



Microbiology Newsletter

Sir Ganga Ram Hospital

Volume 16, No. 1

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CASE REPORT - Ceftriaxone Resistant *Shigella flexneri*

Five month old twin female children were admitted at a teaching government hospital in New Delhi with complaints of loose stools 10-12 times per day. Both children were treated for dehydration and were discharged on oral cefixime for 5 days. Six days post antibiotic therapy they were again admitted in the same hospital with the complaints of diarrhea but one of the twins died while on treatment. The other twin was brought to Sir Ganga Ram hospital (SGRH), New Delhi, for further management.

On physical examination, child was conscious, oriented with a pulse rate of 120 per minute with a temperature of 37°C. Other systemic examination was unremarkable except for the signs of dehydration. Patient was started on intravenous fluids and I/V antibiotics (ceftriaxone and amikacin). On day 3, ceftriaxone was replaced by meropenem due to deteriorating condition. Stool examination showed 15-20 WBC and RBC per high field. Stool culture grew *Shigella flexneri*, identified by Vitek 2 (bioMérieux, France) and confirmed by serotyping (Remel Europe Ltd. Antisera). It was resistant to ampicillin, ciprofloxacin, nalidixic acid, co-trimoxazole, tetracycline, ceftriaxone and sensitive to ertapenem and meropenem by Vitek 2 and Kirby-Bauer disc diffusion methods. MIC of ciprofloxacin and ceftriaxone by E-test method (AB Biodisc, Solna, Sweden) were 8 and >256 ug/ml respectively. The isolate was confirmed as ESBL positive by CLSI recommended double disc diffusion method. Meropenem was continued for 5 days, following which the child's condition improved and was finally discharged in a stable condition.

DISCUSSION

Shigellosis is usually a self-limiting illness but remains to be a major cause of morbidity and mortality among children in the developing countries. Though the duration and severity of the illness can be reduced by effective antimicrobial therapy, but emergence of multidrug resistant strains can limit treatment options. Third generation cephalosporin resistant *Shigella* spp. has

been described in the past, but it is relatively uncommon.

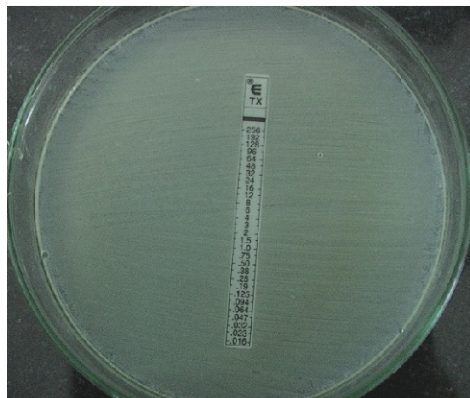


Fig.: Ceftriaxone Resistant *Shigella flexneri* (E test)

Ampicillin, co-trimoxazole, nalidixic acid and chloramphenicol were considered as first line antibiotics for treatment of shigellosis empirically. The emergence of multiple drug

resistance to chloramphenicol, trimethoprim, quinolones and tetracycline over the last two decades highlights the problem of

BOOK RELEASED - 13th April 2010

Emergencies in Infectious Diseases – From head to toe

Edited by Nancy Misri Khadori and Chand Wattal

Publishers: Byword Books Pvt Ltd., Delhi; Pp 284; Rs. 995/- US\$ 165.

Available for online purchase at website: www.bywordbooks.in

The above book was released on the annual day function of SGRH by Mr. Shivram (Vice-Chairman, Trust Society).

REVIEW / REFLECTIONS

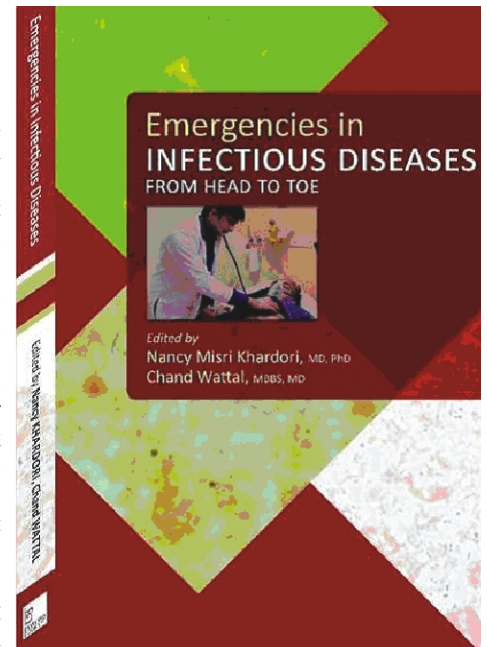
This book is refreshingly different from the usual works on infectious diseases in that it does not have formal presentations. Instead the book is based on actual cases seen by the various authors during their practice. The book is edited by two microbiologists with different experiences. While Prof. Khadori has progressed along the American

Speciality path, which includes a clinical bias, Dr. Wattal has been trained in the largely laboratory oriented Indian mould. Nevertheless, the book has a comprehensive patient base. The multidisciplinary (including clinicians) approach makes his presentations relevant to practice. Another salient feature of the book is coming together of the teams from Southern Illinois University and one of the better private health establishments of India. The cases have been worked up in a comparable fashion.

