The influence of colonic enema irrigation on urodynamic findings in patients with neurogenic bladder dysfunction

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Objective To evaluate whether colonic enema irrigation influences the urodynamic characteristics of patients with spina bifida, an overactive bladder and detrusor sphincter dyssynergia (DSD).

Patients and methods Since 1991, 83 patients with spina bifida at our institution have treated their bowel dysfunction by colonic irrigation every 24–48 h. In 12 patients (seven boys and five girls, mean age 7.7 years, range 0.7–13.8) with an overactive bladder and DSD, urodynamic studies of the bladder before and after enema treatment were available with no intercurrent changes in urological therapy.

Results There were no significant changes overall in bladder capacity, leak-point pressure, bladder compliance and bladder instability in the selected group of children.

Conclusion Although enema therapy for bowel treatment in patients with spina bifida gave good results for faecal incontinence, with good patient compliance, no favourable effect on bladder function should be expected in most patients with a high-risk urinary tract dysfunction. Further study is needed to determine factors in patients who will benefit urologically from enema treatment.

Keywords Neurogenic bladder, spina bifida, faecal incontinence, colonic enema irrigation, bladder–sphincter function

Introduction

Patients with a neurogenic bladder arising from spinal dysraphism often have detrusor–sphincter dyssynergia (DSD) with hyperactivity of the pelvic floor musculature, causing functional bladder outlet obstruction. Similarly, the mechanism of pelvic floor overactivity is mainly responsible for the sometimes impressive faecal constipation that occurs in these patients. Whereas historically these patients have been treated with oral or rectal laxatives and/or digital evacuation of faeces, they are presently increasingly treated using antegrade or retrograde colonic irrigation once every 24–48 h. This type of treatment prevents constant overdistension of the rectosigmoid, provides regular emptying of the colon and faecal continence. This study was undertaken to assess the effect of changes in colonic filling on the urodynamic variables of bladder–sphincter dysfunction. Retrospectively, we compared the results of urodynamic studies in patients with a neurogenic bladder–sphincter dysfunction before and after a colonic irrigation programme.

Patients and methods

In our hospital, the group of patients with spinal dysraphism consists of 190 children between 1 and 17 years old. Since 1991, by analogy with the antegrade continence enema reported by Griffiths and Malone [1] and the enema continence catheter developed by Shandling and Gilmour [2], colonic irrigation programmes were instituted to treat constipation and/or faecal soiling in these children [3,4]. Currently, 83 of the children undergo regular colonic irrigation once daily or once every other day, performed by placing a cone-shaped introducer connected to an infusion system into the anus. After infusing 20 mL/kg body weight of water into the rectosigmoid, the diluted faeces are evacuated spontaneously within 30 min. The procedure can be carried out in almost any bathroom and is surprisingly well tolerated by most children, most of who attain faecal continence.

For this study, 12 children (seven boys and five girls) with spinal dysraphism and neurogenic bladder–sphincter dysfunction with DSD were selected. All had undergone urodynamic studies before and after starting treatment with colonic irrigation, with no changes in their urological treatment. The spinal defect was lumbosacral in five, lumbar in five and thoracolumbar in one. One patient had a lumbosacral spina bifida occulta. The mean age when colonic irrigation was introduced was 93 months (range 8–165). The urodynamic studies took place 1–25 months before and again 2–28 months after starting the colonic irrigation programme. The studies were performed using a computerized urodynamic...
system, recording the intra-abdominal pressure, bladder pressure, detrusor pressure (intra-abdominal pressure minus bladder pressure) and EMG of the pelvic floor. Conditions at the time of the studies did not differ in use of anticholinergics and the practice of clean intermittent catheterization (CIC); no intercurrent operative corrections to bladder or spine had taken place. As bladder capacity, leak-point pressure (LPP) and compliance indicate the risk of future renal scarring, changes in these three factors were assessed, taking the end-filling pressure (EFP) as a measure of compliance [5–7]. Cystometric bladder capacity (CBC) was measured and expressed as percentage of the expected capacity for age, the latter calculated as (age in years + 2) × 30 mL [6]. The LPP was defined as the minimal detrusor pressure required to overcome urethral resistance and any detrusor activity during filling was noted.

