

# Anti Microbial Resistance in Salmonella Infection in a Paediatric Setting – An Alarm !

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## Background and Introduction :

Enteric fever has a huge disease burden in the developing world with poor sanitation, food and water safety. There are a few studies bringing out the clinical features, epidemiology including the antimicrobial resistance seen in Salmonella species. This study reviews the clinical and laboratory profile, treatment and emerging trends of antimicrobial resistance of paediatric Salmonella infections from 2021-2024 as seen in a tertiary care paediatric hospital in South India

## Methods :

A retrospective study on 124 patients whose cultures were positive for Salmonella species between January 2021 and August 2024 were included in the study

Demographic details, clinical and laboratory findings and outcome of patients were noted from the in patient case records

Blood for cultures were collected using strict aseptic precautions

Blood cultures were performed using the UK standards for Microbiological Investigations<sup>1</sup>

Two sets in each case loaded onto the BD BACTEC / FX200 Systems ( BD Sparks MD USA) Peds Plus and Aerobic F Bactec bottles were used

Aerobic incubation was done at 37°C for 7 days protocol

Loopfuls of the Blood broth mixture from Positive bottles were explanted onto Blood agar ( 5-6% sheep blood), MacConkey agar, Chocolate agar, CLED agar and Brain Heart Infusion agar and Gram smears were seen

Conventional identification, biochemical reactions were performed and serotyping of isolates were done using anti- sera from BIORAD France by using the slide agglutination technique

Antimicrobial susceptibility testing was performed using disc diffusion technique and MIC's were performed using E test methodology

Antimicrobial agents tested	MIC's performed for
Ampicillin	Ciprofloxacin *
Trimethoprim sulphamethoxazole	Ceftriaxone **
Chloramphenicol	Azithromycin***
Pefloxacin ,	
Ceftriaxone	
Azithromycin	

Interpretation done using EUCAST guidelines<sup>2</sup> 20<sup>21-24</sup>

\* Ciprofloxacin MIC's > 0.06g/ml were considered to denote failure of monotherapy ( Resistance to Quinolones )

\*\* Ceftriaxone MIC's performed from < 0.25 ug/ml considered as susceptible

\*\*\*Azithromycin MIC's performed <16g/ml considered as susceptible

## Results. No. of patients : 124

	No.	%
gender Male	79	63.7
Female	45	36.3
Age 0-6 mths	3	02.4
6mths	5	04.0
1-2 y	22	17.7
2-5 y	33	26.6
5-15 y	54	43.5
15-16 y	7	05.6

Symptoms	No	%	Signs	No.	%
Fever	122	93.8	Fever	58	46.7
Vomiting	32	25.8	Hepatomegaly	14	11.2
Diarrhoea	26	20.9	Throat congestion	7	5.6
Abdominal Pain	22	17.4	Abdominal tenderness	10	8.0
Cough	27	21.7	Splenomegaly	5	4.0
Nerological	1	0.8	Tachycardia	36	29
Headache	13	10.4	Coated tongue	4	3.2
Decreased Urination And Constipation	5	5			

## LABORATORY PROFILE

Table II a - (CRP: C - Reactive protein,  
ESR: Erythrocyte sedimentation rate,  
LFT: Liver function tests)

Table II b:  
Identification of organisms

Table II c: Laboratory profile :  
Antimicrobial resistance pattern

Parameter	No. of cases	%	Name	No.	%	Salmonella	AMP	CO	CH	Pef	CIP	CRO(%)	AZI	MDR
WBC count Normal	55	44.34	Salmonella typhi	104	83.8	Species	(%)2	(%)1	(%)	(%)	(%)		(%)	
Leucocytosis	20	16.1	Salmonella paratyphi A	10	8									
Leucopenia	49	39.51	Salmonella entritidis/ typhimurium	8	6.4									
Platelet count Normal	115	92.74	Salmonella gallinarum	2	1.6	N=124	(1.61)	(0.8)	0	111 (89.51)	111 (89.15)	0	1 (0.8)	Nil
Thrombocytopenia	9	7.2												
Elevated CRP	38	30.64												
Elevated LFT	13	10.48												
Widal test Significant titre	58	46.77												

Conclusions :

- Suspect enteric fever in infants , children and adolescents even with non specific manifestations
- High fluoroquinolone resistance as seen in this study makes them an unsuitable choice for empiric or combination therapy
- 100% susceptibility to 3rd generation cephalosporins and azithromycin makes them suitable alternatives for treating enteric fever
- 100% Susceptibility to Ceftriaxone and Chloramphenicol noted
- No ESBL or Amp C producing Salmonella species observed in the study

(AMP- Ampicillin, CO-Cotrimoxazole, CH-Chloramphenicol, Pef (Pefloxacin)

CIP- Ciprofloxacin, CRO-Ceftriaxone, AZI - Azithromycin,  
MDR- Multidrug resistant, R - Resistant,

References

1.<https://www.rcpath.org/profession/publications/standards-for-microbiology-investigations.html>

2.EUCAST.org