SPONTANEOUS INFECTION OF A CEPHALOHEMATOMA ASSOCIATED WITH SEPSIS: A CASE REPORT AND REVISION OF THE LITERATURE

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Objective – This case report presents a child born at 41 weeks gestational age with a cephalohematoma that spontaneously evolved into abscess. Case report – We report the case of a newborn Chinese boy, born at 41 weeks by a spontaneous delivery, presented on the 18th day of life with a soft-tissue parietal-temporomandibular mass that spontaneously evolved into abscess. Surgical incision and cleaning of the abscess cavity were performed and systemic antibiotic therapy was carried out with resolution of the infection. The fluid and blood cultures grew Escherichia coli. Conclusions – Infected cephalohematoma requires all microbiological and biochemical laboratory exams to rule out a systemic associated infection. Double antibiotic therapy should be started immediately.

Key words: Cephalohematoma • Birth trauma • Sepsis • Newborn infants.

Introduction

Cephalohematoma is one of the most common birth injuries and consists of a subperiosteal collection of blood, resulting from the rupture of the superficial veins between the skull and the periosseum. It is found in 2.5% of all live births. It is more commonly seen in instrumented deliveries, occurring in 1% to 2% of spontaneous vaginal deliveries, 6% to 10% of vacuum-assisted deliveries and 4% of forceps-assisted deliveries (1). It generally progresses to complete resolution within 2-8 weeks. The initial size conditions the resorption time. In cases of prolonged resorption, over more than one month, cephalohematomas begin to calcify. The most frequent complications are anemia, hyperbilirubinemia, fibrous organization, calcification and skull fracture. Infection is a rare complication, usually resulting from the incision of cephalohematoma to aspirate blood collection. Spontaneous infection is extremely rare, but can lead to septicaemia and meningitis.

We describe a child of Chinese nationality, born at 41 weeks’ gestational age with a cephalohematoma that spontaneously evolved into abscess.

Case report

An at term Chinese boy was born by a prolonged spontaneous labor, without the assistance of vacuum extraction or forceps and
with no scalp monitoring. The maternal pregnancy was uneventful, without any fever. The rupture of the membranes occurred spontaneously less than 12 hours prior to delivery. At birth the baby presented mild asphyxia. The Apgar scores were 6, 7 and 8 at 1, 5 and 10 minutes respectively. Resuscitation was not necessary. The birth-weight was 4100 g (90th percentile), length was 56 cm (97th percentile) and head circumference was 38.5 cm (97th percentile). The baby was discharged on day of life (DOL) 3 with a large, left parietal mass, diagnosed as cephalohematoma, no fever and no jaundice.

On DOL 18 he was admitted to the emergency department due to enlargement of the mass. Skull radiography at that time (Fig. 1) showed no fractures; the baby was otherwise healthy and was discharged. Three days later he was readmitted to the hospital, because the swelling had increased in size, measuring 19 cm in width and 17 cm in height, and it extended into the left parietal temporo mandibular area of the skull. The skin overlying the mass appeared hyperemic, warm and was surmounted by a pustular lesion.

Laboratory tests demonstrated white blood cells 18,800/mm³ (28% neutrophils, 49% lymphocytes and 19% monocytes), hematocrit 33% and platelets 110,000/mm³. C reactive protein was 9 mg/dl (n.v. less than 0.5 mg/dl). Blood culture, urinalysis and urine culture were done. Cerebrospinal fluid (CSF) samples were obtained for bacterial culture. CSF cells count and chemistry were not suggestive for meningitis. Suspecting an abscess, antibiotic therapy was started: teicoplanin 10 mg/kg 12 hrly for the 1st 3 doses, then 10 mg/kg/die and amikacin 10 mg/kg/once daily dosage. The abscess evolved into spontaneous rupture on the day after the admission and 400 ml of purulent material was drained. Surgical incision and cleaning of the abscess cavity were then performed. The TC scan of the skull ruled out the presence of osteomyelitis. The blood culture and the culture of purulent material grew Escherichia coli. The cultures from other sites were negative. Antibiotics were administered until 15 days iv and then oral amoxicillin 50 mg/kg/die was given for a further 7 days, with complete recovery.

**Discussion**

Our patient was suffering from a spontaneous Escherichia coli infection of a parietal cephalohematoma, that had never been incised for blood aspiration. This is a rare and dangerous event, following prolonged spontaneous labour, that can happen even without the use of surgical instruments. Although rare, cases of infected cephalohematomas are described in the literature, with possible complications such as meningitis or osteomyelitis. Recently, Van Helleputte (2) reported a case of infected cephalohematoma with secondary osteomyelitis due to a wound caused by foetal monitoring, that required drainage and long term antibiotic therapy. In 1993, Blom and
Vreede (3) reviewed 27 cases occurring between 1818 and 1993; the first 2 cases (in 1818 and 1907) were complicated by incision of the cephalohematoma, the others were consequent to well known risk factors such as aspiration of blood, scalp infection, forceps delivery and sepsis. Cases reported after 1975 were related to the use of electrode foetal monitoring.