**Results**

The CBC changed by >20% in five children, increasing in three, decreasing in two and remaining the same in seven children (within 20%; Table 1). Before starting irrigation, nine children had a LPP of >40 cmH₂O, considered to be harmful for the upper urinary tract: after treatment, only one of the nine had a lower LPP and in two with LPPs of <40 cmH₂O there was no change after treatment [8]. The LPP was not evaluable in one child because of spontaneous micturition. The EFP increased in four patients from <40 cmH₂O, decreased to <40 cmH₂O in one and remained unchanged in seven. Of the 12 patients, 10 had detrusor instability, with pressures of 15–80 cmH₂O; the instability diminished after starting irrigation in only one child, remaining unchanged or even increasing in the other nine. Thus, overall there were no significant changes in the urodynamic variables.

**Discussion**

Bowel management is a challenging problem in children and adults with spinal dysraphism. Various methods of dealing with incontinence and constipation in these patients have been applied, e.g. oral laxatives, suppositories, biofeedback training, digital evacuation, antegrade and retrograde enemas, or even colostomy [9–11]. The present method of treatment with retrograde colonic irrigation was accepted well by these patients and their parents. Liptak et al. [10] reported the use of an enema continence catheter for bowel dysfunction in children with spinal cord disease or injury; this device is similar to the present cone-ended infusion system. They concluded that good results were obtained for constipation and incontinence, but that compliance with the therapy was difficult, in contrast to the present study, where compliance was good, probably because the patients were supervised closely by a specialist nurse.

Although colonic irrigation is helpful in the treatment of faecal impaction and faecal incontinence in children with spinal dysraphism, there was no substantial change in urodynamic values in most patients. However, it is recognized that constipation can influence bladder function. Malone recently emphasized the importance of treating bladder and bowel dysfunction together and not

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>at CI</th>
<th>at UDS</th>
<th>Capacity mL (%)*</th>
<th>LPP (cmH₂O)</th>
<th>EFP (cmH₂O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Before</td>
<td>After</td>
<td>CIC</td>
<td>Oxy Before</td>
<td>After</td>
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<tr>
<td>M</td>
<td>122</td>
<td>122</td>
<td>149</td>
<td>+</td>
<td>171 (47)</td>
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<td>22</td>
<td>20</td>
<td>42</td>
<td>−</td>
<td>66 (73)</td>
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<td>F</td>
<td>8</td>
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<td>15</td>
<td>−</td>
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<td>143</td>
<td>139</td>
<td>149</td>
<td>+</td>
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<td>137</td>
<td>164</td>
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<td>M</td>
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<td>54</td>
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<td>78</td>
<td>72</td>
<td>95</td>
<td>+</td>
<td>350 (145)</td>
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<tr>
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<td>153</td>
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<tr>
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<td>42</td>
<td>81</td>
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<td>95 (63)</td>
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<tr>
<td>M</td>
<td>73</td>
<td>58</td>
<td>88</td>
<td>+</td>
<td>45 (25)</td>
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</table>

Cl. Colonic irrigation. UDS. Urodynamic studies. CIC. Clean intermittent catheterization. Oxy. Use of oxybutinin. LPP. Leak-point pressure. EFP. End-filling pressure.

*Percentage of capacity expected for age.
as separate entities [11]. Dohil et al. [12] reported that post-void residual volume and upper urinary tract dilatation decreased after the treatment of constipation. Similarly, bladder instability associated with constipation in children with dysfunctional voiding improved after aggressive laxative therapy [13]. Unfortunately, the potentially dangerous characteristics of neurogenic dys-synergic bladders, i.e. small capacity and high-pressure, are not ameliorated by colonic irrigation in most patients. Other forms of therapy, e.g. anticholinergics, intermittent catheterization and/or bladder augmentation, must still be used to prevent renal damage.

The present study was preliminary and aimed to determine the effect on bladder function of treating constipation. Because there were no significant changes in the urodynamic findings before and after colonic irrigation, except in three patients, we conclude that further prospective study is needed to identify the urodynamic characteristics of those patients who may benefit urologically from colonic irrigation.

References

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