

Rotavirus infection in children suffering from gastroenteritis in Kirkuk province

Gateen I. Ali , Hind I. Abdullah , Hadeel M. Younis

College of Dentistry, Tikrit University, Tikrit, Iraq

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Abstract:

This study was conducted in Kirkuk city on a total of 114 children suffering from acute diarrhea for less than two weeks duration and admitted to Azadi General Hospital in Kirkuk in Pediatric and emergencies wards and who attended to primary health center in Arafah and Al-Wassity. The main aim of this study was to diagnose acute gastroenteritis due to rotavirus infection among infants and children aged between one day to twenty four months, during five months. All fecal specimens were examined for children suffering from acute diarrhea, diagnostic laboratory tests were performed on each sample by macroscopic examination, microscopic examination and latex agglutination test for detecting the presence of rotavirus. The rate of acute Rota viral gastroenteritis in children was found to be 27 cases (23.68%) and infection with this virus increased in children this virus under two years old with slight difference between male 16 cases (14.03%) and female 11 cases (9.64%). At the same time the rate of acute Rota viral gastroenteritis was higher among urban children 12 cases (10.52%) than 5 cases (4.38%). Also, the frequency of the disease was found to be lower in breast feeding educated mother, and river water drinking children with percentage value of 10.63%, 14.28%, and 16.66% respectively than bottle feeding, illiterate mother and municipal water drinking children with values of 34.28%, 30.28%, and 25.55% respectively. The peak of this infection was seen in children age 6-12 month which recorded 30% while a lower value of 15.78% was recorded among children aged 1 day to 6 month.

Introduction:

Diarrhea is an important cause of infant and child morbidity and mortality. It is a priority problem in developing countries, including Iraq⁽¹⁾. Human rotavirus (HRV) has been found to be most common cause of infantile and childhood gastroenteritis in developing countries⁽²⁾. HRV characteristically cause severe diarrhea in infants and young children under two years of age and commonly results in dehydration and may even lead to fatal consequence. It was the major cause of acute gastroenteritis that should be required hospital admission⁽³⁾. Since the HRV cultivation was difficult, so there by the laboratory diagnosis was based on the demonstration of HRV in the stool by the electron microscopy (EM) and other various immunological methods in which the most sensitive and specific test was the enzyme linked immunosorbent assay (ELISA), while the latex agglutination (LA) was much simpler and faster that could provide the diagnosis within minutes after collecting the stool specimens^(4,5,6). The diagnosis of HRV gastroenteritis was helpful guide for proper treatment and to prevent any abuse of antibiotics therapy. In viral diarrhea, human rotaviruses (HRV) were by far the most common identified pathogen in addition to adenoviruses, caliciviruses, Norwalk and Norwalk like agents, astroviruses, and corona viruses. Rotaviruses are a major cause of diarrhoeal illness in human infants⁽⁷⁾.

Aim of study :

This study was to diagnose acute gastroenteritis due to rota virus infection among infants and children aged between one day to twenty four months, during five months

Patients and Methods:

A total of 114 infant and young children under 2 years of age suffering from diarrhea for less than ten day duration were studied in:

- 1- Kirkuk Pediatric Hospital.
- 2- Azadi General Hospital.
- 3- patient attended to Following Primary Centers (P.H.C.).
- A) Alwassity P.H.C.
- B) ARFA P.H.

Stool sample was collected from each patient who had diagnosed primarily as acute gastroenteritis case, three - five grams of Faeces were collected in a sterile containers labeled with the number of sample, patients name, sex, age, and the date of collection. Then transported to the laboratory of Azadi Hospital and examined immediately within two hours. The stool specimens were examined macroscopically to identify the color and consistency of the stool in addition to the presence of visible blood and mucus. The specimens were tested with litmus paper for an acid or alkaline pH. The stool for microscopic examination was chosen from an area with blood or mucus if present and a wet amount of each specimen was made by mixing a fleck of stool from the tip of a wooden applicator stick with one drop of lugol's iodine on a glass slide and covered with cover slip. The rotavirus antigen in faeces was detected by latex agglutination test, this technique was performed using slide Rota kit latex agglutination (Biomerieux, France) which is a monoclonal antibody sensitized latex reagent.

