

Use of Color Doppler Ultrasound for the Diagnosis of Subarachnoid Hemorrhage in Asymptomatic Full-Term Neonate: A Case Report

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Received December 17th, 2011; revised January 29th, 2012; accepted February 16th, 2012

ABSTRACT

Cerebral hemorrhages are fairly common in full-term neonates with no history of traumatic birth, mostly limited, and with benign evolution. We report a case of a full-term neonate from vaginal birth with caput succedaneum in the right parietal area. The neonate underwent cranial ultrasonography and color Doppler which showed extra-axial blood effusion. Color Doppler showed vessels crossing the collection area, which allowed the diagnosis of subarachnoid hematoma.

Keywords: Cerebral Hemorrhage; Subarachnoid Hematoma; Cranial Ultrasound; Color Doppler

1. Introduction

Some risk factors to intracranial hemorrhage in full-term neonates have been identified, such as: fetal macrosomia, prolonged labor, use of obstetrical forceps or vacuum extraction [1]. These neonates usually have apnea, bradycardia or seizures after subdural, subarachnoid or intraparenchymal hemorrhages. On the other hand, intracranial hemorrhages in asymptomatic neonates may be common after vaginal birth, though reports on the use of color Doppler ultrasound are rare [1-3]. The present case report describes the use of ultrasound and the importance of color Doppler for the diagnosis of subarachnoid hemorrhage in a full-term neonate.

2. Case Report

F. A. C., 25 years old, was admitted to the maternity ward Frei Damião, João Pessoa-Brazil, in labor, on 09/26/2011. It was a prolonged labor (14 hours) with vaginal birth. No clinical signs of fetal distress were reported during labor. The neonate had 1 minute and 5 minutes Apgar scores of 7 and 10, respectively. Physical examination showed caput succedaneum in the posterior parietal area. In his sixth day of life, the neonate underwent cranial ultrasound (US) with color Doppler which showed the following: subgaleal hematoma in the posterior parietal area;

no presence of malformations or of parenchymal or intraventricular hemorrhages; blood effusion was seen in the intracranial right parietal area, adjacent to the subgaleal hematoma, measuring $6.0 \times 1.5 \times 4.9$ cm (**Figures 1 and 2**). Color Doppler showed blood vessels crossing the hematoma area, confirming the subarachnoid hemorrhage (**Figure 3**). The neonate showed good health conditions and was neurologically normal, under exclusive breastfeeding. Watchful waiting and monitoring by means of US were recommended, and showed gradual reduction of the hematoma. After 20 days of life, the neonate underwent a cranial computed tomography scanning which showed the complete resolution of the hemorrhage. During all this time, the neonate remained asymptomatic.

3. Discussion

Intracranial hemorrhage in neonates is always a concerning event to physicians and family, mainly because of the fear of future neurological sequelae. Recent studies have showed conflicting results regarding the incidence of intracranial hemorrhages (subdural, subarachnoid, parenchymal and intraventricular) in asymptomatic neonates and with no history of traumatic birth [1,4]. In the study of Looney *et al.* a 26% rate of intracranial hemorrhage was found in 97 normal neonates with no traumatic birth [1]. Another study, however, found only 1 case (0.2%) of intracranial hemorrhage in 493 asymptomatic term neonates were examined by ultrasound [4].

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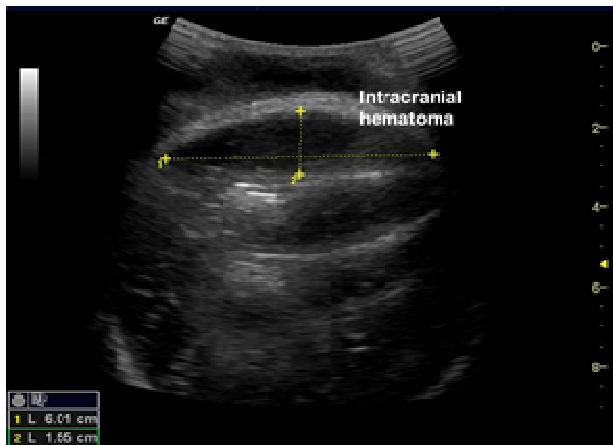


Figure 1. Image of ultrasound using 3, 5 - 7 MHz convex probe. The intracranial hematoma is fully displayed, measuring $6.0 \times 1.5 \times 4.9$ cm.

