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Case report

Curative Surgical Treatment of Cerebral Palsy- A Case Presentation

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Abstract:
There was no cure for Cerebral Palsy (CP) previously. However, there are many treatment options that may help to improve daily functioning of a child suffering from CP. But these options failed to prevent early death of the patients. New curable treatment era has started for CP patients with bilateral cranioplasty and duraplasty. This was the second case of the case series of CP treated by bilateral cranioplasty and duraplasty with very good outcomes. During operation of this patient, after removing cranial bones by craniotomy, found no dural pulsation. It is indicative of raised intracranial pressure. After duraplasty, brain pulsation was found very nicely, which indicates that intracranial pressure became normal. In early childhood, brain grows with the dural growth simultaneously. But dura is adherent with the skull bones. Premature closure of sutures and with thickening of skull bones result in small intracranial volume which does not allow the brain to grow according to age. So, brain atrophy causes widened fissures and widened sulci with brain parenchymal tissue loss as evidenced in CT scan of brain or MRI. In this case, we made adequate rooming for brain by doing cranioplasty and duraplasty and got excellent results.

Keywords: Cerebral palsy, Cranioplasty, Duraplasty

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Introduction:

One of the most important causes of Cerebral Palsy (CP) is birth asphyxia, which is due to prolonged labour with fetal distress, inappropriate management of airway just after delivery in either Cesarean section or normal delivery, low birth weight, amniotic fluid aspiration or meconium aspiration, placental insufficiency, umbilical artery pH value below 7.10, or maternal hypovolumic shock etc.[1] Hippocrates was the first who described the seizures and other neurologic conditions in children. Convulsion is the most common symptom of CP.

All types of epileptic seizures can be seen in patients with CP. Complex partial and secondary generalized ones are the most frequent seizure types.[2] This convulsion leads to further hypoxia, leading to further brain damage. Birth asphyxia leads to hyperostosis of the skull bone and facial bones. So, the fontanelles and sutures are closed prematurely. Actually, there is a pathological process leading to abnormal shape of head with raised intracranial pressure.[3] Fontanelles and sutures are very important for growth of all skull bones uniformly.[4-6] There are 6 fontanelles in a newborn- one anterior, one posterior, two are postero-lateral and another two antero-lateral. Sagittal suture synostosis leading to a scaphocephalic head shape, metopic suture synostosis leading to trigonocephaly, left coronal suture synostosis leading to left-sided plagiocephaly, bicoronal suture synostosis leading to a brachycephalic head shape, and right lambdoid suture synostosis leading to right-sided occipital plagiocephaly. All these types of abnormal head shapes due to craniosinostosis causes decreased intracranial volume, which is found in CP patients.

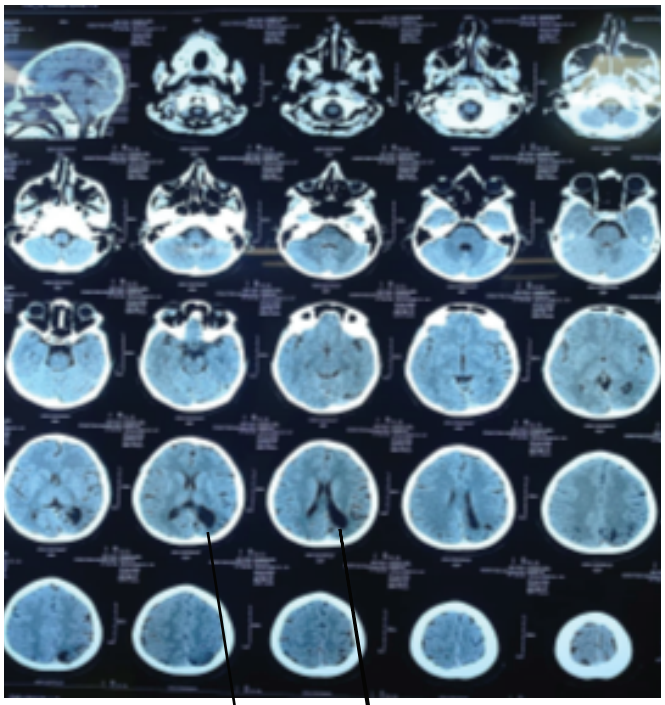
This was the second case of the case-series of CP. To increase intracranial volume, we did bilateral cranioplasty and duraplasy and got satisfactory results just after completion of the operation. The authors named the procedure as 'tanfarid" for future references.

