INTUSSUSCEPTION AT ATYPICAL AGES IN CHILDREN AND ADULTS – 11 YEARS EXPERIENCES

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Intussusception is a curious anatomic condition characterized by the invagination of one segment of the gastrointestinal tract into the lumen of an adjacent segment. Once initiated, additional intestinal telescopes into the distal segment, causing the invaginated intestine to propagate distally within the bowel lumen.

The aim of the study was to evaluate the clinical manifestation, etiology, and outcome of intussusception at atypical ages.

Material and methods. This retrospective study was carried out on patients aged <6 mo or >2 yr with intussusception. Duration of study was from March, 20, 1997 to March, 20, 2008. The places of study were Imam Khomeini and Abuzar referrals hospital. Cases were classified according to age and sex. According to age, patients were <6 mo, 2-10 years, 10-18, and more than 18 years. Age, sex, history, chief complaint, clinical manifestation, sonographic findings, duration of clinical manifestation, method of treatment, outcome, duration of hospital staying, and ICU admission were studied. Data were analyzed with SPSS ver 16 (Chicago, IL, USA) and Epi-info.

Results. In this study, 36 cases with diagnosis of intussusception at atypical ages, <6 mo or >2 yr, were included. From all cases, 21 cases (58.3%) were 2 through 10 years and male: female ratio was 2.26:1. Ten cases (27.8%) had history of medical condition. Eighty percent (29 cases) had abdominal pain and 20 cases (58.3%) had vomiting. Abdominal mass was found in 14 cases (38.8%). Sonography was done for 30 (83.3%) of cases and suggesting intussusception in 25 (69.4%) of cases. Intussusception was reduced by hand and performed appendectomy for 10 cases (27.8%). Bowel resection was done for 19 cases (52.8%) and radiological reduction was done for 2 cases (5.6%). Eighteen (50%) cases had anemia. Twenty-five cases admitted to ICU. One (2.8%) patient died (a 65 year old woman). Appendicitis is the most common well defined injury associated with intussusception.

Conclusion. This study showed that with advancing age, incidence of intussusception will be decreased. As age increasing, rate of bowel resection will be increased. All cases with appendectomy and reduction by hand had hospital staying 3-10 days. The results of this study was similar to other studies. The most widely used diagnostic procedure for intussusception was sonography.

Keywords: intussusception, Meckel’s diverticulum, Henoch-Schönlein, appendicitis, lymphoma, constipation, diarrhea, currant jelly stool

Intussusception is a curious anatomic condition characterized by the invagination of one segment of the gastrointestinal tract into the lumen of an adjacent segment. Intussusception is the most common cause of acute bowel obstruction in infants (1, 2). Once initiated, additional intestinal telescopes into the distal segment, causing the invaginated intestine to propagate distally within the bowel lumen and usually ileocolic (3). Intussusception can present at any age, but is typically segregated into three general age ranges: infants and toddlers, older children, and adults. Within the pediatric age group, the vast majority of cases occur in the first 2 years of life, with peak incidence between 6 months and 1 year of age (4, 5).
MATERIAL AND METHODS

This retrospective study was carried out on patients aged <6 mo or >2 yr with intussusception. Duration of study was 11 years from March, 20, 1997 to March, 20, 2008. The place of study was Imam Khomeini hospital and Abuzar hospital. Cases were classified according to age and sex. According to age, patients were <6 mo, 2-10 years, 10-18, and more than 18 years. Age, sex, history, chief complaint, clinical manifestation, sonographic findings, duration of clinical manifestation, method of treatment, outcome, duration of hospital staying, and ICU admission were studied. Data were analyzed with SPSS (Ver 16.0, Chicago, IL, USA) and Epi-info.

RESULTS

During the period of study, 225 cases were admitted with diagnosis of intussusceptions. From these cases, 36 cases were presented in atypical ages. In this study 36 cases were studied. Most of cases were 2-10 years (58.3%) (fig. 1).

