



Colonization of the Preterm Neonatal Gut With ESBL, CRGNB And Its Association With Neonatal Sepsis



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INTRODUCTION

Neonatal sepsis caused by carbapenem resistant gram-negative bacilli (CRGNB) and extended spectrum beta lactamase (ESBL) producing bacteria is an important cause of mortality and morbidity among neonates especially very low birth weight (VLBW) infants.

OBJECTIVES

- To determine the proportion of preterm VLBW infants whose guts are colonized with MDR bacteria
- To determine postnatal age at which the colonization starts
- To determine the risk factors that predict gut colonization with MDR bacteria?

METHODOLOGY...

Study was performed in PGIMER Chandigarh

Study Type: Prospective, cohort

Screened subjects: 277

Subject enrolled: 236

Inclusion:

- Gestation ≤ 37 weeks
- Birth Weight ≤ 1500 grams
- Age ≤ 72 hrs

Exclusion

- Proven /suspected GI Problem
- Life Threatening clinical condition

Samples:

- Rectal swab sample taken at the time of enrolment and after that regular interval of 7 days until discharge/death.
- Swabs were vortexed in buffer to elute organism and stored in -80°C.
- Lawn culture of the specimen was carried out on plates containing breakpoint concentrations of the relevant antibiotics as described by Clinical Laboratory Standard Institute (CLSI), USA.

Antibiotics used and their conc.

- Cefotaxime 2 ug/ml
- Imipenem 2 ug/ml
- ESBL was defined as resistance to either Cefotaxime or Ceftazidime or Cefpodoxime.
- CRGNB was defined as resistance to either Imipenem or Meropenem or Ertapenem.

RESULTS

Demographic details

Variables	Cases (n=236)
Gestation, w, mean (SD), median (IQR)	30.5 (2.5) 30.0 (29.0,32.0)
BW, g, mean (SD), median (IQR)	1106.8 (219.9) 1126.0 (941.2,1280.0)
Postnatal age, h, mean (SD), median (IQR)	26.2 (17.3) 22.0 (12.0,36.0)
Male, n (%)	119 (50.4)

Risk Factors : The number of days of gavage feeding was a significant risk factor in to predict gut colonization with ESBL organisms shown in table below

	ESBL+ (n=71)	ESBL- (n=165)	P value
Gestational age, wks	29.9(2.5)	30.7(2.5)	0.3
Birth weight, g	1093.5 (210.0)	1112.5 (224.5)	0.5
Postnatal age, h	32.6 (17.3)	23.5 (16.7)	<0.05
No of days of gavage feeding, d	23.3 (24.5)	11.5 (16.0)	<0.05
Number of days of exclusive formula feeding, d	0.0 (0.0)	0.35 (1.9)	0.1
Number of days of exclusive breast milk feeding, d	12.2 (11.9)	9.4 (11.4)	0.0
Cumulative days of intubation, d	0.7 (3.4)	0.6 (3.0)	0.9

Fig1: Shows the growth of either ESBL or CRGNB from total number of sample collected at particular day; number of samples keeps declining from day 0 to day 28 due to discharge of infants from the hospital.

...RESULTS

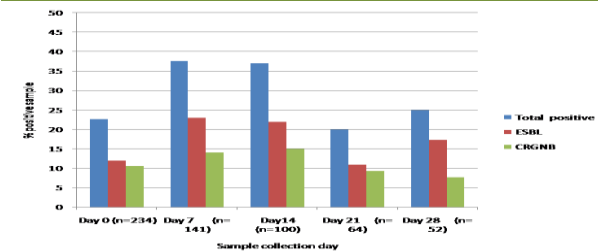


Figure 1: Graph showing percentage of total positive sample and the % growth of ESBL and CRGNB

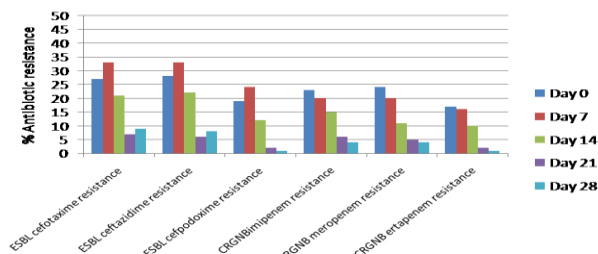


Fig 2 .Antimicrobial resistance pattern of ESBL and CRGNB producing organisms

- Ceftazidime resistance was 100% for ESBLs following Cefotaxime and Cefpodoxime i.e., 96% and 68% respectively at enrolment (Fig. 2) and so on.
- CRGNBs meropenem resistance was 96% followed by Imipenem (92%) and Ertapenem (68%) at enrolment (Fig 2) and so on.

CONCLUSION

• High prevalence of ESBLs and carbapenemases producing isolates was observed for commonly used antibiotics in the rectal swab samples of preterm neonates.

Source of Funding : Department of Biotechnology
BT/PR16806/NER/95/296/2015 dated 31-3-2017