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Original Article

"Intussusception": Changing Trends in Management

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ABSTRACT

Background: In most children there is no abnormality present, and the cause of intussusception is unknown. We tried to find out the answer to question: Does surgery needed in all cases of intussusception? **Aims and Objectives:** In this study, the aim was to observe the results of the conservative management of 3 cases of intussusception admitted in Medeor Hospital, (formerly known as Rockland Hospital), Delhi, North India. The objective was to minimize the need for surgery for intussusception. **Methods:** For the present study, the demographic information, history, physical examination, investigations & management of 3 children suffering from intussusception & admitted at Pediatrics Department in Medeor hospital during the period from 01 January 2012 to 07 August 2014 were recorded & evaluated. **Results**: In this study, the results showed that two cases of intussusception were associated with acute gastroenteritis & one case of intussusception was associated with acute dysentery**.** All the 3 cases of intussusception were managed with intravenous (IV) fluids, IV antibiotics and other supportive treatment. In comparison to previous study in all the 3 children, the intussusception was completely resolved by conservative management. The two-tailed P value equals 0.0143*, in Chi-square test. By conventional criteria, this difference was considered to be statistically significant. **Conclusion**: In this study, it is concluded that in all the 3 children, the intussusception was completely resolved by conservative management, hence no active intervention or surgery was required in these cases. On follow up, there was no recurrence of intussusception in these 3 cases.

Key Words: *(IV) - Intravenous, Intussusception, Medeor Hospital*

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INTRODUCTION

Intussusception is a condition in which part of the intestine folds into the section next to it. Intussusception usually involves the small bowel and rarely the large bowel. Symptoms include abdominal pain, which may wax and wane, vomiting, bloating, and bloody stool. However, each child may experience symptoms differently. Eventually, the blood supply to that area is cut off, which can cause damage to the intestine. Intussusception is the most common cause of intestinal obstruction in children who are between 3 months and 6 years old. Boys are affected four times as often as girls. The cause of intussusception is not known, although viral infections may be responsible in some cases. It may be caused by an abnormality (such as a polyp) in the intestines or as a result of recent intestinal surgery. In most children there is no abnormality present, and the cause is unknown.

Intussusception was first described by Barbette in 1674, and it was first successfully treated surgically by Wilson in 1831. In 1876, Hirschsprung first reported the technique of hydrostatic reduction, and in 1905, after monitoring a series of 107 cases; he reported 35% mortality attributable to intussusception.

Bedside ultrasound (BUS) is an accurate means of diagnosing acute intussusception in pediatric patients. Further study might be indicated to confirm such benefits [1].

AIMS AND OBJECTIVES

In this study, the aim was to observe the results of the conservative management of 3 cases of intussusception admitted in Medeor Hospital, (formerly known as Rockland Hospital), a tertiary care hospital in Qutab Institutional Area, Delhi, North India. The objective was to minimize the need for surgery for intussusception.

MATERIALS AND METHODS

Study Setting and Period of Study: The study was conducted at the Department of Pediatrics, Medeor Hospital at Qutab Institutional Area in Delhi, North India during the period from 01 January 2012 to 07 August 2014. Presently, the Rockland Hospital is known as Medeor Hospital.

Study Design: The study was a Hospital Based Study, conducted at the Department of Pediatrics, Medeor Hospital in Delhi.

Sample Size: For the present study, the data of 3 patients suffering from intussusception & admitted at Pediatrics Department in Medeor hospital was recorded & evaluated.

Study Variables: Age and gender of child suffering from intussusception & method of treatment (conservative or surgery) in a group of children admitted in Medeor Hospital, Delhi.

Inclusion Criteria/ Selection Criteria:

Participants in the study eligible for inclusion were children of either gender of all age groups admitted as intussusception at Pediatrics Department in Medeor hospital, Delhi, North India were evaluated during the period 01.01.2012 till 07.08.2014.

Children were included after obtaining proper informed written consent from their parents/guardian.

Study Characteristics: In this study, the demographic information, history, physical examination, investigations & management of 3 children suffering from intussusception were recorded in the patient's questionnaire. Children that satisfied the inclusion criteria were selected and the children who did not meet the inclusion criteria were excluded.

