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Case series

The Revelation of Caput Succedaneum after Instrumental Assisted Deliveries: Exclusively diagnosed on Ultrasonography: Mini Article of Case Series

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Abstract

Vacuum extraction delivery is one of the commonest and routinely available forms of assisted vaginal delivery in tertiary care hospitals. The association of caput succedaneum and mode of deliveries is sparsely discussed in any of the renowned platform. Here we are presenting case series of infants who presented to us with scalp swelling in our ultrasound suite and we diagnosed them as caput succedaneum exclusively on sonography with no need of CT or MRI scanning.

Keywords: ***Vacuum Delivery, Caput Succedaneum, Ultrasonography.***

Introduction

Caput Succedaneum is a manifestation of birth trauma related to mechanical forces or vacuum delivery resulting in development of bumpy scalp mass (serosanguinous fluid collection) superficial to the galeal aponeurosis in the newborn's scalp. It is basically an extra periosteal collection that is related to venous congestion or edema [1]. Prolonged pressure on the presenting part of the fetal skull against the dilated cervix results in formation of caput succedaneum associated with head molding and also extends across the midline and over cranial suture lines. Caput may be assessed either clinically or imaged by ultrasonography. It mostly gets settled or resolve spontaneously after 1-2 days. No adverse complications are reported but sometimes it may result in bruising, necrosis, 'halo scalp ring' (alopecia) [2] Or ecchymosis [11] Differential diagnosis may include cephalohematoma, encephalocele and sub galeal hematoma, which we can exclude exclusively with help of sonography.

Case Series

CASE 1: A one day old infant presented to us in radiology department through OPD on 13th September 2021. She was born after a gestation of 38 weeks with birth weight of 3.2 kgs, as the child of nulliparous mother, carrying a history of gestational DM. Artificial membrane rupture was done which is followed by vacuum extraction-assisted delivery. The child was then born with scalp swelling for which ultrasound was done to exclude differential diagnosis of caput succedaneum or sub-galeal hematoma.

High frequency linear probe (10 MHz) was used for sonographic assessment of infant. On ultrasonography, there is an elongated anechoic collection/hematoma with minimal septations was appreciated between connective tissue and galeal aponeurosis in skull, it is extra periosteal above the aponeurosis (sub-galeal hematoma was excluded). It seems to be extending across the midline and crossing over the cranial suture (contradicting cephalohematoma which does not cross the suture lines). Its maximum width measures about 4.2mm. Rest of the brain is unremarkable. So we conclude our findings under the prime frame of Caput Succedaneum. Patient was discharged on the very next day, as there was no significant progression of swelling and on follow up, it was found to be almost resolved with no other complications.