Results:

In this study 114 stool sample were examined the children up to 2 years were examined for the suffering from acute gastroenteritis, 67 were male and 47 were female [Table 1]. It is obvious that the of rotavirus gastroenteritis was highest among patient up to one year of age specially in (6-12) months [Table 2]. The rate of Rota viral gastroenteritis in rural patients is most common than urban patients [Table 3]. The rate of RV gastroenteritis was found to be the highest in patients who were bottle fed when compared with mixed fed and breast feeding [Table 4].

The major water supply is municipal origin (90 home drinking municipal water) when compared to another origin of water supply the RV gastroenteritis occur in 23 (25.55%), this reflect that the RV gastroenteritis occur more within the municipal water supply [Table 5]. The rate of infection in the illiterate mothers children were 4 (30.76%) from total number which is the highest percentage [Table 6]. Mother occupation is the most

important role in the infections of children [Table 7].Also, we found that the percentage of rotavirus in patients stool was very low after the first week of diarrhea[Table 8].Different color of stool was passed by patients with acute gastroenteritis and most of the patients in rotavirus infection passed yellowish 15(30%), greenish 7(26.6%) ,yellowish green 4(14.2%) and whitish 1(33.3%) ,all patient with RV gastroenteritis was not showed macroscopic blood in the stool. Also the presence of mucus in the stool was observed in 10 patient with acute gastroenteritis only one patient in the RV positive group showed the presence of mucus in their stool. The pH of stool was determined being either acid

or alkaline using litmus paper and it found to be acidic in 23(28.7%) and alkaline in 4 (11.76%)of patient with acute gastroenteritis.

Patient with acute gastroenteritis were examined microscopically mainly to determine the presence or absence of RBC and pus cell, regarding to the presence of RBC in stool of those patient with acute gastroenteritis 25(25%)of them had no RBC compared to only 2 (14%) had RBC in stool sample while regarding the presence of pus cell of those patient 25(26.3%) of them had no pus compared to only 2 (10.5%)of them had pus cell in stool sample [Table 9].

Table (1) : Rota viral gastroenteritis according to the sex.

| Sex | No . Examined | Rota Viral Gastroenteritis | |
|--------|---------------|----------------------------|---------|
| | | No . Positive | % |
| Male | 67 | 16 | 14.03 % |
| Female | 47 | 11 | 9.64% |
| Total | 114 | 27 | 23.68% |

Table(2):- Rota viral gastroenteritis according to age.

| Age group (months) | Total No. Examined | Rota Viral Gastroenteritis | |
|--------------------|--------------------|----------------------------|-------|
| | | No. Positive | % |
| >6 | 19 | 3 | 2.6 |
| >12 | 40 | 12 | 10.52 |
| >18 | 18 | 5 | 4.38 |
| >24 | 37 | 7 | 6.14 |
| Total | 114 | 27 | 23.63 |

Table (3) :- rotavirus infection according to residency .

| Residency | Total Examined | Rota Viral | |
|-----------|----------------|--------------|-------|
| | | No .Positive | % |
| Urban | 44 | 12 | 10.52 |
| Rural | 70 | 15 | 13.15 |
| Total | 114 | 27 | 23.67 |

Table (4) :- Proportion of Rotavirus among children with different Feeding habits

| Types of feeding | | | | | | | |
|------------------|---------------|-------|------------|---------------|-------|------------|---------------|
| Breast | | | Bottle | | | Mixed | |
| No. Tested | HRV. Positive | | No. Tested | HRV. Positive | | No. Tested | HRV. Positive |
| 47 | No. | % | 35 | No. | % | 32 | No. |
| | 5 | 10.63 | | 12 | 34.28 | | 10 |
| | | | | | | | 31.25 |

