

DIFFUSE CEREBRAL EDEMA AFTER CRANIOPLASTY, IN-SPITE OF VP SHUNT IN-SITU. CASE REPORT

Neurosurgery

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ABSTRACT

Cranioplasty is a known Neurosurgical operation that is performed routinely for patients with cranial defects following decompressive craniectomy. Complication does occur such as infection, seizure, subdural or epidural hematoma, but potentially serious complication such as diffuse cerebral swelling after uneventful cranioplasty is a rare clinical entity. Herein, authors present a case report of diffuse cerebral edema after uneventful cranioplasty, in-spite of having a functional ventriculo-peritoneal (VP) shunt in-situ.

KEYWORDS

Sunken skin flap, Cranioplasty, vacuum suction drain, cerebral edema

CASE REPORT

A 25 year female, an old operated case of Lt. Fronto-parieto-temporal decompressive craniectomy with Rt. Ventriculo-peritoneal shunt in-situ. She was on 4 antiepileptic medicines (Phenytoin, Levetiracetam, Clobazam, Lacosamide). She was electively admitted for cranioplasty using autologous bone graft (3 months post surgery). Her GCS was E2VTM4, Rt. Hemiparesis, afebrile, hemodynamically stable, operated skin flap sunken. Preoperative NCCT Head (Fig. 1) revealed sunken flap Lt. cerebral hemisphere with cranial defect, shunt catheter in-situ. After informed consent and pre-anaesthetic evaluation, she was taken for surgery. Myocutaneous flap was raised, there was no dural/arachnoid breach, cranial defect defined and cranial reconstruction using autologous bone flap was done, Subgaleal vacuum drain put as a routine step, surgery went uneventfully. Post operatively she was kept on ventilator support and weaned off from ventilator next day and maintained on T-piece. She had an episode of seizure on the night following surgery, it was controlled with Inj. Midazolam & antiepileptic dosage was modified and neurologically her GCS was E2VTM4. On 1st post-operative day, Subgaleal vacuum drainage was 50 ml, so it was removed and NCCT head done as a routine protocol. NCCT Head (Fig. 2) revealed diffuse cerebral edema with chinked ventricles, thin layer of inter-hemispheric fissure bleed, with ventricular shunt catheter in-situ on Rt. Side. To us, this is very unusual & unexpected complication, we were more concerned about the subdural or epidural collection after cranioplasty in this case with ventriculoperitoneal shunt in-situ. Cerebral osmotic decongestants Inj. Mannitol, Inj. Furosemide were started and she remained neurologically stable and discharged on 10th post-operated day with GCS of E4VTM4.

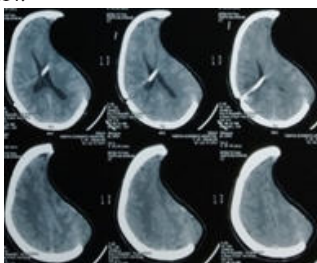


Fig. 1 NCCT Head (Pre-op.)

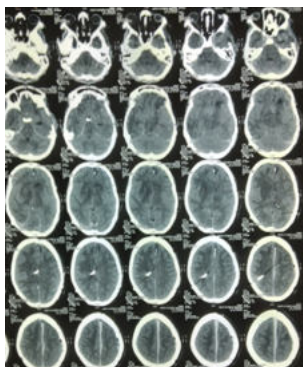


Fig. 2 NCCT Head (1st Post-op. day)

DISCUSSION

Case reported here was of a young lady who had undergone decompressive craniectomy after traumatic brain injury, later on underwent ventriculo-peritoneal shunt surgery for hydrocephalus. She was electively admitted, 3 months post decompressive craniectomy for cranial reconstruction surgery. She had sunken craniectomy site. There was no untoward event during cranioplasty surgery, subgaleal vacuum suction drain was kept as a routine step. On the night following surgery she had an episode of seizure, which was controlled with Inj. Midazolam & antiepileptic dosage modified. On the next day, NCCT head (Fig. 2) was done which revealed very unpredictable event of diffuse cerebral edema. However, her neurological status remained same. Roost et al^[1], first reported a rare case in 2003 that involved a devastating cerebral swelling attributed to a negative pressure from cranioplasty. Sinking skin flap syndrome and vacuum suction drain may be the main risks of a postoperative venous congestion and stasis, which may result in diffuse cerebral swelling^[2].

In our case, there was sunken skin flap, and subgaleal vacuum suction used, due care was taken in positioning the patient during operation and post-operatively. There might be strong possibility of venous congestion/stasis as there was small venous haemorrhagic infarct (Fig. 2), in Lt. anterior Frontal para-sagittal region, and thin layer of acute inter-hemispheric bleed which might be due to pressure variation. Cerebral decongestants were added post-operatively in this case, as such they (cerebral decongestants) are not used routinely in such a lax flap. One interesting thing was that the patient had not deteriorated neurologically because of the functional Ventriculo-peritoneal shunt. This complication had eventually increased the ICU stay and the overall expenses.

Chitale et al^[3], also proposed that a significant pressure differential that induced slow blood flow in venous sinuses may lead to a diffuse hemorrhagic infarct, as well as vein thrombosis.

Sviri GE^[4], reported a rare complication of sudden death in association with massive cerebral edema immediately after cranioplasty. It was proposed that a negative pressure difference from the elimination of atmospheric pressure that had been chronically applied on the injured sinking brain in combination with the negative pressure applied by the closed subgaleal suction drain may lead to brain shift toward the cranioplasty site and initiate a fatal vasomotor response^[5,6].

The use of suction drains in neurosurgery is individual preference based and has been reported with significant risks to patients, including sudden death^[7]. Generally, most of the neurosurgeons prefer to apply suction drain where dura was closed watertight and there is no documented guideline as to how much pressure is to be applied.

Honeybul S^[8] suggested that it might be related to a combination of failure of autoregulation and the use of closed vacuum suction drainage, in his three patients who had undergone decompressive hemicraniectomy for ischaemic stroke.

In this indexed case there were sinking skin flap, post-operative seizure episode, and subgaleal vacuum suction drain which were the culprits

for diffuse cerebral edema, in spite of having functional ventriculo-peritoneal shunt. And also, the patient had not deteriorated neurologically because of functional Ventriculo-peritoneal shunt.

CONCLUSION

Cranioplasty in sunken skin flap where vacuum suction drain use, may pose the risk of venous congestion and stasis, which may result in diffuse cerebral swelling, in a few unfortunate cases.

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