Case History:

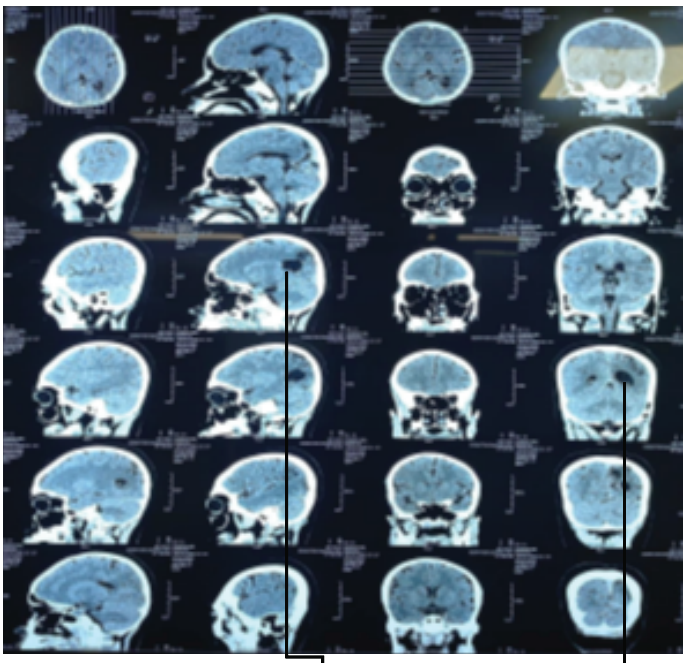
The patient's name was Sumon, aged 13-years, son of Mr. Sumor Ali, hailing from Sokhipur, Tangail, Bangladesh, presented with the complaints of repeated convulsion for long duration. The patient was getting afraid all times- so, he could not go out of home. Even he could not go to toilet without his father and mother. Patient was unable to recognize numeric signs like 1,2,3,4, 5,6….9 and was unable to count or recognize 10 taka, 20 taka, 50 taka, 100 taka note or even 500 taka notes. He was unable to read and write. He failed to learn alphabet, and always looked depressed. We admitted the patient into Ganoshastho Nagor Hospital 10-days before the operation for close observation and monitoring. Clinical examination showed that no neurological deficit, no pain, and hearing difficulties and feeding problems.

CT scan findings of this Cerebral palsy Patients:

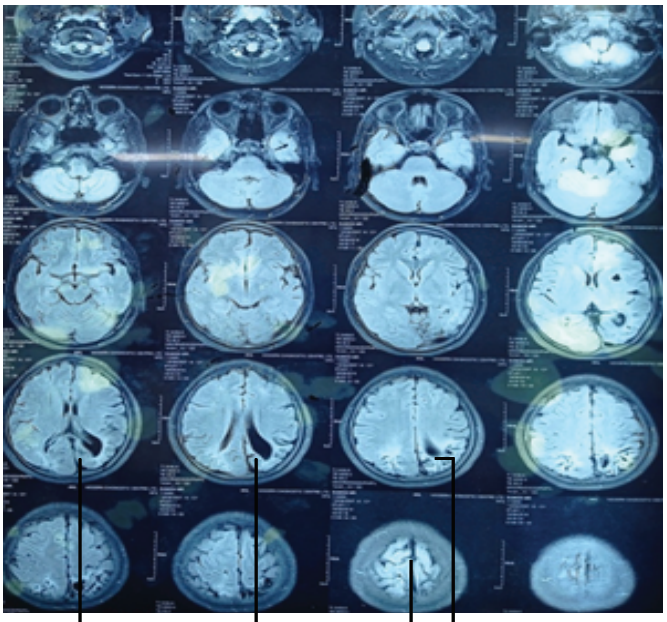
The CT scan and MRI pictures of brain showed that unilateral ventriculomegaly, especially left occipital horn was much enlarged than the right. (Pictures 1,2) There was infarction in both occipital lobes, with larger infarcted area in the left lobe than the right. (Picture 3) There was generalized atrophy of the brain. On 7th post operative day, follow up CT scan showed decreasing infarct area. (Picture 4)