Sausage shaped mass was found in 8 male and 6 females cases. Currant jelly stool was found in 8 males and 2 females. Distention was found in 9 males and no female (p=0.06). Fever was detected in 9 male cases and 5 female cases (p=0.86)

Of all cases, 19 (52.8%) cases underwent bowel resection, 10 cases (27.8%) underwent reduction by hand and appendectomy, 5 cases had spontaneous reduction, and 2 (5.6%) cases were treated by radiological interventions.

The most common type of surgery among male cases was bowel resection 13 (52%) and reduction 8 (32%). The most common type of surgery among female cases was bowel resection 6 (54.5). Bowel resection was done for 3 cases (60%) <6 months, 7 cases (33.3%) aged 2-10 years, 4 cases (80%) aged 10-18 years, and 5 cases (100%) aged >18 years (p=0.21).

The most frequent type of intussusception in patients 2-10 years was ileocolic (n=16, 76.2%). The most frequent type of intussusception at 10-18 years was ileoileal (n=2.40%). Under 6 months, most of intussusception remained unknown. More than 18 years, ileocolic intussusception is the most frequent.

There is 4 (80%) positive sonography reports in cases <6 months. Sonographic findings were positive in 16 cases (76.2%) for patients aged 2-10 years. For children aged 10-18 years, 4 cases (80%) had positive findings. For children age >18 years, sonography was not done for 2 cases and 1 case has positive sonography. Plain roentgenogram was obtained for all cases and 2.8% of all cases, had evidence of intestinal obstruction in their roentgenogram.

Nine (36%) male cases had history of common cold or gastroenteritis. One case had history of surgery. Three male cases had history of common cold or gastroenteritis in addition to surgery. Twelve male cases had no history. In female groups, 1 case had history of common cold gastroenteritis. One case had history of surgery and 9 cases had no history. There is no significant difference between male and female (p=0.2). Common cold gastroenteritis was seen in 6 (28.6%) of cases aged 2-10 years, 2 (40%) of cases aged <6 months, and 2 cases (40%) >18 years. There is no significant difference among age groups regarding to history (p=0.59).

From 25 male cases, 14 cases showed anemia. Of 11 female cases, 4 cases had anemia. (chi^2=1.18, df=1, p=0.27). Five cases of male patients required ICU admission vs. 4 female cases (p=0.53).

Of all male cases, 21 cases (84%) had abdominal pain and 16 (64%) cases had vomiting. The less frequent complaints were restlessness in 4 (16%), diarrhea 2 (8%) and anorexia 1 (4%). In female group, 8 cases had abdominal pain and 6 cases had vomiting. Diarrhea, anorexia, and restlessness were seen in 3, 4, and 2 cases respectively. All cases aged <6 mo had restlessness. The most common chief complaints in children in other age groups was abdominal pain (tab. 1).
Duration of clinical manifestation in male cases was 1 or less in 9 (36%), 2 days for 3 (12%), 3 or more for 13 (52%) cases. In female group, 2 cases (18.2%) had one or less, duration of manifestations. One case had 2 days of clinical manifestation. Eight female cases had 3 or more days of clinical manifestation (p=0.42).

All male cases discharged with improvement (100%). From female cases, 10 cases discharged healthy (90.9%), and there is one mortality and she is a 65 year old woman. There is no significant difference between male and female for outcome.

In male cases, 2 (8%) cases had ileosecal; 17 (68%) cases had ileocolic and 3 (12%) cases had ileoileal intussuception. Three (12%) cases had undetermined type of intussusception. In female cases, ileocolic; ileoileal; jejunouileal intussuception were seen in 5 (45.45%), 3 (27.27%), and 2 (18.18%) cases respectively. One (9.09%) case had undetermined type of intussusception.

Sixteen male (64%) cases had positive sonographic findings. Four cases had no finding. Sonography was not done for five cases. of 11 female cases, 9 cases had positive results. One case had negative finding. Sonography was not done for 1 female case. There is no significant difference between males and females (p=0.49).