The case vignettes have been well laid out and constructed, sequencing the steps in clinical case. The discussions after the case presentations are crisp and clinically relevant. Indian readers would probably find the discussion on 'Spreading Soft Tissue Infection' (pp229-232) interesting particularly the accent on aggressive surgical debridement. The discussion on infective endocarditis is good (p136).

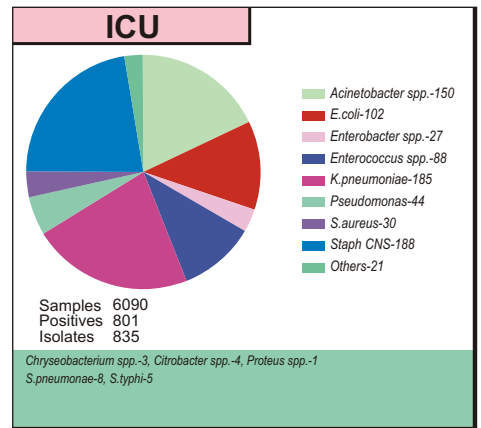
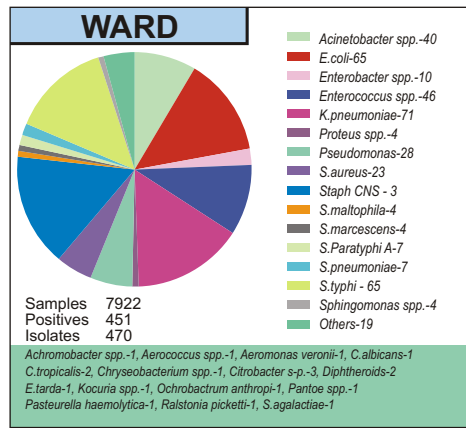
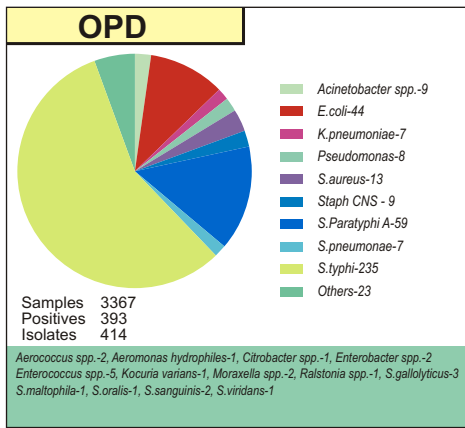
Some unusual cases have been described. The mycoplasma myocarditis, haemolytic uraemic syndrome caused by *P. falciparum* (p241) and the unusually severe disease caused by *P. vivax* (p248) attracted the reviewer's attention.

The reviewer feels the role of antibiotic (particularly aminoglycoside) assays could be stressed in the section on Infective Endocarditis. Likewise, a mention about serum



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PERCENTAGE SENSITIVITY

OPD
WARD
ICU

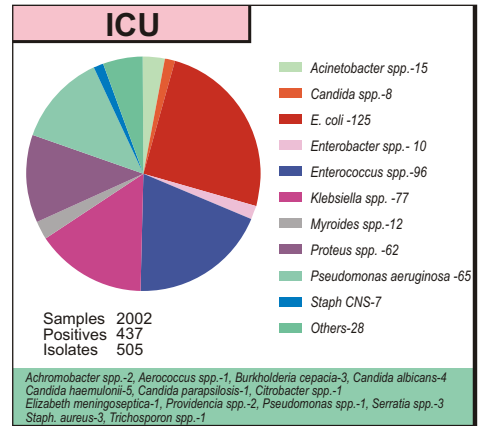
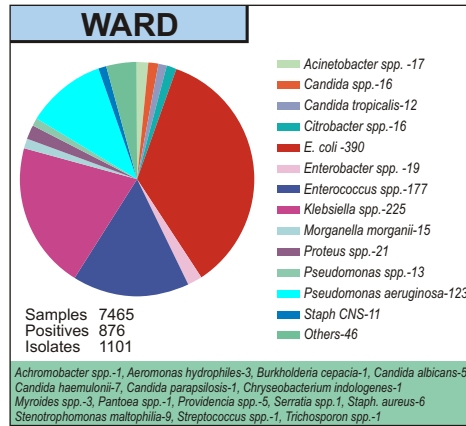
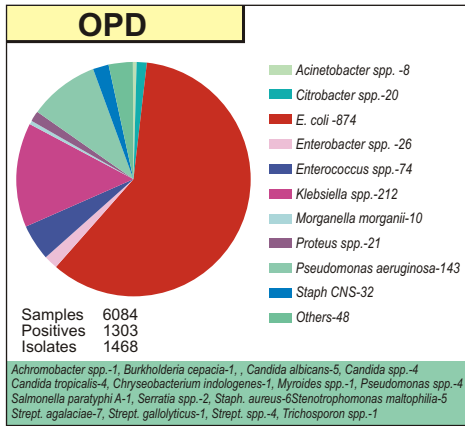
GPC	No. of Isolates	Antibiotic									
		Penicillin	Oxacillin	Ampicillin	Clindamycin	Gentamicin	Gentamicin 120	Vancomycin / Teicoplanin	Linezolid	Ceftriaxone	Levofloxacin
Staph aureus	13	0	77	-	69	83	-	100	-	-	-
	23	0	68	-	87	74	-	100	-	-	-
	30	0	63	-	64	45	-	100	-	-	-
Staph CNS	9	0	22	-	33	78	-	100	-	-	-
	73	1	13	-	35	45	-	100	-	-	-
	188	1	8	-	15	23	-	100	-	-	-
Enterococcus spp.	5	-	-	-	-	-	-	-	-	-	-
	46	-	-	9	-	-	13	73	100	-	-
	88	-	-	7	-	-	13	68	100	-	0
Strep. pneumoniae	7	100	100	-	-	-	-	100	-	100	100
	7	100	100	-	-	-	-	100	-	100	100
	8	75*	100	-	-	-	-	100	-	100	100

