Comparison of neurodevelopmental outcomes in children with GBS Sepsis and Meningitis

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To the Editor,

We read with interest the Clin Infect Dis supplement by Professor Lawn et al[1] describing findings from a series of studies assessing neurodevelopmental outcomes following invasive Group B Streptococcal (GBS) disease in infancy. These important studies from South Africa, Mozambique, India, The Netherlands, and Denmark being to fill an important evidence gap regarding the long-term outcomes of GBS sepsis and meningitis in infancy, including data from low-and middle-income countries [1].

We have previously shown that GBS is the leading cause of sepsis and meningitis in infants less than three months of age in the United Kingdom (UK) [2], yet the burden of neurodevelopmental sequelae following GBS disease, particularly sepsis, is largely unquantified. Thus, we undertook an observational study to describe the neurodevelopmental outcomes of survivors of young infant (<3 months of age) GBS sepsis or of bacterial meningitis (any pathogen) in the United Kingdom.

Participants were recruited via two sources: 1) Parents/carers of children that participated in a meningitis surveillance study conducted in 2010-13 (n=102) were contacted and invited to participate [3]; 2) Infants less than 90 days of age with GBS cultured from a normally sterile site born between January 2011 – May 2014 were identified from the UK Health Security Agency national surveillance database used by laboratories to report clinically significant infections electronically [4].

Family General Practitioner (GP) contact details were obtained and a letter was sent asking for their permission to approach the family. Unless the GP indicated otherwise, families were contacted and underwent an informed consent process. Children were followed-up between 2 and 5 years of age. Neurodevelopmental impairment (NDI) was defined by a score of more than 2 standard deviations below the mean in the third edition of the Bayley Scales of Infant Development. [5], Presence of hearing and visual impairment, cerebral palsy, neurological diagnoses, and social and communication difficulties, were collected using the modified health status questionnaire. [6]

763 families were approached, and 119 infants recruited (15.6%). 40 children (33.6%) had a deficit in one or more of the areas assessed (Table 1). 37.3% (19/51) of children with meningitis and 30.9% (21/68) with GBS sepsis had NDI (p=0.56). The difference in the proportions of children with meningitis and those with GBS sepsis experiencing subsequent problems was significant for the outcomes of cerebral palsy (11.8% vs 0%) and hydrocephalus (requiring a VP shunt) (11.8% vs 0%), which were more frequent in children with meningitis (p=0.005). 60.0% of premature infants had NDI versus 28.3% of term infants (p=0.009).

Our results are consistent with the data reported in the CID supplement, where 27.9%, 48.6% and 20.5% of children with GBS sepsis from South Africa[7], India[8] & Mozambique[9] respectively had some degree of NDI. Our study provides important information regarding the proportion of children with GBS sepsis experiencing subsequent neurodevelopmental problems in a high-income country. It provides strong evidence for the need to follow-up, assess, and where necessary support, survivors of infant sepsis and to institute better prevention strategies.

NOTES

Data Sharing: Requests for accessing an anonymised dataset will be considered and will be subject to approval by the data management department at St George's, University of London, and the UK National Health Security Agency.

Ethics: Ethics permission for the study was granted by the NRES Committee South Central Hampshire (Ref:14/SC/1152).

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Disclosures: PTH reports research grants to institution for GBS vaccine study unrelated to this work from Pfizer and Minervax. We declare no competing interests. The authors believe that the data reported in this letter are correct and have not been published elsewhere.

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Table 1 - Comparison of neurodevelopmental outcomes in children with GBS Sepsis and Meningitis (all cause)

