Early Human Development 85 (2009) 197–200

Contents lists available at ScienceDirect

Early Human Development

journal homepage: www.elsevier.com/locate/earlhumdev

Visual, motor and perceptual abilities at school age in children with isolated mild antenatal ventricular dilatation

Francesca Colitto [a], Flaviana Bianco [a], Rita Luciano [b], Valeria Donvito [a], Giovanni Baranello [a], Claudia Brogna [a], Lucia Masini [c], Stefano Ciotti [c], Eugenio Mercuri [a,*]

[a] Pediatric Neurology Unit, Catholic University, Rome, Italy
[b] Neonatology, Catholic University, Rome, Italy
[c] Department of Obstetrics, Catholic University, Rome, Italy

ARTICLE INFO

Article history:
Received 31 July 2008
Received in revised form 7 October 2008
Accepted 8 October 2008

Keywords:
Ventriculomegaly
Outcome
Prenatal diagnosis
Follow-up
Visual
Perceptual abilities

ABSTRACT

Background: The detection of prenatal ventriculomegaly raises anxiety about possible neurological sequelae. A few studies have investigated possible neurodevelopmental sequelae in the first years after birth but no systematic assessment has been performed at school age.
Aims: The aim of this study was to assess minor neurological signs, perceptual and visual function in a cohort of children with isolated mild antenatal ventricular dilatation examined at school age.
Study design: Seventeen children with evidence of mild antenatal ventriculomegaly in the second and third trimester of pregnancy were included in the study.
Outcome measures: Children were assessed at school age (range 5 years 3 months–11 years, 11 months) using a structured neurological examination for minor neurological signs and age specific tests assessing perceptual motor abilities (Developmental Test of Visual-Motor Integration; Movement Assessment Battery for Children).
Results: Only one of the 17 children had abnormal results. The remaining 16 had normal results on all the tests, irrespective of the magnitude and the symmetry of the dilatation or of its evolution on neonatal scan.
Conclusions: Our results suggest that children who had mild isolated prenatal ventricular dilatation are unlikely to develop even minor motor or perceptual difficulties at school age.
© 2008 Published by Elsevier Ireland Ltd.

1. Introduction

Estimation of ventricular size has become an important part of the assessment of brain development on prenatal ultrasound scans. The detection of prenatal ventriculomegaly raises anxiety about possible neurological sequelae and several studies have tried to identify possible prognostic factors of normal and abnormal outcome. Not surprisingly, while a poor prognosis is often associated with the presence of associated central nervous system and multisystem abnormalities, a normal outcome has been reported in 64 to 100% of the infants with antenatal isolated mild ventriculomegaly [1–13]. In most of these studies outcome was mainly defined as presence or absence of cerebral palsy and/or of school difficulties with the information often obtained by telephone call or interviews to the families or family doctors [1–10]. A few other studies have used developmental assessments in the first years after birth [11–13], but no systematic assessment has been performed at school age. This may be important as previous studies in prematurely born children or other children at risk of neurological sequelae have reported that normal findings on neurological examination and developmental scales at 2 years do not exclude the possibility of minor neurological signs or perceptual motor difficulties at school age [14,15].

The aim of this study was to assess neurological signs, perceptual motor abilities and visual function at school age in a cohort of children with isolated mild antenatal ventricular dilatation.

2. Subjects and methods

All patients born at or referred to the Catholic University of Rome between December 1993 and January 2001 with ultrasound (US) prenatal diagnosis of mild isolated ventricular dilatation were selected and enrolled in the present study. Infants in whom neonatal ultrasound showed signs of associated lesions or evidence of intrauterine infections, congenital malformations, chromosomal abnormalities and metabolic disorders were excluded.

The study was approved by the Research Ethical Committee of the Catholic University.

* Corresponding author. Neuropsichiatria Infantile, Policlinico Gemelli, Largo Gemelli, 00168 Roma, Italy. Tel.: +39 06 30155340; fax: +39 06 30154363.
E-mail address: mercuri@rm.unicatt.it (E. Mercuri).

0378-3782/$ – see front matter © 2008 Published by Elsevier Ireland Ltd.
doi:10.1016/j.earlhumdev.2008.10.002

2.1. Antenatal ultrasound

Ultrasound examinations were always performed transabdominally using a multiplanar approach with 3.5–5 MHz probes. Routine screening prenatal ultrasonography includes, in all cases and in all gestational ages, a measurement of foetal cerebral ventricular size, at the level of the atrium of lateral ventricles (AW) [16]. Ventriculomegaly (VM) is diagnosed when AW is ≥10 mm in the II and III trimester of pregnancy: "mild" VM if AW is between 10 and 15 mm; "severe" VM if AW is >15 mm. All examination were performed and analysed by an expert sonographer (LM).

2.2. Neonatal ultrasound

Cerebral US scans were always performed within 6 h after birth and repeated at least once at the end of the first week and 3 months later. Neonatal US were always performed by the same investigator (RL) using a Hewlett-Packard Image Point equipped with a multifrequency beam (5–7.5 MHz). Lateral ventricles were measured on the basis of ventricular index and ventricular height [17].

