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What is This?
Rectal Prolapse in Pediatrics

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Summary: Rectal prolapse in pediatrics has its highest incidence in infancy and is uncommonly seen in industrialized countries. The prolapse may involve only the mucosa (mucosal prolapse) or all layers of the rectum (complete prolapse or procidentia). It is usually detected by the child’s parents and is brought urgently to medical attention; however, it is usually spontaneously reduced by the time they reach the practitioner’s office. Rectal prolapse should be viewed as a symptom of an underlying condition rather than a discrete disease entity. Potential causes are increased intra-abdominal pressure, diarrheal and neoplastic diseases, malnutrition, and conditions predisposing to pelvic floor weakness. Its strong association with cystic fibrosis makes the sweat test mandatory for infants and children with recurrent rectal prolapse. Of particular importance are three entities related to rectal prolapse that may easily escape diagnosis by practitioner: occult rectal prolapse, solitary ulcer of the rectum syndrome, and inflammatory cloacogenic polyps. The treatment of rectal prolapse is mainly conservative and is directed at the underlying conditions. Surgical intervention may be required for recurrent rectal prolapse refractory to conservative measures. The simplest, less invasive, yet highly effective approach, appears to be perirectal injection with a sclerosing agent. While the majority of children experience spontaneous resolution of the prolapse, the prognosis is worse when presentation occurs after the age of 4 years. Clin Pediatr. 1999;38:63-72

Introduction

Rectal prolapse was much more common in the first half of this century, and the decreased occurrence is thought to be secondary to improved nutrition and hygiene in industrialized countries.1 Although rectal prolapse is relatively uncommon and usually a benign condition, its appearance, nevertheless, provokes considerable anxiety for the child’s family. Therefore, it is often brought urgently to medical attention. Owing to parental anxiety and the primary care physician’s unfamiliarity with the condition, rectal prolapse often results in the immediate referral for surgical evaluation. However, the vast majority of these children may be managed conservatively by their primary care physicians since they do not require surgical intervention. Referral of children with this usually benign condition to surgeons is related perhaps to the fact that rectal prolapse in children is discussed most prominently in the surgical literature. In addition, more than 10 years have passed since the last review of rectal prolapse in children; again, this was a surgically oriented review.2 It is our intention,
therefore, to provide a thorough, up-to-date review of rectal prolapse in pediatric patients, emphasizing recent data on pathophysiology and relationships of rectal prolapse to other medical conditions: particularly cystic fibrosis and the two recently described entities of solitary ulcer of the rectum syndrome (SURS) and inflammatory cloacogenic polyps (ICP). We have taken the view that rectal prolapse should be approached by the primary care physician as a symptom of an underlying condition rather than a discrete disease entity; otherwise, the evaluating physician is likely to miss the primary problem.

Prolapse of the rectum is, quite simply, an intussusception of the rectum that may involve only the mucosa (Figure 1A, B) or may involve all layers of the rectum, in which case it has been termed complete rectal prolapse or procidentia (Figure 2A, B). Complete rectal prolapse (procidentia) has been further subdivided based on degree of prolapse as detailed in Table 1.

Characteristically, mucosal prolapse produces radial folds at
the junction with the anal skin (Figure 1A), while full-thickness prolapse is characterized by circular folds in the prolapsed mucosa (Figure 2A). Prolapse of 2 cm or more virtually always involves the full thickness of the rectum.

**Etiology and Pathophysiology**

Rectal prolapse in childhood occurs most commonly under age 4 years with the highest incidence in the first year.\(^2\) Most clinical series report approximately equal sex incidence in children,\(^2,4,5\) which contrasts sharply with adult patients, among whom females are six times more susceptible.\(^6\) Prolapse becomes uncommon in late childhood and early adult-
hood and reappears with increasing frequency after the age of 40 years.

The increased incidence of rectal prolapse in early childhood is thought to relate to several important anatomical considerations: the vertical course of the rectum along the straight surface of the sacrum and coccyx, the relatively low position of the rectum in relation to the other pelvic organs, the increased mobility of the sigmoid colon, the relative lack of support by the levator ani muscle, the loose attachment of the redundant rectal mucosa to the underlying muscularis, and the absence of Houston’s valves in about 75% of infants under a year of age. In contrast, the increased incidence of rectal prolapse in older adults is due primarily to pelvic muscular weakness related to injury from childbirth and advancing age.

Many unrelated conditions predispose to rectal prolapse in childhood but may be grouped into several broad categories:

1. Increased intraabdominal pressure caused by straining due to chronic constipation; toilet training; protracted coughing spells, especially with whooping cough or chronic lung disease; excessive vomiting; and chronic straining during urination (e.g., phimosis). Prolonged straining during defecation associated with misguided and often premature attempts at toilet training is possibly a major cause of rectal prolapse in the United States.

