Rectal hyposensitivity is uncommon in patients with obstructed defaecation and high-grade internal rectal prolapse

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Neurogastroenterology & Motility 2011; 23(2):151-4
Abstract

Background: There are several causes of obstructed defaecation one of which is thought to be internal rectal prolapse. Operations directed at internal prolapse, such as laparoscopic ventral rectopexy, may improve obstructed defaecation symptoms significantly. It is not clear whether the obstructed defaecation with internal prolapse is a mechanical phenomenon or whether it results changes in rectal sensitivity. This study aimed to evaluate rectal sensory function in patients with obstructed defaecation and high-grade internal rectal prolapse.

Method: This study represents a retrospective review of a prospectively collected database of patients attending a tertiary referral pelvic floor unit. Patients with high-grade (recto-anal) intussusception formed the basis of this study. Rectal sensory function was determined by intra-rectal balloon inflation. Three parameters (sensory threshold, urge to defaecate and maximum tolerated volumes) were recorded. Abnormal sensitivity was defined as partial (one or two parameters abnormal) or total (all three abnormal).

Key Results: 408 patients with high-grade internal rectal prolapse both with and without obstructed defaecation symptoms were studied. 241 (59%) had normal sensation. 18 (4%) had total hyposensitivity and 3 (1%) total hypersensitivity. A further 96 (24%) had partial hyposensitivity whilst 50 (12%) had partial hypersensitivity. Neither hypersensitivity nor hyposensitivity differed between patients with and without symptoms of obstructed defaecation.

Conclusion and Inferences: Rectal hyposensitivity is relatively uncommon in patients with high-grade internal rectal prolapse and obstructed defaecation. Internal rectal prolapse may cause obstructed defaecation through a mechanical process. It does not appear that rectal hyposensitivity plays a significant part in the pathological process.
Introduction

Obstructed defaecation is a common problem with an estimated prevalence of 2-10%. The pathophysiology of obstructed defaecation is multifactorial though internal rectal prolapse has been recognised as one of its major causes. Internal rectal prolapse, also known as incomplete rectal prolapse or rectal intussusception, is defined as the protrusion of the full thickness of the wall of the rectum into the rectal lumen or anal canal. Whilst clinical examination may raise suspicion, the most common route of diagnosis is by defaecating proctography.

The importance of sensory abnormalities in pelvic floor dysfunction has been recognized for almost sixty years. The use of the rectal balloon distension to examine the rectal sensory perception and rectal wall contractility has been present for over three decades and it is now routinely used in clinical practice as part of the physiological assessment. Three main volume or pressure parameters are usually measured. This includes sensory threshold volume, urge to defaecate volume and maximum tolerable volume. Disorders of rectal sensation are found in around one sixth of patients who come for anorectal physiological assessment.

Whilst internal rectal prolapse is recognized to cause obstructed defaecation, the mechanism by which it does this is unclear. This could be a mechanical phenomenon but might also be through changes in rectal sensitivity. This paper reports on the incidence of abnormalities in rectal sensation amongst patients with high-grade internal rectal prolapse investigated in our unit.

Method

The study comprised patients with high-grade internal rectal prolapse on defaecating proctography or at examination under anaesthetic. Rectal prolapse was graded using the Oxford Rectal Prolapse Grade (figure 2, table 1, page 12,13). High-grade internal rectal prolapse was defined as those with Oxford Rectal Prolapse Grade 3 or 4 (recto-anal intussusception). Patients were identified from a prospectively collected database that also included information on symptom scores and physiological parameters.

Patients were studied in the left lateral position as part of standard physiological testing. No bowel preparation was used. A latex balloon was inserted into the rectum at 10cm from the anal verge. This was inflated with air at a rate of 1ml/sec. Patients were asked to state when they first felt the balloon expanding in their rectum (sensory threshold
volume; normal range 20-70ml in our unit), when they first appreciated the sensation that they needed to open their bowels (urge to defaecate; normal range 35-120ml) and the volume at which they were unable to tolerate further balloon inflation (maximum tolerable volume; 100-260ml). Rectal hyposensitivity was defined as “partial” if there was the elevation of one or two of the three sensory parameters above the normal range or “total” if all three parameters were elevated. Similarly, total rectal hypersensitivity was defined as reduction in all three sensory threshold volumes below the normal range, whilst partial hypersensitivity was defined as an abnormality in one or two of these parameters. Non-parametric data were compared using Fisher’s exact test. A p-value of less than 0.05 was considered statistically significant.