The most common length of hospital admission in males was 3-10 days (64%) and females was 3-10 days (63.6%). Most of the cases in various age groups, had duration of admission about 3-10 days.

As seen in the tab. 2, there is no significant difference between age group for ICU admission and history of anemia. As seen in tab. 3, the most common lead points is appendicitis in overall cases. Negative findings were seen in 36% of male and 54.55% of female cases. As seen in tab. 4, most of the cases were in the range 2-10 years.

As seen in tab. 5, hospital staying more than 10 days was significantly correlated with bowel resection. All cases with appendectomy and reduction by hand had hospital staying 3-10 days (p=0.001)

**DISCUSSION**

In our study, 16% (36 cases of 225 cases) of cases were presented in unusual ages and is similar to other study (2). In our study, 13.88% of cases were considered as adults cases. Some
Table 3. Etiology of Intussusception among males and females

<table>
<thead>
<tr>
<th>Male (n)</th>
<th>Female (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meckel’s diverticulum (2; 8%)</td>
<td>Meckel’s diverticulum (1; 9.09%)</td>
</tr>
<tr>
<td>Lymphoma (2; 8%)</td>
<td>Lymphoma (1; 9.09%)</td>
</tr>
<tr>
<td>Appendicitis (4; 16%)</td>
<td>Appendicitis (1; 9.09%)</td>
</tr>
<tr>
<td>Volvulus (2; 8%)</td>
<td>Volvulus (1; 9.09%)</td>
</tr>
<tr>
<td>HSP (1; 4%)</td>
<td>Distal ileum abscess (1; 9.09%)</td>
</tr>
<tr>
<td>Leukemia (1; 4%)</td>
<td>Negative (6; 54.55%)</td>
</tr>
<tr>
<td>Intra-abdominal hernia (2; 8%)</td>
<td></td>
</tr>
<tr>
<td>Diverticulum + appendicitis (1; 4%)</td>
<td></td>
</tr>
<tr>
<td>Worm (1; 4%)</td>
<td></td>
</tr>
<tr>
<td>Negative (9; 36%)</td>
<td></td>
</tr>
<tr>
<td>Total (25; 100%)</td>
<td>W sumie / total (11; 100%)</td>
</tr>
</tbody>
</table>

Table 4. Etiology of intussusceptions among different age groups

<table>
<thead>
<tr>
<th>Age</th>
<th>Meckel’s diverticulum</th>
<th>lymphoma</th>
<th>volvulus</th>
<th>negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;6 mo</td>
<td>1 (20%)</td>
<td>1 (20%)</td>
<td></td>
<td>3 (60%)</td>
<td>5 (100%)</td>
</tr>
<tr>
<td>2-10 years</td>
<td>1 (4.8%)</td>
<td>2 (9.5%)</td>
<td>4 (19%)</td>
<td></td>
<td>9 (40%)</td>
</tr>
<tr>
<td></td>
<td>Meckel’s diverticulum</td>
<td>lymphoma</td>
<td>appendicitis</td>
<td>distal ileal abscess</td>
<td>HSP</td>
</tr>
<tr>
<td>10-18 years</td>
<td>2 (40%)</td>
<td>1 (20%)</td>
<td>2 (40%)</td>
<td></td>
<td>6 (100%)</td>
</tr>
<tr>
<td>&gt;18 years</td>
<td>2 (40%)</td>
<td>1 (20%)</td>
<td></td>
<td></td>
<td>3 (100%)</td>
</tr>
</tbody>
</table>

Table 5. Correlation between type of treatment and hospital staying

<table>
<thead>
<tr>
<th>Type of Tx</th>
<th>&lt;3 days</th>
<th>3-10 days</th>
<th>&gt;10 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction by hand and appendectomy</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Bowel resection</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Radiologic reduction</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Spontaneous reduction</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

In our study, 13.77% (31 cases of 225 cases) were >2 years. Some studies from Nederland (7) and Canada (8) found that 44 and 37% of their cases, respectively, to be older than 2 years old.

