

### Evaluation of Urinary Tract Infection In Children With Acute Gastroenteritis

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#### Abstract :

**Background:** Diarrhea is common in infants and children, and urinary tract infection (UTI) is the second most common bacterial infection. Association of urinary tract infections with anomalies of genitourinary tract is common. Diarrhoea may be manifestation of urinary tract infections in this age therefore we planned to evaluate if this can be used as a high risk index to pick up cases of urinary tract infections. There have been a limited number of studies on the correlation between UTI and acute diarrhea, and it is still not clear when to investigate for UTI in young children presenting with diarrhea Therefore, this study aimed to evaluate the relationship between diarrhea and UTI. **Objective:** Primary objective of this is to assess association of urinary tract infection in children with acute gastroenteritis. **Methods:** Study includes 546 children presenting with diarrhea in the age group of 1 to 60 months after excluding congenital anomalies of Genitourinary and Gastrointestinal tracts. Complete urine examination and urine culture sensitivity were done. **Results:** The overall prevalence of UTI in children presenting primarily with diarrhea was 6.04%. The prevalence of UTI in girls presenting with diarrhea was more in contrast to boys. **Conclusion:** Diarrhea is one of the common manifestations and risk factors of UTI in children.

**Keywords :** Dehydration, Diarrhea, Urinary tract infection.

#### Introduction:

Diarrhea is common in infants and children, and urinary tract infections (UTI) is the second most common bacterial infection.<sup>(1,3,4,6)</sup> Since in developing countries diarrhea is more, demonstration of an association between UTIs &

Acute diarrhea will be of clinical significance. Association of urinary tract infections with anomalies of genitourinary tract is common and Diarrhea may be the presenting - symptom in younger children with urinary tract infections, as diarrhoea is common manifestation of urinary tract infections in this period therefore we planned to evaluate if this can be used as a high risk index to pick up cases of urinary tract infections.<sup>(1)</sup> There have been a limited number of studies on the correlation between UTIs and acute diarrhea, and it is still not clear when to investigate for UTIs in young children presenting with diarrhea. Therefore, this study aimed to evaluate the relationship between diarrhea and UTIs. Along with diarrhoea, Urinary tract infections in co-relation to source of drinking water, socioeconomic status of family, maternal education, diaper usage, circumcision, severity of dehydration and leucocyturia were also evaluated.<sup>(2)</sup>

#### Methodology :

**Aim :** To assess association of urinary tract infections in children with acute gastroenteritis. Early diagnosis of urinary tract infections in children with acute gastroenteritis as preventive measures to reduce the risk of complications of UTIs.

Cross sectional observational study conducted in 546 children with acute gastro enteritis in the age group of 1 to 60 months attending paediatric ward and OPD of Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri Pune from october 2017 to October 2019. Children with chronic diarrhea, antibiotics 48 hrs prior to admission, previous history of UTIs, genitourinary and gastrointestinal anomalies were excluded. After obtaining the consent, required physical examination and necessary investigations were done as per the proforma. Urine samples were obtained from children less than two years using catheter and for the others (with toilet training control) by midstream clean catch method.<sup>(9)</sup> All the data collected was entered in MS EXCEL and analysed by using SPSS. Chi square test and ANOVA test was applied to check the statistical association.

#### Results :

**Table 1:** Distribution of the cases based on Age and gender

| Age in months | Gender     |            | Total      |
|---------------|------------|------------|------------|
|               | Male       | Female     |            |
| 1-6           | 30         | 11         | 41         |
| 7-12          | 48         | 23         | 71         |
| 13-60         | 266        | 168        | 434        |
| <b>Total</b>  | <b>344</b> | <b>202</b> | <b>546</b> |

**Table 2 :** Distribution of the cases based on their water sources for drinking

| Water sources for drinking | No. of cases | Percentage (%) |
|----------------------------|--------------|----------------|
| Municipal supply           | 356          | 65.2           |
| Bore wells                 | 102          | 18.6           |
| Open well                  | 32           | 5.8            |
| Others                     | 56           | 10.2           |
| <b>Total</b>               | <b>546</b>   | <b>100</b>     |

**Table 3 :** Distribution of the cases based on their Socio-economic status

| Socio-economic status | No. of patients | Percentage (%) |
|-----------------------|-----------------|----------------|
| Upper (I)             | 29              | 5.3            |
| Upper Middle (II)     | 34              | 6.2            |
| Lower Middle (III)    | 229             | 41.9           |
| Upper Lower (IV)      | 171             | 31.3           |
| Lower (V)             | 83              | 15.2           |
| <b>Total</b>          | <b>546</b>      | <b>100</b>     |