Data Collection Methods and Tools: Patient's history information was collected in questionnaires and the data was collected and reported, and then statistical analysis of data was performed using SPSS software. Calculations of P values were done using Quick Calcs-Graphpad Software.

Statistical Methods and Statistical Interpretation: Chi- square test was used to calculate Two-tailed P values in our study. When presenting P values, it was helpful to use the asterisk rating system as well as quoting the P value:

P < 0.05* , it is **statistically significant**,

P < 0.01 ** , it is **very statistically significant**,

P < 0.001*,** it is **extremely statistically significant**.

RESULTS AND OBSERVATIONS

In this study, the demographic information, history, physical examination, investigations & management of 3 children suffering from intussusception & admitted at Pediatrics Department in Medeor hospital were recorded & evaluated as follows:

Case 1

Diagnosis: Ileoileal Intussusception with Acute Dysentery with Hyperpyrexia with Mesenteric Lymphadenopathy and Hyponatremic Dehydration

History of Present Illness: 6 years & 3 months old female child was admitted in hospital on **18.07.2012** with chief complaints of abdominal pain (periumbilical) on & off for 4 days, high grade fever with chills & rigor for 4 days, watery loose stools with mucus & blood on & off (3-5 episodes per day) for 3 days, decreased urine output & decreased oral acceptance for 2 days and 3-4 episodes of vomiting since evening yesterday. Abdominal pain was paroxysmal, colicky and recurred at frequent intervals. Child was on supportive treatment (Oral Rehydration Solutions (ORS) & Syrup Paracetamol) from Outpatient Department (OPD), before admission to Rockland Hospital. Child was admitted in a very sick condition in emergency with high fever & dehydration with low blood pressure and persistent vomiting.

No **past history** of hospitalization with similar illness.

Her **birth history** was unremarkable.

On examination, the findings were as follows:

Weight – 18 kg , General condition- stable

Heart Rate– 140 beats/min, Respiratory Rate – 30 breaths/min,

Temperature- 106.2 ^{0} F , Blood Pressure in left arm supine- 70 / 50 mmHg

SPO_2 – 99% (in room air), No pallor / icterus / cyanosis

Capillary Filling Time-less than 3 seconds, **Extremities-cool**

Eyes – sunken, Oral mucosa – dry, Tongue-coated

Chest **–**Bilateral air entry equal, Bilateral vesicular breath sounds +, no adventitious sounds

Cardiovascular system – S1 S2 normal, no murmur.

Per Abdomen **– Distention +, Tenderness +(Periumbilical),** Soft, Bowel sounds present,

Liver was palpated 2 cm below costal margin.

Nervous system – **Irritable, lethargic**, no neck rigidity, no focal neurological deficit.

Course in Hospital: 6 years & 3 months old child was admitted in hospital with above mentioned complaints and was investigated as follows- Hemoglobin – 11.5 gm/dL, Total Leukocyte Count (TLC)- 8400 / µL, Differential Leukocyte Count (DLC)- Neutrophils- 61, Lymphocytes- 28 , Monocytes- 10 , Eosinophils- 01 , Platelet count-3.48 lac/µL, Peripheral blood smear – Normal, Erythrocyte Sedimentation Rate (ESR)- 18 mm/hr, C-Reactive Protein (CRP)- Negative, Random Blood Sugar (RBS)- 82 mg/dL, Serum Calcium- 9 mg/dL, Liver Function Tests (LFT) & Renal