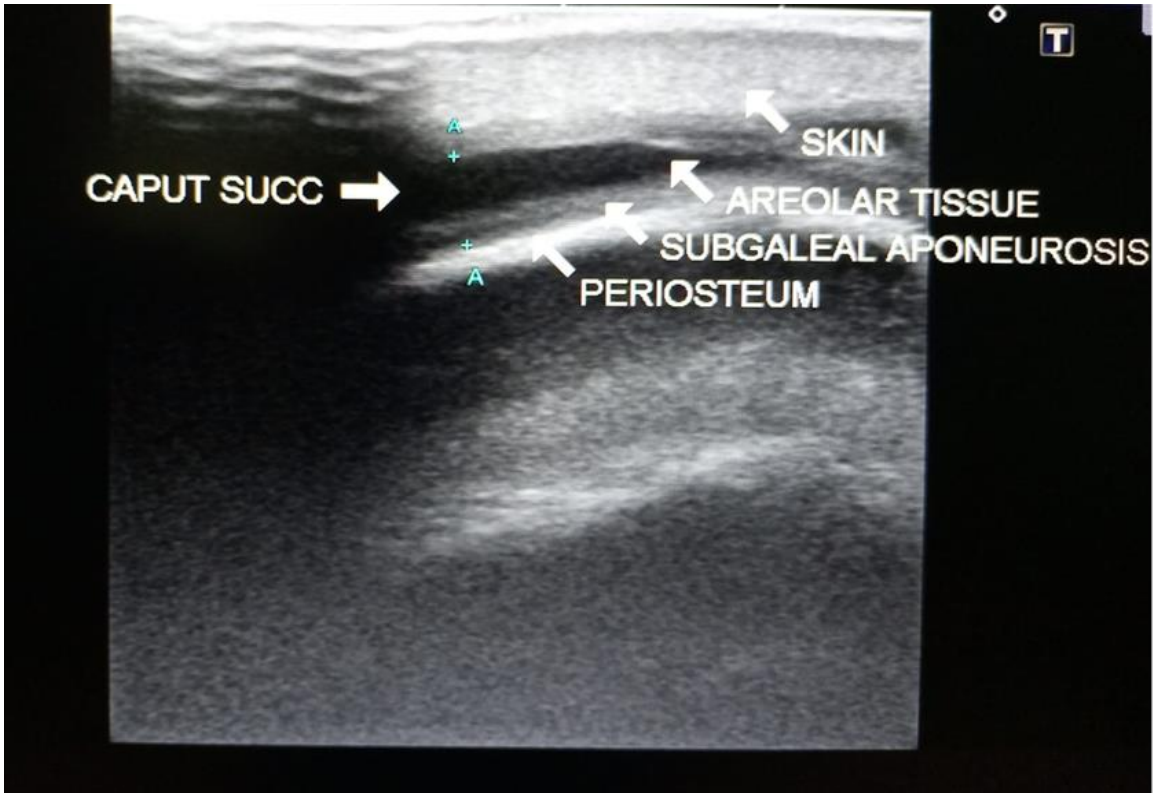


Figure 1: Case 1: Labelled sonographic image of skull demonstrating Caput succedaneum crossing midline and external to galea aponeurosis

CASE 2: A one day old infant presented to us from neonatal ward on 17th July 2020. He was born after gestation of 40 weeks with estimated birth weight of 3.3 kgs, as a child of primary gravid mother with no significant antenatal history. Vaginal delivery was followed by forceps extraction that results in formation of parieto-occipital swelling for which baby was referred to ultrasound department.

High frequency linear probe (10 MHz) was used for sonographic assessment of infant. On sonography, there is an anechoic collection noted in the region of vertex above the galeal aponeurosis crossing sutures. It contains some echoes and septations. Maximum depth measures about 0.6cms. It is also slightly extending into temporal and occipital regions. Rest of the brain scan is insignificant. So again due to its extra periosteal location, we confidently conclude it as a caput succedaneum on sonography. Patient was then followed and full regression of symptoms was found in 3-5 days. On follow up, patient did complain about light mark/dryness of scalp but there is no evidence of alopecia at that time.