Table (5):- Correlation of water supply with rota viral gastroenteritis

| Origin | Total No . | No of +ve cases | % |
|-----------|------------|-----------------|-------|
| Municipal | 90 | 23 | 20.17 |
| River | 24 | 4 | 3.50 |
| Total | 114 | 27 | 23.68 |

Table (6) :- Rota viral gastroenteritis according to mothers educational level

| Mothers Educational Level | NO . Examined | Rotaviral gastroenteritis | |
|-----------------------------------|---------------|---------------------------|-------|
| | | No. Positive | % |
| Illiterate | 13 | 4 | 30.76 |
| Primary | 34 | 9 | 26.47 |
| Intermediate and Secondary | 60 | 13 | 21.28 |
| University | 7 | 1 | 14.28 |
| Total | 114 | 27 | 23.68 |

Table (7) :Distribution of Rota viral gastroenteritis according to mothers occupation

| Mothers Occupation | No. Examined | Rotavirus gastroenteritis | |
|--------------------|--------------|---------------------------|-------|
| | | No. Positive | % |
| House wife | 70 | 15 | 21.42 |
| Employee | 44 | 12 | 27.27 |
| Total | 114 | 27 | 23.68 |

Table (8) :- Relation between the duration of diarrhea and the finding of rotavirus in stool of patient with acute rotavirus gastroenteritis .

| Duration of diarrhea (day) | No .Tested | *HRV Positive | |
|----------------------------|------------|---------------|-------|
| | | NO | % |
| 1-2 | 27 | 9 | 33.33 |
| 3-4 | 50 | 14 | 28 |
| 5-7 | 12 | 2 | 16.66 |
| 8-10 | 25 | 2 | 8 |
| Total | 114 | 27 | 23.68 |

*Human rotavirus

Table 9:- Macroscopic and microscopic examination of stool specimen from patients with acute gastroenteritis

| Characteristics | No. Tested | HRV Positive | |
|-------------------------------|------------|--------------|-------|
| | | No. | % |
| 1-Consistency watery Loose | 64 | 20 | 31.2 |
| | 50 | 7 | 14 |
| 2-Colour yellowish | 50 | 15 | 30 |
| Greenish | 30 | 7 | 26.6 |
| Yellowish green | 28 | 4 | 14.2 |
| Whitish | 3 | 1 | 33.3 |
| Brownish | 1 | 0 | 0 |
| Bloody | 2 | 0 | 0 |
| 3-Mucus in stool | 10 | 1 | 10 |
| 4-PH of stool acidic | 80 | 23 | 28.7 |
| Alkaline | 34 | 4 | 11.76 |
| 5-Pus present | 19 | 2 | 10.5 |
| Absent | 95 | 25 | 26.3 |
| 6- RBC present | 14 | 2 | 14.2 |
| Absent | 100 | 25 | 25 |

Discussion:

Out of 114 infant and children up to 2 years , the attack rate of Rota gastroenteritis was 27(23.68%).This percentage represents rotavirus predominance cause of acute gastroenteritis in Kirkuk province in addition to another causes including bacteria and parasite. The importance of rotavirus as a causative agent of gastroenteritis in infant and children is also reported by other workers in Iraq ,such as ; in Baghdad ⁽⁸⁾, in Basrah ⁽⁹⁾ and in Mosul ⁽¹⁰⁾.There was no high difference in the proportion of Rota viral gastroenteritis between male and female ,this finding is in agreement with that reported ⁽¹¹⁾.Regarding the age distribution of rotavirus diarrhea and milk feeding were showed in this study that children from 6-24 months old were highly susceptible to rotavirus gastroenteritis. Rotavirus diarrhea was less frequent up to the age of 6 months which may be due to either reduced exposure to rotavirus of their main contact with either parents who were unlikely to be excreting rotavirus or due to maternal antibody and breast feeding may give some protection against the virus ,this finding is in accordance with previous study ⁽¹²⁾ .