Function Tests (RFT)-Normal, Alkaline Phosphatase (ALP)- 213 U/L, **Serum Sodium- 127.4 mEq/L**, Serum Lipase-26 U/L, Serum amylase- 53 U/L, Typhidot (IgM & IgG)- Negative, Free T3- 1.97 pmol/L, Free T4- 1.44 pmol/L, Serum TSH- 1.720 µIU/mL, Mantoux test- Negative, Widal test- Negative , Blood Culture & Sensitivity (C/S) – No growth, Urine Routine and Microscopy (R/M) – 1-2 Pus cells / HPF, Nil - RBC / HPF, Urine Culture & Sensitivity (C/S) – No growth, **Stool Routine and Microscopy (R/M)- Mucus ++ , Blood Nil , Numerous Pus cells / HPF, 1-2 RBC / HPF,** Ova & Cyst- Nil, Stool for Reducing Substances- Negative, **Stool Culture & Sensitivity (C/S)- E.coli (Profuse growth)**, X-Ray Chest PA View- Normal , **X-Ray Abdomen Supine & Erect- Mildly dilated bowel loops, Ultrasound Whole Abdomen – There is a small Ileo-ileal Intussusception in loop of terminal ileum, close to ileo-caecal junction. (The inner loop bulges 5 mm into the outer loop). Few enlarged lymph nodes are identified (Right Para-Aortic & Right Para-Umbilical mesenteric lymph nodes). A fine trace of ascites present, gravitated in pouch of Douglas.** Repeat investigations done before discharge are as follows: Serum Sodium- 135.2 mEq/L, Stool Routine & Microscopy (R/M)- Mucus & Blood Nil , 1-2 Pus cells / HPF, Nil RBC / HPF and X-Ray Abdomen Supine & Erect- Normal. In view of **Ileoileal Intussusception, Gastroenterology Reference** was done & case was seen by surgeon who supported the diagnosis & advised to continue same medications. **Paediatric Surgeon Reference** was also done & case was seen by pediatric surgeon who also supported the diagnosis & advised to continue same medications. Child was initially NPO (nil per os) & as the child's condition became stable, child was given clear liquids which were followed by soft diet. Child was managed with intravenous (IV) fluids, intravenous (IV) antibiotics (Injection Ceftriaxone, Injection Amikacin & Injection Metronidazole) and other supportive treatment. Child responded well to treatment and on discharge on **21.07.2012**, the loose stools have decreased in frequency and there was no further vomiting & abdominal pain. She was passing urine normally. She was afebrile and accepting orally well. On discharge, she was advised oral antibiotics (Syrup Metronidazole & Syrup Albendazole) & other supportive treatment. **Repeat ultrasound abdomen done after 2 weeks of discharge was normal.**

Case 2

Diagnosis: Ileo-colic Intussusception with Acute Gastroenteritis with Mesenteric Lymphadenopathy with Moderate Dehydration and Secondary Lactose Intolerance

History of Present Illness: 2 years & 4 months old male child was admitted in hospital on **19.01.2013** with chief complaints of watery loose stools (10-15 episodes per day) for 5 days, vomiting (1-2 episodes per day) for 3 days, decreased urine output & decreased oral acceptance for 2 days.

Child was admitted in Rockland Hospital for Acute Gastroenteritis with Moderate Dehydration from 06.01.2013 till 09.01.2013 and thereafter child was on supportive treatment (Oral Rehydration Solutions (ORS) & Syrup Domperidone) from Outpatient Department (OPD).

Child was admitted in a very sick condition in emergency with dehydration and decreased urine output.

Past history: There was a past history of hospitalization for Acute Gastroenteritis for 3 days about 9 months ago.

His **birth history** was unremarkable.

On examination, the findings were as follows:

Weight – 9 kg **,** General condition- stable

Heart Rate– 124 beats/min, Respiratory Rate – 30 breaths/min,

Temperature- 100 ^{0} F , Blood Pressure in left arm supine- 80 / 60 mmHg

SPO_2 – 99% (in room air), No pallor / icterus / cyanosis

Capillary Filling Time-less than 3 seconds, **Extremities-cool, Eyes – sunken, Oral mucosa – dry, Tongue-coated**

Chest **–** Bilateral air entry equal, Bilateral vesicular breath sounds +, no adventitious sounds

Cardiovascular system – S1 S2 normal, no murmur.

Per Abdomen **– Distention +, Tenderness + (Periumbilical),** Soft, Bowel sounds present,

Liver was palpated 2 cm below costal margin.

Nervous system – **Irritable, lethargic**, no neck rigidity, no focal neurological deficit.