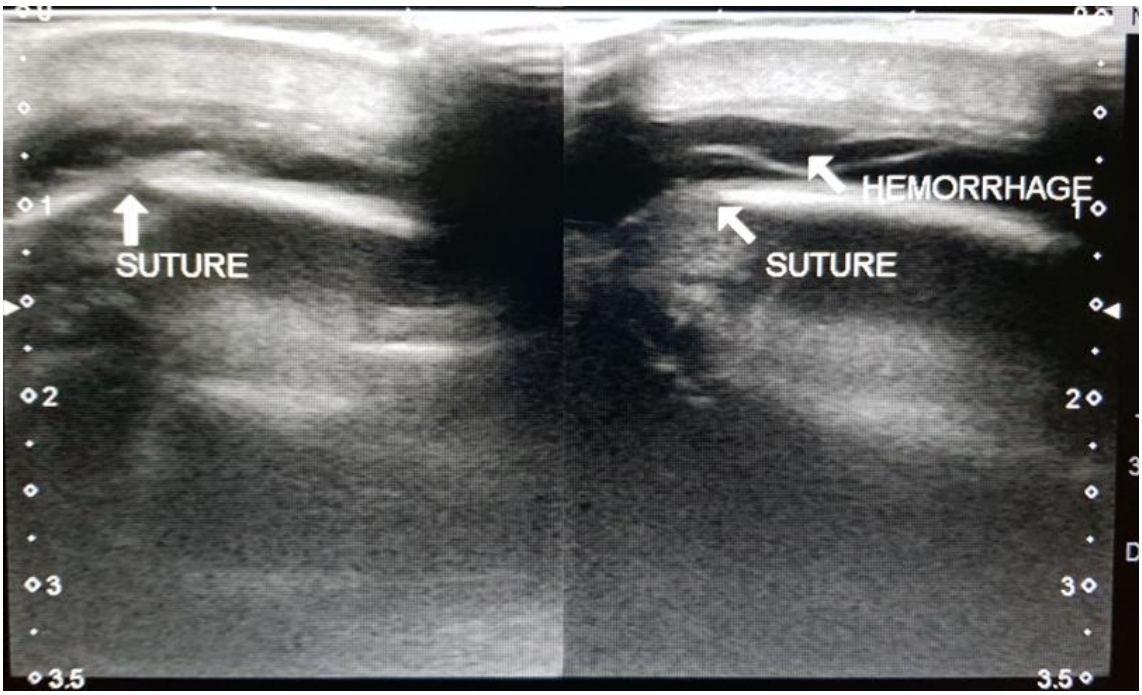


Figure 2: Case 2: Ultrasound image of a skull showing hematoma with septation and echoes likely caput succedaneum also crossing midline sutures.

CASE 3: A two days old infant arrived at our radiology department on 14th September 2019. She was born at gestation age of 38 Weeks as a child of multiparous mother, carrying birth weight of 3.6 Kgs. Prolong and forceful delivery was reported that leaves small bumpy swelling over the bilateral temporal region of scalp of baby for which ultrasound was done.

High frequency linear probe (10 MHz) was used for sonographic assessment of infant. On ultrasound, Minimal hyperechoic fluid collection with septae is noted overlying the occipitotemporal region which is crossing the sutural lines below the skin. Maximum depth measures about 0.6cms. On the basis of its extra periosteal location and midline extensions, we gave firm diagnosis of Caput succedaneum. Rest of the brain is unremarkable for any pathology. Patient was then followed and full recovery was reported after 2 days.

CASE 4: A one day old baby presented to us in our ultrasound suite on 18th may 2019. She was carrying a gestational age of 39 Weeks and born as a child of nulliparous mother. Antenatal scans showed cisterna magna in brain. Though Delivery was very difficult and followed by forceps assisted delivery. So child then develop a bumpy swelling posteriorly, for which she was referred to radiology department.

High frequency linear probe (10 MHz) was used for sonographic assessment of infant. On sonography, there is a hypoechoic collection with echoes was found in occipital region, external to periosteum crossing sutures well definably having a maximum AP diameter of 4.2mm. So we wind up our findings under the diagnosis of caput succedaneum. Rest of the brain shows mild dilatation of ventricles along with cisterna magna communicating with 4th ventricle. Vermis of cerebellum is not properly visualized, so we gave a possibility of Dandy Walker Variant. However, patient was followed for scalp swelling which was found to be resolved after 1-2 days.