While these result related to age variation in rotavirus gastroenteritis disagree with that result by ⁽¹³⁾. Regarding residency , the rate of Rota viral gastroenteritis in urban infants and young children was higher than that in rural

.Similar findings reported from Australia and South Africa study by ⁽¹⁴⁾ . Rota viral infection in infants and young children of illiterate mothers was highest 30.76 than that with the other levels of educational groups. It seems that there were high correlation between the infection and the educational level of the patients mother similar finding was reported by another investigator ⁽¹⁵⁾.The percentage of patients were shedding rotavirus in their stool become very low after the first week of diarrhea 2(8%)out of 25 patients, this agreement with other study ⁽¹⁶⁾.Regarding to the macroscopic examination in most cases of rotavirus gastroenteritis patients stool were shown as watery yellow or green not obviously bloody and rarely contain mucus . This observation is in agreement with that study by Lebaron ., et al ⁽¹⁷⁾.The finding of acidic pH in most cases of Rota virus gastroenteritis could be explained by the fact that the majority of children with this type of illness have lactose malabsorption in colon and the unabsorbed lactose undergoes fermentation by intestinal bacteria producing acid stool .This finding is in agreement with a study by Mitchell ,et al ⁽¹⁸⁾.Regarding to the microscopic examination of the stool showed 25 (26 .3 %) out of 95 infant and young children have no pus cells in stool and 2 (10.5 %) out of 19 patient have puscell in stool 25 (25 %) out of 100 patient have no RBC is stool 2 (14.2 %) out of

14 have RBC in stool. These findings mean the majority of children with rotavirus gastroenteritis have no pus cells or

RBCs. This agrees with a study by Stoll *et al*⁽¹⁹⁾.

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الملخص

أجريت هذه الدراسة في محافظة كركوك على ١١٤ طفل يعانون من الإسهال الحاد لفترة اقل من أسبوعين عند الأطفال الذين ادخلوا إلى مستشفى آزاد المركزي، في ردهة الأطفال وفي ردهة الطوارئ ومن المراجعين إلى الرفأ والواسطي الصحي .

الهدف الأساس من هذه الدراسة هو تشخيص الالتهاب المعوي الحاد المتسبب عن فيروس الروتا لدى الأطفال الذين تتراوح أعمارهم بين يوم واحد و ٢٤ شهر ، وخلال خمسة اشهراذ تم فحص جميع عينات الخروج للأطفال الذين يعانون من إسهال حاد وتم التشخيص مختبريا بإجراء الفحص العياني اجري الفحص المجهرى وفحص التلازن لتحديد وجود فيروس الروتا .

معدل الالتهاب المعوي الحاد الناتج عن الاصابة بفايروس روتا سجل في ٢٧ حالة (٢٣،٦٨) % عند الأطفال.

تحت ٢ سنة من العمر مع اختلاف طفيف بين الذكور ١٦ حالة (١٤،٠٣) % والإناث ١١ حالة (٩،٦٤) % .

وأظهرت الدراسة إن المرض أكثر تكرارا بين أطفال الريف إذ أعطى ١٢ طفل ونسبة ١٠،٥٢% بينما ظهر ٥ حالات ونسبة ٤،٣٨% لدى أطفال المدينة.

وان المرض يكون اقل تكرارا لدى الأطفال المعتمدين على الرضاعة الطبيعية وأبناء المتعلمات بينما كانت نسب الإصابة عند الأطفال الذين يشربون ماء النهر والمعتمدين على الرضاعة الصناعية وأبناء غير المتعلمات ١٠،٦٣ % ، ١٤،٢٨ % ، ١٦،٦٦ % على التوالي أما الأطفال الذين يشربون الماء المعقم كانت نسبهم ٣٤،٢٨ % ، ٣٠،٢٨ % و ٢٥،٥ % على التوالي .

وان أعلى معدل الإصابة كان عند الأطفال بعمر ٦- ١٢ شهر إذ سجل ٣٠ % بينما اقل نسبة كانت ١٥،٧٨ % عند الأطفال الذين تراوحت أعمارهم بين يوم واحد الى ١٦ شهر .