*2 isolates (MS to penicillin)
- Not done

GNB	No. of Isolates	Antibiotic															
		Ampicillin	Ceftriaxone	Ceftazidime	Cefexime	Cefepime	Gentamicin	Amikacin	Nalidixic Acid	Ciprofloxacin	Co-trimoxazole	Chloramphenicol	Piperacillin + Tazobactam	Cefoperazone+ Sulbactam	Ertapenem	Imipenem / Meropenem**	Colistin
S. typhi	235	87	100	-	-	-	-	-	6	82	91	93	-	-	-	-	-
	65	89	100	-	-	-	-	-	9	80	88	93	-	-	-	-	-
	5	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
S. paratyphi A	59	88	100	-	100	-	-	-	0	100	100	100	-	-	-	-	-
	7	100	100	-	100	-	-	-	0	100	100	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli	44	11	35	-	-	36	61	100	-	23	-	-	70	86	100	100	100
	65	9	23	-	-	27	45	88	-	14	-	-	58	83	92	95	100
	102	2	11	-	-	11	39	84	-	4	-	-	59	72	92	93	100
Klebsiella spp.	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	71	0	1	-	-	1	19	65	-	13	-	-	15	16	36	46	100
	185	0	3	-	-	4	18	46	-	16	-	-	18	20	42	51	100
Enterobacter spp.	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10	0	20	-	-	20	50	60	-	20	-	-	40	50	63	78	-
	27	0	30	-	-	48	53	63	-	33	-	-	52	59	60	63	96
Acinetobacter spp.	9	25	71	50	-	67	78	78	-	89	-	-	55	87*	-	52	100
	40	0	3	19	-	22	37	47	-	30	-	-	24	26	-	30	100
	150	2	2	7	-	9	12	22	-	10	-	-	9	16	-	15	99
Pseudomonas aeruginosa	8	-	-	87	-	62	63	75	-	75	-	-	75	75	-	75	-
	28	-	-	18	-	19	15	25	-	11	-	-	43	19	-	31	100
	44	-	-	22	-	23	25	34	-	23	-	-	41	26	-	29	100

ACCo in *S. typhi*: 7%
Carbapenemase production in Enterobacteriaceae: 35.8%
ESBL production in Enterobacteriaceae: 50.3%

* No. of isolates small and were mostly *A. lwoffii*
**Therapy of carbapenemase producing isolates with these agents may result in treatment failures.
- Not done



PERCENTAGE SENSITIVITY

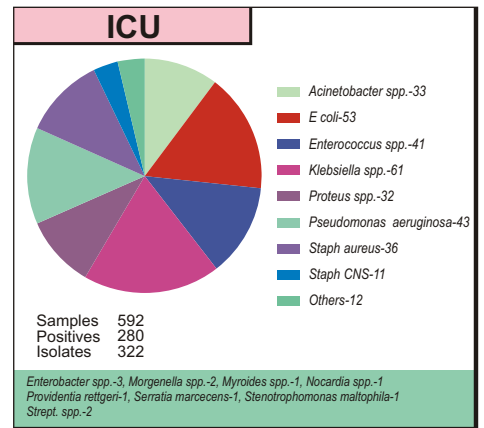
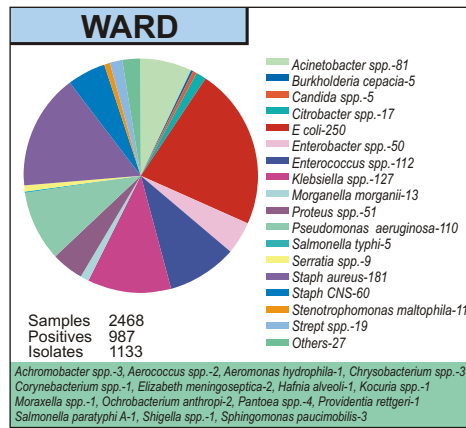
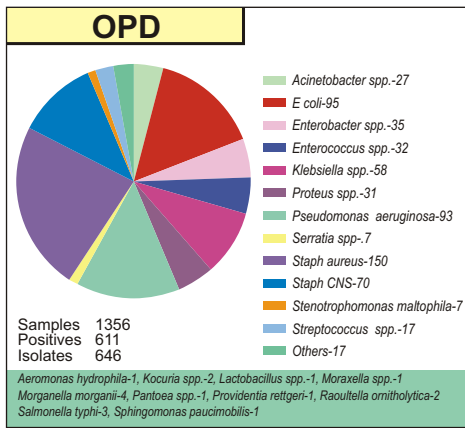
OPD
WARD
ICU