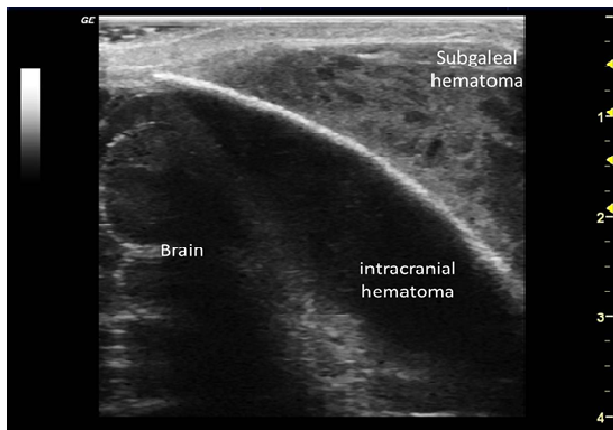


Figure 2. Image of ultrasound using 7 - 12 MHz linear probe. Identifies clearly the subgaleal and intracranial hematomas.

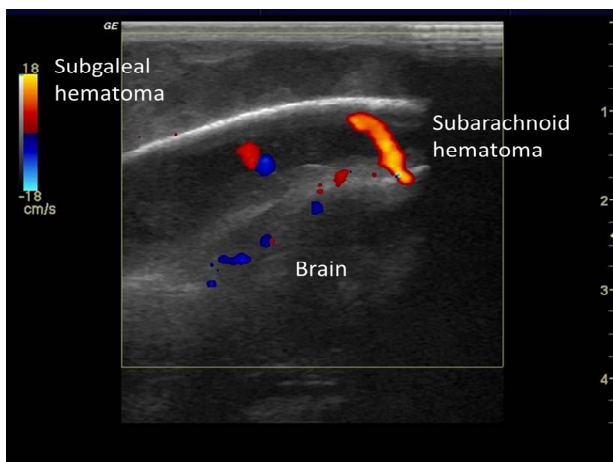


Figure 3. Image of ultrasound using 7 - 12 MHz linear probe. Color Doppler showed blood vessels crossing the hematoma area (cortical vein sign), confirming the hemorrhage in subarachnoid space.

We report a case of subarachnoid hemorrhage in an asymptomatic neonate presenting caput succedaneum after prolonged labor. US helped to identify an intracranial bleeding in the area corresponding to the subgaleal hematoma, which was gradually reduced until its complete resolution in the third week. The color Doppler was cardinal for the differential diagnosis between subdural and subarachnoid bleeding by showing the arachnoid vessels that crossed the internal area of the hematoma. Chen *et al.* reported for the first time the possibility of using color Doppler to differentiate between collections of subdural and subarachnoid space [2]. The identification of vessels crossing the liquid space characterizes subarachnoid hemorrhage, while in subdural hemorrhage the vessels found would be pressed against brain [2,5]. This has been described on computed tomography and magnetic resonance imaging (MRI) under the name of “cortical vein sign” [6,7]. Color Doppler US depiction of the “cortical vein sign” appears to be as effective as MRI in differentiating enlargement of the subarachnoid fluid space from subdural effusion [2,5].

The advantages of US are that it is a non-invasive and easy-to-perform technique that does not require sedation like other imaging techniques (e.g., CT, MRI) [5]. Color Doppler is complementary to cranial grayscale US and it is a reliable technique for the differential diagnosis of intracranial extraaxial fluid collections.

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