Salmonella enterica serovar Paratyphi A: Common cause of Salmonellosis among patients attending Om Hospital and Research Centre, Kathmandu, Nepal

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Country Profile: Nepal

- Total Area: 147,181 sq Km
- Total Population: 29 million
ParaTyphoid: Disease Burden

• Paratyphoid and Typhoid fever is a global public health problem
• Typhoid affects around 22 million and Paratyphoid affects about 6 million people a year
• Due to typhoid fever 200,000 deaths occur worldwide and due to paratyphoid around 60,000 death occur in a year
• Kathmandu, the capital city of Nepal, has previously been coined a typhoid fever capital of the world
• Enteric Fever among top 10 causes for OPD consultation & among five causes for hospitalization in Nepal
Background

- Enteric fever due to S.Typhi and S.Paratyphi A is common in South East Asia, as is in Nepal where it is endemic throughout the year.

- At Om hospital, S. Paratyphi A was found to be one of the common cause of enteric fever.

- Variability was however noted in terms of year, month, age, gender and antibiograms of the isolates.
Objectives

- This five years retrospective study (2009-2013) was carried out to:
  - 1) to determine total number of cases of S. Paratyphi A with age, sex, month and year of their occurrence during this period, and
  - 2) to determine the antimicrobial susceptibility of the isolates
Study Settings
Om Hospital and Research Centre, Chabahil, Kathmandu, Nepal

Methods
➢ Five years (2009-2013)* data was collected from Records of microbiology section of blood culture, in Department of Pathology, Om Hospital, from the patients with signs and symptoms of Enteric fever. (*2014)
➢ Samples were processed according to standard protocol of American society of Microbiology (ASM).
➢ Antibiotic susceptibility of the isolates was determined using Kirby-Bauer disc diffusion method on Mueller Hinton Agar at pH 7.2. Antibiotic discs tested were: Amoxycillin(10 mcg), Ciprofloxacin(5 mcg), Ofloxacin(5 mcg), Cefixime(30 mcg), Cotrimoxazole (25 mcg), Ceftriaxone(30 mcg), Nalidixic Acid(30 mcg)**, Chloramphenicol(30 mcg) and Azithromycin(15 mcg). (HiMedia Antimicrobial Susceptibility Discs)

(**After 2013)
## Findings

### Table 1: Total S.Typhi and S. Paratyphi A isolates in Om Hospital (2009-2013)

<table>
<thead>
<tr>
<th></th>
<th>S. Typhi</th>
<th>S. Paratyphi A</th>
<th>Total Salmonella</th>
</tr>
</thead>
<tbody>
<tr>
<td>year-2009</td>
<td>32</td>
<td>31</td>
<td>63</td>
</tr>
<tr>
<td>year-2010</td>
<td>80</td>
<td>127</td>
<td>207</td>
</tr>
<tr>
<td>year-2011</td>
<td>13</td>
<td>17</td>
<td>30</td>
</tr>
<tr>
<td>year-2012</td>
<td>17</td>
<td>52</td>
<td>69</td>
</tr>
<tr>
<td>year-2013</td>
<td>92</td>
<td>123</td>
<td>215</td>
</tr>
<tr>
<td>Total</td>
<td>234</td>
<td>350</td>
<td>584 (3.64%/16,039)</td>
</tr>
<tr>
<td>Percent</td>
<td>40</td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

#2014: 27 S. Typhi and 18 S. ParatyphiA = 45
Yearwise Distribution of S. Paratyphi A cases in Om Hospital (2009-2013)

Year-2009: 31
Year-2010: 127
Year-2011: 17
Year-2012: 52
Year-2013: 123

#2014-S.Paratyphi A=18
Monthwise Distribution of S. Paratyphi A cases in Om Hospital (2009-2013)
Sexwise Distribution of S. Paratyphi A cases at Om Hospital (2009-2013)