GPC	No. of Isolates	Penicillin	Ampicillin	Oxacillin	Nitrofurantoin	Ciprofloxacin	Co-trimoxazole	Vancomycin / Teicoplanin	Linezolid
<i>Staph aureus</i>	6	0	-	67	100	-	50	100	-
	6	0	-	67	100	-	67	100	-
	3	-	-	-	-	-	-	-	-
<i>Staph CNS</i>	32	0	-	25	100	-	38	100	-
	11	0	-	14	100	-	50	100	-
	7	0	-	18	100	-	-	100	-
<i>Enterococcus spp.</i>	74	-	62	-	65	16	-	89	100
	177	-	29	-	51	7	-	71	99*
	96	-	29	-	53	19	-	74	100

* 2 isolates
- Not done

GNB	No of Isolates	Ampicillin	Co-trimoxazole	Nitrofurantoin	Ceftriaxone	Ceftazidime	Cefepime	Quinolones	Piperacillin + Tazobactam	Cefoperazone + Sulbactam	Ertapenem	Imipenem / Meropenem	Gentamicin	Amikacin	Netilmicin	Colistin
<i>E. coli</i>	874	12	32	73	32	-	33	17	71	88	95	98	48	93	68	100
	390	4	24	67	17	-	18	9	53	72	90	95	35	83	64	100
	125	4	21	53	17	-	18	3	48	71	88	92	41	83	63	100
<i>Klebsiella spp.</i>	212	0	22	15	19	-	21	16	37	50	66	84	27	68	36	98
	225	0	13	6	10	-	12	9	21	27	39	63	18	44	28	98
	77	1	18	14	8	-	9	10	21	21	35	54	17	38	16	100
<i>Enterobacter spp.</i>	26	0	43	13	35	-	50	44	54	69	73	73	35	60	56	100
	19	0	13	22	18	-	42	35	42	47	39	61	33	50	50	100
	10	0	22	11	20	-	20	37	33	20	25	38	20	30	25	100
<i>Proteus spp.</i>	21	55	36	-	77	-	77	50	95	95	95	100	82	91	81	-
	21	24	42	-	39	-	50	26	96	58	84	78	43	68	27	-
	62	82	13	-	87	-	84	7	100	90	100	98	87	90	80	-
<i>Pseudomonas aeruginosa</i>	143	-	-	-	-	37	38	24	64	34	-	41	31	31	39	98
	123	-	-	-	-	36	33	28	65	33	-	44	32	36	48	99
	65	-	-	-	-	23	29	21	43	26	-	28	25	29	29	100
<i>Acinetobacter spp.</i>	8	-	32	-	0	50	50	38	50	50	-	50	50	38	100	100
	17	-	25	-	14	-	31	47	47	50	-	39	47	71	86	94
	15	-	17	-	17	43	40	36	40	43	-	40	40	57	57	100

- Not done



PERCENTAGE SENSITIVITY

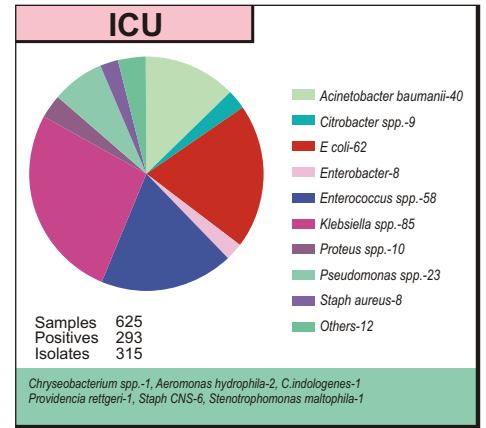
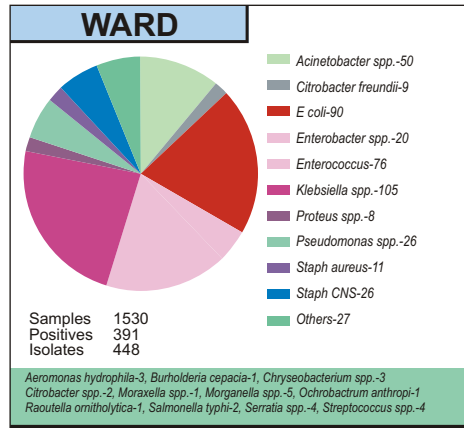
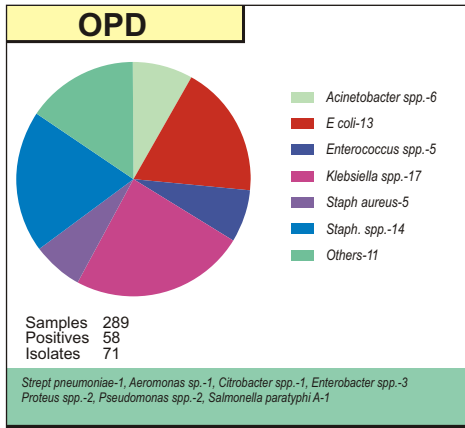
OPD
WARD
ICU