In non-instrumental, prolonged labours cephalohematoma is associated with cephalopelvic disproportion or with a deviant position of the head (occipital posterior, occipital transverse). These risk factors contribute to the impact of the head against the pelvic bones during the labour. The continuous trauma of the skull, compressed against the mother’s bone, generates the lesion of the nutritive vessels of the periosteum, with bleeding into the subperiosteal layer of the skull. The bleeding lifts the periosteum away from the skull. In the case of forced delivery or vacuum extraction, subperiosteal hematoma usually results in two soft masses at the vertex of the head, separated by a deep sulcus along the sagittal suture.

Cephalohematoma generally does not cross cranial sutures. Only three cases have been described in the literature where the lesion crosses the sagittal suture (4-6). They have to be differentiated as caput succedaneum and subgaleal hematoma. Caput succedaneum is defined as a collection of serosanguineous fluid between the scalp and the epicraneal aponeurosis. It generally crosses the cranial sutures. Generally it is evident immediately after delivery, on the vertex of the head. It has a soft, boggy feel with irregular margins, and it may have haemorrhagic manifestations (petecchia, purpura, ecchymosis). A subgaleal hematoma is a collection of blood between the epicraneal aponeurosis and the periosteum. It generally crosses the sutures, such as the caput succedaneum. It is potentially life threatening (7). The most frequent complications of cephalohematoma are shown in Box 1.

**Box 1 Complications of cephalohematoma**

- Skull fractures: 5% of unilateral and 18% of bilateral cephalohematoma. They are not correlated with the dimension of the cephalohematoma and generally they require no treatment.
- Calcification: this is a rare instance and may cause cranial deformity. It is caused by the incomplete resorption of the hematoma, with the formation of fibrous tissue and then (about four weeks later) with the calcification of the mass. The long-term natural history is unknown (8).
- Anemia: this is caused by the collection of blood in the mass. It is generally present in more large lesions (9).
- Hyperbilirubinemia: this occurs when the red blood cells in the cephalohematoma are destroyed (10).
- Infection: the predisposing factors to infection are similar to those associated with the development of a scalp infection in a monitored infant. These include the presence of ruptured membranes, vacuum extraction, high-risk indications for monitoring and the presence of amnionitis.

It has been reported that the incidence of a scalp abscess at the site of electrode application is highly increased when a scalp electrode has been used. It may reach 4.5 per cent of newborn infants following continuous, direct fetal heart rate monitoring during labour (11-12). The most frequent bacteria is *Escherichia coli*, as in our patient, but other bacteria, such as *Staphilococcus aureus, Staphylococcus epidermidis, Pseudomonas, Proteus,*
Bacteroides, Salmonella, Gardenella, group B Streptococcus and Escherichia hermanii may be involved (13). These data indicate that a scalp abscess complicating intrapartum foetal monitoring may be relevant as a nosocomial infection, and infants monitored should be closely observed in order to prevent more serious infectious complications.

If an infected cephalohematoma is suspected, the diagnostic approach should be directed both locally and systemically. If possible, an aspirate should be considered. The systematic approach includes performing blood and CSF culture. Imaging of the skull should be obtained to discriminate the scalp abscess from osteomyelitis, epidural abscess or subdural empiema. Head ultrasounds may be used as the first line diagnosis. Considering the most frequent bacteria responsible for the infection, antibiotics against Escherichia coli and Staphylococcus aureus should be administered. Moreover, meningitis could be a complication of infected cephalohematoma. Therefore combined treatment with ampicillin and an aminoglycoside should be started immediately, upon suspicion of an infection. In some clinical settings the proportion of Escherichia coli resistant to ampicillin may be high, especially when preterm infants catch this infection. In these cases, gentamicin may be a useful option as a second antibiotic. When meningitis has been excluded, ampicillin, aminoglycoside or cephalosporins (i.e. Cefotaxime) may be started as monotherapy and the therapy has to be continued for 10-14 days, but in the presence of meningitis it should be continued for at least 21 days. When Staphylococcus aureus is the bacteria responsible for the infection, Vancomycin therapy should be started and continued for four weeks or more. Once diagnosed, if there is no spontaneous drainage, the infected cephalohematoma should be incised and drained and, if underlying osteomyelitis or epidural abscess are found, surgical debridement should be performed (14-17).

In our case the cephalohematoma was evident on initial presentation, but the infection remained subclinical until late in the course, no risk factors were present, the labour was without complications, and no invasive manoeuvres were performed. It was not possible to establish if the bacteraemia was subsequent to or causative of the infection of the cephalohematoma.

**Conclusions**

A cephalohematoma associated with persistent fever, erythema of the overlying cutis, tenderness and fluctuation of the mass may be suggestive of an infected lesion. In this case all microbiological and biochemical laboratory tests should be performed to exclude a systemic associated infection. Double antibiotic therapy should be started immediately, considering the frequent serious infectious complications of infected cephalohematoma in infants.

**Conflict of interest:** The authors declare that they have no conflict of interest.

**References**