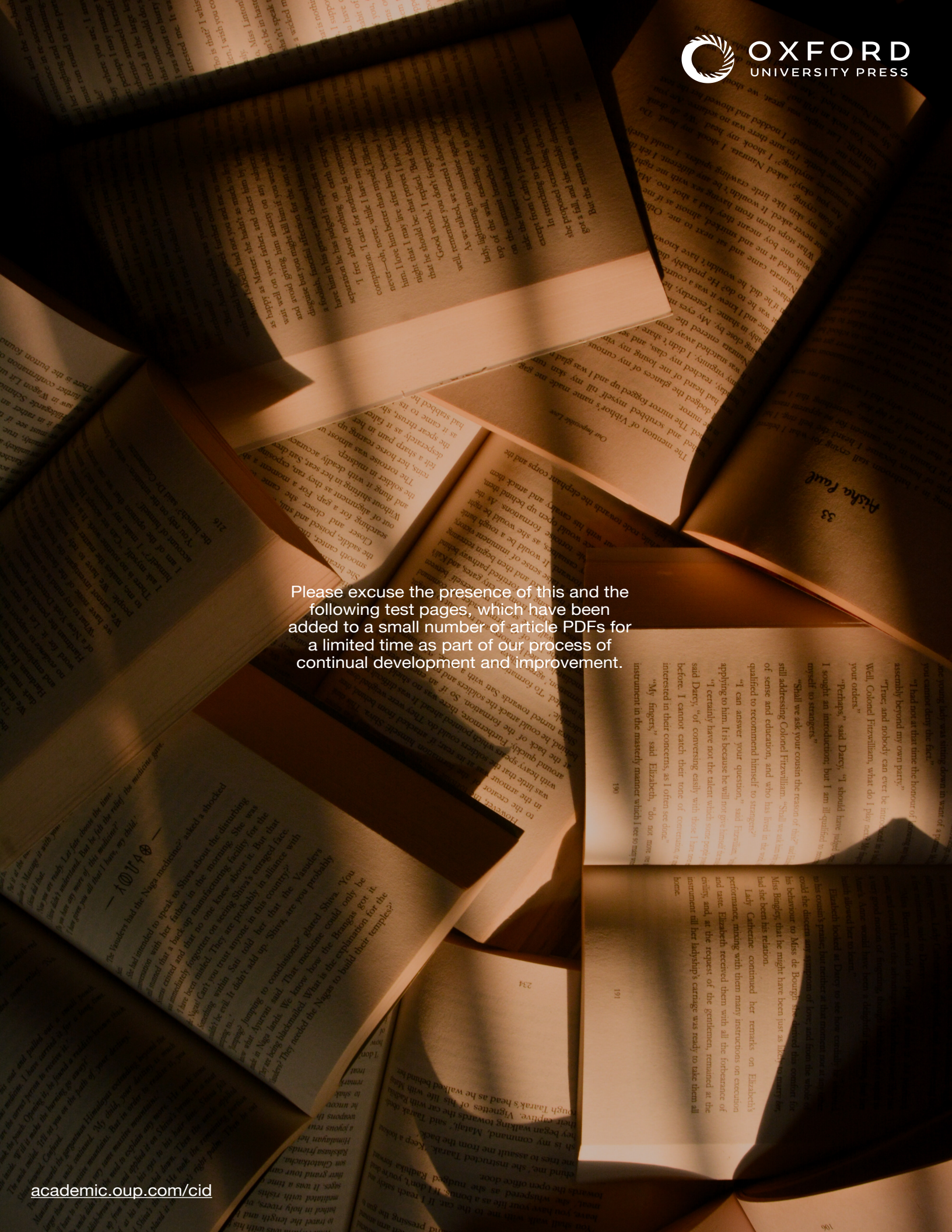
Outcome	GBS Sepsis (%) n= 68	Meningitis (%) n=51	P Value*	Total
Cerebral Palsy	0	6 (11.8)	0.005	6 (5.0)
Hearing impairment	1 (1.5)	3 (5.9)	0.3	4 (3.4)
Visual problem	5 (7.4)	[a] 6 (11.8)	0.5	11 (9.2)
Seizures	1 (1.5)	3 (5.9)	0.3	4 (3.4)
VP Shunt	0	6 (11.8)	0.005	6 (5.0)
Social & Communication Problems [b]	16 (23.5)	12 (25.5)	1.0	28 (23.5)
Problems with swallow/PEG	1 (1.5)	2 (3.9)	0.6	3 (2.5)
Global Developmental Delay [c]	0	1 (2.0)	-	1 (0.8)
BSID Cognitive Score <75 [c]	1 (1.5)	0	-	1 (0.8)
BSID Motor Score <75 [c]	1 (1.5)	0	-	1 (0.8)
No problems identified	47 (69.1)	32 (62.7)		79(66.4)
At least one problem	21 (30.9)	19 (37.3)	0.6	40 (33.6)
1 area affected	18 (26.5)	10 (19.6)		28 (23.5)
2 areas affected	2 (2.9)	3 (5.9)		5 (4.2)
3 areas affected	0	2 (3.9)		2 (1.7)
4 areas affected	0	2 (3.9)		2 (1.7)
5 areas affected	1(1.5)	1 (1.7)		2 (1.7)
6 areas affected	0	1 (1.7)		1 (0.8)

* Pearson's chi-squared or Fischer's exact tests used.

[a] Child with meningitis and visual impairment not included in analysis as has alterative diagnosis to explain visual impairment (Trisomy 21)

[b] Two children with social & communication problems not included in analysis as had alternative diagnoses to explain delayed communication (Trisomy 21& galactosaemia).

[c] Statistical test not performed due to small numbers in each group



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