

# Neurodevelopmental Impairment of Neonatal Meningitis in Full-Term and Near-Term Newborns : A Retrospective Study of One Center

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Neonates are at more serious hazard for sepsis and meningitis than different ages. Early Neonatal meningitis due to streptococcus group B is serious but uncommon disease.

The prevalence of neonatal meningitis is estimated 0.15-0.5 per 1000 birth in industrialized countries and mortality from neonatal meningitis ranges from 10–15%.

Increasing intrapartum antibiotic prophylaxis (IAP) coverage as linearly associated with decreased risk of Early-onset group B streptococcal disease (EOGBS) disease by 85-90%. But group B Streptococcus (GBS ; Streptococcus agalactiae) still a leading infectious cause of neonatal morbidity and mortality of neonatal onset sepsis and. The risk without an IAP policy is estimated 1,1%.

Neurologic complications remain high in neonate patient with neonatal meningitis due to streptococcus.

### Global etiology of bacterial meningitis:

The occurrence of intrusive GBS illness in newborn children was 0.49 per 1000 live birth (95% certain stretch [CI], .43-.56), and was most elevated in Africa (1.12) and least in Asia (0.30). Early-onset disease incidence was 0.41 (95% CI, .36-.47); late-onset disease incidence was 0.26 (95% CI, .21-.30). C. Stéréotype III (61.5%) commande, witz 97% of cases borough about by serotypes Ia, Ibb, II, III, and V.

### Objective

The aim of this study was to determine complications and neurodevelopmental impairment of neonatal meningitis, due to streptococcus group B in full and full Term newborns in a tertiary-level neonate intensive care unit.

### Study design

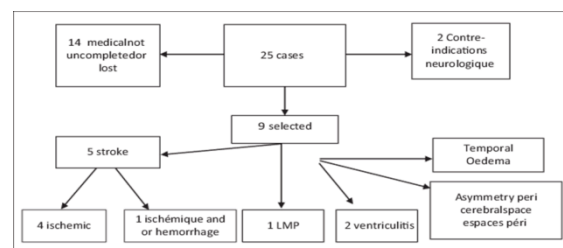
Twenty five (25) cases of neonatal meningitis B streptococcus Benwee 1985 and 2010 have been reported. Two were excluded because they had congenital abnormalities. 14 records have not been found in the archives.

### Résultats

In total, only 9 cases have been analyzed. Eight kids had either a CT sweep or MRI and head ultra sound (HUSS). All eight had an abnormal imaging: 5 cases 62.5% had a stroke, one case of ventricular leukomalacia was highlighted. Other abnormalities were asymmetric pericerebral edema, a right temporal cortical subcortical lesions; 1 echogenicity and ventricular dilatation.

All children admitted were symptomatic: neurological symptoms were present in 66.66% of cases, breathing in all cases, hemodynamic in 33% of cases.

The median admission was 13 days (3-20) age; the median temperature of 38.5 of the 9 cases, only three mothers had a history streptococcus B 95% CI (0.117-0.64). The average glucose level was 1.4 mmol/l, the protein level of 1.75g /l. Blood culture was certain in 33.33%, 95% CI (0.11-0.64). 25% had neurodisabilities between the ages of 1-4 years.



CASE	CBP admission	WBC admission	Blood culture	LP WBC	MRI/ CT scan	Evolution neurologique (normal=1)
A	317	3100	0	7265	Stroke ISH	1
B	32	2110	0	-	Stroke ischemic/hemorrhage	0
C	208	14800	0	7195	ventriculitis	0
D	155	11000	1	1630	Leukomalacia	1
E	91	25600	1	895	Stroke ischemic	0
F	137	2810	0	3600	Ventriculitis	1
G	5	13100	0	6300	Asymmetry pari ventricular space	0
H	6	2300	0	0	Stroke ischemic	0
I	209	7100	0	14600	temporal oedema	0
Moyenne	106.6	9324.44	-	5189.375	-	-
Pourcentage	-	-	33%	-	-	25%

WBC : white blood count, MRI: Magnetic Resonance Imaging, CRP: C-réactive Protéine. P: lumbarpuncture CT

Scan : X-ray computedtomography.