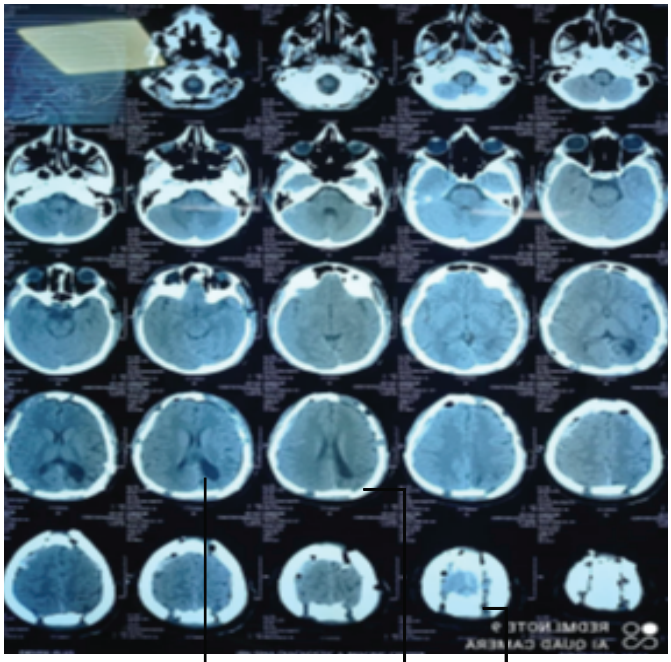
Picture 2: Pre-opeative axial section of CT Scan of brain showed:
i) Occipital horn enlarged, unilaternal ventriculomegaly; and
ii) Occipital lobe infarction.



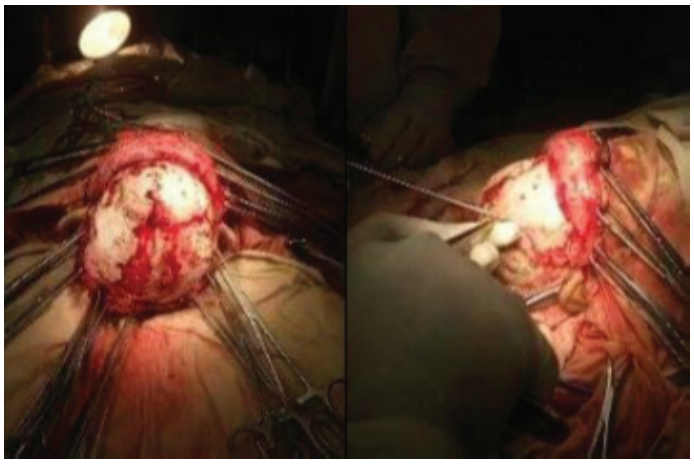
Picture 1: Pre-operative CT scan sagital section showed:
i) Occipital lobe infarction, and
ii) Ventriculomegaly



Picture 3: Pre-operation MRI showed :
i) Atrophy of brain;
ii) Lcft occipital horn enlargement ; and
iii) Occipital labe infarction.



Picture 4: 7th On Post-opeative day, CT Scan:
i) Infarction size decreased;
ii) Vcntricular size decreaing, and
iii) Reconstructed skull.



Picture 5: Per-operative picture of reconstructed skull

Invented surgical approach:

Bilateral cranioplasty and duraplasty and removal of skull base hyperostosis bone was done by drilling, removal of thickened temporal bone.

Pictures 6,7,8,9: From left to right- physical appearances of the CP patient before operation (6,7), just after operation (8) and 25 days after operation (9).