2. Acute or chronic diarrheal disease caused by infections such as giardia, salmonella, shigella, antibiotic-associated colitis, and E. coli0157: H7 or malabsorption syndromes such as celiac disease or pancreatic insufficiency have been associated with rectal prolapse. The presence of rectal prolapse in hemolytic-uremic syndrome (E. coli0157: H7) is thought to be associated with significant extraintestinal disease and poor long-term outcome.

3. Parasitic and neoplastic disease of the rectum have been associated with rectal prolapse. Infestations, particularly trichuriasis (whipworm), during which the parasites colonize or invade the rectal mucosa or rectal neoplasms such as polyps either spontaneously or as a result of schistosoma infection (bilharziomas) may provide a leading point for intussusception, and thus prolapsing of the rectum. Similar mechanisms may be responsible for rectal prolapse seen in ulcerative colitis associated with pseudopolyps. In addition, true polyps or polypoid lesions may prolapse through the anus, thus mimicking rectal prolapse (Figure 3).

4. Malnutrition is perhaps the most common condition worldwide associated with rectal prolapse in infancy and childhood, especially in underdeveloped countries. In the course of protein-calorie deprivation, major predisposing factors are the disappearance of the ischiorectal fat resulting in decreased perirectal support and chronic diarrhea.
from enteric infections. Other mechanisms may be operative in an individual patient such as a chronic parasitic infection that might result in both chronic diarrhea and continuous rectal bleeding, eventually rendering the patient anemic, hypoproteinemic, and malnourished and susceptible to rectal prolapse.

5. Cystic fibrosis deserves special mention since rectal prolapse has been found in up to 23% of these patients. However, cystic fibrosis accounts for only 11% of the cases of rectal prolapse in the Western world. Conceivable mechanisms by which cystic fibrosis predisposes to rectal prolapse include voluminous, bulky bowel movements; undernutrition; and/or increased intraabdominal pressure due to coughing paroxysms related to the pulmonary component of the disease. However, rectal prolapse appears to be most closely correlated with the severity of diarrhea. Of importance to the primary care physician, rectal prolapse may represent the presenting symptom of cystic fibrosis in up to one third of the patients, preceding the more common characteristics such as pulmonary disease and diarrhea from malabsorption.

6. Pelvic floor weakness in childhood is commonly the result of neurologic disorders affecting enervation of the pelvic musculature or following pelvic surgery. For example, children with myelomeningoceles often have paralysis of the levator ani muscle plus raised intraabdominal pressure leading to procidentia. Surgical correction of anorectal abnormalities, especially imperforate anus, may predispose to rectal prolapse in childhood.

7. Miscellaneous associations with rectal prolapse include Ehlers-Danlos syndrome, congenital hypothyroidism, homosexual activity, Hirschsprung’s disease, and extensive burns. The rectum and even the sigmoid colon have been sucked out of the anus by inadvertent contact with a swimming pool suction drain. Physiologic studies have been performed in a few normal children with rectal prolapse but without an identifiable underlying predisposition. There were no obvious differences in rectal pressures, anal canal pressures, lengths of high-pressure zones, or anal/rectal relaxation between children with complete rectal prolapse (even those with fecal incontinence) and normal age- and sex-matched controls. However, the rate of basal rhythmic contractions of the anal smooth muscle and rectal compliance were both significantly lower in patients with prolapse. Dynamic ultrasonographic and radiographic studies have confirmed the hypothesis that rectal prolapse starts initially as an intussusception of the rectum and then develops more fully. Since measurements of sphincter function in these children yield generally normal values and since rectal prolapse may be obviated in most patients by eliminating predisposing factors, these results reinforce a conservative approach to the management of rectal prolapse in most children.

Clinical Features

Most parents and families find the appearance of rectal mucosa protruding from the anus a harrowing experience. Parents usually see a dark, reddened mass emerging from the anal verge together with excess mucus and/or traces of blood but observe with amazement that the protrusion of the child’s “insides” appears painless. In most cases, the rectal prolapse has already reduced...
spontaneously by the time the patient reaches medical attention. Digital rectal examination immediately following reduction of a brief rectal prolapse may reveal decreased or even absent tone of the anal musculature, but normal tone usually returns after several hours, resulting in apparently normal findings from rectal examination. Persistently decreased sphincter tone or patulous anal musculature with a gaping anal orifice after the buttocks are retracted may be observed in association with disorders causing pelvic floor weakness such as myelomeningocele and other spinal lesions, including tethered cord and congenital maldevelopment of the pelvis. Since most prolapses reduce spontaneously, an examination having the patient in a squatting position (if the child is old enough to cooperate) may be the only means of demonstrating the prolapse. If the rectum is prolapsed at the time of the evaluation, palpation of the prolapsed mucosa between the finger and thumb allows the examiner to distinguish between mucosal and complete rectal prolapse. An acute prolapse is reduced easily if reduction is undertaken promptly before there is edema formation. However, sustained rectal prolapse may lead to venous obstruction and thrombosis producing considerable edema and even ulceration of the prolapsed rectal mucosa. In cases of long-standing or frequent rectal prolapse, an acute proctitis may develop and the mucosa may lose its normal circular folds, becoming edematous and hyperemic with excessive mucoid secretion (Figure 2A). In these cases reduction may be difficult even with manual pressure. Adolescents may complain about the intermittent protrusion itself and/or soiling from mucus, blood, or feces associated with cramping rectal pain.