**Table 4 :** Distribution of the cases based on their Maternal Education

| Maternal Education                           | No. of cases | Percentage (%) |
|--|--------------|----------------|
| Below 7 <sup>th</sup> standard               | 164          | 30             |
| 8 <sup>th</sup> to 12 <sup>th</sup> standard | 286          | 52.3           |
| Graduation                                   | 73           | 13.3           |
| Postgraduation                               | 23           | 4.2            |
| <b>Total</b>                                 | <b>546</b>   | <b>100</b>     |

**Table 5 :** Distribution of the cases based on their severity of dehydration

| Age in months | No dehydration |           | Some dehydration |           | Severe dehydration |           | Total      |
|---------------|----------------|-----------|------------------|-----------|--------------------|-----------|------------|
|               | Male           | Female    | Male             | Female    | Male               | Female    |            |
| 1-6           | 8              | 2         | 19               | 8         | 3                  | 1         | 41         |
| 7-12          | 20             | 7         | 24               | 11        | 4                  | 5         | 71         |
| 13-60         | 92             | 66        | 133              | 77        | 38                 | 28        | 434        |
| <b>Total</b>  | <b>120</b>     | <b>75</b> | <b>176</b>       | <b>96</b> | <b>45</b>          | <b>34</b> | <b>546</b> |

**Table 6 :** Distribution of the cases based on diaper usage

| Diaper |        |          |        | Total |
|--------|--------|----------|--------|-------|
| Used   |        | Not used |        |       |
| Male   | Female | Male     | Female | 546   |
| 147    | 82     | 197      | 120    |       |
| 229    |        | 317      |        |       |

**Table 7 :** Distribution of the cases based on Circumcision

| Age in months | Circumcision |            | Total      |
|---------------|--------------|------------|------------|
|               | Done         | Not done   |            |
| 1-6           | 0            | 30         | 30         |
| 7-12          | 1            | 47         | 48         |
| 13-60         | 19           | 247        | 266        |
| <b>Total</b>  | <b>20</b>    | <b>324</b> | <b>344</b> |

**Table 8 :** Distribution of the cases based on Total leukocyte counts

| Age in months | Total leukocyte counts |           |            |            | Total      |
|---------------|------------------------|-----------|------------|------------|------------|
|               | Raised                 |           | Normal     |            |            |
|               | Male                   | Female    | Male       | Female     |            |
| 1-6           | 10                     | 5         | 18         | 8          | 41         |
| 7-12          | 18                     | 11        | 28         | 14         | 71         |
| 13-60         | 66                     | 60        | 204        | 104        | 434        |
| <b>Total</b>  | <b>94</b>              | <b>76</b> | <b>250</b> | <b>126</b> | <b>546</b> |

Table 9 : Distribution of the cases based on Leucocyturia

| Age in months | Leucocyturia |           |            |            | Total      |
|---------------|--------------|-----------|------------|------------|------------|
|               | Present      |           | Absent     |            |            |
|               | Male         | Female    | Male       | Female     |            |
| 1-6           | 4            | 3         | 26         | 8          | 41         |
| 7-12          | 11           | 7         | 37         | 16         | 71         |
| 13-60         | 17           | 17        | 249        | 151        | 434        |
| <b>Total</b>  | <b>32</b>    | <b>27</b> | <b>312</b> | <b>175</b> | <b>546</b> |

Table 10 : Distribution of the cases based on growth of organisms in Urine culture

| Organisms    | No. of cases | Percentage (%) |
|--------------|--------------|----------------|
| E.coli       | 24           | 72.8           |
| Klebsiella   | 7            | 21.2           |
| Proteus      | 1            | 3              |
| Candida      | 1            | 3              |
| <b>Total</b> | <b>33</b>    | <b>100</b>     |

