

Letters to the Editor

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The Color of Ruptures

To the Editor:

Elijovich et al¹ described the predictors of intraprocedural rupture (IPR) in patients treated for ruptured intracranial aneurysms. Their findings could have been helpful in identifying groups of patients at higher risk for IPR. However, several problems have not been sufficiently emphasized, raising the question whether some of their findings should be part of reported conclusions:

1. The study is retrospective and the statistical findings post hoc. There is no rationale for many of the factors studied as a predictor for IPR, other than the convenience that they were in the databank.
2. The difficulty of retrospective databases is definition of variables and missing data. What criteria were used to qualify a patient as hypertensive or hyperlipidemic? It is likely that not every patient was asked about family history, CAD, COPD, etc. Furthermore, drawing inferences on comorbid diseases may be premature, if other confounders haven't been controlled for, such as concurrent medications (ie, antiplatelets, statins).
3. The alleged conceptual links between race, comorbidities and IPR is very weak, because IPR is an event strongly related to technical details that merit future study but escape this type of registry. These technical factors vastly differ between coiling versus clipping. Among clipped patients, did the aneurysm rupture at the time of induction, dural opening, hematoma drainage, vessel exposure, or clip apposition? For endovascular interventions, an analysis of medications and devices used may provide further insight. Was there a misfit of coil size with aneurysm size? Did IPR occur with the microguidewire or coil? How often was balloon-assisted coiling used, or stents? Other factors to consider include time from onset of patients' symptoms to treatment, and whether ventricular drainage affects outcome. We are not suggesting they should have analyzed more variables; we are only emphasizing the importance of what procedural factors could not transpire from their model.
4. The small number of IPRs among patients coiled could explain why previously identified risk factors, such as small aneurysm size, could not be recovered.²⁻⁴ The mixing of surgical and endovascular cases is another potential explanation. In the univariate analysis, a *P* value of 0.10 arbitrarily excluded size from multivariate analyses. We hope authors can give us a separate incidence according to size for the endovascular series.
5. There were only 16 ruptures during coiling. To study 16 risk factors and 17 subvariables that could be related to these 16 events is excessive. Positive findings may be found by chance alone. Perhaps the authors should have restricted their analysis to the surgical sample.
6. Conversely, other findings raise suspicions about the value of the statistical model. Most importantly, how can IPR

occur in 5% of coiled patients (n=16), but Asian race be associated with odds ratio of 25 and with an astronomical probability value. If this were true, coiling should be proscribed in Asia (and half of humanity). Yet only 6% of the entire series (and 7 individuals with endovascular or surgical IPRs) were of Asian race. A similar problem concerns black race being a risk factor with an odds ratio of 11, and another category, labeled 'other/unknown race' (please raise your hand . . .) almost reached statistical significance (authors' Table 2).

7. Rather than speculating about biochemical and cellular processes to explain these results, the discussion should have included a thorough critical review of the potential pitfalls of their methods.

With our literature becoming saturated with statistical inferences and random associations, we must question the excessive use of mathematical models, and urge physicians to set limits to what can reasonably be inferred *before* performing an analysis. Hopefully, denial of treatment for ruptured aneurysms will not be incorrectly relayed to patients of certain racial backgrounds on the basis of this report, because trying to extract too much from too little data may be dangerous.

Disclosures

None.

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