Results

Demographics
408 Patients (359 (88%) female, 49 (12%) male) with Grade 3 or 4 internal rectal prolapse were identified. The mean age of the study group was 59 years (range 19-90). 294 patients (72%) had obstructed defaecation symptoms and 114 (28%) did not. 81 (71%) of these patients with non-obstructed defaecation symptoms were complaining of pure faecal incontinence.

Sensory abnormalities
241 Patients (59%) had normal sensation (all three sensory parameters in the normal range). 18 patients (4%) had complete hyposensitivity (all three sensory parameters abnormal above the normal range). 96 (23%) Patients had partial hyposensitivity (52 patients with a single abnormal parameter, 44 with two abnormal parameters). 3 Patients (1%) was complete hypersensitive with all three parameters abnormal and 50 (12%) had partial hypersensitivity (37 with a single abnormal parameter, 13 with two abnormal parameters). These results are summarised in table 2.

<table>
<thead>
<tr>
<th>Sensation</th>
<th>No. of abnormal parameters</th>
<th>No. Of patients</th>
<th>Overall percentage (%)</th>
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</thead>
<tbody>
<tr>
<td>Normal</td>
<td>0</td>
<td>241</td>
<td>59</td>
</tr>
<tr>
<td>Hypersensitive</td>
<td>1</td>
<td>37</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>13</td>
<td>3</td>
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<tr>
<td></td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Hyposensitive</td>
<td>1</td>
<td>52</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>44</td>
<td>11</td>
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<tr>
<td></td>
<td>3</td>
<td>18</td>
<td>4</td>
</tr>
</tbody>
</table>

*Table 2,* Summary of the prevalence of sensory abnormalities in the study group (sensory threshold volume, urge to defaecate and maximum tolerated volume).
Obstructed defaecation versus non-obstructed defaecation symptoms

Of the 294 patients with obstructed defaecation symptoms, 84 (28%) displayed partial or complete hyposensitivity. By comparison, of the 114 patients without obstructed defaecation symptoms, 29 (25%) had partial or complete hyposensitivity. The proportion of patients with hyposensitivity did not differ between these groups (p=0.62).

Partial or complete hypersensitivity was seen in 38 (13%) of the patients with obstructed defaecation as compared to 16 (14%) of the patients without these symptoms. This was not statistically significant (p=0.75).

Discussion

Rectal hyposensitivity could reflect either an impaired afferent nerve pathway or the presence of abnormal rectal wall properties. Our study suggests that in patients with internal rectal prolapse and obstructed defaecation, hyposensitivity occurs in only a minority. Of the patients with “abnormal sensation”, many had only one of three parameters outside the normal range and may have been exhibiting little more than normal population variation.

There are a number of methods of assessing rectal sensation other than balloon inflation used in this study. One such technique is the measurement of rectal mucosal electrosensitivity. The reproducibility of this method has been questioned, however, with a report suggesting that there is variability depending on the circumferential position of the electrode and the presence of faeces. Another alternative involves the use of a barostat. This maintains a constant pressure within an air-filled bag usually made of polythene by means of a computerized feedback mechanism during rectal distension. This helps to overcome issues of rectal capacity and compliance during rectal distension, which may be an issue in some patient subgroups such as those with mega rectum. There are some studies that suggest that the measurement of sensation by simple balloon inflation does not correlate well with assessment using a barostat in healthy volunteers. Furthermore, this discrepancy might be even more marked when one considers patients with rectal hyposensitivity. However, simple balloon inflation has been and continues to be the most commonly employed method of assessing rectal sensation in clinical practice.

