

The Challenge of Multi Drug Resistant Bacteria in Intensive Care Patient Management in Bangladesh

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Introduction:

Multidrug-resistant bacteria pose a serious and rapidly emerging threat to patients in intensive care unit in developing country like Bangladesh. Incidences of multi drug resistant bacteria are markedly increasing with high mortality in spite of use of wide range expensive antibiotic. In Intensive care unit “Health care associated infections (HCAIs)” are common & it is no longer a local or regional problem. With the dissemination of multi-drug resistant bacteria across the globe, the problem of HCAIs has become even grimmer. Controlling the spread of resistance requires the collaboration of several participants such as medical, vaterinary and public health communities⁴⁻⁷. The objective of this study was to determine bacterial pathogens prevalence and to assess the multidrug resistant strains to different antibiotics in the intensive care unit of Bangladesh.

Method and material:

This is retrospective study of different ICU of different group of patient for identifying the type, pattern of bacteria, bacterial resistance patterns, use of antibiotic & there result related to mortality from January 2009 to July 2013. During a those period 3320 samples of blood, tracheal suction, urine, cerebral spinal fluid, wound swab & others from 1219 ICU admitted patient were collected & send for cultural sensitivity in microbiology department. All bacteria were identified by standard microbiological

methods and their antibiotic sensitivity were detected using disk diffusion method.

Result :

There is difference of pattern & frequency of bacteria & bacterial resistant in different ICU of different samples (table I & II). Positive cultural in blood 17.9% (Acinetobacter, Pseudomonas, E.coli, Kleibsiella) Tracheal aspirate 78.06% (Acinetobacter, Proteus, Pseudomonas) urine 32.30% (E.coli, Enterobacter & other 40.21% (Acinetobacter, E.coli, Pseudomonas) but some situation up to 86.25% positive cultural sensitivity. Among those multi drugs resistant bacteria is (ceftazidime, ciprofloxacin, vencomycin and tobramycin) from 9.09% to 30.50% (table III & Fig. 1). The major resistant pathogens in ICU of Bangladesh are multi drug resistant Gram negative bacteria like Acinetobacter baumannii and Pseudomonas aeruginosa, extended spectrum lactamase (ESBL) producing Klebsiella pneumoniae and Escherichia coli, methicillin resistant Staphylococcus aureus (MRSA), vancomycin resistant Enterococcus (VRE). With a different ICU setup multi drugs resistant bacteria varies up to 85.4%. Now a days effective anti micro bacterial agent in Bangladesh for ICU patient management are Colistin, Impenem, Ceftazidime, Ciprofloxacin. Overall ICU mortality is increasing from 40.48% to 57% but some situation up to 85% when infective with MDR (Fig.-1).

Table I: Demography of sample (N=3320)

Year	University ICU		Govt Hospital ICU		Private ICU	
	Total sample	Positive sample	Total sample	Positive sample	Total sample	Positive sample
2009	256	103(40.23%)	180	76(42.22%)	114	42(36.85%)
2010	280	135 (48.21%)	193	92(47.67%)	131	61(46.57%)
2011	310	99(31.93%)	214	112 (52.34%)	164	79(48.18%)
2012	322	107 (33.22)	232	126 (54.32%)	181	95(52.49%)
2013	340	126 (37.05%)	260	146 (56.16%)	203	114(56.16%)
Total	1508	570 (37.80%)	1079	552 (51.16%)	793	391(49.31%)

Table II: Isolation of micro organism (pattern & frequency) from different sample