**Occult Rectal Prolapse, Solitary Ulcer of the Rectum Syndrome, and Cloacogenic Polyps**

Occult rectal prolapse (third-degree rectal prolapse) is a condition with potentially confusing symptoms, posing significant diagnostic problems and usually occurring in adolescents and young adults. The patients, usually young women, complain of tenesmus and anorectal pain, often with the passage of blood and mucus. Recurrent occult rectal prolapse may remain unrecognized for months or even years. Sigmoidoscopic examination may reveal "proctitis" characterized by erythema and granularity of the distal rectum usually localized to the anterior surface of the rectal ampulla. A polypoid, white-topped mucosa on the anterior rectal wall is variably present, but when present, represents a striking and characteristic feature of occult rectal prolapse. This lesion is caused by superficial necrosis of edematous, congested mucosa and probably precedes ulceration of the rectum. In a series of six patients, five of whom were women, occult rectal prolapse was missed initially and proctitis was diagnosed in all patients. Four of these patients eventually developed solitary ulcer of the rectum syndrome (SURS) (see below). Bleeding and ulceration occur frequently with chronic third-degree occult rectal prolapse, but severe hemorrhage is unusual.

Solitary ulcer of the rectum syndrome represents localized necrosis of the mucosa and is a well-described, but uncommon and not widely appreciated, complication of rectal prolapse. This chronic, benign condition affecting adolescents and young adults causes rectal bleeding, passage of mucus, and rectal pain. SURS is somewhat of a misnomer since examination of the rectum may reveal single or multiple shallow ulcers covered with white, gray or yellowish slough with hyperemic margins, which are usually situated on the anterior or anterolateral wall and sharply demarcated from surrounding normal mucosa. The most characteristic histologic lesion is the obliteration of the lamina propria in the region of the ulcer by fibroblasts and muscle fibers derived from the muscularis mucosa. The epithelium may show considerable reactive hyperplasia with goblet cell depletion and cystic dilatation of the tubules. Several investigators report an association between SURS and occult rectal prolapse. Schweiger and Alexander-Williams reported a series of 12 patients with SURS, all of whom were found to have occult rectal prolapse eventually. The postulated mechanism responsible for rectal prolapse in most cases appears to be excessive straining efforts during which high intraabdominal pressure forces the anterior rectal mucosa firmly into the tightly contracting puborectalis muscle. Frequently, the anterior rectal mucosa was forced into the anal canal, prolapsed through the puborectalis sling, and as a consequence became strangulated, causing congestion, edema, superficial necrosis, and ultimately ulceration. Clearly, this sequence requires a strong pelvic floor, perhaps accounting for the occurrence of this syndrome predominantly in younger people with powerful anal sphincters.

Inflammatory cloacogenic polyps (ICP) are polyloid formations, 0.4 to 1.2 cm in diameter, arising from the transitional zone that lies between the columnar
rectal and squamous anal epithelium. They represent a nonspecific regeneration process and histologically are characterized by tubulovillous architecture, inflammatory granulation tissue of the lamina propria, hyperplastic mucosal glands, and thickened muscularis mucosa with expansion of smooth muscle and fibrous stroma into the lamina propria. Their association with rectal prolapse has been well described. It has been postulated that ICPs, as the SIRS, with which they share similar histologic features and occasionally coexist, are caused from mucosal ischemia subsequent to rectal prolapse. Clinically they usually present with rectal bleeding. Other symptoms include discomfort with defecation, tenesmus, and anal itching. Endoscopically they can be missed if a retroflexion maneuver during colonoscopy is not performed.

**Differential Diagnosis**

Rectal prolapse must be distinguished from two other primary entities: first, ileocecal intussusception protruding through the anus, and second, a prolapsing rectal polyp. The child with ileocecal intussusception usually appears ill, and the examining finger may be passed between the prolapsed bowel and the anal sphincter. This contrasts with prolapse, in which the protruding mucosa is continuous with the perianal skin, and the examiner’s finger will not pass this junction. A protruding polyp (Figure 3) may mimic prolapse: appearing with defecation and reducing spontaneously. However, on digital examination this lesion does not involve the entire anal circumference.

