EVD clamp trials and ventriculoperitoneal shunt insertions in patients with nontraumatic SAH

TO THE EDITOR: We are thankful to Ascanio et al.1 for their work on nontraumatic subarachnoid hemorrhage (SAH) (Ascanio LC, Gupta R, Adeeb N, et al: Relationship between external ventricular drain clamp trials and ventriculoperitoneal shunt insertion following nontraumatic subarachnoid hemorrhage: a single-center study. J Neurosurg [epub ahead of print March 16, 2018. DOI: 10.3171/2017.10.JNS171644]). They conducted a retrospective review of all consecutive patients with nontraumatic SAH complicated by acute hydrocephalus who were admitted over a period of 10 years to a single major academic institution in the United States. After considering the exclusion criteria, 114 patients who underwent external ventricular drain (EVD) insertions during the first 24 hours after admission and who underwent at least 1 clamp trial prior to removal were included in the final analysis. Through this paper the authors delivered a crucial message that failure of initial EVD clamp trials in such patients “does not necessarily indicate that the patient should receive a shunt,” which is commendable. However, some points are worth mentioning with respect to the methodology and findings in this study.

First, the inclusion of patients with EVD infections in the final sample size is debatable. In the setting of an EVD infection, there would be a change in the entire line of management with respect to CSF diversion. The process of clamping will have to be discontinued because the patient cannot receive a shunt irrespective of the result of the clamp trial. Also, an increase in length of ICU stay is likely in this subset of patients. Hence, the presence of EVD infection anytime during the hospital stay could have been an exclusion criterion.

Second, there is evidence in the literature to suggest that surgical clipping of ruptured intracranial aneurysms may be associated with a lower risk of shunt-dependent hydrocephalus.2,3 Varelas et al.6 in their retrospective study involving 188 patients, found that permanent shunting was associated with coiling. They postulated that during clipping, blood or clots may have been evacuated from the subarachnoid space, which is not possible in an endovascular approach. However, in the paper by Ascanio et al., the authors remain silent with respect to the method used for securing ruptured aneurysms. An inhomogeneity in the patient population with regard to this characteristic may have confounded the results of the study.

Last, in patients who underwent surgical clipping, the question of whether lamina terminalis fenestration was performed is a factor that deserves a mention. Fenestration of the lamina terminalis can reduce the rates of shunt-dependent hydrocephalus, although there is still conflicting evidence in this regard.4,5 A prospective randomized controlled trial such as the ongoing FISH trial6 could help settle this debate.

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References
Response

We thank Agarwal and Raheja for their comments on our recent publication, “Relationship between external ventricular drain clamp trials and ventriculoperitoneal shunt insertion following nontraumatic subarachnoid hemorrhage: a single-center study.”

In our original analysis, we assessed the relationship between the EVD clamp trials and ventriculoperitoneal (VP) shunt insertion following nontraumatic SAH, and showed that 38.9% of patients who underwent a third clamp trial did not require a VP shunt.

Seventeen (14.9%) patients had their aneurysm secured with microsurgical clipping; 74 (64.9%) were managed endovascularly with coils, stent-assisted coils, or the Pipeline embolization device; 21 (18.4%) were managed expectantly; and 2 (1.8%) had combined surgery and endovascular treatment. We compared the VP shunt rates between patients who underwent microsurgical clipping and those who received endovascular treatment. In the endovascular group, 32 (43.2%) patients received a VP shunt compared to 4 (23.5%) patients in the clipping group (p = 0.13). Similarly, Nam et al.6 reported a VP shunt insertion rate of 18.7% in the clipping group and 21.8% in the coil group (p = 0.31). In contrast, Varelas et al.7 reported that coiling was independently associated with increased risk of VP shunt insertion on multivariable analysis (OR 6.35, 95% CI 1.3–29.0; p = 0.02). However, this study had some methodological limitations, which requires caution in interpreting the result. The results of their univariable analysis implicating coiling as a risk factor for VP shunt insertion are not reported. Furthermore, the criteria used in constructing the multivariable analysis are unknown.

On the other hand, our data are concordant with theirs, in constructing the multivariable analysis are unknown. In our recent publication, “Relationship between external ventricular drain clamp trials and ventriculoperitoneal shunt insertion following nontraumatic subarachnoid hemorrhage: a single-center study.”

Seventeen (14.9%) patients had their aneurysm secured with microsurgical clipping; 74 (64.9%) were managed endovascularly with coils, stent-assisted coils, or the Pipeline embolization device; 21 (18.4%) were managed expectantly; and 2 (1.8%) had combined surgery and endovascular treatment. We compared the VP shunt rates between patients who underwent microsurgical clipping and those who received endovascular treatment. In the endovascular group, 32 (43.2%) patients received a VP shunt compared to 4 (23.5%) patients in the clipping group (p = 0.13). Similarly, Nam et al.6 reported a VP shunt insertion rate of 18.7% in the clipping group and 21.8% in the coil group (p = 0.31). In contrast, Varelas et al.7 reported that coiling was independently associated with increased risk of VP shunt insertion on multivariable analysis (OR 6.35, 95% CI 1.3–29.0; p = 0.02). However, this study had some methodological limitations, which requires caution in interpreting the result. The results of their univariable analysis implicating coiling as a risk factor for VP shunt insertion are not reported. Furthermore, the criteria used in constructing the multivariable analysis are unknown. On the other hand, our data are concordant with theirs, regarding EVD placement as a risk factor for a VP shunt insertion (p = 0.01), which was also found in other studies.3,4 In fact, our group developed4,5 and validated1,2 a predictive scoring system for VP shunt insertion following SAH, which uses EVD insertion as a key component.

One concern raised by Agarwal and Raheja is that we included 13 patients with EVD infection in the study, which may have biased the results. We compared the number of clamp trials between patients who had EVD infection and those who did not have an EVD infection (p = 0.52). Although this analysis may not fully answer the concerns raised, we conducted a sensitivity analysis excluding the patients with EVD infection. One hundred one patients were included. The median number of EVD clamp trials was 2 (range 1–4). Forty-one patients underwent VP shunt insertion. The proportion of patients who underwent 3 clamp trials and avoided VP shunt placement was 35.3%. The odds ratio in this group of getting a VP shunt compared to those who underwent 1 clamp trial is 3.74 (95% CI 1.17–12.21; p = 0.06) (Table 1). These findings are similar to what we found in the original analysis of the entire group. The median number of days in the ICU was 15 for 1 clamp trial, 16 for 2 clamp trials, 15 for 3 clamp trials, and 24 for 4 clamp trials (p = 0.48). Again, these findings are similar to what we found in our original analysis.

With regard to lamina terminalis fenestration, this procedure is not routinely performed in our institution.

TABLE 1. Clamp trials and VP shunt in patients without EVD infection

<table>
<thead>
<tr>
<th>No. of Clamp Trials</th>
<th>VP Shunt Total</th>
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<tbody>
<tr>
<td></td>
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<tr>
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<td>4</td>
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</tr>
<tr>
<td>Total</td>
<td>41</td>
</tr>
</tbody>
</table>

Values are the number of patients, unless otherwise indicated.

*p = 0.06.

References


3. Komotar RJ, Olivi A, Rigamonti D, Tamargo RJ: Microsurgical fenestration of the lamina terminalis reduces the...