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newborn care

CLINICAL CASE STUDY

# aEEG MONITORING IN A NEWBORN WITH EXTREMELY LOW BIRTH WEIGHT

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## CHARACTERISTICS OF PATIENT

Female, the offspring of a 44-year old alcoholic mother, diagnosed with liver failure and hepatorenal syndrome. Delivered vaginally, with no respiratory effort requiring advanced neonatal resuscitation maneuvers, APGAR 4 - 6, Weight 820 grams, Length: 35 cm, Head circumference: 25 cm, Ballard score gave a gestational age of 28 weeks.

## INITIAL ASSESSMENT AND CLINICAL DIAGNOSIS

She was admitted into the NICU with preterm infant diagnosis with extremely low birth weight (ELBW).

A dose of surfactant was administered at 200mg/k/dose and required the support of mechanical ventilation. The lab results showed leukopenia, which was suggestive of early sepsis, the reason why a double antimicrobial course with Ampicillin and Amikacin was initiated. At 24h of life, she presented hyperbilirubinemia requiring the application of intensive phototherapy.

Respiratory evolution was favorable and at 2 days of life the ventilation parameters were minimal. Mechanical ventilation was therefore withdrawn and respiratory assistance with nasal CPAP was continued.

At 72 hours neurological assessment was requested as a screening in the search for intraventricular haemorrhage in the premature infant.

A transfontanellar ultrasound was performed, with a pattern of convolutions of greater gestational age being found, with the presence of primary, secondary and tertiary convolutions and hypoplasia of the corpus callosum, with no evidence of intraventricular hemorrhage *(Figure 1 and 2)*.

aEEG monitoring was performed to corroborate brain ontogeny in the patient and a continuous background pattern was observed with established sleep-wake cycle, without epileptic crises.

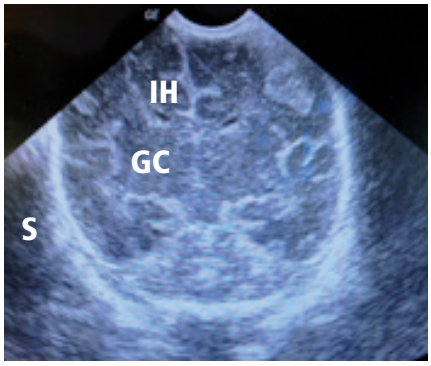


**Figure 1. Transfontanellar ultrasound with presence of inter-hemispheric convolution (IH), Sylvius (S), cingulate gyrus (CG), cerebellum (Cer) without alterations.**

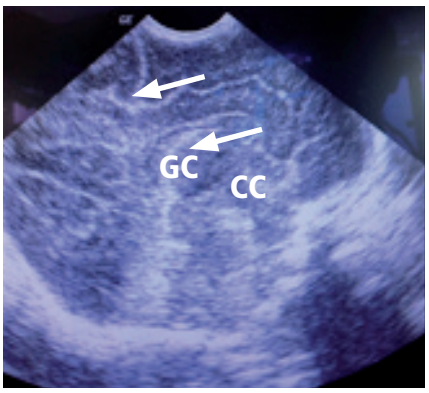


**Figure 2. Hypoplasia of the corpus callosum (CC) in its posterior third, cingulate gyrus (CG) and tertiary convolutions present. No intraventricular hemorrhage was found.**

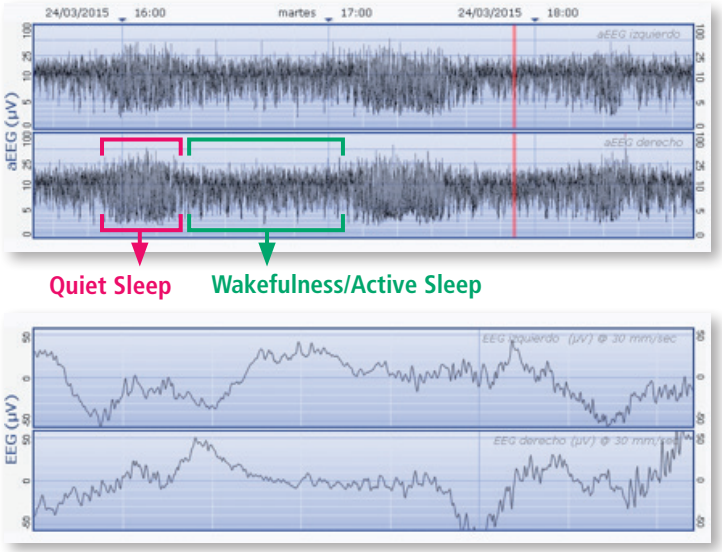


**Figure 3. Continuous pattern with established sleep-wake cycle without epileptic crises (alternating tracing).**

This finding made us suspect higher late-preterm gestational age, which is why the prematurity diagnosis was revised to intrauterine growth restriction (IUGR). The head circumference, length and weight were all below the 3rd percentile for a gestational age of 36 weeks, and so symmetrical IUGR was concluded.