GPC	No. of Isolates	Penicillin	Ampicillin	Oxacillin	Gentamicin HLAR	Co-trimoxazole	Clindamycin	Erythromycin	Vancocycin / Teicoplanin	Linezolid	Tigecycline	Daptomycin
Staph aureus	150	0	-	59	-	65	68	47	100	-	100	100
	181	1	-	60	-	63	70	46	100	-	100	100
	36	3	-	50	-	55	55	26	100	-	100	100
Staph CNS	70	1	-	14	-	-	43	23	100	-	100	-
	60	2	-	16	-	-	40	20	100	-	100	-
	11	0	-	18	-	-	45	27	100	-	100	-
Enterococcus spp.	32	-	58	-	31	-	-	-	90	100	100	-
	112	-	48	-	35	-	-	-	90	98*	100	-
	41	-	24	-	12	-	-	-	67	100	100	-

* 2 cases of Linezolid resistance
- Not done

GNB	No of isolates	Ampicillin	Cefotaxime	Ceftazidime	Cefipime	Ciprofloxacin	Gentamicin	Amikacin	Netilmicin	Cefoperazone+ Sulbactam	Piperacillin + Tazobactam	Ertapenem	Imipenem / Meropenem	Tigecycline	Colistin
E. coli	95	7	19	-	20	6	36	95	56	86	63	90	94	95	100
	250	7	14	-	16	12	37	86	63	75	55	90	94	95	98
	53	4	5	-	11	2	32	71	54	55	36	86	92	93	99
Klebsiella spp.	58	0	19	-	20	31	26	77	48	60	52	76	77	72	100
	127	0	17	-	20	24	33	67	46	47	36	60	73	59	100
	61	0	0	-	3	8	11	44	26	13	1	15	43	57	100
Enterobacter spp.	35	0	45	-	60	48	48	65	58	64	54	70	78	83	100
	50	0	21	-	26	30	28	40	32	40	26	44	72	74	100
	3	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Proteus spp.	31	39	48	-	58	42	65	84	56	87	100	93	87	50	-
	51	12	26	-	30	17	2	61	16	68	96	96	90	57	-
	32	22	46	-	44	34	37	53	50	77	100	100	96	54	-
Pseudomonas aeruginosa	93	-	-	65	64	51	60	64	66	60	77	-	83	-	100
	110	-	-	32	38	32	33	40	54	42	52	-	60	-	97
	43	-	-	21	30	18	21	28	23	21	46	-	30	-	100
Acinetobacter spp.	27	0	6	-	29	33	37	40	60	40	22	50	37	65	100
	81	0	11	-	10	7	15	24	30	22	11	20	15	51	100
	33	0	0	-	3	3	9	2	25	12	3	0	12	50	100

- Not done



PERCENTAGE SENSITIVITY

OPD
WARD
ICU

GPC

	No. of Isolates	Penicillin	Ampicillin	Oxacillin	Erythromycin	Clindamycin	Gentamicin HLAR	Vancomycin / Teicoplanin	Linezolid	Tigecycline
<i>Staph aureus</i>	5	-	-	-	-	-	-	-	-	-
	11	9	-	45	27	40	-	100	-	100
	8	0	-	88	33	75	-	100	-	100
<i>Staph CNS</i>	14	0	-	36	33	57	-	100	-	100
	26	0	-	8	15	31	-	100	-	100
	6	0	-	17	0	17	-	100	-	100
<i>Enterococcus spp.</i>	5	-	-	-	-	-	-	-	-	-
	76	-	26	-	-	-	24	63	99*	100
	58	-	4	-	-	-	14	54	100	100

