CASE REPORT

An Alien's Head on a CT Scan: Reshaping the Skull of a Cerebral Palsy Patient

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ABSTRACT

A unique cause of reshaping the skull of a young girl that suffers from cerebral palsy and hydrocephalus that made an alien's skull shape due to lack of movements, changing the patient's position, and craniosynostosis.

Key words: Head, Skull, Cerebral Palsy, Craniosynostosis, Hydrocephalus, Computed Tomography.

CASE REPORT

A seven-year-old female patient who suffers from cerebral palsy since birth and hydrocephalus. The patient has a history (Hx) of seizures, hydrocephalus, and cerebral palsy. She was in ICU since she was born lying down with no movement or change of her position. Since then due to the severity of the hydrocephalus that might was going to compress the brain stem, she was left in ICU and off sometimes to operation room to place a ventriculoperitoneal (VP) shunt or replace it. The patient lifted lying down on her back for a long time that her skull due to hydrocephalus was extended and elongated to form a dolichocephaly or what is also called "scaphocephaly". The bones of the skull were extended because the skull bones are soft in newborn babies. The body of the baby is 40 cm in length from the neck to the sole of the feet, 10 kg in weight, 22.96 as BMI, length of the whole body from the vertex to sole of feet is 66 cm, length of the skull from the vertex to the chin is 26 cm, and the length of the skull from the vertex to the base of the skull is 18.75 cm. The patient has seizures which made some motion artifact during CT scan see (Fig. 1). The seizures thought to be related to malfunction of the VP shunt that is in situ see (Fig. 2). The shape of the skull looks like alien's head see (Fig. 3). The distention of the skull caused the head to grow without fusing of the occipital fontanel and made wormian bones see (Fig. 4). It could be a form of delayed suture closer, not a fontanel. The patient has brachycephaly or plagiocephaly from lying down for a very long time as seen in (Fig. 2&5). Hydrocephalus and VP shunt in situ is seen in (Fig. 6). The patient has craniosynostosis based on the early closure of the bi-coronal sutures as seen in (Fig. 6) which caused the double shaped skull from the anterior view see (Fig. 1, 2, and 3).

DISCUSSION

Due to presence of fontanels (i.e. the weakest areas), which allowed the skull to be extended in a craniocaudal fashion which caused formation of the skull like alien's head. If the hydrocephalus came after fusion of the soft parts of the skull (i.e. fontanels), it would extend in all directions and compress the brain inside. A large anterior fontanel or delayed fontanel closure are caused by a condition like; achondroplasia, hypothyroidism, Down syndrome, increased intracranial pressure, and rickets[1].

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The best method of evaluating cranial sutures in case of craniosynostosis is volume rendering technique (VRT)[2]. In this case where there was more motion artifact, the VRT did not help in evaluating the sutures.

According to one published paper, the coronal suture is not the most common involved suture in craniosynostosis[3]. In another paper, the author claims that the coronal suture is the second most common involved suture (20% of the cases) after the sagittal suture (50% of the cases) [4]. Both sutures on both sides (i.e. right and left coronal sutures) have equal involvement rate in craniosynostosis by 30% of all craniosynostosis cases[3].

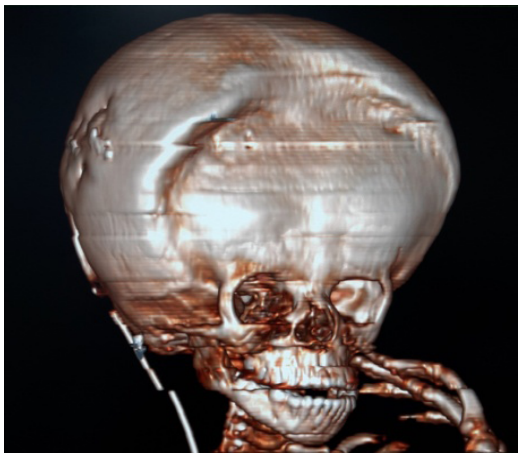

Figure 1. A CT scan of the head by using volume rendering technique. This right anterior oblique (RAO) view which shows an enlarged skull. Some motion artifact caused some distortion of the image due to the seizures and the unstable condition of the patient, even though, sedation was given and fixation was used, but the patient was still moving.

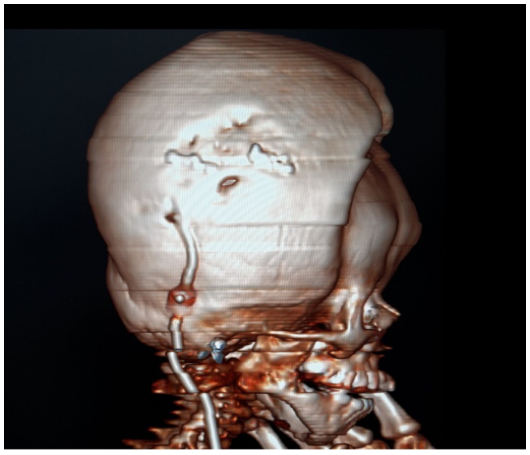

Figure 2. A CT scan of the head using volume rendering technique. This lateral view which shows the ventriculoperitoneal shunt in place. As well, The skull is flattened from the posterior edge.There is some motion artifact.

