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Case Report

Surgical Technique of Fronto-orbital Advancement And Strip Craniectomy for Correction of Oxycephaly With Towering of Bregma, a Case Report

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Abstract:

Background*: Craniosynostosis is a congenital problem of brain development that causes disfigurement of the head and face. Multiple synostoses is an abnormal development of head where fusion ofmany or all cranial sutures '! oxycephaly (tower skull with undeveloped sinuses and shallow orbits). The most accepted surgical correction involves frontoorbital advancement and forehead remodeling.*

Aim of the Study*: In this study, we described our experience and technique in surgical correction of multiple synostoses (Oxycephaly) in BSMMU,department of neurosurgery.*

Key Words*: Craniosynostosis –Oxycephaly- Frontoorbital remodeling.*

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Introduction

CRANIOSYNOSTOSIS is the premature closure of one or more of the skull sutures. It occurs as an isolated (simple) form or complex form in which multiple sutures are involved (syndromic)[1,2]

Craniosynostosis disturbs the growth of the skull, affecting both cranial and facial bones, resulting in deformity. It is not only the deformity that matters, untreated cases may develop brain atrophy, increased intracranial pressure, mental retardation, ocular complications, and optic nerve atrophy.Sagittal, Coronal, Metopic, Lambdoid are some type of single suture Craniosynostosis. Some cases shows fusion of many or all cranial sutures called Multiple Synostoses. Major skull sutures (saggital, coronal, lambdoid, and metopic) are responsible mainly for the

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normal shape and configuration of the skull and face. When one or more of these sutures are affected by early closure, cranial deformity and restriction of growth will occur with the potential increase in intracranial pressure.

Case Summary

Our patient Master Raihan 2.5 years old male admitted under BSMMU department of Neurosurgery with the complaints of gradual disfiguration of head for 1.5 years. His developmental milestone are normal. He has no h/o trauma to head ,prolong fever ,convulsion,or loss of consciousness.but he came to BSMMU with a scar mark over the forehead,on query his mother told ,he was under went excision of bony growth of the skull on 23th july 2018 ,on local hospital.Pts mother antenatal checkup drug history was normal and her pregnancy period was uneventfull,and underwent NVD at home.Pt generaland systemic examination reveals normal,examination of head OFC-43cm,Fontanelle are closed ,and a well healed scar mark measuring about 10cm,on face examination hypertelorism is noted:ICD -29mm,depressionof supraorbital eminence. Screening of limbs are normal.On neurological examination ,higher psychic function intact,Rt handed, gait normal,GCS-15.All cranial nerve examination are normal.

Operative technique

The baby was placed supine with head elevation to 20 -30 degree. Then he was wrapped with roll cotton to prevent hypothermia. Proper padding of pressure points was ensured. The bicoronal incision was given halfway between the coronal and lambdoid suture. Anterior and posterior flaps were raised in the subgaleal plane to supraorbital ridge anteriorly and lambdoid suture posteriorly. Laterally, a subperiosteal dissectionensures elevation of the temporalis muscle with the scalpflap and complete exposure of the temporal fossa. The supraorbitalrim is exposed in the subperiosteal plane. A frontal craniotomyis performed by cutting the frontal bone. Next, the supraorbital baris mobilized by cutting the bone 5 mm above the frontonasalsuture and then along the superior roof of the orbits 5 mm posteriorto the supraorbital rim. The osteotomy is continued laterallyto above the frontozygomatic suture and the supraorbital rim is then removed. Bar is then overcorrected by bending to -90 degrees at thelateral orbital margin. Small piece of bone have tobe removed to allow proper reshaping. Resorbable plates andscrews are then used to secure the new shape of the reconstructedsupraorbital bar. Next, the supraorbital bar is repositionedin place. Each side of the bar is advanced to the desiredposition. After proper hemostasisclosed it in layer with a drain tube. Drain output was checked closely and postoperative hemoglobin level was checked on 1st POD. Next post-operative days were uneventful. Stitches were taken out on 7th post-operative day. A post-operative CT scan was done. During discharge, parent were adviced to follow up after 1 month.

