

Don't Get Cut on Occam's Razor!

Can. J. Neurol. Sci. 2005; 32: 137

The article *Pseudoephedrine-induced hemorrhage associated with a cerebral vascular malformation* by Baker et al. in this issue of the Journal forces one to consider several issues in addition to the ones they raise:¹

1. Occam's Law of Parsimony, later called Occam's razor, states that one should not look for multiple causes when a single one provides a suitable explanation.² It is occasionally wrong. In the case by Baker et al. an arteriovenous malformation AND a hypertensive response to pseudoephedrine were responsible for the intracerebral hemorrhage.¹ The exaggerated pharmacological response, in turn, may relate to a hereditary predisposition, invoking a third potential contributor.

2. When the phenomenon is atypical, look more closely. In the case reported by Baker et al., the hemorrhage occurred in the centrum semiovale in a 50 year old man.¹ This site would be atypical for a hypertensive hemorrhage, even if it were drug-induced. Most hypertensive hemorrhages occur in the "vascular centrencephalon" (the thalamus, lentiform nuclei, middle pons and cerebellum) where end-arteries bear the brunt of severe hypertension.³ The patient is too young to have a lobar hemorrhage associated with congophilic angiopathy. Congophilic angiopathy, a disorder of medium sized cerebral arteries with deposition of amyloid in their walls, usually affects individuals over 60 years.⁴ Thus one should consider whether there was an abnormal vessel or other condition, e.g., metastasis, predisposed for a hemorrhage in this location at this age. The authors were exemplary in demonstrating this principle.¹

3. Disasters cry out for preventive measures. Several years ago phenylpropanolamine was removed from patent medications when it was found to cause severe hypertensive reactions in normal individuals and intracerebral hemorrhages (ICHs) in persons taking the drug in cold preparations, appetite suppressants or illicit drugs sold as amphetamine look-alikes.^{5,6} Several other sympathomimetics remain in available medications and alternative/herbal remedies.⁷ Even though the risk of ICH is very small, if such preparations have widespread use, too many avoidable, devastating strokes will occur each year. Health Canada has moved to ban ephedra compounds from specific drugs.⁸ Spontaneous hypertension in the population is much more common than the drug-induced variety; therefore optimal blood pressure control is probably more important in preventing ICH than any other measure.⁹ As clinical neuroscientists, we should share in this responsibility.

4. When ICH occurs, steps should be taken to limit the damage. Preliminary evidence indicates that activated factor VII reduces the size of hematomas in primary, hypertensive ICH.¹⁰ It

is worth considering that it may also help in hemorrhages related to drug induced-hypertension with or without an underlying vascular malformation.

G. Bryan Young
London, Ontario

REFERENCES:

1. Baker SK, Silva JE, Lam KKS. Pseudoephedrine-induced hemorrhage associated with a cerebral vascular malformation. *Can J Neurol Sci* 2005;32: 248-252
2. Lo Re V 3rd, Bellini LM. William of Occam and Occam's razor. *Ann Intern Med* 2002;136:634-635.
3. Qureshi AI, Tuhrim S, Broderick JP, et al. Spontaneous intracerebral hemorrhage. *N Engl J Med* 2001;344:1450-1460.
4. Yamada M. Cerebral amyloid angiopathy: an overview. *Neuropathology* 2000;20:8-22.
5. Kernan WN, Viscoli CM, Brass LM, et al. Phenylpropanolamine and the risk of hemorrhagic stroke. *N Engl J Med* 2000;343:1826-1832.
6. Stoessl AJ, Young GB, Feasby TE. Intracerebral hemorrhage and angiographic beading following ingestion of catecholaminergics. *Stroke* 1985;16:734-736.
7. Haller CA, Benowitz NL. Adverse cardiovascular and central nervous system events associated with dietary supplements containing ephedra alkaloids. *N Engl J Med* 2000;343:1833-1838.
8. Health Canada. Health Canada requests a recall of certain products containing ephedra/ephedrine. Available at www.hc-sc.gc.ca
9. Benson RT, Sacco RL. Stroke prevention: hypertension, diabetes, tobacco, and lipids. *Neurol Clin* 2000, 18:309-319.
10. Hall CE, Grotta JC. New era for management of primary hypertensive intracerebral hemorrhage. *Curr Neurol Neurosci Rep* 2005;5:29-35.