

and there was no significant difference between the CSF leakage rate in these patients and patients without hydrocephalus although the number of patients was too small to allow a statistical comparison.

There was also not a statistical difference between CSF leakage and patients with extended opening of the arachnoid.

Discussion and Conclusions

There are different dural closure techniques in use ranging from meticulous primary dural closure using interrupted or continuous stitches, use of dural substitutes-autologous (fat graft, fascia, pericranium) and synthetic. Many

neurosurgeons use autologous materials or dural substitutes due to the associated lesser complication rates.⁴ Complication rates following posterior fossa surgeries vary between 1 and 10%.^{1-3,6} Various aspects of the surgical approach and closure technique contribute to the complication rate. CSF leakages following posterior fossa surgery has remained an

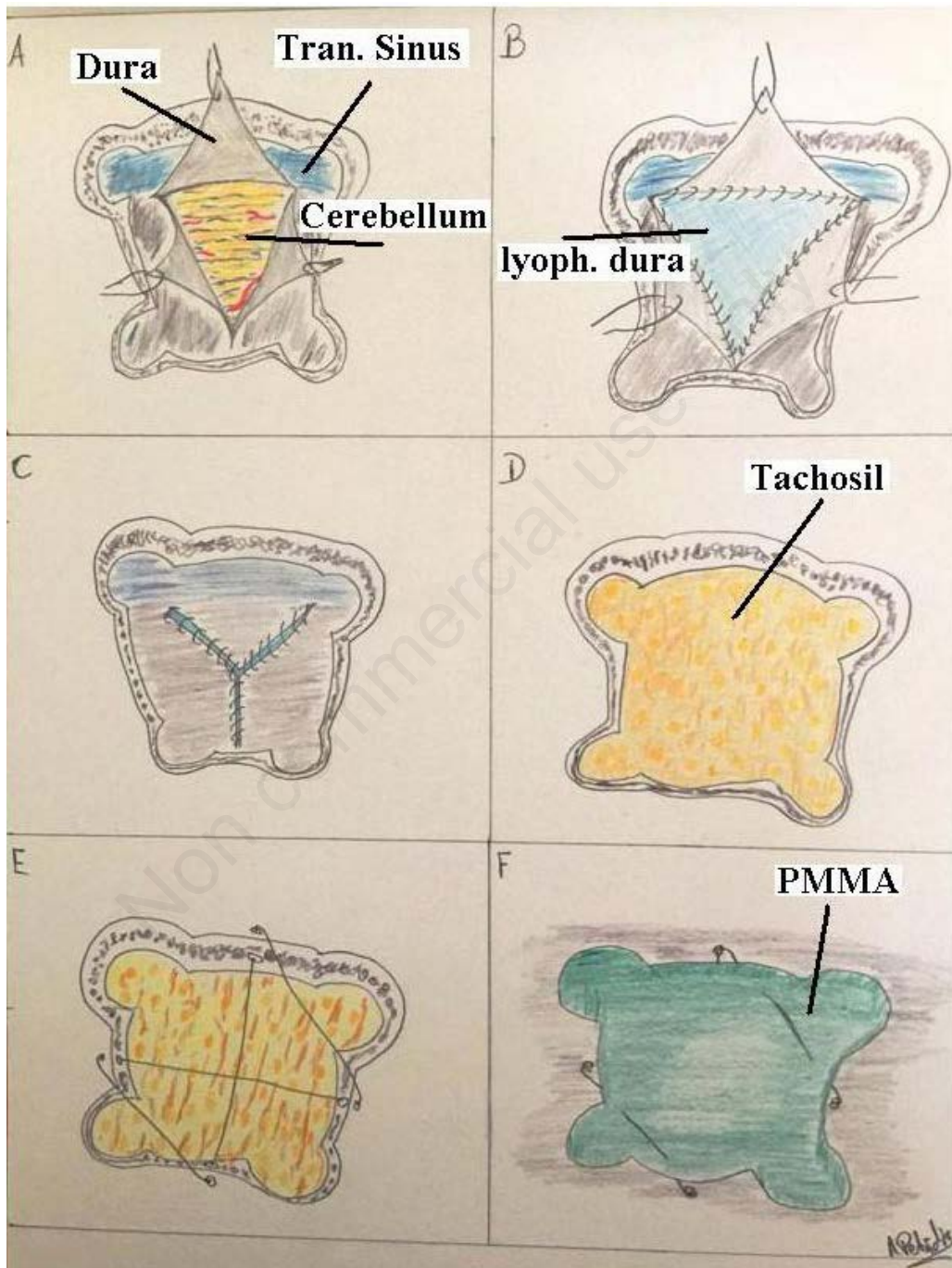


Figure 1. Illustration of the dural closure. A) Dura is opened in a Y shape; B) Lyophilized dura is opened and sutured on the dural edges; C) After suturing the lyophilized dura the dura is approximated; D) Fibrin coated dura seal is now applied epidurally; E) X-shaped suture is put over the closed dura through small hole in the calvaria; F) Polymethylmethacrylate (PMMA) is applied. The suture on the bone assists fixation of the PMMA to the defect.