Ventriculomegaly was defined as mild, when the ventricular system became distended, but not to the extent of causing an increase in the width of the bodies of the lateral ventricles to 5 mm+2 SD over expected values.

2.3. Outcome

At school age the children's neurological status, motor competence, visual and cognitive ability were assessed by two examiners (FC, VD) who were not aware of the prenatal and neonatal ultrasound findings.

2.3.1. Neurological examination

A simplified version of the Touwen's Examination of the Child with Minor Neurological Dysfunction [18,19] was administered. The examination evaluates performance in nine areas: sensorimotor apparatus, posture, balance of the trunk, coordination of the extremities, fine manipulative ability, (dys)kinesia, gross motor function, quality of motility, and associated movements. The examination was classified as normal if the child had normal findings in all the 9 areas. In order to have a profile of possible abnormal neurological findings, abnormalities, when present were annotated for each individual area rather than giving a global classification of abnormal to the whole examination.

2.3.2. Movement Assessment Battery for Children

The Movement Assessment Battery for Children (Mov ABC) [20] was used to assess the children's perceptual motor abilities on a range of functional tasks. The three manual dexterity items, two ball skill items and three balance items were scored according to the manual. The total scores were expressed as percentiles based on age specific-normative data. Scores falling at or below the 5th percentile were considered to be indicative of a motor problem.

2.3.3. Developmental Test of Visual-Motor Integration (VMI)

This is a paper and pencil task in which a child copies a series of geometric shapes of increasing difficulty [21].The standard score reflects the accuracy of the copies and can range from 0 to 19, the lower the score, the less competent the performance. According to the distribution of scores obtained by the reference sample, standard scores of 6 (15th centile) were considered as borderline and 5 or lower (5th centile) as abnormal performance on this test.

2.3.4. Acuity and crowding ratio

The Cambridge Crowding Cards were used to obtain a measure of binocular crowding acuity. In this test letters are presented, both alone on the cards [single optotype] and surrounded by four other letters, which are half a letter width away (crowded optotype). Each child was tested on the single before the crowded optotype. When crowded optotypes were shown only the central letter had to be identified. The child was tested at a distance of 3 m and asked to name or to match the letter shown. If the response was correct the tester decreased the letter size until the child was unable to recognise it. As the aim of this study was not to identify refractive errors but to evaluate possible cerebral visual impairment by measure of crowding, children with known refractive errors were tested using their prescription glasses.

A maximum of 3 letters of each size was shown. The third letter was shown only if in the previous two trials using the same size one letter had been correctly identified and one not. The last letter size where the criteria of 2 out of 3 were reached was taken as the measure of acuity.

The results of the single and crowded optotype were compared and their ratio calculated by dividing acuity for crowded by acuity for single optotypes. According to our normative data [22,23], and in agreement with previous studies [24,25] the crowding effect was considered abnormal when >2.

2.3.5. Stereopsis

This was tested using the TNO test a test specifically designed for screening for defects of binocular vision [26]. The test consists of 7 3-D images (plates) of increasing difficulty. While the first 4 plates provide a quick and easy way to establish whether stereopsis is present at all, plates V to VII enable a quantitative assessment of stereoscopic sensitivity. According to age specific normative data, stereopsis was classified as absent if the children did not pass any of the plates, weak if only the first 5 (240 s/arc) were passed and normal when at least plate VI was completed (60 s/arc).

2.3.6. Visual fields

These were tested by gradually moving a small white ball (a Stycar ball of 40 mm in diameter) from 90° laterally towards the child's midline. The child was asked to indicate the ball soon after seeing it. Eyes and head movements of the child were also observed to estimate the border of the visual fields and their symmetry.

2.3.7. Cognitive function

In order to exclude cognitive impairment that may interfere with the performances on the other tests, we also used the Raven Standard Progressive Matrices [27], a simple and quick measure of components of general nonverbal intelligence that does not require reading or linguistic ability that has good correlation compared with conventional tests of intelligence, such as the Wechsler and Stanford Binet Scales. This test consists of a series of picture diagrams that evaluate pattern recognition ability.

3. Results

Seventeen of the 20 consecutive patients who fulfilled the inclusion criteria agreed to participate to our study. The remaining 3 refused because they lived quite far away from the hospital but on phone interview there were no school difficulties or any overt concern about their development. All 17 were born at term with a mean gestational age (GA) of 39.5 weeks (Table 1). All had a birth weight (BW) >3° centile for GA according to the Italian neonatal growing curves (mean BW 2733+704) [28].

3.1. Antenatal ultrasound

Four of the 17 patients had evidence of ventricular dilatation on the US routinely performed at 22 weeks. The age of diagnosis of fetal cerebral ventriculomegaly was made between 18 and 34 weeks. The ventricular dilatation was asymmetrical in 2 of the 17. In none of the children there were other signs of CNS involvement (Table 1).

Download English Version:

https://daneshyari.com/en/article/3917901

Download Persian Version:

https://daneshyari.com/article/3917901

Daneshyari.com