Course in Hospital: 2 years & 4 months old male child was admitted in hospital with above mentioned complaints and was investigated as follows- Hemoglobin – 13 gm/dL, **Total Leukocyte Count (TLC)- 12920 / µL**, Differential Leukocyte Count (DLC)- Neutrophils- 42, Lymphocytes- 50 , Monocytes- 08 , Eosinophils- 00, **Platelet count- 4.51 lac/µL,** C-Reactive Protein (CRP)- Negative, Blood Culture & Sensitivity – No growth, Renal Function Tests (RFT)- Normal, Urine Routine and Microscopy (R/M) –Protein nil, 1-2 Pus cells / HPF, Nil - RBC / HPF, Stool Routine and Microscopy (R/M)- pH- 7.0, Mucus Nil , Blood Nil, 2-3 Pus cells / HPF, Nil - RBC / HPF, Ova & Cyst- Nil, **Stool for Reducing Substances- Positive, Stool Culture & Sensitivity (C/S)- Klebsiella Species (Profuse growth) and Ultrasound Whole abdomen – Few small mesenteric lymph nodes are noted largest measuring about 13*6mm. Hypoechoic round area with concentric ring appearance is seen in the right iliac fossa region ? due to intussusception (Ileo-colic).** In view of **Ileo-colic Intussusception**, **Surgeon Reference** was also done & case was seen by surgeon who also supported the diagnosis & advised to continue same medications. Child was initially NPO (nil per os) & as the child's condition became stable, child was given clear liquids which were followed by soft diet. Child was managed with intravenous (IV) fluids, IV antibiotics (Injection Cefotaxime, Injection Metronidazole & Injection Amikacin) and other supportive treatment. Child responded well to treatment and on discharge on **24.01.2013**, there was no further vomiting and loose stools. He was passing urine normally. He was afebrile and accepting orally well. On

discharge, child was advised oral antibiotics (Syrup Metronidazole & Syrup Albendazole) & other supportive treatment. **Repeat Ultrasound Whole Abdomen done after 2 weeks was normal.**

Case 3

Diagnosis: Ileo-ileal Intussusception with Acute Gastroenteritis with Mesenteric Lymphadenopathy and Moderate Dehydration

History of Present Illness: 3 years & 3 months old female child was admitted in hospital on **11.01.2014** with chief complaints of abdominal pain (periumbilical) on & off for 3 days, vomiting (2-3 episodes per day) for 2 days, decreased oral acceptance for 1 day and one episode of watery loose stool in morning today. Abdominal pain was paroxysmal, colicky and recurred at frequent intervals in periumbilical region & relieved after analgesic medicines.
Child was admitted in a very sick condition in emergency with abdominal pain & dehydration.
Past history: There was no past history of hospitalization with similar illness.
Her **birth history** was unremarkable.

On examination, the findings were as follows:
Weight – 12 kg **,** General condition- stable
Heart Rate– 120 beats/min, Respiratory Rate – 38 breaths/min,
Temperature- 100 ^{0} F , Blood Pressure in left arm supine- 80 / 58 mmHg
SPO_2 – 99% (in room air), **Mild pallor+**, No icterus & cyanosis,
Capillary Filling Time-less than 3 seconds, **Extremities-cool, Eyes – sunken**, **Oral mucosa – dry, Tongue-coated**
Chest **–** Bilateral air entry equal, Bilateral vesicular breath sounds +, no adventitious sounds
Cardiovascular system – S1 S2 normal, no murmur.
Per Abdomen **– Mild Distention +, Tenderness + (Periumbilical),** Soft, Bowel sounds present,
Liver was palpated **3 cm** below costal margin.
Nervous system – **Irritable, lethargic**, no neck rigidity, no focal neurological deficit.

