Prevelance of Nososcomial infection in PICU of a tertiary Care Centre in Western Uttar Pradesh, India

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ABSTRACT

Introduction: Nococomial infection (NI) one of the major cause of morbidity and mortality in developing countries. The present study was carried out to know the prevelance of nososcomial infection in PICU and identify the organisms responsible.

Material and Methods: Data was retrieved from medical record section of all the patients admitted in PICU from June 2013 to June 2014. Demographic profile diagnosis at admission, culture reports of organisms grown and antibiotic sensitivity pattern were analysed.

Results: Total 140 pateints were hospitalized in PICU, out of which 107 pateints met inclusion criteria. Total 27 episodes of nososcomial infection were diagnosed. Blood stream 10/27 (37.03%) followed by urinary tract 8/27 (29.62%) and culture from septic foci 6/27 (22.2%). Most commonly identified organisms were *Klebseilla* followed by *Staphlococcus aureus*, *E.coli*, *CONS*, *Pseudomonas aeruginosa* and *Acenobactor* (87.5%). Fifty percent of them were sensitive to 3rd generation Cepholosporins and Gentamycin.

Conclusion: The predominant organism resposnsible for nososcomial infections are *Staphylococcus aureus* and Klebsiella, and at present Vancomycin and Carbapenems seems to be the best empirical therapy pending culture sensitivity reports.

Keywords: Blood culture, PICU, Nososcomial infections

INTRODUCTION

The spectacular success achieved in improving the standard of care of critically patients in PICUs has been marred by the advent and recognition of a new threat; that of hospital acquired infections. Nococomial infection (NI) are now being increasingly recognized as important complication of hospitalization.[1] The Centre for Disease Control and Prevention (CDC) defines the intensive care unit associated infections as those that occur after 48 hours of ICU admissions or within 48 hours after the transfer of the patients from the ICU.[2]

Although NIs occur universally, its frequency in developed countries is low, In contrast developing countries have high rates of hospital acquired infections.[3,4] Though the causes are multifactorial including imunocompromised status, malnutrition, invasive procedures, intense and inappropriate antibiotic use, promoting antibiotic resistance. High incidence of NI is reflective of poor quality of health care delivery. Hence all PICU's should ideally be required to maintain an ongoing surveillence for early detection of NI, quick identification of organisms responsible and their antibiotic sensitivity pattern in order to mount an effective strategy to prevent hospital acquired infection.

This assumes still greater significance as the initial choice of antibiotic and empirical treatment is started on suspicion of NIs pending identification of organisms responsible and their antibiotic sensitivity patterns.[5]

This retrospective study was carried out from June, 2013 to June 2014, in the PICU of a teaching hospital, to investigate the prevalence of NI among the patients admitted to PICU. It is hoped that the study will add to the existing knowledge on the subject.

MATERIAL AND METHODS

A retrospective descriptive study was carried out from June 2013 to June 2014 at tertiary care teaching hospital in western U.P. Data was collected of patients admitted in PICU. Patients were suspected to have developed NI after 48 hours of admission to PICU if they had

(i) Unexplained hectic fever >38^{0}C, (ii) leukocytosis >10000 / mm 3 (ii) New infiltrates in CXR and development of pleural effusion (iii) dysurea, development of burning micturition, suprapubic tenderness (iv) thrombophlebitis.[5]

Exclusion criteria:- Patients with <48 hours stay in PICU were excluded from study.

Data was collected and descriptive statistics were used. There was no external funding and no conflict of interest.

RESULTS

Total of 140 patients were hospitalized in PICU, out of which 33 patients were excluded because of <48 hours stay, so data of 107 patients were analysed retrospectively.

The demographic characteristics of patients included in study are depicted in Table 1. Most of patients were in age group of 1to 3 years; males being 57.14% (24/42) compared to 42.85% (18/42).

On basis of diagnosis at admission patients were divided into two groups: Infective and Non Infective. In infective group most patients admitted in PICU had varying degree of diarrohea with dehydration (moderate dehydration to shock) 18/55 followed by septicemia (11/55), meningitis (18/55), empyema (5/55)and pneumonia (3/55). In noninfected group most common diagnosis was severe anemia 11/52followed by SAM10/52, nephrotic syndrome 10/52and CNS patients with status epilepticus 11/52 (Table 2).