Fig.-1: *Pre-op*

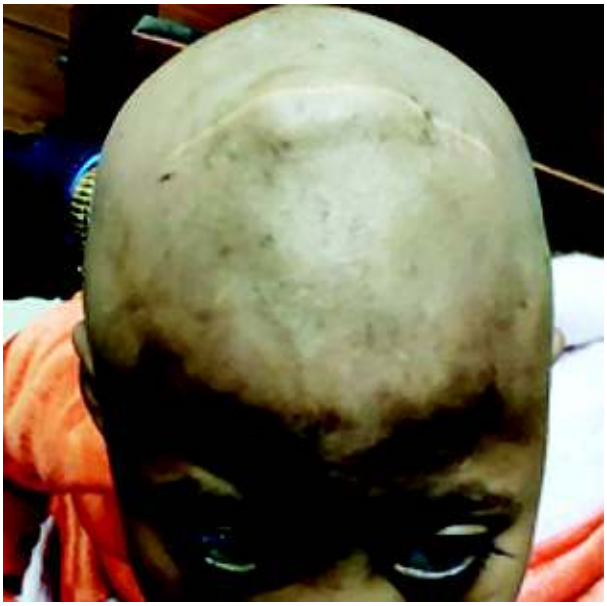

Fig.-2: *Pre-op*

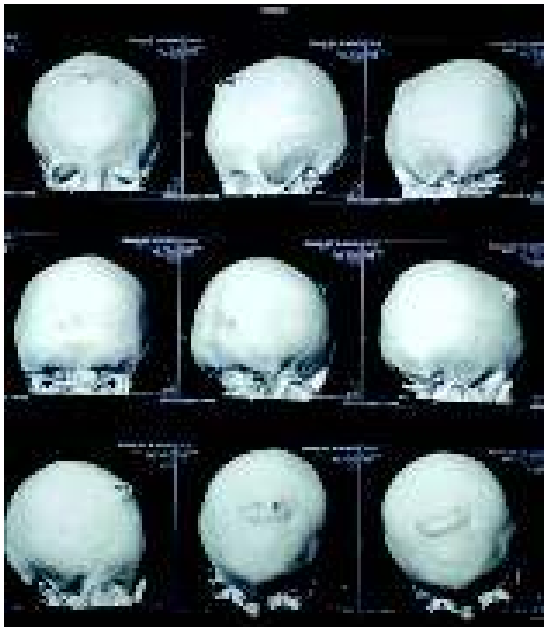

Fig.-3: *Pre-op,3D CT scan*

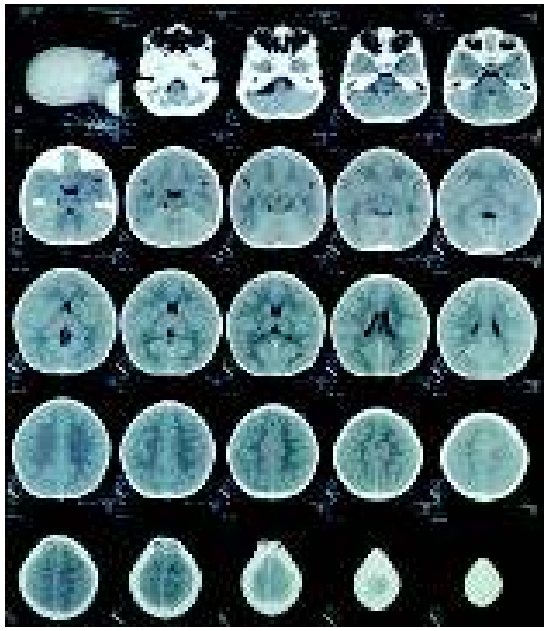

Fig.-4: *Pre-op,CT scan*

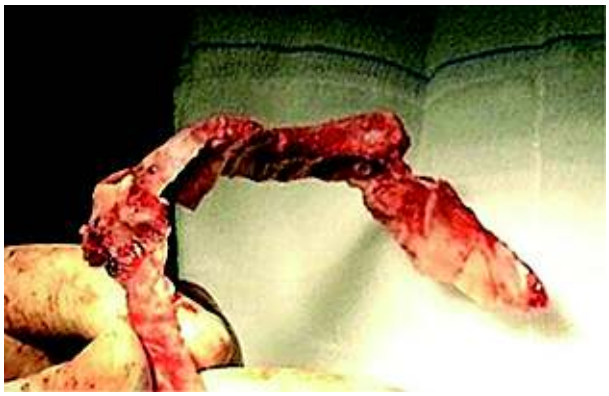

Fig.-5 *Per-operative pic*

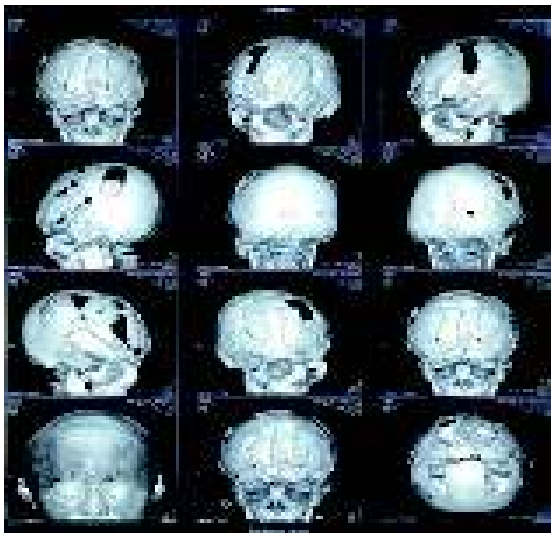

Fig.-6: *Post-op CT scan*

Fig.-7: *Post-op pic*

Discussion:

Craniosynotosis is the premature closure of one or more cranial sutures. It occurs in 2000-2500 live birth. More than 90% occurs spontaneously, less than 10% are in syndromic forms. The most commonly affected suture is the sag-gital suture, about 50% of non syndromic cases. This is followed by metopic then unilateral coronal craniosynostosis. The bilateral coronal affection is most commonly involved in syndromic cases

The exact etiology of simple (non syndromic) craniosynostosis is unknown, however, some risk factors like prenatal intake of valproate, under-weight, preterm delivery and early use of v-p shunt for congenital hydrocephalus may be associated.

According to Virchow's law, the skull grows parallel to the closed suture, not perpendicular to it. That's why in saggital craniosynostosis, (called dolicocephalic head), while in bilateral coronal craniosynostosis (called brachycephaly). Uni-lateral coronal craniosynostosis is more complex, (called anterior plagiocephaly).

Early closure of the metopic suture, which closes normally very early in life, causes triangular shape of the forehead (trigonocephaly). This is usually associated with hypotelorism[3].