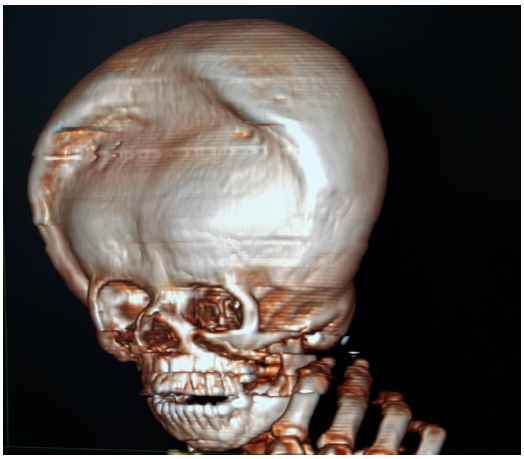

Figure 3. A CT scan of the head using volume rendering technique. This left anterior oblique (LAO) view shows the unusually skull shape.

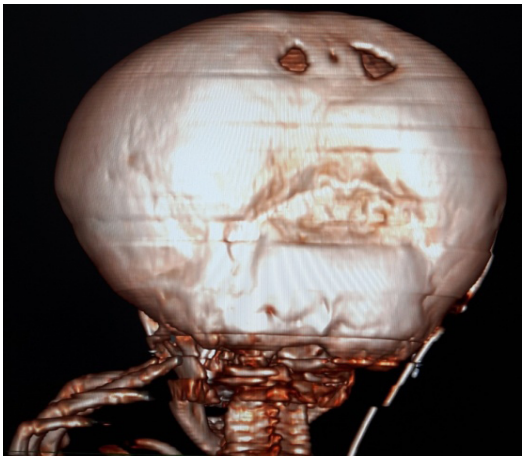

Figure 4. A CT of the skull using a volume rendering technique. This posterior view shows delayed infused occipital fontanel. The occipital fontanel has two wormian bones separate it into three. The back of the skull is flattened (brachycephaly). Notice there is some motion artifact.

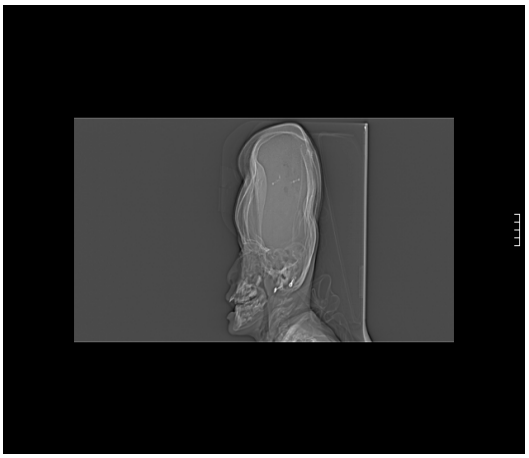

Figure 5. A CT scan topogram shows the elongated skull (dolichocephaly).

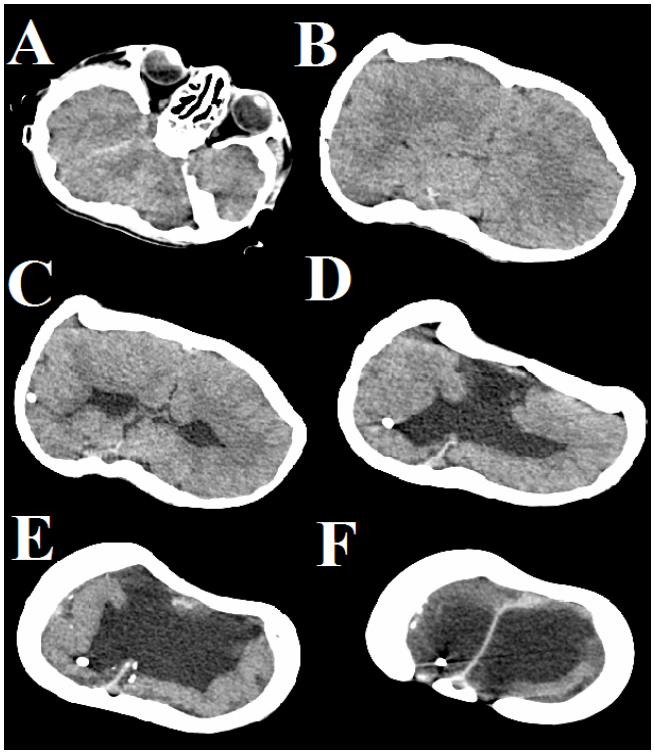

Figure 6. A CT scan of the brain shows the strange skull shape (B, C, D), early closure of bi–coronal sutures (B, C, D, and E) claverial thickening (C, D, E, and F), VP shunt (C, D, E, and F), hydrocephalus (C, D, E, and F), and unclosed occipital fontanel (F).

CONCLUSION

The combination of hydrocephalus, craniosynostosis, high intracranial pressure, and making the patient stay in the same position for a long time can form a strange skull shape. The use of VRT is not the golden standard for diagnosing skull sutures.

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