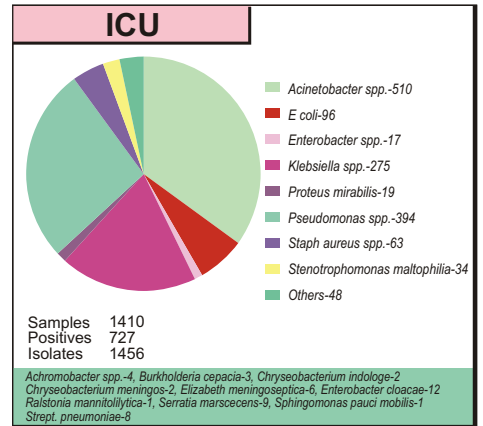
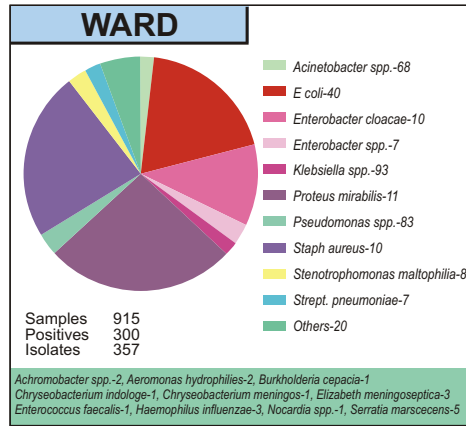
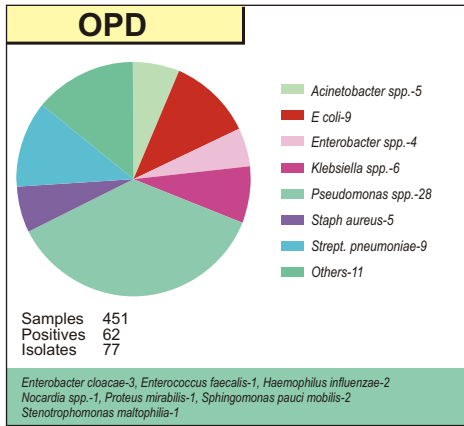
* One isolate
- Not done

GNB

	No of isolates	Ampicillin	Ceftriaxone	Ceftazidime	Cefepime	Ciprofloxacin	Gentamicin	Amikacin	Netilmicin	Piperacillin+ Tazobactam	Cefoperazone+ Sulbactam	Ampicillin - Sulbactam	Ertapenem	Imipenem / Meropenem	Tigecycline	Colistin
<i>E. coli</i>	13	15	15	-	15	15	38	92	95	77	83	-	100	100	100	100
	90	1	9	-	9	8	59	71	74	29	48	-	76	94	96	100
	62	5	13	-	15	11	45	82	76	46	62	-	78	89	100	97
<i>Enterobacter spp.</i>	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20	5	5	-	30	20	20	42	14	50	44	-	58	83	65	100
	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Klebsiella spp.</i>	17	0	31	-	29	24	25	53	50	29	29	-	29	33	-	100
	105	0	5	-	4	8	17	51	56	19	21	-	31	53	49	96
	85	0	1	-	1	2	2	47	47	9	10	-	24	59	65	99
<i>Pseudomonas spp.</i>	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	26	-	-	8	23	27	19	42	45	50	8	-	-	35	-	100
	23	-	-	21	18	17	17	17	21	52	17	-	-	22	-	100
<i>Acinetobacter spp.</i>	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	50	-	9	20	17	12	22	32	47	18	27	15	-	19	56	96
	40	-	0	18	15	16	18	40	55	15	22	20	-	20	38	100

- Not done

RESPIRATORY ISOLATES January - December 2009



PERCENTAGE SENSITIVITY

OPD
WARD
ICU

GPC	No. of Isolates	Penicillin	Oxacillin	Ceftriaxone	Clindamycin	Erythromycin	Ciprofloxacin	Vancomycin / Teicoplanin	Linezolid	Tigecycline
<i>Staph. aureus</i>	5	-	-	-	-	-	-	-	-	-
	10	0	60	-	60	20	-	100	100	100
	63	0	21	-	32	24	-	100	100	100
<i>Strept. pneumoniae</i>	9	78*	100	100	100	89	85	100	-	-
	7	100	100	100	86	86	100	100	-	-
	8	100	100	100	100	100	100	100	-	-

