



In response to the letter to the editor related to “Management and Prevention of Cranioplasty Infections” by Shay T, Mitchell KA, Gordon CR Recognizing a problem is the first step in fixing it

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Dear Editor:

We warmly thank Shay et al. for their valuable comments on our recent paper [1]. Although we routinely use no shave or minimally shave technique in all neurosurgical procedures, including CSF shunt placement, we completely agree that shaving the scalp and visually inspecting the cranial contour before cranial repair is strikingly important.

Concerning the difference between our protocol and the John Hopkins protocol related to the type of skin antiseptics (chlorhexidine versus iodine solution, respectively), we currently use 2% chlorhexidine gluconate in 70% isopropyl alcohol solution in disposable single-dose sterile applicator, since chlorhexidine warrants bactericidal effect rather than bacteriostatic. Thus, its use is preferred in the most recent antiseptics guidelines [2], but it is still limited in neurosurgery due to the potential toxic effect resulting from direct contact to neural tissue. To prevent this complication, we adopted a strict policy that regulates the dose of chlorhexidine to be used in relationship to the extension of the surgical site (that is easily feasible thanks to the disposable single-dose applicator) and that respects the time of drying of the chlorhexidine before skin incision.

The use of subcutaneous drainage deserves further consideration. We agree that subcutaneous fluid collections may complicate the implant of cranial prosthesis. On the other side, the use of drainage may increase the risk of contamination of the implant. Furthermore, the use of vacuum suction drainage has been associated to increased risk of mortality in cranial

reconstruction [3]. Thus, we limit the use of external drainage to patients with severe sinking flap syndrome. In this circumstance, we place the drainage in the epidural space without vacuum suction aiming to favor the cerebral expansion [4].

A multi-layer scalp closure is desirable in cranial repair, but unfortunately, in delayed cranioplasty, this is not always feasible mainly due to subcutaneous scarring. In fact, in young children, who may present thin scalp, attempts to dissect the galeal plane may result in unfavorable injury to the skin. On the other side, whenever the scalp is considered too thin to cover the cranioplastic material, we exploit alternative options to thicken the scalp. Among these, a first option is preparing a galeal flap far from the unaffected scalp and rotating it over the cranioplasty. A second option reducing the risk of additional morbidity of the previous one is covering the synthetic material with collagen matrix. The choice to avoid or minimize the use of subcutaneous sutures is mainly due to the possibility of sterile stitch abscess that may complicate the wound healing especially in children and negatively affect the outcome of cranioplasty [5].

Unfortunately, we may not provide definitive conclusions regarding the impact of our bundle on the infection rate in pediatric cranioplasty, due to the small number of patients treated since the introduction of this bundle. However, we observed with great satisfaction no infection of synthetic cranioplasty. On the other side, with equally great disappointment, we registered no significant reduction in the infection rate of autologous-bone-assisted cranioplasty. This suggests us that other factors, such as the method of storage and the formation of biofilm, may be involved in the latter circumstance [1].

In conclusion, we strongly agree with the assumption from Shay et al. that by consistently using a perioperative bundle or algorithm, we may reduce the risk of infectious complications in cranioplasty, and we also advocate that more groups involved in cranial reconstruction adopt a bundle or protocol aiming to standardize the management of this condition.

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Indeed, we think that the discussion about differences between protocols is stimulating, but we may not draw definitive conclusions about the superiority of one protocol over the others so far. Nonetheless, we may definitely state that establishing an institutional protocol or a bundle is the first step in reducing complications.

Compliance with ethical standards

Conflict of interest There are no conflict of interest to disclose.

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