ERRATUM

Pediatric hydrocephalus: systematic literature review and evidence-based guidelines. Part 6: Preoperative antibiotics for shunt surgery in children with hydrocephalus: a systematic review and meta-analysis

TO THE EDITOR: After publication of the Pediatric Hydrocephalus Guidelines, it came to our attention that

we made an error in preparing our article, “Pediatric hydrocephalus: systematic literature review and evidence-based guidelines. Part 6: Preoperative antibiotics for shunt surgery in children with hydrocephalus: a systematic review and meta-analysis” (*J Neurosurg Pediatr (Suppl)* 14:44–52, 2014). We are grateful to Drs. Jeff Campbell and Joseph Piatt for bringing this error to our attention. Despite multiple attempts at proofreading, we mistakenly assigned the wrong infection rate to the 1992 paper by Walters et al. in Figures 2–4, although that paper is correctly described in our text. The infection rates for the treatment and control groups are actually 14/155 (9%) and 22/145 (15%), respectively, and not vice versa, which ap-

FIG. 2. Preoperative antibiotics forest plot for all studies in the meta-analysis.

FIG. 3. Preoperative antibiotics forest plot for RCTs in the meta-analysis.

peared in our original figures. The impact of this mistake is as follows.

There are now 674 shunt operations without prophylactic antibiotics (that is, the control groups) with 72 infections, yielding a pooled infection rate of 10.7%. In the treatment groups, there are now 38 infections in 643 operations, yielding an overall infection rate of 5.9%. This gives an absolute and relative risk reduction of 4.8% and 44.9%, respectively, compared with the previously reported 2.1% and 22%, which was incorrectly stated in our original paper. The overall risk ratio (RR) is now 0.55 with a 95% confidence interval (CI) of 0.38–0.81; this reaches statistical significance, suggesting a protective benefit of prophylactic preoperative intravenous antibiotics (revised Fig. 2). There was no significant heterogeneity detected ($I^2 = 0.0\%$). For the first part of the sensitivity analysis in which only the 7 randomized controlled trials (RCTs) were evaluated, the overall RR is now 0.62 (95% CI 0.40–0.96, revised Fig. 3), again suggestive of a protective benefit to preoperative antibiotics. When only the 4 methodologically superior RCTs were analyzed, the RR became 0.63 (revised Fig. 4), but this is no longer statistically significant (95% CI 0.38–1.04).

In summary, 9 clinical trials met our inclusion criteria,

2 of which (both retrospective cohort studies) showed a benefit with preoperative antibiotics, whereas 7 randomized trials failed to demonstrate a benefit. As we stated in the *Conclusions* section of the paper, we suspect the reason why the 7 RCTs failed to demonstrate a benefit was because they were underpowered (Type II error, failure to reject a false null hypothesis).

In our article, we originally concluded that the use of preoperative antibiotics for shunt surgery in children had not been shown to lower the risk of shunt infection and gave our Strength of Recommendation as Level I, high clinical certainty. We believe that this recommendation should be changed to Level II, moderate degree of clinical certainty that preoperative antibiotics are beneficial in lowering the infection rate in children undergoing shunt surgery for hydrocephalus.

Proponents on both sides of the argument could find evidence for their cause. Those who believe preoperative antibiotics work would necessarily have to believe in the power of a meta-analysis, whereas a purist would claim that there is as yet no convincing Class I data that demonstrate a benefit. Ultimately, as we stated in our *Conclusions*, our findings and any debate about them are likely to be a meaningless exercise, as it will not lead to a change

FIG. 4. Preoperative antibiotics forest plot for higher-quality RCTs.

in the daily practice of today's pediatric neurosurgeon nor will it lead to an appropriately powered trial.

We apologize to the editor and readership for any confusion our errors may have caused, and we are grateful for the opportunity to correct them. The errors have been corrected online as of May 8, 2015.

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