Everyday memory in children with hypoxic ischaemic encephalopathy (HIE) who underwent hypothermia treatment (HT)

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CONCLUSION

Initial findings indicate that children with HIE treated with HT, have IQ scores within the normal range; however, a higher percentage scored below average in the visual spatial tasks. Our findings suggest a specific pattern of difficulties in everyday memory, in particular impairment in episodic memory (memory for events)[4]. Impairment in everyday memory can have a great impact on the child's day-to-day activities and school experience and in the child's ability to retain information learned at school. This study emphasises the importance of follow up for children with neonatal HIE without a history of severe neuromotor impairment beyond toddler age, in particular the need to identify those children that experience subtle problems, which may have subsequent impact on the child's self-confidence and self esteem.

BACKGROUND

Peripartum asphyxia with subsequent hypoxic ischaemic encephalopathy (HIE) carries a high risk for hypoxic-ischaemic brain injury. Despite hypothermia treatment (HT), which is now standard care for newborns with moderate-severe HIE, there remains a considerable risk for neurodevelopmental impairment.

There is evidence suggesting that children with HIE who do not develop severe neuromotor impairment (Cerebral Palsy, CP) experience difficulties in areas important for learning, such as general cognitive abilities and impairment in memory[(2,3,4)]. Children with a history of HIE without severe neuromotor impairment are understudied, particularly at school age. Moreover there is a lack of studies comparing children with HIE with typically developing children without a history of HIE.

AIMS

- To report general cognitive and memory abilities in children with HIE who underwent HT and survived without severe neuromotor impairment
- To compare the children with HIE with a group of children without a history of HIE.

METHODS

Participants

Children with a history of neonatal HIE and HT (N=33)

- Recruited from a clinical cohort of term born children admitted for HT to Princess Anne Hospital, Southampton, UK, a tertiary neonatal centre between 2009-2013
- No severe neuromotor impairments (normal neurology or CP with GMFCS <2)
- 5-7 years old at time of assessments (mean 5.04; SD 0.42)

Typically developing children without history of neonatal HIE (N=12)

- Recruited from the same school as children with HIE (mean 5.8; SD0.62); matched for age and sex

Measures

- Rivermead Behavioural Memory test II (RBMT-C) to assess everyday memory
- Wechsler Preschool and Primary Scale (WPPSI-IV) to assess general cognitive abilities (Full Scale IQ, FSIQ), Verbal Comprehension (VCI) and Visual Spatial abilities (VSI).

RESULTS

Table1: Mean and SD scores FSIQ, VCI, VSI and RBMT-C

	HIE	Control
FSIQ	93.9 (13.4)	101.1 (13.6)
VCI	94.5 (11.9)	96.4 (11.1)
VSI	87.1 (15.3)	101.6 (17.0)
RBMT-C^	14.2 (2.7)	15.0 (4.4)

^ Norms mean (SD) 17.5 (1.55); Standard profile score: Borderline 12-15, Impaired 0-11

Figure 1: FSIQ Composite score qualitative descriptions

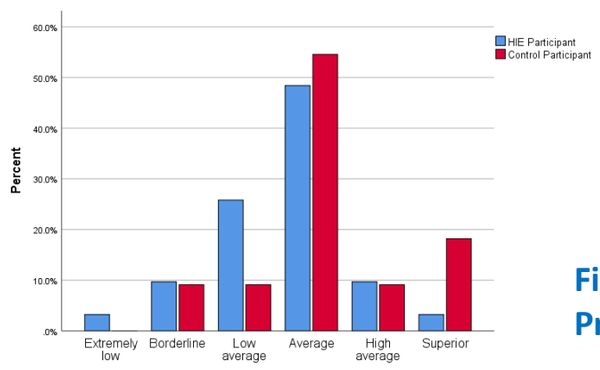

Figure 2: RBMT-C Standardised Profile Score

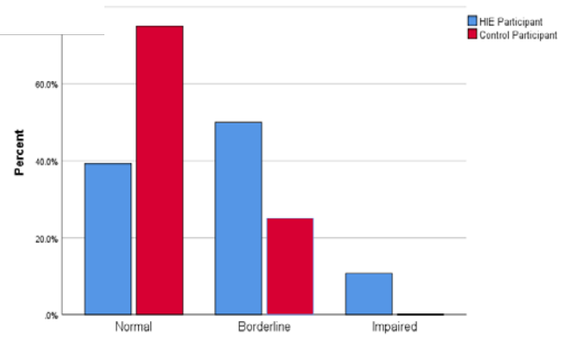

Table2: Percentages of children in the borderline and impaired scores In each subscales of the RBMT-C

Types of memory	RMBT-C Subtests	HIE	Control
Episodic	Story recall – immediate*	67.6% (=19)	8.3% (=1)
Episodic	Story recall – delayed^	75% (=21)	41.7% (=5)
Episodic/semantic	Pictures recognition	21.5% (=6)	18.2% (=2)
Episodic/semantic	Faces	7.1% (=4)	9.1% (=1)
Episodic	Remembering a short route - immediate	3.6% (=1)	0
Episodic	Remembering a short route – delayed	3.6% (=1)	8.6% (=1)
Episodic/Prospective	Remembering a hidden objects	7.1% (=2)	0
Episodic/Prospective	Remembering to deliver a message	0	0
Semantic	Orientation questions	25% (=7)	0

*** p=0.001; ^p= 0.031**

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