*2 isolates (MS to penicillin)
- Not done

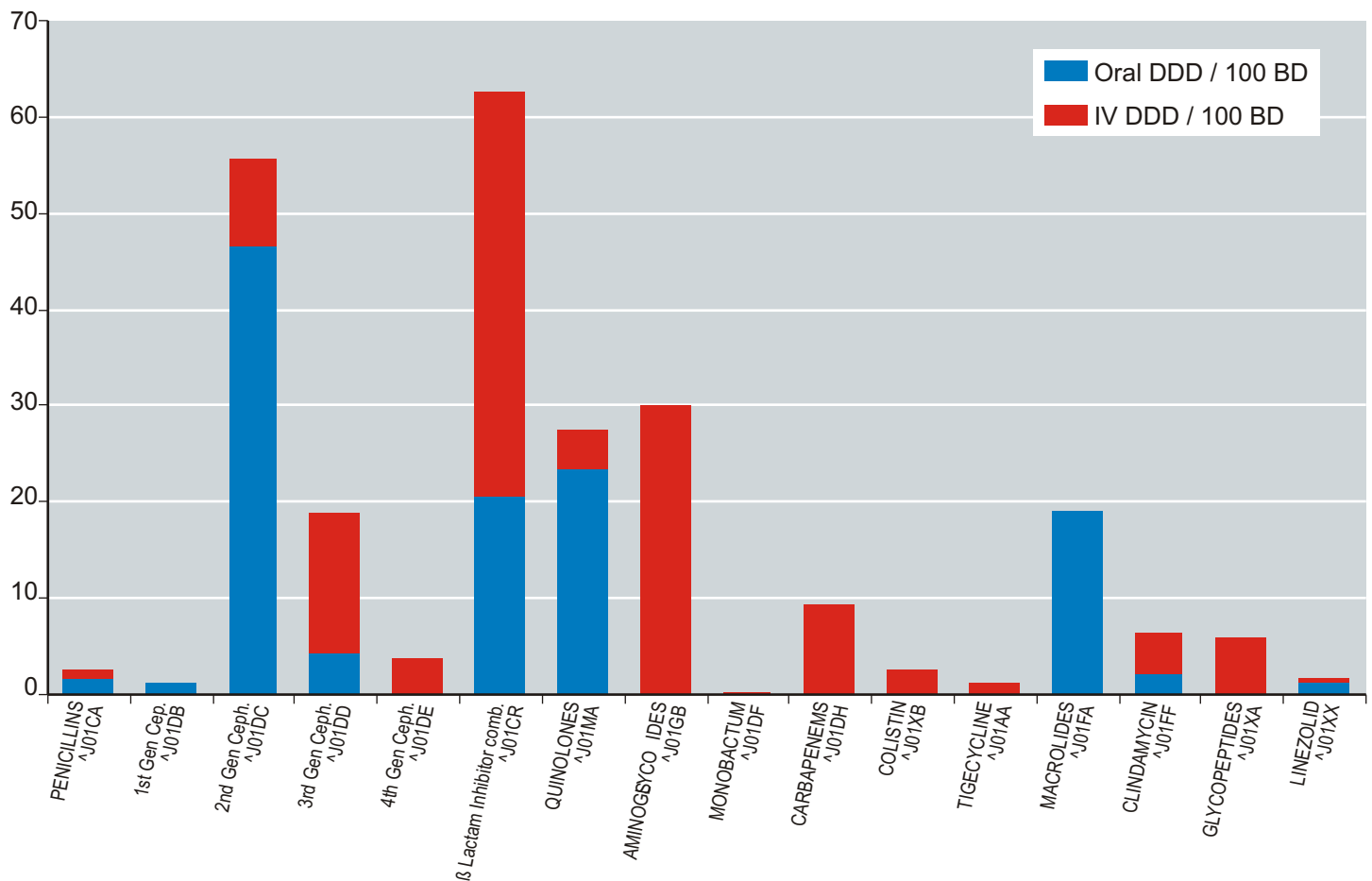
GNB	No of isolates	Ceftriaxone	Ceftazidime	Cefipime	Gentamicin	Amikacin	Ciprofloxacin	Co-trimoxazole	Piperacillin + Tazobactam	Cefoperazone+ Sulbactam	Ertapenem	Imipenem / Meropenem	Tigecycline	Colistin
<i>E. coli</i>	9	11	-	11	33	77	0	-	50	55	78	99	100	100
	40	5	-	5	26	80	2	0	49	59	92	97	100	98
	96	7	-	9	36	69	4	33	32	56	80	82	100	100
<i>Enterobacter spp.</i>	4	75	-	75	75	75	99	-	75	75	75	75	75	100
	7	43	-	57	57	57	40	99	57	57	57	71	60	-
	17	12	-	12	18	29	12	50	29	19	51	62	69	100
<i>Klebsiella spp.</i>	6	43	-	37	57	99	43	-	57	85	99	99	80	100
	93	5	-	8	15	58	4	33	24	35	52	65	49	97
	275	5	-	6	25	55	13	19	20	29	51	65	60	100
<i>Pseudomonas spp.</i>	28	0	84	68	73	86	61	-	87	89	90	90	-	99
	83	0	51	57	52	57	51	0	71	54	61	61	-	99
	394	0	27	32	32	33	28	0	52	32	37	37	-	99
<i>Acinetobacter spp.</i>	5	0	0	0	0	25	0	0	0	0	-	0	100	100
	68	3	4	5	15	22	6	8	6	6	-	4	63	99
	510	1	2	2	14	15	3	10	3	9	-	3	47	99

- Not done

*PRESCRIPTION AUDITING OF ANTIMICROBIALS

January - December 2009

**DDD / 100 BD



*Based on the hospital pharmacy data of the antibiotic dispensed.

** DDD - Daily Defined Doses: Calculated as per the Anatomical Therapeutic Chemical (ATC) classification index, WHO Collaborating Centre for Drug Statistics Methodology, OSLO, Norway.