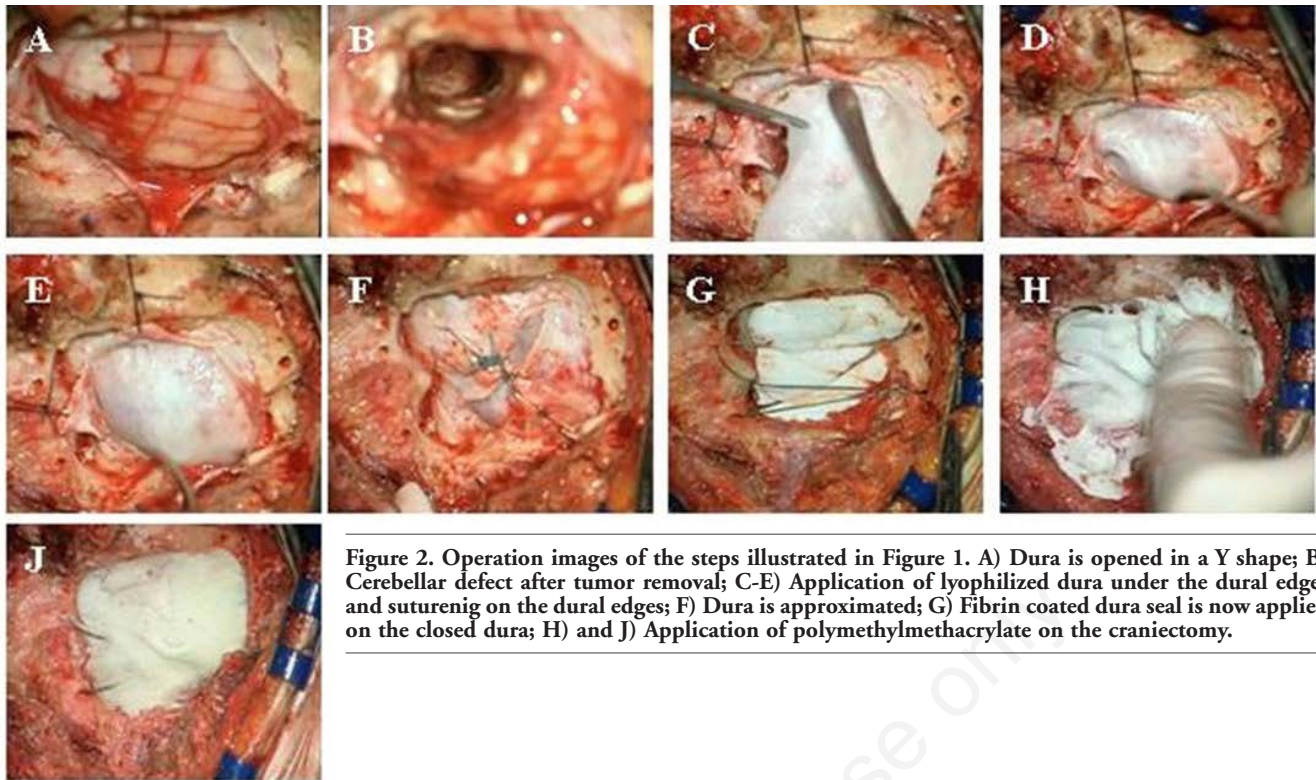


Figure 2. Operation images of the steps illustrated in Figure 1. A) Dura is opened in a Y shape; B) Cerebellar defect after tumor removal; C-E) Application of lyophilized dura under the dural edges and suturing on the dural edges; F) Dura is approximated; G) Fibrin coated dura seal is now applied on the closed dura; H) and J) Application of polymethylmethacrylate on the craniectomy.

