Autologous bone flap cryopreservation

In order to be compliant to the European directives 2004/23/EC, 2006/86/EC and 2015/565/EC the standard protocol in EU now includes obtaining a swab culture of the extracted autologous bone flap prior to its cryopreservation. This screening for microbial contamination has resulted in positive cultures of unknown significance. However, the department protocol from Linköping, Sweden only allows for reimplantation of bone flaps with negative cultures, leading to increased amounts of discarded bone flaps and thus increasing the use of custom-made implants. To address this problem, the authors developed a new method for handling cryopreserved bone flaps including pulsed lavage of the bone flap preceding culture swab [1)].

The objectives of a study of Yeap et al. were to assess the predictive value of swab cultures of cryopreserved skull flaps during cranioplasty for surgical site infections (SSIs).

The authors conducted a retrospective review on the consecutive patients who underwent delayed cranioplasties with cryopreserved autografts between 2009 and 2017. The results of cultures obtained from swabs and infected surgical sites were assessed. The accuracy, sensitivity and specificity of swab cultures for SSIs were evaluated.

The study included 422 patients, categorized into two groups, the 'swab' and 'non-swab' groups, depending on whether swab cultures were implemented during cranioplasties. The overall infection rate was 7.58%. No difference was seen in the infection rates between both groups. There were 18 false-positive and no true-positive swab culture results. All bacteria between swab cultures and SSI cultures were discordant. Meanwhile, there were 19 false-negative swab cultures. The results showed high specificity but low sensitivity for swab cultures to predict SSI occurrence and the pathogens.

Due to low accuracy and sensitivity, swab cultures of cryopreserved autografts should not be routinely performed during delayed cranioplasties [2)]

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1)
Melin S, Haase I, Nilsson M, Claesson C, Östholm Balkhed Å, Tobieson L. Cryopreservation of autologous bone flaps following decompressive craniectomy: A new method reduced positive cultures without increase in post-cranioplasty infection rate. Brain Spine. 2022 Jul 22;2:100919. doi: 10.1016/j.bas.2022.100919. PMID: 36248144; PMCID: PMC9560573.
2)
Yeap MC, Chen CC, Chen CT, Liu ZH, Wu CT, Hsieh PC, Lai HY, Wang YC, Chang TW, Lee CC, Liu YT, Huang YC, Wei KC, Tu PH. Predictive Value of Swab Cultures for Cryopreserved Flaps During Delayed Cranioplasties. World Neurosurg. 2021 Oct 2:S1878-8750(21)01464-9. doi: 10.1016/j.wneu.2021.09.111. Epub ahead of print. PMID: 34610447.