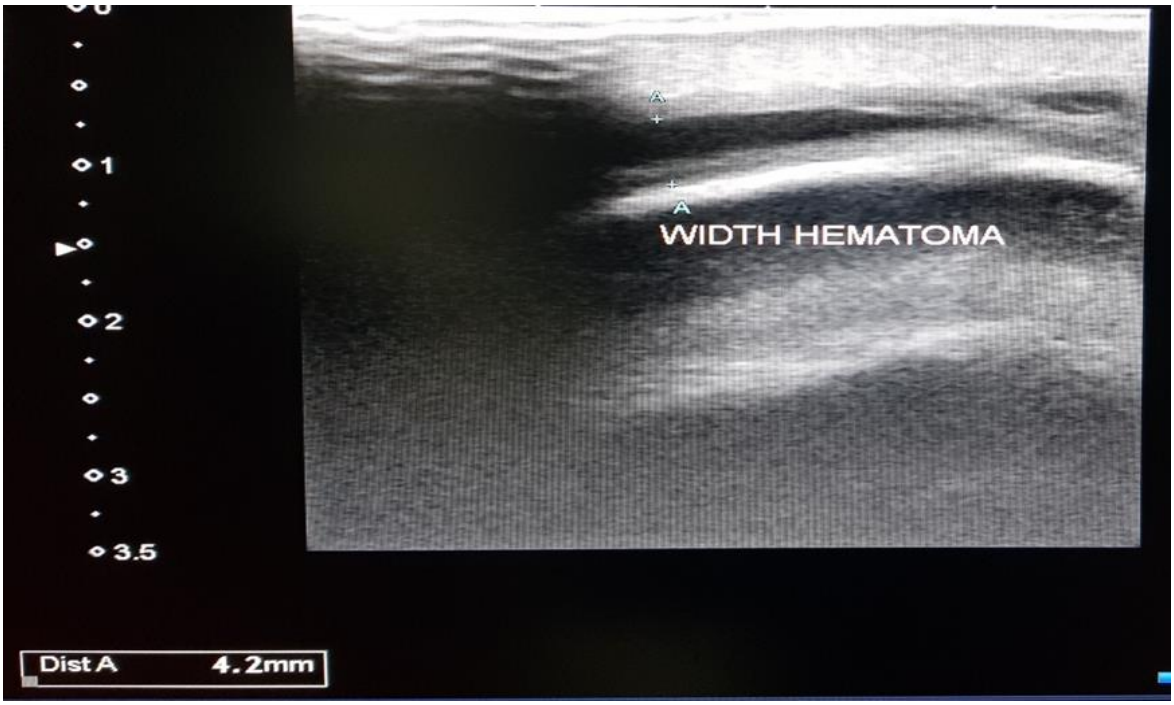


Figure 3: Case 4: Sonographic image showing hematoma carrying width of 4.2mm crossing suture representing Caput Succedaneum.

CASE 5: A one day old infant brought up in our department on 12th February 2019. She was born with gestational age of 40 Weeks of nulliparous mother carrying birth weight of 3.5 Kgs. Due to prolonged second stage of labour, Forceps assisted delivery was done and child was born with bilateral parietal swelling for which ultrasound was performed.

High frequency linear probe (10 MHz) was used for sonographic assessment of infant. On ultrasonography, Minimal echogenic fluid is seen in scalp of bilateral parietal regions crossing the sutures external to galeal aponeurosis. Maximum AP diameter measured about 0.4 cms. Rest of the brain scan was unremarkable. Again findings were more in favor of caput succedaneum which gets resolved in 1-2 weeks. On follow up, there is minimal bruising of scalp which also gets settled after 2 weeks.

Discussion

Recalling the three Cs that leaves boggy scalp mass in neonatal head, one should be aware of caput succedaneum, cephalohematoma and cephalocele that deserves more attention in Neonatal Intensive Care Unit, [3] especially found as result of either vacuum extraction delivery or difficult labour. Other differential that can mimic three Cs include sub-galeal hematoma that need to be excluded for further guarded prognosis because of its life threatening condition.

According to the recent study, Ultrasonography was proved to be one of the most effective modality for evaluating superficial soft tissue masses and as well as for discriminating benign and malignant lesions [4]. Its diagnostic accuracy is reaching up to peak as far as future endeavors are concerned.

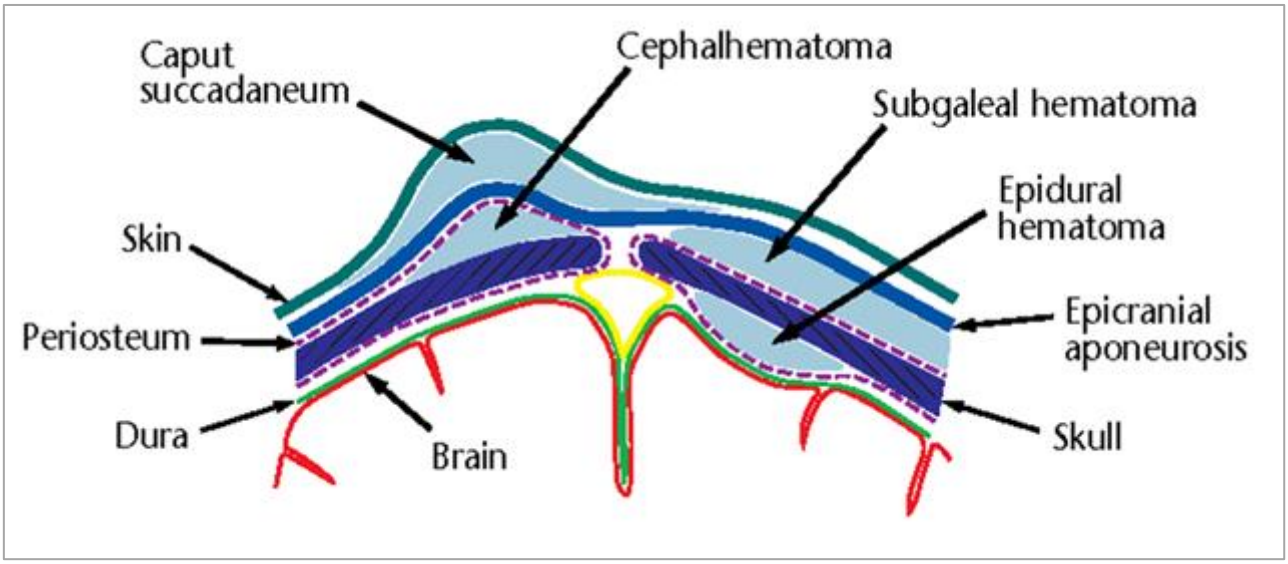
Caput succedaneum is a common sequel of difficult labour, birth trauma or vacuum assisted delivery. It is a localized cranial subcutaneous serohematic collection which lies external to galeal aponeurosis and carries a bucket of good prognosis with spontaneous regression in a few days [1]. Extreme pressure to fetal scalp causes serosanguinous fluid to escape from subcutaneous tissue and accumulate in between scalp and periosteum. It seems to be accompanied with head molding and characteristically crosses sutures, with frequent extension across the midline [5,6].