#2014--Male(61.1%), Female(38.9%)
Agewise Distribution of S. Paratyphi A cases at Om Hospital (2009-2013)
Antibiotic resistant pattern of S. Paratyphi A at Om hospital (2009-2013) by Disc Diffusion method

Am R

Yr-2009: 9.67%
Yr-2010: 11.76%
Yr-2011: 23.07%
Yr-2012: 12.19%
Yr-2013: 12.19%
#2014=16.66%

Azm R

Yr-2009: 0.00%
Yr-2010: 5.50%
Yr-2011: 26.92%
Yr-2012: 8.13%
Yr-2013: 8.13%
#2014+5.55%

Cfx R

Yr-2009: 0.00%
Yr-2010: 2.36%
Yr-2011: 11.76%
Yr-2012: 5.76%
Yr-2013: 2.43%
#2014=0%

Cot R

Yr-2009: 0.00%
Yr-2010: 0.80%
Yr-2011: 5.88%
Yr-2012: 11.53%
Yr-2013: 23.57%
#2014+11.11%
Antibiotic sensitivity pattern of *S. Paratyphi* A (2009-2012) to Cf, Of, C, Cro according to CLSI guidelines 2011 (HIMEDIA)

<table>
<thead>
<tr>
<th>Years</th>
<th>CF</th>
<th>Of</th>
<th>C</th>
<th>Cro</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Yr-2009</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Yr-2010</td>
<td>95%</td>
<td>95%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Yr-2011</td>
<td>94%</td>
<td>94%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Yr-2012</td>
<td>96.00%</td>
<td>96.00%</td>
<td>100%</td>
<td>98.00%</td>
</tr>
</tbody>
</table>

Cf=Ciprofloxacin, Of=Ofloxacin, C=Chloramphenicol, Cro=Ceftriaxone
Frequency of Nalidixic acid resistant S. Paratyphi A at Om Hospital (2013-2014)

Antibiotic sensitivity pattern of S. Paratyphi A (2013-2014) to Cf, Of, C, Cro according to CLSI guidelines 2012, Journal of Clinical Microbiology*

<table>
<thead>
<tr>
<th></th>
<th>Cf</th>
<th>Of</th>
<th>C</th>
<th>Cro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yr-2013</td>
<td>IS</td>
<td>IS</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>85%</td>
<td>85%</td>
<td>100%</td>
<td>98%</td>
</tr>
<tr>
<td>Yr-2014</td>
<td>80%</td>
<td>80%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

IS-Intermediate Sensitive
Conclusion

- This study shows that Enteric fever due to S. Paratyphi A was/is more common than due to S. Typhi at this institution.
- Paratyphoid was prevalent throughout the year and among in all age and gender group and will remain so till there is significant improvement in sanitation and personal hygiene.
- Paratyphoid fever was seen more common among school-age children and young adults.
- There were no multidrug resistant cases, however, morbidity was noted. To the best knowledge of the authors there was no mortality.
- There was very high incidence of Nalidixic acid Resistant S. Paratyphi A cases at this institution.
Recommendations

• To cope with high number of paratyphoid enteric fever cases, significant improvement in sanitation and personal hygiene along with vaccination is needed.

• Vaccination for Typhoid and Paratyphoid should be priority programme of the Government of Nepal and it should be introduced in schools and made available to all who seek it as is evident from this study predominantly school-age children and young adults are affected; as the results will be felt with reduction in no. of salmonella cases.

• Antibiotics should be prescribed only after Antimicrobial susceptibility test

• MIC and Molecular characterization of NAR S. Paratyphi A along with molecular mechanism of resistance and epidemiology should be done.
Recommendations

• Regional and National level surveillances of paratyphi fever at community level is must, as most of enteric fever cases are treated in local pharmacies and health posts in Nepal.

• Concerned authority should be very alert as enteric fever outbreak can occur in any season of the year (no seasonal variation).

• Treatment strategy of Nepal to enteric fever needs revision as there is a high number of NARS isolates and which is in increasing trend.
Acknowledgement

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