EDITORIAL

Post-untethering positioning and diuresis

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THE authors of the paper “Randomized clinical trial of acetazolamide administration and/or prone positioning in mitigating wound complications following untethering surgeries” should be congratulated for performing a partially blinded, randomized controlled trial using factorial design to evaluate the use of positioning and diuretics in the immediate postoperative period of patients who have undergone tethered cord release.¹ In this paper, the authors show us that keeping patients flat and prone for 10 days leads to fewer CSF leaks or subcutaneous collections after cord untethering, and also that administering acetazolamide provides no protection against the same. Indeed, there are complications of the latter reported with enough frequency that the authors stay just shy of concluding harm.

So let us initially congratulate the authors on providing us with Level-I neurosurgical evidence, a rarity in our literature. The well-espoused epidemiology classroom points here can be ticked off like a preflight checklist: “Sample size calculation?” Check. “A priori hypothesis?” Check. “Statistically appropriate analysis performed?” Check (and factorial, at that; 2 questions, 4 groups, and no real cost of sample size). “Defined outcome?” Possibly check. It initially appeared to be a composite outcome in which several types of failure were combined into one, but in reality the authors split them up for analysis, finding significance in those related to CSF leak or collection. “Blinded where possible?” Again, possibly check. Not sure exactly how much the outcome assessors were fully blinded, as the study surgeons were the raters.

However, there is 1 major issue here that warrants comment: the relevance of the initial clinical question upon which the entire study is founded. Few neurosurgeons, if any, have their patients stay prone for 10 days, nor do they administer acetazolamide for 10 days, in the postoperative care of these patients. As a result, in my opinion, the overall question may be irrelevant for the vast majority

of patients undergoing release of a tethered cord. There would be very few of us who would rewrite postoperative instructions based on the results of this study. Now, this is certainly not the case for the authors of this study, I would think. The practice at their institution, their culture, their heuristics, has been to keep them prone and diurese them for 10 days after surgery. They have completed the study and can tell their colleagues that at least a major part of this practice needs to change. I do not in any way want to undermine this. This is critical work, to first change yourself before effecting change elsewhere. I commend them for starting down this path. Indeed, I can think of several instances of heuristics at my own current institution, at my prior institution, and during my training in which things were done “because that is how we have always done it.” I encourage you as the reader to consider the same.

So in the end, as neurosurgeons we have learned to not start giving these patients acetazolamide. In addition, we see there may very well be some value in keeping them prone, but how much value and for how long? We do not know. What we do see is the commitment by the authors to perform a future randomized controlled trial to reduce the amount of time that patients stay prone. I invite them to survey their colleagues before conducting such a trial so that they can ask the question that will have the most impact. Based on their ability to use appropriate methodology and their clear commitment to their patients, this future study will truly be an interesting and impactful one to read. I would look forward to seeing it published in the pages of our journal.

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Disclosures

The author reports no conflict of interest.

Response

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We appreciate the opportunity to expand the discussion raised in the editorial by Dr. Wellons. We do affirm that many neurosurgeons, particularly those in Western countries, may not routinely use prophylactic acetazolamide or the prone position following spinal cord untethering procedures. However, our literature review revealed that many neurosurgeons remain in favor of acetazolamide administration following duratomy.^{4,5} A study in the US suggested that administration of propranolol and acetazolamide, by reducing CSF volume and production, have favorable outcomes in the conservative management of postlaminectomy pseudomeningocele.² Similarly, the role of early acetazolamide administration in the prevention of CSF leakage in patients at high risk of CSF leakage (with conditions such as rhinorrhea, otorrhea, pneumatocele, or imaging-based evidence of severe skull-base fracture) has been demonstrated.¹ It had been also reported that acetazolamide can be used as conservative management of CSF cutaneous fistulas following peridural analgesia.³

A literature review by the authors confirmed that postoperative positioning still has an essential role in the postsurgical management of patients undergoing cord untethering surgeries in some countries, such as India and Japan.^{6,7} The prone position has been specifically emphasized, given that according to the All India Institute of Medical Sciences, patients with spinal dysraphism were postoperatively kept prone as a routine protocol for a duration of approximately 7–10 days.⁴ Indeed, many neurosurgeons, especially in Eastern countries, rely on the role of positioning to reduce the rate of wound failure and CSF complications in their practice, as we do.

We cannot ignore that positioning the patients, especially children, is unfavorable. On this basis, we added a complementary step to our study: utility assessment of the

interventions, complications, and side effects of our trial. Primary analysis of the results revealed that according to the parents' judgment, disutility of prone and supine positioning are not varied significantly, meaning that the limitation itself, and not the type of positioning, is bothersome. Another interesting finding of our ongoing study demonstrated that a 10-day time span is short enough that it has little impact on quality-adjusted life days, and many parents will accept this unfavorable position to avoid dealing with a low-probability complication such as surgical repair of the operative site (unpublished data).

We agree that this study was an attempt to urge a reconsideration of the current perspective among neurosurgeons in our country and in other overseas neurosurgical societies. Preventing administration of acetazolamide would be the initial step, and can be taken into account as an achievement because of the reduction of unnecessary medication side effects or overuse. The next step will be investigating the duration of postoperative positioning to reduce the number of days required to keep the child in an unwilling position, as was recently performed by Ogiwara et al. in Japan,⁷ or even comparing the prone position with supine or lateral positions. Finally, we believe that making a pragmatic change in medical practice, however small, can be of great importance in patient quality of life, as well as in refining the current dogma.

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