Name of organism	Blood (N 723)	Tracheal (N 1053)	Urine (N 1124)	Other (N 480)
	Positive for C/S 130 (17.98%)	Positive for C/S 822 (78.06%)	Positive for C/S 363 (32.30%)	Positive for C/S 193 (40.21%)
Acinetobacter	31(23.85%)	392 (47.68%)	25(6.89%)	41(21.25%)
E.coli	10(7.7%)	2(0.25%)	198 (54.55%)	33(17.1%)
Enterobacter	1(0.8%)	2(0.25%)	54 (14.88%)	3(1.56%)
Klebsiella	10(8%)	67 (8.15%)	21(5.79%)	10(0.52%)
Proteus	3(2.31%)	96(11.68%)	6(1.65%)	12(6.22%)
Pseudomonas	65(50%)	253 (30.78%)	24(6.61%)	68(35.24%)
Salmonella Typhi	10(7.70%)	0	4(1.11%)	0
Staph.aureus	5(3.85%)	3(0.37%)	8(2.20%)	19(9.85%)
Others / Streptococcus	4(3.08%)	7(0.86%)	23(6.23%)	7(3.63%)

Table III: Culture sensitivity to anti microbial agent with different sample (Positive C/S for blood, N = 130; tracheal, N = 822; Urine, N = 363)

Year	Sensitivity to none Positive for C/S (N)			Sensitivity to one drugs Positive for C/S (N)			Sensitivity to many drugs Positive for C/S (N)		
	Blood	Trachea	Urine	Blood	Trachea	Urine	Blood	Trachea	Urine
2009	9.09%	18.43%	25%	45.45%	29.79%	23.71%	45.45%	52.49%	51.78%
2010	12%	20%	25.71%	45%	30.18%	37.14%	40%	49.71%	47.14%
2012	13.33%	25.12%	28.23%	46.66%	34.88%	29.41%	40%	40%	42.35%
2013	18.18%	27.87%	29.13%	45.45%	35.13%	30.10%	35.16%	36.81%	39.58%
2014	20%	28.18%	30.50%	45%	33.63%	28.81%	35%	38.18%	40.67%
Total	19 (14.61%)	197 (23.96%)	101 (15.15%)	60 (45.15%)	278 (32.14%)	102(28.09%)	51(39.23%)	355 (43.18%)	159(43.80%)

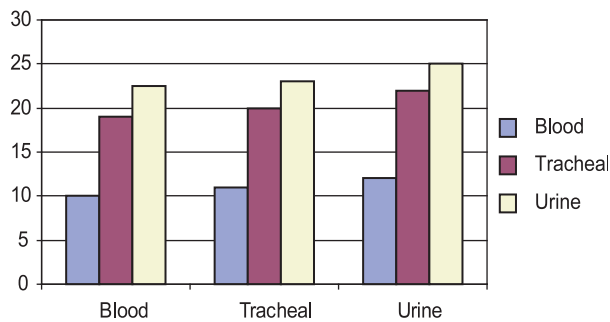


Fig 1 Sensitivity to none anti micorbial agent for positive C/S

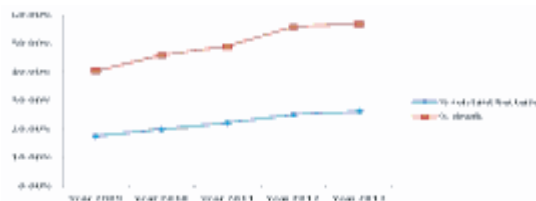


Fig 2 Relationshi of multi drug resistant bacteria with ICU mortality

Discussion:

In this study we find out that emergence of high frequencies multi drug resistant bacteria in ICUs setup is an important problem endangering patient safety in terms of mortality, morbidity, disability, psychosocial effects on society, and the cost of healthcare¹. Our study result are comparable to South East Asia region like India, Thailand² etc. Methicillin-resistant S. aureus (MRSA) is a major problem in hospital-associated infections in almost all countries in the SEA Region. But in our study multi drug resistant Pseudomonas, Acinetobacter and Klebsiellae species have given new dimensions to the problem of hospital-associated ICU infections³.

Conclusion:

The dissemination of MDR bacteria is not in burden of Bangladesh but across the globe, the problem of

ICU patient management has become even grimmer. Therefore, it is important to frame local & international policies and measures and take affirmative action's for prevention and reduce the burden of MDR.

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