Course in Hospital: Child was admitted in hospital with above mentioned complaints and was investigated as follows- **Hemoglobin – 10.6 gm/dL**, Total Leukocyte Count (TLC)- 9670 / µL, Platelet count- 4.38 lac/µL, C-Reactive Protein (CRP)- Negative, Blood Culture & Sensitivity (C/S) – No growth, Blood Urea- 21 mg/dL, Serum Creatinine- 0.42 mg/dL, **Serum Sodium- 132.3 mEq/L**, Serum Potassium- 4.3 mEq/L, **X-Ray Abdomen Supine & Erect- Fecal loaded large bowel loops are seen & Ultrasound Whole abdomen (11.01.2014) – Findings are suggestive of Ileo-ileal Intussusception.** In view of Ileo-ileal Intussusception, **Surgeon Reference** was also done & case was seen by surgeon who also supported the diagnosis & advised to continue same medications. Child was initially NPO (nil per os) & as the child's condition became stable, child was given clear liquids which were followed by soft diet. Child was managed with intravenous (IV) fluids, intravenous (IV) antibiotics (Injection Ceftriaxone, Injection Amikacin & Injection Metronidazole) and other supportive treatment. **Repeat Ultrasound abdomen (after 24 hours) (12.01.2014) - In comparison to previous study, the paraumbilical Ileo-ileal Intussusception is completely resolved. Mild mesenteric fat stranding and enlarged mesenteric lymph nodes are seen. Contrast Enhanced Computed Tomography (CECT) Scan Whole Abdomen (13.01.2014) revealed Mild to Moderate Mesenteric Edema & fat stranding in periumbilical region. Enlarged Mesenteric Lymph Nodes (largest 22*20 mm). Mild Ileocecal Bowel Wall Thickening. Infective etiology is considered. Possibility of Abdominal Koch's cannot be ruled out.** Repeat **Ultrasound Whole abdomen done before discharge – Mild Hepatomegaly with few centimeter to subcentimeter sized non-specific Mesenteric Lymph nodes.** Child responded well to treatment and on discharge on **16.01.2014**, there was no further vomiting, loose stool & abdominal pain. She was afebrile and accepting orally well. On discharge, she was advised oral antibiotics (Syrup Cefixime, Syrup Albendazole & Syrup Metronidazole) and other supportive treatment.

Table showing the management in 3 cases of intussusception admitted in Medeor Hospital, (formerly known as Rockland Hospital), a tertiary care hospital in Qutab Institutional Area, Delhi, North India.

Type of management	Conservative	Surgery	P value
Number of cases of intussusception	3	0	0.0143*

In the table, Chi squared equals 6.000 with 1 degree of freedom. **The two-tailed P value equals 0.0143*, in the Chi-square test. By conventional criteria, this difference was considered to be statistically significant.**

DISCUSSION

In this study, the results showed that there were 3 cases as follows:

(i) Ileoileal Intussusception with Acute Dysentery with Hyperpyrexia with Mesenteric Lymphadenopathy and Hyponatremic Dehydration

(ii) Ileo-colic Intussusception with Acute Gastroenteritis with Mesenteric Lymphadenopathy with Moderate Dehydration and Secondary Lactose Intolerance

(iii) Ileo-ileal Intussusception with Acute Gastroenteritis with Mesenteric Lymphadenopathy and Moderate Dehydration

The two cases of intussusception were associated with acute gastroenteritis & one case of intussusception was associated with acute dysentery**.** All the 3 cases of intussusception were managed with intravenous (IV) fluids, intravenous (IV) antibiotics and other supportive treatment. All the 3 children suffering from intussusception responded well to treatment. In comparison to previous study in all the 3 children, the intussusception was completely resolved by conservative management. In the table, Chi squared equals 6.000 with 1 degree of freedom. The two-tailed P value equals 0.0143*, in the Chi-square test. By conventional criteria, this difference was considered to be **statistically significant**.

Thus, in this study, the results showed that the intussusception in all the 3 children was completely resolved by conservative management. On follow up, there was no recurrence of intussusception in these 3 cases. All the 3 children are alive and healthy.