Surgery onwards outcome:

After regaining consciousness from anesthesia, the patient's voice changed to commanding. He was behaving like a smart hero. On 6th post-operative day, we gave him different notes of money, but he failed to recognize. From 7th post-operative day to onwards, we taught him counting and values of different currency notes. From 10 post-operative day, he was able to count and able to recognize all categories of notes of money. Also interesting that he was ordering his father to bring chicken meet and his silly appearance also changed to smart one.

Discussion

A diagnosis of Cerebral palsy (CP) is primarily based on clinical findings and is generally more reliable after 2 years of age. Because, early signs and symptoms suggestive of CP may in fact be a normal variation or due to developmental lag and tend to resolve in many infants.[7] This is the usual practice of diagnosis. But definite CT scan and MRI findings are absolutely needed for early treatment. The CT scan findings are widened fissure, especially sylvian fissure, obliterated sulci, or widened sulci, infarction, temporal horn enlargement, infarction, periventricular hypodensity, unequal temporal lobe or unequal temporal fossa, excessively thick skull, abnormal shape of skull, very small and thick temporal bone. Compact brain, very small ventricle, enlargement of ventricle due to parenchymal tissue loss, brain atrophy, hypodensity is very common in cingulated gyrus. Post-operative CT scan also guides how much the patient is improving. Balanced diet also be an essential part of CP treatment along with cranioplasty and duraplasty.

Usual management by a multispecialty management team is needed for CP children's treatment. Neurophyscians or Paediatrics consultants who used to treat CP patients is the team leader to make a plan for long-term treatments. Orthopedist and Spine surgeons look for preventing contractures, hip dislocations, and scholiosis. Physical therapist take care for developing and implementing care plans to improve movement and strength, and administers formal gait analyses. Occupational therapist develops and implements care plans focused on activities of daily living. Speech and language therapist develops and implements care plans to optimize the patient's capacity for communication. Surgical procedures may improve mobility and decrease pain. Surgical management options include placement of a baclofen pump, selective dorsal rhizotomy, tendon releases, hip dislocation/rotation surgery, spinal fusion, strabismus repair, and deep brain stimulation.[8]

This was the second case of the case-series of CP managed

surgically. In this case, we did the same cranial surgery and aim of the surgery was to increase volume of the cranial cavity. We did bilateral cranioplasty and duraplasty as of the previous case.[9] The cranial bones were found more thickened than normal. Temporal bones were thickened. Dural pulsation was absent, but after duraplasty, the pulsation appeared. In post-operative period, patient did not require any kind of therapy, like speech or behavioral therapy. After recovering from anesthesia, his attitude changed like a brave boy. On 10th post-operative day, he was able to count and recognize 10, 20, 50,100, 500 taka notes. After one year of surgery, he was leading life without any support from his parents. So, cranial surgery is the real treatment of CP.

Prognosis with usual treatment:

Maximum CP patients can survive up to adulthood.[10] The most common cause of early death is respiratory disease like aspiration pneumonia and chocking deglutition failure. With all supports, the CP patients grow up to adult. Overall survival of all CP children until the age 20 years is 90%. Survival age up to 30 years is 95% of CP children with diplegia and 75% of children with quadriplegia. It is also found that 95% of children who have CP with mild cognitive deficit and 65% of children with severe cognitive deficit survive until the age of 38 years. With all supports and interventions, 2 out of 3 individuals with CP are ambulatory with or without assistance, 3 out of 4 have ability to speak and 1 out of 2 have normal cognitive abilities. If they are found on seizure, the result will be worst. Actually, no curative treatment was available till this newly introduced surgical management.

Prognosis with invented cranial surgery:

In this case, we did bilateral cranioplasty and duraplasty. After recovery from anesthesia, patient looks like a normal boy and was behaving like a brave. The patient became seizure-free in post-operative periods, although he was on anti-convulsive drugs. The patient was then able to count and able to recognize currency notes. He also could move without his parent's support.

Conclusion

We can conclude that bilateral cranioplasty and duraplasty is the curative surgical treatment of CP as the patient got remedy just after recovery from anesthesia. Other treatment options are not able to cure. Rather if conventional treatment would continue in this patient, there's colud be the possibility of development of permanent blindness as progressive occipital lobe infarction would not be stopped.

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Conflict of interest: None.

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