Culture samples were taken from various sites including blood, urine, pleural fluid, septic foci, pus and tip of indwell-

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ing catheter. Most common site of infection was blood stream 10/27 (37.03%) followed by urinary tract 8/27 (29.62%) and culture from septic foci 6/27 (22.2%). Table 3. Site of Noscomial infection could be identified in 27 out of 107 patients (25.2%). Most commonly identified organisms were *Klebseilla* followed by *Staphlococcus aureus*, *E.coli*, *CONS*, *Acenobactor* and *Pseudomonas aeruginosa* (Table 4).

We attempted to correlate the organisms isolated with sensitivity pattern to formulate antibiotic protocol for PICU. Staphlococcus *aureus* was most sensitive to Vancomycin and Meropenem (100%) followed by 3rd generation Cephalosporin and Oxacillin. *Klebsiella* was most sensitive to Amikacin and Meropenem (87.5%). Fifty percent of them were sensitive to 3rd generation Cepholosporins and Gentamycin.

Age	Male		Female		Total	
	No.	%	No.	%	No.	%
1-3 Years	24	57.14	18	42.85	42	39.25
3-5 Years	22	59.45	15	40.54	37	34.57
5-12 Years	17	60.7	11	39.28	28	26.16
	63	58.87	44	41.13	107	41.12

Table–1: Age and Sex Distribution

DISCUSSION

Although there is abundance of literature regarding nosocomial infection most of it is from developed countries. There is lack of data regarding nosocomial infection in pediatric patients in India. The frequency observed in present study is lower than that reported from other PICUs.[5] The most frequent type of NI in our study was Blood steam infection which corroborates the finding of other studies[4], followed by UTI[6]

Demographic profile of patients showed most children with NIs, were in age group 1-3 years with male preponderance. Similar findings were shown in studies by Freeman[7] and Ganguly[8]

Data from different institutions in other countries suggest *Klebsiella* and *Staphlococcus aureus* to be the predominant isolates in ICUs.[5,9,10] *Satphlococcus aureus* showed 100% sensitivity to Vancomycin[5] and Meropenem. Amikacin and Meropenem were most effective antibiotics in case of Gram negative sepsis. Based on findings of the current study, the initial empiric therapy recommendation would be Carbap-

Infected		Non infected	
Diarrohea with dehydration	18	Neurodevelopmental delay	5
Meningitis Tubercular Pyogenic	 10 8	Epilepsy	7
Septicemia	11	ICSOL	4
Empyema	5	Hemophilia	3
Pneumonia	3	Severe Anemia	11
TOTAL	55	Nephrotic Syndrome	10
		SAM	10
		Acute Pancreatitis	2
		Total	52

Table–2: Diagnosis at admission (N = 107)

Organisms	Blood Stream	UTI	Respiratory tract	Cellulitis	Indwelling Catheter
Gram +ve					
Staphlococcus aureus	1		1	5	
CONS		1			1
Gram -ve					
Pseudomonas				1	
Klebsiella	3	5			
Acinobacter	2				
E.Coli	4	2			

Table–3: New bacterial acquisition detected as 3rd day (N-27)

Antibiotic	Staphlococcus Aureus, N = 7				Klbsiella, N= 8			
	Sensitive		Resistant		Sensitive		Resistant	
	N	%	N	%	N	%	N	%
Oxacillin	2	28.56	5	71.45	0	0	8	100
Vancomycin	7	100	0	0	0	0	8	100
Gentamycin	0	0	7	100	4	70	4	50
Amikacin	0	0	7	100	7	80	1	12.5
Ceftriaxone	2	28.56	5	71.45	4	50	4	50
Cefotaxime	3	42.86	4	57.1	4	50	4	50
Meropenem/Imipenem	7	100	0	0	7	87.5	1	12.5

Table–4: Antibiotic Sensitivity Pattern of Staphalococcus and Klebsiella

enems and Vancomycin specially if *Staphlococcus aureus* is suspected.

CONCLUSION

This study highlights the importance of NI's in PICU for surveillance of NIs to formulate measures for infection control in hospitals. It also helps in formulating recommendations for initial empirical therapy pending culture sensitivity report.

LIMITATIONS

No information is available regarding MIC (Minimum inhibitory concentration) of antibiotics for organism isolated as this is not performed in our institute. We have also not studied about clinical correlation and outcome of NIs in PICU.

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