^ATC Codes.

RECENT PUBLICATIONS

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HIGHLIGHTS - In blood isolates in-patient department

ACCo resistance in *S.typhi*: 7%, Ciproflox resistance: 18% to 20%.
 ESBL in enterobacteriaceae: 50.30%
 Carbapenemase in enterobacteriaceae: 35.8%
 (11.3% KPC, 24.5% MBLs)
 Amp C production in enterobacteriaceae: 7.6%
 VRE: 31%
 MRSA: 34%
 (However, overall prevalence of the above drug resistance markers in the 1024 blood positive samples was as :ESBL: 16.2%, Amp C: 2.4%, Carbapenemase: 11.46%, VRE: 3.9%, MRSA: 1.75%)

WORKSHOP HELD

Satellite pre-conference workshop of annual conference of IAMM - Delhi Chapter was held on March 12, 2010 at SGRH on the topic :
Rapid Tools in the diagnosis of Tuberculosis & MDR TB (HAIN test)

Case Report - Ceftriaxone Resistant..... (contd. from page 1)

MDR pathogenic bacteria and makes the selection of treatment for shigellosis more problematic. Ciprofloxacin or other fluoroquinolones have been recommended as the drug of choice for therapy in both adults and children by the WHO.¹ However resistance to nalidixic acid has increased steadily since its emergence in 2002. Resistance as high as 72% to nalidixic acid and 49.5% to ciprofloxacin has already been reported.² A similar trend has been reported from other parts of India and Asia.^{3,4,5} Ceftriaxone and azithromycin are considered as alternative drugs suitable for *Shigella* treatment.¹ But strains of *Shigella* spp. producing ESBLs conferring resistance to third generation cephalosporins have also been reported.^{2,6} The first occurrence of third generation cephalosporin resistant *S. flexneri* was from the stool sample of a 16-month-old Algerian child hospitalized in Paris, France, in 1995.⁶ Since then many strains of *Shigella* spp. harbouring different types of ESBLs have been reported in developed and developing countries in Asia.⁷ To our knowledge this is the first case of ceftriaxone resistant *Shigella* from North India, the other two cases are reported from south India.^{2,4} This emergence of resistance to ceftriaxone resistance by ESBL confers evolutionary advantage and we predict that ceftriaxone resistant *Shigella* spp. will become more prevalent in due course of time. Therefore, apart from routine antimicrobial susceptibility testing for all *Shigella* strains, more vigilance is required in detecting ESBL-producing *Shigella* spp.

In a country like India where shigellosis is more common in children from under-privileged society, effective treatment of life threatening shigellosis by carbapenems will pose a serious economic and therapeutic challenge. Alternative drugs as azithromycin should be evaluated further for treatment of shigellosis.

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Book Review / Reflections (contd. from page 1)

bactericidal assays would enhance the write-up. Treatment of tuberculosis (p126-127) could benefit by reference to the national programme schedules and mention of the Directly Observed Treatment Short-course (DOTS).

The section **Choosing Optimal Antimicrobial Therapy** is well written. However, each clinical facility should evolve its own policy to suit its milieu, this chapter can be a good guide. The 'Final Thought' is a pithy piece which should guide person interested in infectious diseases.

Overall, the book under review is a useful addition to the collection of all clinicians and laboratory personnel concerned with getting their infected patients 'up and going'! I am sure readers will enjoy going through it. The reviewer enjoyed undertaking the exercise of appraising the book.

Lt. Gen. D. Raghunath (Retd.)

Sir Dorabji Tata Centre for Research in Tropical Diseases
Innovation Centre, Indian Institute of Science Campus

.....
Congratulations for the publication of the book which, I am sure, will be an important and valuable contribution in an area largely neglected.

Dr. Pallab Ray, Prof., Dept of Medical Microbiology,

Post Graduate Institute of Medical Education and Research, Chandigarh

.....
Thank you for sending me the wonderful book. I have not seen such book in our infectious disease field. The print, setup is good, photographs are good. Overall presentation is very good. Congratulation for such achievement! Convey the same to Jaswinder. I have seen her name in some of the cases.

Dr. Arunaloke Chakrabarti,

Prof., Dept of Medical Microbiology (Mycology),

Post Graduate Institute of Medical Education and Research, Chandigarh

.....
Congratulations for your book. This was long awaited.

Dr. Monorama Deb,

Prof and Chairperson VMMC & Safdurjung Hospital, New Delhi

.....
Wow, the book looks awesome.

Dr. Camilla Rodrigues, Consultant Clinical Microbiologist

P.D. Hinduja Hospital & Medical Research Center, Mumbai

.....
It is an informative book and I think all of us who have been working in the laboratory must read it so that a proper consultation can be given whenever clinicians come to us for advice. We do not have any such "ready reckoner" for infectious diseases.

Dr. Arti Kapil, Prof., Dept of Medical Microbiology

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