The foremost symptom of caput succedaneum is a lumpy bumpy puffy, soft spot on the vertex just under the skin of the scalp. The area may appear on one particular side or extend across the middle of the scalp. The bumpy spot typically appears on the part of the head that went first through the birth canal (mostly occipital area).

The main differential diagnosis that mimics our prime diagnosis is cephalohematoma, which needs proper evaluation for further management. Others include encephalocele and sub-galeal hematoma which needs surgical resection and urgent guarded prognosis respectively [7].

Prolong labour and nulliparity which are followed by instrumental deliveries commonly lead to formation of cephalohematoma which carries an incidence of about 10% [8]. Due to the compulsive pressure during labour, tearing of emissary and diploic veins lead to the formation of cephalohematoma [8,9]. On ultrasonography, it appears to be well demarcated anechoic collection which shows dense attachment with the periosteum and delimited by the cranial sutures lines. (Opposed to caput succedaneum which crosses the suture lines) [8,10]. They usually resolve spontaneously within weeks; however one should be aware of rare complications related to skull deformity because of calcifications.

Clinically, a true caput succedaneum often regress after 1 to 2 days with full recovery, but it will be alarming if swelling persists and continue to progress even after 3 to 4 days [11]. So in this kind of scenario, two differentials should be kept in mind, one encephalocele and second sub-galeal hematoma. Iatrogenic encephalocele with an enlarging subcutaneous Cerebrospinal Fluid collection is a rare complication of vacuum extraction delivery [12]. And on ultrasonography, it appears to be purely anechoic or cystic mass that shows herniated brain tissue along with bony defect. Basically its intracranial abnormality which require surgical exploration, on opposition with caput which is extra periosteal [1]. On the contrary sub-galeal hematoma often emerge when emissary veins connecting the dural sinuses and scalp veins get rupture and accumulate in between galeal aponeurosis and the periosteum [8]. Most of them get resolved completely within 2-3 weeks but large hematomas can prove to be lethal and need urgent management [9]. On sonography, a hematoma can be well appreciated as hypo or hyperechoic fluid collection deep to the galeal aponeurosis that is not confined by cranial sutures and can cross midline [13]. On contrary to caput that is also not confined by sutures and can cross midline too but found superficial to galeal aponeurotica [13].



Conclusion

As we already mentioned, there is very scarce data available regarding associations of caput succedaneum with mode of deliveries and its exclusive sonographic findings and differentiation with other mimicking pathologies which are described above. With confined and evolutionary approach, we can easily make a diagnosis of Caput solely on ultrasonography with no need of additional CT or MRI scanning.

Ethics approval and consent to participate

As per international standard or university standard, written ethical approval and written consent has been collected and preserved by the author(s).

Conflicts of Interest

There is no conflict of interest regarding the publication of this paper.

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None

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