Table 11 : Summary of study observation

| Criteria                |  | Urine culture |          | Total no. of cases | Percentage (%) |
|-------------------------|--|---------------|----------|--------------------|----------------|
|                         |  | Positive      | Negative |                    |                |
| Age                     | 1-6 months                                   | 3             | 38       | 41                 | 7.3            |
|                         | 7-12 months                                  | 9             | 62       | 71                 | 12.6           |
|                         | 13-60 months                                 | 21            | 413      | 434                | 4.8            |
| Gender                  | Male   | 15            | 329      | 344                | 4.3            |
|                         | Female                                       | 18            | 184      | 202                | 8.9            |
| Socio-economic status   | Upper (I)                                    | 1             | 28       | 29                 | 3.4            |
|                         | Upper Middle (II)                            | 1             | 33       | 34                 | 2.9            |
|                         | Lower Middle (III)                           | 7             | 222      | 229                | 3              |
|                         | Upper Lower (IV)                             | 14            | 157      | 171                | 8.1            |
|                         | Lower (V)                                    | 10            | 73       | 83                 | 12.04          |
| Water supply            | Municipal supply                             | 14            | 342      | 356                | 3.9            |
|                         | Bore wells                                   | 9             | 93       | 102                | 8.8            |
|                         | Open well                                    | 8             | 24       | 32                 | 2.5            |
|                         | Others                                       | 2             | 54       | 56                 | 3.5            |
| Maternal education      | Below 7 <sup>th</sup> standard               | 18            | 146      | 164                | 10.9           |
|                         | 8 <sup>th</sup> to 12 <sup>th</sup> standard | 12            | 274      | 286                | 4.1            |
|                         | Graduation                                   | 2             | 71       | 73                 | 2.7            |
|                         | Postgraduation                               | 1             | 22       | 23                 | 4.3            |
| Severity of dehydration | No dehydration                               | 8             | 187      | 195                | 4.1            |
|                         | Some dehydration                             | 11            | 261      | 272                | 4.04           |
|                         | Severe dehydration                           | 14            | 65       | 79                 | 17.7           |
| Diaper                  | Used   | 20            | 209      | 229                | 8.7            |
|                         | Not used                                     | 13            | 304      | 317                | 4.1            |
| Circumcision            | Done   | 0             | 20       | 20                 | 0              |
|                         | Not Done                                     | 16            | 308      | 324                | 4.9            |
| TLC                     | Raised                                       | 28            | 142      | 170                | 16.4           |
|                         | Normal                                       | 5             | 371      | 374                | 1.3            |
| Leucocyturia            | Present                                      | 32            | 27       | 59                 | 54.2           |
|                         | Absent                                       | 1             | 486      | 487                | 0.2            |
| Organisms               | E.coli                                       | 24            | 522      | 546                | 4.3            |
|                         | Klebsiella                                   | 7             | 539      | 546                | 1.2            |
|                         | Proteus                                      | 1             | 545      | 546                | 0.2            |
|                         | Candida                                      | 1             | 545      | 546                | 0.2            |

Discussion :

In present study majority (72.2%) of urine culture growth were E.coli (n=24) followed by Klebsiella (n=7). Positive urine cultures are more seen with female children in comparison to males, 7-12 month age group, lower socioeconomic class, cases using Open well water for drinking,<sup>(2,11)</sup> cases with Maternal Education below 7<sup>th</sup> standard, cases reported with Severe dehydration. This study also showed 18 cases out of 229 cases with using diaper shown positive culture reports. Whereas, Only 15 out of 317 cases without using diaper shown positive culture. 16 out of 324 cases without Circumcision shown positive culture reports. Whereas, no cases reported positive in circumcised patients. 28 cases out of 170 cases with Raised TLC shown positive culture reports. 32 cases out of 59 cases with Leucocyturia shown positive culture reports. Whereas, 1 out of 487 cases without Leucocyturia shown positive culture reports, all this findings were statistically significant. (P< 0.05) Similar to study conducted by O'Brien K et al., Kavitha et al.,<sup>(2)</sup> Rachamadugu et al.,(2017)<sup>(1)</sup> Sharma A et al<sup>(10)</sup>, Akram M et al.<sup>(11)</sup> In the present study the overall prevalence of Urinary tract infections in children with acute gastroenteritis was 6.03%. Overall prevalence rate of many studies conducted all over world varies from 5%-27%. In a similar study done by Rachamadugu et al.,(2017)<sup>(1)</sup>, the prevalence of urinary tract infection in children with diarrhea was 8%. Thakar et al.,<sup>(5)</sup> reported 8% prevalence. In a study by Umesh et al.,<sup>(7)</sup> among 458 children 16.73% showed culture positive. Whereas, Gholamreza et al.,(2016) for evaluation of urinary tract infection in children with gastro enteritis showed prevalence of was 27%.

Conclusion :

Urinary tract infection is more common in females,7-12months age group, low economic status, children using diaper, Severe dehydration, raised total leucocyte counts, leucocyturia and risk decreases with circumcision, well educated mothers.

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