This illustrates a common problem in rural practice, and one not easily overcome. When technology and expertise are available, financial limitations may still impact practice.

Finally, the multivariate model used in this study identified co-morbid hypertension and WFNS grade as predictors of poor outcome. This is not a surprising result. While prior work has shown an association between high-grade hemorrhage and worse outcome,<sup>[4]</sup> this impact may be amplified in this study by determining intervention based on grade. It is difficult to identify alternative predictors of poor outcome with such a high impact from a single variable. Nonintervention is clearly a high impact variable, with a mortality rate of 76.9% by the end of hospital stay.<sup>[1]</sup>

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Access this article online	
Quick Response Code:	Website: www.ruralneuropractice.com
	DOI: 10.4103/0976-3147.131646

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**How to cite this article:** Guth J. The clinical profile, management, and overall outcome of aneurysmal subarachnoid hemorrhage at the neurosurgical unit of a tertiary care center in India. *J Neurosci Rural Pract* 2014;5:113-4.

**Source of Support:** Nil. **Conflict of Interest:** None declared.

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