In our study, 54.55% of males and 36% of females had idiopathic intussusceptions. In the study done in Tanzania, etiology of intussusception was mainly idiopathic (85.7%) (9). Pathologic lead point was not found in 13 cases. In the patients aged > 2 yrs (31 cases), lead point was identified in 23 cases. Some author reported there is 20% lead point identified in cases >2 years (10). Appendicitis and Meckel’s diverticulum were the lead points in 6 and 3 cases respectively. In other references, appendicitis is the most common pathologic lead point for intussusceptions (11).

In our study, 68% of male cases and 45.45% of female cases had ileocolic intussusceptions. In study done in Thailand, 50% of intussusceptions were ileocolic (12). Most of published papers, reports ileo-colic as the most common type (13). In the current study, duration of clinical manifestation was as following: <24 hr (11, 30.6%), 2 days (4, 11.1%), and 3 days or longer (21, 58.3%). This is similar to Wang et al. study (14).

In our study 5 cases (100%) aged >18 years had abdominal pain. Demirkan A et al., studied 40 cases with intussusception. Out of these cases, 31 cases aged <18 years were considered pediatric and 9 cases aged>18 years were adults. The most common complaints in adults cases was abdominal pain. It was present in 7 of 9 cases (15). In the Swiss study on the 10 adult cases with intussusception, all of them had abdominal pain (16).

In our study, bowel resection is the most common type of treatment for patients. This is due to our study done at atypical presentation age. Saleem et al., reported that 18% of their cases had bowel resection. They studied 109 cases (74 male, 35 female) with range 2 months – 14 years (17). In our study, Male/
Female ratio was 2.26:1 and is similar to Carneiro and Kisusi (9).

Of all cases, 2 cases (5.6%) had spontaneous reduction. Two studies reported the rates of spontaneous reduction from 4-to 10 % (18, 19), and is similar to our study. Spontaneous reposi-
tion of invaginated segment may be seen in 82% of cases (20). Some studies describe some patients with spontaneous reduction on the operating table, presumably due to relaxing effect of anesthetic medication (21, 22).

Mortality rate in our study was 2.77%. Cruz Lopez et al., reported mortality rate as 2.5% (1.7% related to intussusceptions) (23). In the study from China on 39 cases < 3 months, vomiting was found in 84.6% of cases (24). They found vomiting as the commonest clinical manifestation. We found restlessness in 100% and vomiting in 80% of cases aged <6 months.

We found one case with impacted worm as pathologic lead point of intussusception. In the study done in Nigeria, they found one case of intussusception caused by impacted worm. Previous reports showed that an increase in the worm load in a child could increase the risk of intestinal obstruction from worm impaction and suggested the risk can be reduced through repeated massive treatment, improved sanitation, and increased health education (25, 26).

We found 4 cases with Meckel’s diverticulum associated with intussusception. There is a report about Meckel’s diverticulum as a lead point of intussusceptions (27).

In the current study we found that lymphoma as a cause of intussusception in 1 case <6 mo and 2 cases 2-10 years. In the large study done by Ein et al., on the 1200 infants and children that treated over the last 40 years, only 11 cases were found to have lymphoma as a lead point of intussusceptions (28).

In overall we found 6 cases with appendicitis as a cause of intussusception (16.67%). HSP is the leading point of intussusception in one case aged 2-10 years. Intussusception is the most common surgical complication of HSP in childhood with a frequency of 0.7 to 13.6% of cases (29-32).

Distal ileal abscess was found in 1 case. Abscess may cause as the leading point of intussusception. There is several reports indicating every tumor like lesion may act as lead point of intussusception (33).

We found 2 cases with intra abdominal hernia as a cause of intussusception. Internal hernia is the rare cause of intussusceptions (34).

CONCLUSION

In conclusion, our findings are similar to other studies. The most commonly used radiologic investigation is sonography. The most common pathologic lead point is appendicitis. As the age increase, the possibility of pathologic lead point is increased.

REFERENCES

Intussusception at atypical ages in children and adults – 11 years experiences