### DISCUSSION

The frequency of beginning stage sepsis because of gathering B streptococcus (GBS), 0 • 43 for every 1000 live birth [95% CI 0, 37-0, 49] and mortality 12, 1% is multiple times higher than those announced for latte contaminations. Intense complexities of neonatal bacterial meningitis incorporate cerebral edema.

(vasogenic and cytotoxic), ventriculitis, cerebritis, hydrocephalus, brain abscess, cerebral infarction, and subdural effusion or empyema. Development of these complications may lead to moderate to severe neurodisabilities.

**UK and IRELAND surveillance** : In a retrospective, active national surveillance of invasive group B streptococcal disease in infants younger than 90 days was done from April 1, 2014 to April 30, 2015, through the British Paediatric Surveillance Unit, microbiology reference laboratories, and national public health agencies in the UK and Ireland.

In Patterns of complications of neonatal and infant on MRI by organism: A 10 year review by Jacob and coll. In a 10 yr retrospective review of magnetic resonance imaging (MRI) and microbiology data for all neonates (age <30 d) and infants (age <1 yr) imaged for possible complications of meningitis at a tertiary children's hospital. 63 patients (25 neonates, 38 infants) were included in the study. The 3 most common pathogens were streptococcal species (n = 32, mean age 4.7 mo), E. coli (n = 9, mean 1.2 mo), and herpes simplex virus (n = 4). The most common findings were meningeal enhancement (78% of those given IV contrast), infarct (52%), subdural collection (35%), and ventriculomegaly (32%).

E. coli presented much more frequently with ventriculomegaly (64% vs. 22%) than streptococcal species. Extensive infarcts were typical of streptococcal meningitis (13/32, 41%) and rarely seen with other organisms (2/31, 6%, p = 0.001).

In study of brain Magnetic Resonance Imaging of Infants with Bacterial Meningitis, by Carlos R. Oliveira and coll. 440 infants lower than 12 months who had meningitis were enrolled. Of these, 68% (75/111) had a brain MRI performed during the hospitalization; abnormalities included leptomeningeal enhancement (57%),

cerebral infarct (43%), subdural empyema (52%), cerebritis (26%), hydrocephalus (20%), and abscess (11%).

Rajesh Gupta and coll. reported a 2-day-old infant presented bilateral haemorrhagic basal ganglia infarction associated with early-onset group B streptococcus. MRI brain showed extensive haemorrhagic infarction within the lentiform and caudate nuclei with involvement of both posterior limbs of the internal capsule. Haemorrhage was followed by triventricular hydrocephalus, complicated by infantile spasms, and neurodevelopmental impairment: cerebral palsy. A systematic review and meta-analysis of impact in intelligence and development were performed by Debarh Cristie. They found moderate evidence that surviving bacterial meningitis has a deleterious impact on IQ and development in infant.

Thirty-three studies provided data on intelligence quotient (IQ) (2015 subjects) and 12 on developmental delay (382 subjects). Across all bacterial organisms, meningitis survivor had a mean IQ 5.50 (95% CI: -7.19, -3.80; I<sup>2</sup> = 47%, p = 0.02) points lower than controls.

IQ was significantly lower than controls for Neisseria meningitidis (NM: 5 points) and Haemophilus influenzae b (Hib: 6 points) but not in viral, with only single studies included for Streptococcus pneumoniae (SP) and group B streptococcus (GBS).

In Neurodevelopmental Impairment in Children After Group B Streptococcal Disease Worldwide: Systematic Review and Meta-analyses: Maya Kohli-Lynch and all estimate of moderate to severe neurodevelopmental impairment (NDI) following GBS meningitis is 18% (95% CI, 13%–22%) of survivors. Is consistent with the estimate of NDI after meningitis of all infectious etiologies, which is 23% (95% CI, 19%–26%).

### Conclusion:

Neonatal meningitis due to group B streptococcus is uncommon, however can cause inconvenience in both term and preterm infant. Neurologic outcome remains the major adverse outcome of survivors.

In our study the main acute neuro-imaging complication is stroke; with 25 per cent of neurologic disabilities at four years old.

All neonatal meningitis should have clause neurodevelopmental follow up due potential neurodisabilities.

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