The aim from the surgical correction of crani-osynostosis is to give adequate intracranial pressure and volume to allow the brain to expand normally so that minimizing the cognitive sequel that may occur from chronic increase intracranial pressure. Also to regain the normal shape of the skull. Different types of surgical correction had been used by neurosurgeons, varying from the minimally invasive endoscopic suturectomy with the use of post-operative molding helmet, to open calvarial reconstruction[6]. Other authors advocated su-turectomy with spring implantation and cranial distraction[7].

The choice of individual type of surgery depends mainly on age of the patient, suture involved, socioeconomic standard of the parents and facilities at surgical center[2,6,7]. In our study no helmets were used nor mini plates due high expense on parents, Surgical correction of sutures involved reshaping the anterior half of the skull convexity from the coronal suture to the orbital rim (frontoorbital remodelling), then orbital band advancement was the second step. This correction involved lateral extension of the coronal sutures all the way done to the greater wing of the sphenoid ridge at the skull base. We found this technique facilitates global fashioning and allow large cor-rection of the orbital rim and forehead. This technique has been utilized in many studies[4,5, 8-10]. Our patient in this study could not afford for expensive helmets .

Conclusion:

Frontoorbital advancement with strip craniotomy is one of the best option for treating oxycephaly with towering of bregma. For achieving better results surgery should be done at the optimum age and in well-equipped medical center. Although using mini-plates and helmets may help with the outcome, surgery can be performed with minimal resources in accordance with the economic state of the community with good results.

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