Custom cranioplasty using rapid prototyping technology

Sir,

Cranioplasty for a large skull bone defect can be a challenging surgical problem. A variety of materials have been used for cranioplasty. Due to the advances in bioengineering, custom templates and prosthesis are now available for cranioplasty using Rapid Prototyping (RP) technology. Rapid prototyping technology was originally developed to rapidly build a prototype of a new product, especially in automobile industry. Now the same technology is used in the medical field in the production of anatomical models and templates, which facilitate surgeons to optimize preoperative surgical planning, interactive surgical simulation, while reducing operative time and complications.

TIFAC CORE (Technology Information, Forecasting and Assessment Council - Center of Relevance and Excellence), PSG College of Technology, Coimbatore provided the first custom template for cranioplasty in our patient. Under the broad umbrella of technology vision-2020, TIFAC has set up a center of Relevance and Excellence in product design, optimization and collaborative product.

A frontotemporal craniectomy defect in a head injury victim was closed with a prosthesis made up of a biocompatible substance polymethyl metha acrylate (Figure 1). This prosthesis was a replica of the custom template produced by Rapid Prototyping Technology, using the data of 3D-CT scan images and 2 mm CT cuts submitted to TIFAC CORE (Figure 2).

Rapid prototyping (RP) technology has shown significant benefit in Maxillo facial reconstruction, cranio synostosis, skull and maxillo facial tumor surgery, skull plastics, orthodontic surgery, deformities of long bone joints and knee surgery, pelvic fractures, hip dysplasia, spinal trauma, congenital and degenerative spinal diseases, foot and hand malformations, and in models of soft tissue structures such as the cardiovascular system. The most exciting case in which RP technology was used in the recent past was in planning the successful separation of conjoined twins (Siamese twins) by using the RP model of the twins’ brain and their venous structure.

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References

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Treatment of idiopathic opsoclonus-myoclonus syndrome with intravenous immunoglobulin
Sir,

Opsoclonus-myoclonus syndrome (OMS) is a rare but distinctive disorder, characterized by irregular, continual, and conjugated chaotic saccades of the eyes accompanied by appendicular myoclonus and truncal ataxia. No etiological factor can be found in 50% of adult cases. In 20% of cases it may be paraneoplastic and may also be a manifestation of brainstem stroke or infection. The most common tumors, which give rise to OMS are breast and lung cancers and infectious agents are Epstein-Barr virus and enteroviruses such as Coxackie B. 1,2

A 41-year-old woman presented with severe vertigo and gait unsteadiness for ten days. There was no history of any antecedent viral infection or vaccination. Neurological examination revealed coarse eye movements with severe truncal ataxia and limb myoclonus. Laboratory examination (routine hematological tests, urine and cerebrospinal fluid examination, serological tests for infections, oncological bands workup, magnetic resonance imaging of brain and electroencephalography) revealed no abnormality. As assays for paraneoplastic antibodies couldn’t be performed due to technical limitations, the patient was considered to be a case of idiopathic OMS.

Therapeutic trial with prednisolone (1 mg/kg/orally) and clonazepam (4 mg/day) was attempted. Because of the lack of any beneficial effect, intravenous immunoglobulin (IVI g) (0.4 g/kg/day for five days) was added on the sixth day and Prednisolone and clonazepam were tapered in the following five days. On the third day of IVI g treatment, muscle jerking and eye movements stabilized. She began to sit without assistance and during the next two weeks the patient gradually recovered. She was symptom free within eight weeks. Physical symptoms and repeated laboratory examinations for occult malignancy after one-year interval was negative. She has been asymptomatic for two years.

The response to immunotherapy is unclear in paraneoplastic and idiopathic OMS, because the rarity of this disorder hinders controlled clinical studies and the possibility of spontaneous remissions makes interpretation difficult in isolated cases. In adults under 40 years of age, the clinical evolution is more benign and the effect of IVI g seems more effective. 2

IVI g is an immunomodulating agent that has multiple activities, including neutralization of pathogenic autoantibodies, suppression of inflammatory mediators, complement inactivation, functional blockage of Fc receptors on macrophages and modulation of T-cell functions. 3 Treatment with IVI g has been reported in a few idiopathic adult-onset OMS cases in literature. Pless et al. first reported beneficial effects of IVI g in 1996. 4 Bataller et al analyzed 10 idiopathic and 14 paraneoplastic adult OMS patients. IVI g was used in five of the idiopathic cases. They concluded that idiopathic OMS presents an age dependent prognosis and immunotherapy seems to be associated with a faster recovery. 2

Our case suggests that patients with idiopathic OMS treated with IVI g may have a faster recovery and this treatment should be recommended in cases with severe neurological dysfunction.

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Metastasis of frontal oligoastrocytoma to cerebellar vermis

Sir,

Metastasis of a low-grade glioma through the cerebrospinal fluid (CSF) is very rare. We report a case of CSF spread of a right frontal oligoastrocytoma to cerebellar vermis.

A 46-year-old woman presented with symptoms of raised intracranial pressure and difficulty in walking of two months duration. On examination, she had bilateral papilloedema and cerebellar signs on the left side. Four years earlier she had undergone excision of right frontal mixed oligoastrocytoma to cerebellar vermis.

Metastasis of a low-grade glioma through the cerebrospinal fluid (CSF) is very rare. We report a case of CSF spread of a right frontal oligoastrocytoma to cerebellar vermis.

A 46-year-old woman presented with symptoms of raised intracranial pressure and difficulty in walking of two months duration. On examination, she had bilateral papilloedema and cerebellar signs on the left side. Four years earlier she had undergone excision of right frontal mixed oligoastrocytoma (WHO Grade 2) followed by 54 Gy of Cobalt teletherapy to the brain. Magnetic resonance imaging (MRI) of the brain showed a 2 cm homogeneous contrast enhancing mass in the inferior vermis with extension into the left cerebellar hemisphere and hydrocephalus. There were postoperative changes in the right frontal lobe in the form of loss of brain tissue and there was no evidence of recurrence (Figures 1a and 1b). A differential diagnosis of metastases from a systemic tumor, CSF spread of the frontal glioma or radiotherapy-induced tumor were considered. On referring to her previous radiotherapy records it was found that the posterior fossa was not included in the radiation field. Chest X-ray and an ultrasound abdomen were normal. She underwent right ventriculoperitoneal shunt followed by midline suboccipital

References