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LETTER TO THE EDITOR - NEUROSURGERY GENERAL

Letter to the editor Re: Standardized assessment of outcome and complications in chronic subdural hematoma: results from a large case series by Bucher B et al.

Laurence Marshman [1,2]

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Dear Editor

We read with interest the article by Bucher et al. [3] which commendably recorded all complications after chronic subdural hematoma (CSDH) surgery both by type and by the Clavien-Dindo classification. It is agreed that this should now become the standard practice. Importantly, the authors noted a post-operative morbidity of 38.3% [3]. A similarly high rate (47%) was also recently reported by Thomas et al. [11]. Notably, both rates were significantly higher than the "standard" (10%) proposed by Brennan et al. [2]. Indeed, whilst Brennan et al. [2] had separated out recurrences, even including recurrences (9%) only resulted in a rate of 23% [11]: i.e., still significantly lower than both aforementioned studies [3, 11]. Importantly, the range of complication type observed by Brennan et al. [2] was singularly narrow: e.g., it did not include common complications expected in a CSDH age group, such as delirium [11]. Further, post-operative morbidity in a fractured neck-of-femur cohort (a group frequently compared with CSDH by neurosurgeons [5, 8, 11], including by Brennan et al. [2]) was similar (i.e., 45% [4]) to that of Bucher et al. [3] and Thomas et al. [11], but not Brennan et al. [2]. Thus, a "standard" post-operative morbidity of 10% [2] is untenable.

As with others, Bucher et al. [3] state that the length of hospital stay was significantly longer for patients with complications than that for patients without complications (6 vs. 5 days, $P < 0.001$). Unfortunately, however, standard deviations (SD) were not provided [3]. A highly significant P value, with a mean difference of 1 day, implies correspondingly small SD values. Given that length of stay (LOS) may be influenced by numerous administrative factors, in addition to purely clinical factors, a wide range of LOS would have been expected. For example, Brennan et al. [2] found a median LOS of 7 days associated with a range of 1–179 days (although an association with post-operative morbidity was not assessed). Thomas et al. [11] also found a wide range, with a LOS significantly prolonged in those with post-operative morbidity (19.5 ± 8.1 vs. 9.9 ± 14.9 days, $P < 0.01$). Post-operative morbidity which prolongs LOS after major non-neurosurgery is associated with decreased long-term survival [9]. Long-term survival after CSDH is known to be markedly reduced compared with age-matched controls [6]. LOS, like functional impairment at discharge, is therefore an important parameter to exact.

Unfortunately, like most CSDH reports [7], Bucher et al. [3] did not comment on anti-seizure prophylaxis. Since the frequency observed (19%) [3] was significantly higher than that reported by Thomas et al. [11] (5%)—where anti-seizure prophylaxis was uniformly used—this suggests that anti-seizure prophylaxis was not uniformly used by Bucher et al. Interestingly, Battaglia et al. [1] reported no beneficial effect of anti-seizure prophylaxis (4.2%) against controls (5.9%, $P = 0.697$). Unfortunately, the study was retrospective, non-randomized, and too small to determine a null effect [7]: nevertheless, if continued, it could provide useful results [7]. It would therefore be important for Bucher et al. to note the proportion who received anti-seizure prophylaxis in their cohort.

Whilst Buchner et al. [3] found that ASA grade had some utility in predicting the degree of post-operative morbidity, Thomas et al. [11] found that ASA grade, The Physiological and Operative Severity Score for enumeration of Mortality

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✉ Laurence Marshman
l.a.g.marshman@btinternet.com

[1] Department of Neurosurgery, The Townsville Hospital, Douglas, Townsville, Queensland 4810, Australia

[2] School of Medicine and Dentistry, James Cook University, Douglas, Townsville, Queensland 4810, Australia

and Morbidity (POSSUM), and the American College of Surgeons National Surgical Quality Improvement program (ACS-NSQIP) had no utility. Importantly, however, age, pre-existent co-morbidities, and GCS were found to be predictive [11]. Since these latter parameters are incorporated into POSSUM, whilst age and pre-existent co-morbidities incorporated into ACS-NSQIP and pre-existent co-morbidities incorporated into ASA, the predictive failure of POSSUM, ACS-NSQIP, and ASA appeared singular [11]. The authors speculated that factors, such as the incorporation of systemic inflammatory response effects into ASA, POSSUM, and ACS-NSQIP, had proved confounding [11]. However, it would be interesting to see the effect of greater numbers in the cohort of Buchner et al. on POSSUM and ACS-NSQIP.

Finally, the complications recorded suggest that patients with CSDH due to shunt over-drainage were included in the study of Buchner et al. [3], where other studies have excluded these [2, 10, 11]. Future studies should, therefore, include outcome assessments with and without shunted patients to permit comparisons.

A/Prof Laurence AG Marshman

Townsville, Queensland

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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