**Evaluation and Management**

If the rectal prolapse is still present at the time of the examination, reduction should be undertaken promptly before edema formation occurs. The herniated bowel may be grasped with fingertips surrounding the bowel and pushed in. If edema is present, firm, steady pressure for several minutes may be necessary to reduce the swelling and allow reduction of the prolapse. Digital rectal examination should follow this maneuver to make certain that reduction is complete. If a prolapse occurs immediately following reduction, the buttocks may be strapped together with adhesive tape for several hours.

With the exception of patients with pelvic floor weakness or spinal cord lesions, rectal prolapse spontaneously resolves in most patients, including those with cystic fibrosis. Therefore, conservative management should be attempted initially and evaluation should be directed toward identification of underlying or predisposing conditions such as prolonged potty training time, constipation, diarrhea, parasitic infections, polyps, anal stenosis, and, most importantly, cystic fibrosis. Indeed, the primary care physician should approach rectal prolapse initially as a symptom rather than a specific disease entity and always search for an underlying disorder. Therefore, any child with unexplained rectal prolapse should be evaluated for cystic fibrosis.

Initial office management should be directed toward measures preventing recurrent prolapse such as training the parents to use disposable gloves and lubricating jelly to promptly reduce a prolapse whenever it occurs. Since the use by children of an adult commode with prolonged sitting with the buttocks very dependent is the primary cause of rectal prolapse in the majority of older children, many practitioners place the child on an adult toilet with a special seat having a smaller hole or a child’s “potty chair” to support the buttocks while supporting the child’s feet, thus allowing the child to relax and decreasing intraabdominal pressure. Another treatment plan preferred by one author (TPV) involves taking the child off the adult commode by the use of a fracture bedpan to allow the child to have bowel movements, if potty trained, in a somewhat recumbent position. This will prevent the problem of venous stasis and edema. Usually, this technique, although bothersome for parents and child to some degree, prevents the prolapse and allows the rectal tissue to reattach to the sacral fascia. A period of 4–6 weeks’ utilization of this type of bedpan usually solves the problem. Other recommendations include taping the buttocks or having the child defeate in the lateral recumbent position. It is doubtful that compliance can be achieved with the latter two recommendations. If not successful within several weeks, further search for primary etiology should begin. Patients with recurring rectal prolapse with no apparent cause should undergo proctosigmoidoscopy to rule out polyps and other rectal lesions. The initiation of adequate pancreatic replacement therapy results in the cessation of prolapse in approximately 70% of cystic fibrosis patients.

**Management of Chronic Recurrent Rectal Prolapse**

Patients with recurrent rectal prolapse or poor response to con-
sive measures may require surgical intervention. Generally, patients with pelvic floor deformities or spinal cord lesions respond poorly to conservative management. The simplest, most benign, yet efficacious intervention appears to be injection of sclerosing solutions such as ethanolamine oleate, phenol in almond oil, quinine, sodium morrhuate, saline, or 70% ethyl alcohol into the rectal submucosa. The success rate of this procedure is reported to be as high as 90-100%. Reported complications include bleeding, perirectal inflammation, urinary retention, ischiorectal abscss, and necrosis of the rectal mucosa. If injection of a sclerosing solution is unsuccessful after several sessions, most authorities recommend anal encirclement with silastic bands, catgut, or nonabsorbable proline suture material (Thiersch procedure). Success rates with this procedure are reported to be above 90% without serious complications other than breakage of the encircling material. The Thiersch procedure appears to be ideal for cases of rectal prolapse resulting from pelvic floor weakness such as extrophy of the bladder and myelomeningocele and in the treatment of recurrent rectal prolapse associated with cystic fibrosis.

Other surgical procedures include presacral packing with gauze or gel foam through a posterior approach or presacral insertion of polyglactin mesh. Linear cauterization of the rectum has been advocated by Hight et al. Ashcraft et al have utilized several types of rectopexy in a series of 40 patients over a period of 17 years. Their most commonly applied approach was the transsacccygeal rectopexy with pexation of the rectum in children whom symptoms of protrusion first appear after the age of 4 years and are much less likely to respond to conservative therapy since most of these children have neurologic or muscular defects of the pelvis. Referrals to surgeons are justified after a thorough investigation for detection of underlying conditions and after failure of conservative management. Since patients with spinal cord lesions, skeletal deformities, or pelvic floor abnormalities respond poorly to conservative management, surgical intervention should be considered early in their course.

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Siafakas, Vottler, Andersen