Added to the clinical assessment, at 3 days of life she was free of oxygen dependency *(Figure 4),* with distinctive facies *(Figure 5).*

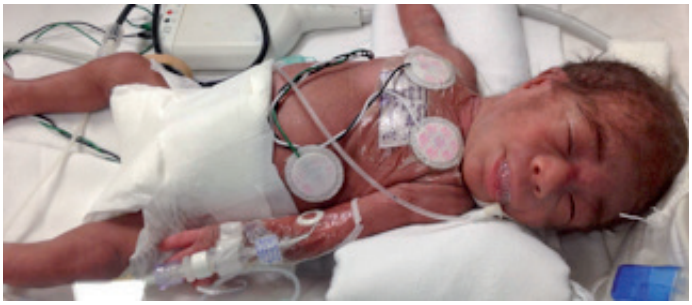

**Figure 4. Female weighing 820g without oxygen dependency at 3 days of life.**

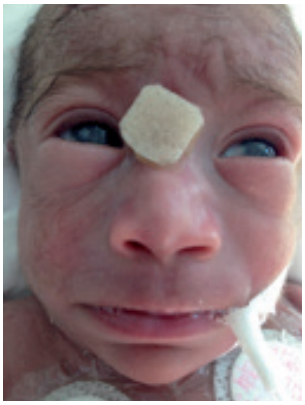

**Figure 5. Facies with short eyelid folds, wide nasal bridge, epicanthal folds, short nose, smooth philtrum, thin upper lip, micrognathia.**

**REFERENCES**

1. Hellström-Westas L, de Vries L, Rosén I. Atlas of Amplitude Integrated EEGs in the New Born. Second Edition 2008, Informa UK Ltd; pp 17 – 30.
2. Libenson Mark H. Practical Approach to Electroencephalography. First Edition 2010. Saunders Elsevier; pp 301 – 327.
3. Martín Fernández-Mayoralas D, Fernández-Jaén A. Fetopatía alcohólica: puesta al día. (Updated Alcoholic Foetopathy) Rev Neurol (Neurol. Review) 2011; 52 (Suppl. 1): S53-7.

## RESULT

In analysing the antecedents of an alcoholic mother, together with the clinical picture with symmetrical IUGR and distinctive facies (described above) as well as the findings of structural alterations in the central nervous system such as hypoplasia of the corpus callosum and head circumference below the 10th percentile, the diagnosis of Fetal Alcohol Syndrome was established.

## DISCUSSION

In the newborn with VLBW, screening for intraventricular hemorrhage is a very important assessment as it allows for timely and appropriate care of one of the target organs of prematurity, the brain. In this case, when performing a routine ultrasound screening, we were struck by having found markers suggestive of higher gestational age, such as the presence of numerous brain convolutions. As part of tackling "brain ontogeny" we conducted electroencephalographic monitoring, where we found a continuous background pattern with established sleep-wake cycle.

This electrical pattern is the equivalent of the "alternating tracing" classically described in newborns from 37 weeks of gestation onwards. Hellström-Westas and Libenson mention that the findings in physical exploration can provide false results as to gestational age, but the electroencephalographic pattern will always be highly reliable in determining real age. The finding of higher gestational age, with lower somatometry than expected, turned the diagnosis around, from newborn with VLBW to symmetrical IUGR. The principal cause of symmetrical IUGR is genetic syndromes.

This case was in keeping with the antecedent of an alcoholic mother, facial anomalies such as smooth philtrum and thin upper lip, somatometry under the 10$^{th}$ percentile and hypoplasia of the corpus callosum as an anomaly of the central nervous system. This led to the diagnosis of Fetal Alcoholic Syndrome (FAS).

The worldwide prevalence of disorders on the alcoholic spectrum could be approximately 1%. It is important to be aware of the characteristics of such infants owing to the fact that cognitive and conduct-related alterations encompass a broad group of disorders associated with this syndrome. The social setting and the alterations inherent to the disease place such children in an adverse psychosocial environment for achieving their full development.





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