Letters to the Editor

NEUROSURGICAL FORUM

Bow hunter's syndrome: surgery or conservative therapy?

TO THE EDITOR: We read with interest the recent article by Jost and Dailey,¹⁸ in which the authors reported 2 new cases of bow hunter's syndrome and reviewed 124 previously reported cases (Jost GF, Dailey AT: Bow hunter's syndrome revisited: 2 new cases and literature review of 124 cases. *Neurosurg Focus* 38(4):E7, April 2015). They carried out an in-depth review and concluded that patients with bow hunter's syndrome classically have an impaired collateral blood flow to the brainstem.

In this review, the options for surgery were summarized and the authors suggested that the prognosis for surgically treated bow hunter's syndrome was excellent.¹⁸ They concluded that conservative therapy plays a marginal role and might not suit the lifestyle of the typical patient with bow hunter's syndrome. However, the review included only 3 conservatively treated cases with follow-up. In a recent study, Choi et al. found a favorable long-term outcome of conservative treatment in bow hunter's syndrome.⁴ In that study, 19 of 21 patients were treated conservatively, and the median duration of follow-up was 37.5 months. None of the patients who were treated conservatively developed posterior circulation stroke, and 4 of them showed resolution of their symptoms during the follow-up. This study indicated that conservative therapy might be of great help for some patients with bow hunter's syndrome. Further study is needed, however, to determine when and why conservative therapy may be successful.

Bow hunter's syndrome is characterized by recurrent attacks of paroxysmal vertigo and/or syncope induced by head movement.^{4,19,21,29,30} The gold standard for diagnosis of bow hunter's syndrome is digital subtraction angiography (DSA),^{6,8,14,36} which reveals the vertebral artery compression during head turning. CT angiography and MR angiography (with and without 3D reconstructions) and extracranial and transcranial Doppler sonography can also be used in the evaluation of patients, but we believe that basing a review on the use of uniform diagnostic criteria could improve the accuracy of the data. We suggest that the criteria for inclusion in such a review could be diagnosis with the gold standard method, DSA. Once each case was diagnosed with the gold standard, the diagnostic accuracy of other methods could be evaluated; this would be of great help in developing a diagnostic algorithm.

Jost and Dailey's review included 43 papers published

from 1952 to November 2011. When we searched PubMed using the key words the authors listed in their article, 29 papers (Table 1) fulfilled the inclusion criteria for the period from 2012 through December 2014 alone. Among these papers was one by Choi et al., reporting on long-term follow-up of 21 patients,⁴ and one by Zaidi et al., reporting on 11 patients with angiographically confirmed bow hunter's syndrome, 9 of whom underwent surgical treatment.³⁶ These data would be an important complement to

TABLE 1. Articles on bow hunter's syndrome published from 2012 through December 2014

Authors & Year	Journal
Zaidi et al., 2014	<i>World Neurosurg</i>
Yamaoka et al., 2015	<i>J Neuroimaging</i>
Takeshima et al., 2014	<i>Spine (Phila Pa 1976)</i>
Sarkar et al., 2014	<i>Ann Vasc Surg</i>
Safain et al., 2014	<i>J Neurosurg Spine</i>
Park et al., 2014 ²⁵	<i>J Neurol</i>
Park et al., 2014 ²⁴	<i>Korean J Spine</i>
Missori et al., 2014	<i>World Neurosurg</i>
Lee et al., 2014	<i>Otol Neurotol</i>
Ikeda et al., 2014	<i>J Clin Neurosci</i>
Healy et al., 2015	<i>J Clin Neurosci</i>
Cornelius et al., 2014	<i>J Craniovertebr Junction Spine</i>
Buchanan et al., 2014	<i>J Neurosurg Spine</i>
Anaizi et al., 2014	<i>J Neurosurg Spine</i>
Schelfaut et al., 2015	<i>J Spinal Disord Tech</i>
Inamasu & Nakatsukasa, 2013	<i>Clin Neurol Neurosurg</i>
Go et al., 2013	<i>J Korean Neurosurg Soc</i>
Fleming et al., 2013	<i>World Neurosurg</i>
Ding et al., 2013	<i>Interv Neuroradiol</i>
Dargon et al., 2013	<i>J Vasc Surg</i>
Choi et al., 2013 ⁵	<i>Clin Neurol Neurosurg</i>
Choi et al., 2013 ⁴	<i>Stroke</i>
Yamaguchi et al., 2012	<i>J Stroke Cerebrovasc Dis</i>
Taylor et al., 2012	<i>Proc (Bayl Univ Med Cent)</i>
Tanaka et al., 2012	<i>Rinsho Shinkeigaku</i>
Kan et al., 2012	<i>World Neurosurg</i>
Darkhabani et al., 2012	<i>J Stroke Cerebrovasc Dis</i>
Cornelius et al., 2012	<i>Neurosurg Rev</i>
Andereggen et al., 2012	<i>Clin Neuroradiol</i>

this review. A lot can be done to improve the quality of reviews in the future.

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DISCLOSURE

The authors report no conflict of interest.

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Response

We would like to thank Yu and coauthors for their interest and critical appraisal of our article. In their comment, the authors refer to the study by Choi et al.,¹ who reported that 4 of 19 conservatively managed patients had symptom resolution, their latest follow-up being between 5 and 38 months. This implies that 79% of their patients continued to suffer from bow hunter's syndrome despite taking antiplatelet agents and trying to avoid triggering motions.

Our review of 124 previously published cases of rotational vertebrobasilar insufficiency and the addition of our own 2 cases covers the published experience of over half a century, from 1952 to 2011. These data enabled us to define the typical patient characteristics and clinical presentation and to suggest a management algorithm. Not surprisingly, the patient demographics in the study by Choi et al.¹ further corroborate these findings. We acknowledge that the utility of conservative therapy might hitherto have been underreported. This may be because, while conservative therapy may prevent strokes as Choi and colleagues suggest, the majority of patients are destined to a life with symptoms. Nevertheless, these new data suggest that patients who accept a life with the symptoms of rotational vertebrobasilar insufficiency may not be at risk for related strokes and have perhaps a 20% chance of improving for an undetermined period of time, although they do have to endure the risks of antiplatelet therapy. For the rest of the patients, surgery has an excellent track record. We agree with Yu and colleagues that counseling a patient on the prospects of not proceeding with a surgical intervention should be paramount in any surgeon-patient encounter.

Yu et al. imply that only including cases diagnosed with DSA may “improve the accuracy of the data” and may enable accurate determination of other diagnostic modalities. In fact, the clinician's recognition of a patient's complaints as suggestive of rotational vertebrobasilar insufficiency is probably the most important step toward the diagnosis. As the more historic reports of our literature review show, conventional angiography appeared to work well to establish the dynamic stenosis. Angiography has more recently been replaced by contemporary modalities, as mentioned in our review. Determining the specificity and sensitivity of each of these modalities for diagnosing bow hunter's syndrome could be the subject of another study. Each of them likely has its role: transcranial Doppler ultrasonography for noninvasive first screening and follow-up; CT angiography or magnetic resonance angiography for showing the cause of the vertebral artery stenosis and, if done in the triggering and non-triggering positions, also the dynamic occlusion; and DSA to reversibly associate the patient's symptoms with the impaired flow of contrast medium in the affected vertebral artery. As the growing list of publications on bow hunter's syndrome beyond the time frame of our analysis suggests, this condition maintains an allure for authors.

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DOI: 10.3171/2015.7.FOCUS15331.

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