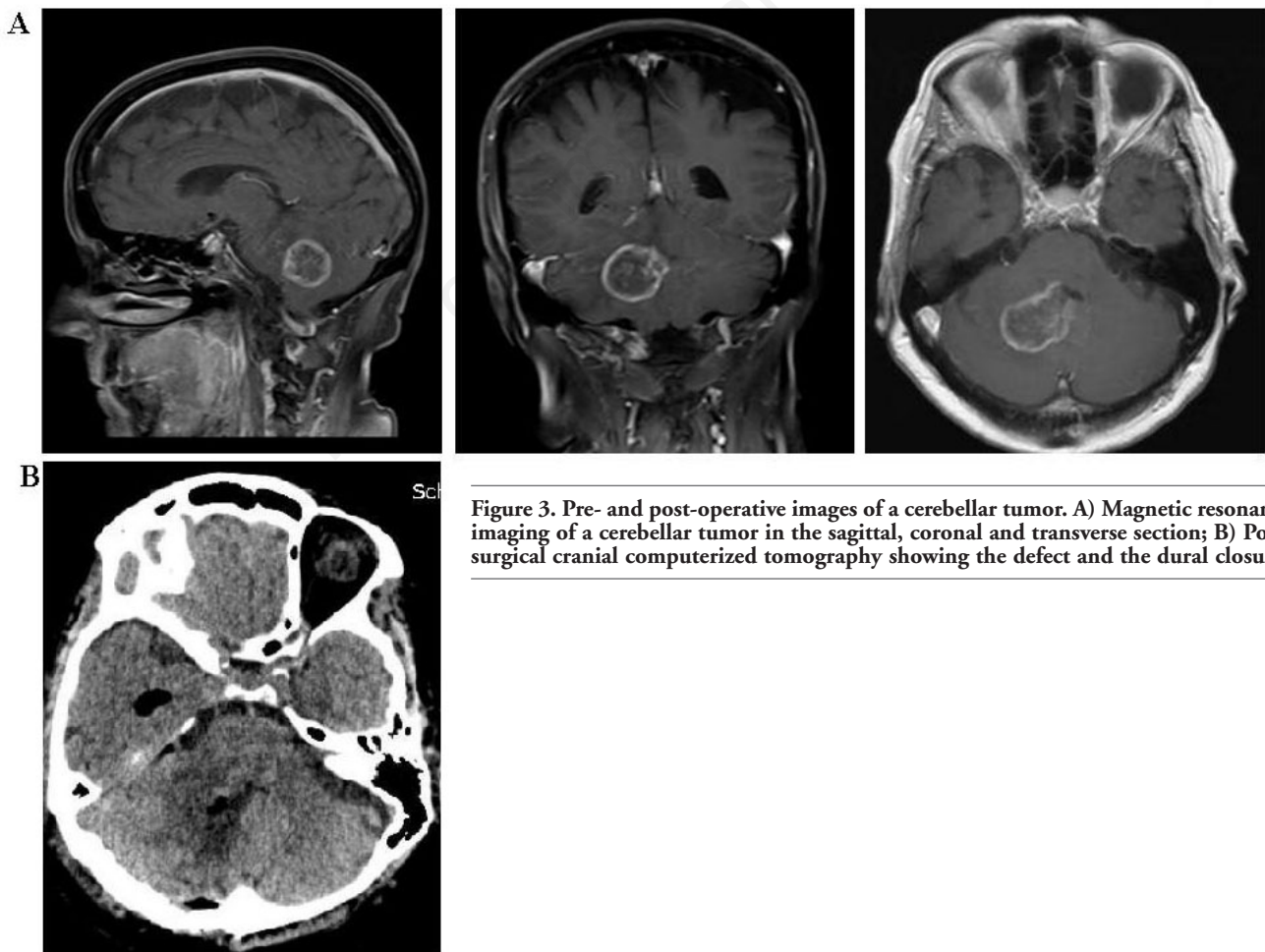


Figure 3. Pre- and post-operative images of a cerebellar tumor. A) Magnetic resonance imaging of a cerebellar tumor in the sagittal, coronal and transverse section; B) Post-surgical cranial computerized tomography showing the defect and the dural closure.

unsolved problem since the era of Cushing⁴ and constitute a major post operative complication due to potentially life threatening sequelae and delay beginning of adjuvant therapy in oncologic cases.⁶ It occurs in 2-17% following posterior fossa surgery.^{2,4,6}

In the present study the combination of those techniques, as it is in the sandwich technique, reduces the CSF leakage complication rate to 3.8% (only 0.5% needed a surgical revision) which is low compared to the complication rate described in the literature.^{3,6,7}

The 0.5% of patients needed a second surgery for CSF leakage closure which is better compared to 3.7% in a similar study.⁷ The rest of the patients with CSF leakage were managed by a lumbar drain for 5-7 days. The 2% of the patients had cerebellar bleeding with no need of re-operation and 3% had a wound infection treated with antibiotics to good effect. The sandwich wound closure we applied for posteri-

or fossa surgery in our patients, correlates with a significant reduction of CSF leaks compared to the literature and less need for surgical closure for the few who had CSF leaks.

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