Several studies report rectal sensation in various groups of patients with a range of functional symptoms. Gladman et al. reported the prevalence of rectal hyposensitivity in patients with different functional problems. They used balloon distension and defined hyposensitivity as in this study (one or more of the three sensory thresholds elevated).
Of those patients with symptoms of constipation, the authors divided them into patients with infrequency of defaecation and obstructed defaecation or a combination of the two. They reported rectal hyposensitivity in 8/42 (19%) of patients with stool infrequency. This contrasted with 50/250 (20%) of patients with obstructed defaecation and 44/146 (30%) of patients with a mixture of both findings. In patients with intussusception on proctography and symptoms of obstructed defaecation, rectal hyposensitivity was seen in 25/62 (40%).

Gosselink and Schouten\textsuperscript{16} studied rectal sensation in women with obstructed defaecation using a barostat. They found significant differences in the median values of all three sensory parameters for patients with obstructed defaecation compared to controls, though they did not give data on the percentages of patients with hyposensitivity. Interestingly, they found that rectal sensitivity was no different between patients with slow transit compared to those with normal transit.

By comparison, our study has shown hyposensitivity to be less common in obstructed defaecation. There might be a number of explanations for this including differences in the referral patterns of patients for investigation and variation in the methodology of testing for rectal sensation. In our study, only patients with recto-anal intussusceptions were included. In the study of Gladman et al., the authors report that rectal intussusception was sometimes classified as normal if it “appeared to be clinically insignificant and did not constitute a physical obstruction”.

Whilst these studies show an association between obstructed defaecation and rectal hyposensitivity, the relationship between the two is not clearly understood. In particular, it is not known if obstructed defaecation cause rectal hyposensitivity. Straining may cause a stretching of the pudendal or hindgut autonomic nerves, resulting in a neuropathy.\textsuperscript{17} This might then precipitate the rectal hyposensitivity.\textsuperscript{18} Alternatively, it is possible that the rectal hyposensitivity is the cause of the obstructed defaecation. Schouten et al.\textsuperscript{19} showed that the mean distending volume required to elicit an urge to defaecate was significantly greater in patients with obstructed defaecation compared to normal controls. In all control patients in this study, evocation of the urge to defaecate induced a pronounced increase in rectal tone, proximal to the distal stimulating balloon. This increase in rectal tone was significantly higher in control subjects as compared to those with obstructed defaecation.

There are a number of surgical techniques which have been developed for the treatment of obstructed defaecation. These techniques differ considerably and range from perineal to abdominal procedures. Most prominent amongst the perineal techniques has been a new operation that uses the circular stapler for the specific management of this condition, STARR.
Since its development, a prospective study of 90 patients has shown the STARR procedure to be a quick technique to perform, with short recovery times and effective at reducing obstructed defaecation symptoms.\textsuperscript{20} This has been supported by a number of other studies.\textsuperscript{21,22, 23,24} STARR is not without risk, however.\textsuperscript{25} Some of these complications result from the resectional nature of STARR (bleeding, anastomotic dehiscence and sepsis) whilst others are a result of perineal instrumentation and anal dilatation (faecal incontinence). Inappropriate positioning and firing of the staplers can cause damage to other structures including the vagina (rectovaginal fistula) and small bowel, especially in patients with an enterocoele.

Part of the proposed mechanism by which this stapled transanal resection of rectum (STARR) procedure works is said to be through resection of the ‘hyposensitive’ portion of the rectum. This is said to restore rectal compliance and decrease the rectal sensory threshold in patients with obstructed defaecation.\textsuperscript{26} Resection of the hyposensitive rectum would be difficult to achieve via an abdominal approach as it would involve essentially a very low anterior resection with all its attendant surgical risk and functional disturbance.

This study suggests that rectal hyposensitivity is not a prominent feature of most patients with obstructed defaecation. Anatomical abnormalities, such as internal rectal prolapse, rectocele and enterocoele, may be more important. This might explain laparoscopic ventral rectopexy, which restores normal anatomy without removing the hypo-sensitive mucosa, has good functional results when undertaken in patients with obstructed defaecation and internal prolapse.\textsuperscript{27,28}
References