Following studies support our observations:

- We conducted a review of Medline literature, published from 1995 onwards on intussusception in the World Health Organization's European Region. The results are compared with data from previous reviews and other regions. The classic triad of intussusception symptoms (abdominal pain, abdominal mass, bloody stools) was present in 29-33% of patients according to the medical literature reviewed. Conservative treatment (barium, air or saline enema) was the rule (81% of cases), and few complications were observed during treatment. Treatment outcome was generally favorable, with recurrence occurring in approximately 1 in 10 patients, and only 1 death reported. The incidence of acute intussusception in young children in Europe, according to 6 heterogeneous hospital-based studies, ranged from 0.66 to 2.24 per 1000 children in inpatient departments and from 0.75 to 1.00 per 1000 children in emergency departments. Peak incidences were found in children 3-9 months of age. There are still gaps in our knowledge of intussusception with respect to its etiology [2].

- We identified 82 studies from North America, Asia, Europe, Oceania, Africa, Eastern Mediterranean, and Central & South America that reported a total of 44,454 intussusception events. The mean incidence of intussusception was 74 per 100,000 (range: 9–328) among children <1 year of age, with peak incidence among infants 5–7 months of age. No seasonal patterns were observed. A radiographic modality was used to diagnose intussusception in over 95% of the cases in all regions except Africa where clinical findings or surgery were used in 65% of the cases. Surgical rates were substantially higher in Africa (77%) and Central and South America (86%) compared to other regions (13–29%). Case-fatality also was higher in Africa (9%) compared to other regions (<1%). The primary limitation of this review relates to the heterogeneity in intussusception surveillance across different regions [3].

- One hundred and six patients with intussusception were reviewed with the aim of evaluating a new method of reducing intussusceptions suited to our Third World environment. In our cohort, delayed presentation was common, with 32% of patients presenting more than 48 h after the onset of the intussusception. On clinical grounds alone, 41% of patients required a primary laparotomy. Standard barium and air reductions for intussusception were rarely successful under these conditions i.e. 13% and 22%, respectively. By using an air enema under general anesthesia in the operating theatre, the reduction rate has improved to 53%. This approach is suggested as a last attempt at reducing an intussusception prior to laparotomy following failed standard enema reduction, and as the first line of management in the attempted reduction in the patient with delayed presentation without symptoms of peritonitis [4].

SUMMARY

In this study, the aim was to observe the results of the conservative management of 3 cases of intussusception admitted in Medeor Hospital, (formerly known as Rockland Hospital), a tertiary care hospital in Qutab Institutional Area, Delhi, North India. The objective was to minimize the need for surgery for intussusception. The study was conducted at the Department of Pediatrics, Medeor Hospital at Qutab Institutional Area in Delhi, North India during the period from 01 January 2012 to 07 August 2014. The study was a Hospital Based Study, conducted at the Department of Pediatrics, Medeor Hospital in Delhi. For the present study, the data of 3 patients suffering from intussusception & admitted at Pediatrics Department in Medeor hospital was recorded & evaluated. Participants in the study eligible for inclusion were children of either gender of all age groups admitted as intussusception at Pediatrics Department in Medeor hospital, Delhi, North India. Children were included after obtaining proper informed written consent from their parents/guardian. In this study, the demographic information, history, physical examination, investigations & management of 3 children suffering from intussusception were recorded in the patient's questionnaire. Patient's history information was collected in questionnaires and the data was collected and reported, and then statistical analysis of data was performed using SPSS software. Calculations of P values were done using Quick Calcs-Graphpad Software. Chi- square test was used to calculate Two-tailed P values in our study.

In this study, the results showed that two cases of intussusception were associated with acute gastroenteritis & one case of intussusception was associated with acute dysentery**.** All the 3 cases of intussusception were managed with IV

fluids, IV antibiotics and other supportive treatment. In comparison to previous study in all the 3 children, the intussusception was completely resolved by conservative management. The two-tailed P value equals 0.0143*, in Chi-square test. By conventional criteria, this difference was considered to be statistically significant. On follow up, there was no recurrence of intussusception in these 3 cases. All the 3 children are alive and healthy.

CONCLUSION

In this study, it is concluded that in all the 3 children, the intussusception was completely resolved by conservative management, hence no active intervention or surgery was required in these cases. On follow up, there was no recurrence of intussusception in these 3 cases.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

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