Assessment of Bowel Control with Anorectal Manometry after Surgery for Anorectal Malformation

Akira Nagasaki, Keiichi Ikeda, Yutaka Hayashida, Kenzo Sumitomo and Shinji Sameshima

ABSTRACT: Bowel function after surgery for anorectal malformation was assessed by Kelly's score in 101 children over 3 years of age. Seventy-two were examined using anorectal manometry. In the “good” group, resting pressure of the anal canal was as high as in the normal children, and the frequency of contraction waves in the anal canal was the same as in the normal children. Recto-anal reflex was recognized in about three fourths of the “good” group. On the other hand, in the “poor” group resting pressure was low, in only one were contraction waves evident and in none was there a recto-anal reflex. The findings of the anorectal manometry placed the “fair” group between the “good” and the “poor” groups. The clear contraction waves of the anal canal or the clear recto-anal reflex related to a resting pressure in the anal canal of over 20 cmH₂O. This high pressure in the anal canal is important for good anal continence, and depends on a precise pull-through of the rectum into the puborectalis muscle.

KEY WORDS: anorectal malformation, imperforate anus, anal continence, anorectal manometry, recto-anal reflex

INTRODUCTION

The objective of surgery for anorectal malformation is the construction of an anus which facilitates a normal defecation. Good results have been obtained in the translevator type, but the anal function of supravalevator type is still unsatisfactory,1-5 Accurate and objective assessment of defecation after surgery for anorectal malformation is necessary to compare the results of the operation and to investigate the cause of disorder and/or to improve anal function.

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Table 1. List of Patients with Anorectal Malformation from 1962 to 1982.

<table>
<thead>
<tr>
<th>Type</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>45 (7)</td>
<td>8 (3)</td>
<td>53 (10)</td>
</tr>
<tr>
<td>Intermediate</td>
<td>13 (2)</td>
<td>16 (1)</td>
<td>29 (3)</td>
</tr>
<tr>
<td>Low</td>
<td>36 (1)</td>
<td>51 (4)</td>
<td>87 (5)</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>2 (1)</td>
<td>3 (0)</td>
<td>5 (1)</td>
</tr>
<tr>
<td>Unknown</td>
<td>5 (1)</td>
<td>1 (0)</td>
<td>6 (1)</td>
</tr>
<tr>
<td>Total</td>
<td>101 (12)</td>
<td>79 (8)</td>
<td>180 (20)</td>
</tr>
</tbody>
</table>

were of intermediate, 87 were of low, 5 were miscellaneous, and we were unable to classify 6. Twenty children died of various causes (Table 1). One hundred and one children over 3 years of age were investigated. Fifty-five were boys and 46 were girls. Thirty-two were of high type deformity, 23 were of intermediate and 46 were of the low type. Patients with high and intermediate type deformities were treated by the abdomino-perineal or the sacro-perineal approach, and those with low type by the perineal approach. The ages ranged from 3–12 years at the time of the investigation.

Bowel function was assessed using Kelly’s score, and 72 children were examined by anorectal manometry. The control group for the anorectal manometry included 20 normal children with no defecation problem and who were 3–12 years of age. A glycerine enema was given before the examination and 5–7 mg/kg of ketamine chloride or 100 mg/kg of chloral hydrate was given to children not cooperative.

The pressure was measured by the infused water filled open tip method with LPU-0.1 Transducer (Toyo Baldwin, Tokyo, Japan) and the Polygraph 360 System (NEC San-Ei, Tokyo, Japan). The resting pressure and the frequency of the contraction waves of the anal canal were measured first, and then changes in the intraluminal pressure in the anal canal were measured when the rectum was distended by the balloon. In the normal children, the intraluminal pressure of the anal canal drops when the rectum is distended and we call this phenomenon “recto-anal reflex”, according to Gaston.

Data were expressed as means±SDs and and statistical analysis was evaluated using Student’s t-test. P-values of less than 0.05 were considered to be significant.

RESULTS

Clinical score

Of the 32 children with high type deformity, 9 were clinically good, 15 were fair and 8 were poor. Of the 23 with intermediate type deformity, 11 were good, 10 were fair and 2 were poor. Of the 46 with low type deformity 38 were good, 8 were fair. Considering only the patients operated on since 1970, of the 20 with high type 9 were good, 8 were fair and 3 were poor. Of the 13 with intermediate type 6 were good, 6 were fair and one was poor. Of the 36 with low type 31 were good and 5 were fair (Table 2).

Anorectal manometry of normal children

The average resting pressure was 5.2±3.2 cmH2O in the rectum and 44.0±17.4 cmH2O in the anal canal. The contraction waves of the anal canal were defined in 90 per cent, the average frequency being 13.2±1.8/min. When the rectum was distended, the intraluminal pressure of the anal canal dropped to an average of 12.8±7.8 cmH2O (Table 3).

Anorectal manometry by types of malformation

The average resting pressure of the rectum was 3.2±6.4 cmH2O in the high type, 2.9±3.4 cmH2O in the intermediate type and 4.5±4.7 cmH2O in the low type. There was no significant difference. The average resting pressure in the anal canal was 19.1±15.7 cmH2O in the high type, 17.3±11.5 cmH2O in the intermediate type and 30.6±15.9 cmH2O in the low type (p<0.01). Contraction waves in the anal canal were evident in 9 (36.0 per cent) out of the 25 high types, 6 (40.0 per cent) out of the 15 intermediate types and 28 (87.5 per cent) out of the 32 low types, and the average frequency being 11.8±1.2, 11.8±3.3 and