Complications Following Posterior Sagittal Approach-PSARP

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Abstract

The complications following PSARP are early complications like wound infection, bleeding, mis-located anus, wound dehiscence, bowel retraction, recurrent fistula, transient femoral nerve palsy, injury to urethra, bladder, vas deferens or ureter, peritonitis, perineal skin excoriation and bladder dysfunction. Besides, there are many delayed or late complications like ano-cutaneous stenosis, anorectal stricture, rectal mucosal prolaps, urethral stricture, neurogenic bladder, and more frequent functional problems like chronic constipation with overflow incontinence and primary fecal incontinence. The early complications can be avoided by meticulous haemostasis proper closure of the wounds without leaving any dead space, adequate dilatation of the pulled down rectal pouch without tension and good vascularisation of the pulled down rectal pouch. Concerning the late complications, one has to distinguish between 1. Neurogenic problems due to sacral malformations or injury to the neuro erigentes 2. Secondary psychological problems 3. Sphincter insufficiency 4. Altered rectosigmoid motility. For general evaluation of postoperative continence we propose a clinical score, modified according to our publication from 1983. However, this score should be used only for true or primary incontinence based on hypoplasia of sphincter muscles. For children with chronic constipation we propose a special score which involves chronic constipation and overflow incontinence. The classification concerning the degree of continence or incontinence depends on the postoperative treatment necessary. There might be no treatment necessary or special treatment to motility problems and chronic constipation or even special treatment for sphincter insufficiency. According this kind of treatment anorectal malformations are classified in type I in complete continence, in type II partial continence (IIA: continence with dietary management and/or laxative, type IIIB: constipation with overflow soiling but clean with enemas and type IIC: partially insufficient muscle complex soiling occasional, no constipation). Finally there is a group III of incontinent children (Type IIIA: complete insufficient muscle complex encopresis, type IIIB: severe motility problems, constipation not manageable). In conclusion we propose that 3 main and 5 subgroups of continence problems should be

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distinguished and that one should not speak anymore from degrees of continence. The details concerning the treatment of chronic constipation (conservative or operatively) and sphincter insufficiency are discussed.

Key words: PSARP, Complication scmsa, Motility disturbance, Chronic constipation, Overflow incontinence, Sphincter insufficiency, Early/late complications

I Introduction

The posterior sagittal ano-rectoplasty (PSARP) performed for infants and children with anorectal malformations (ARM) is a technically demanding operation and requires strict adherence to the finer operative details to achieve good results. The postoperative care of the wound, catheterization of the urinary bladder postoperatively for 12 days until a voiding cystography has shown appropriate healing of the recto-urethral fistula and than a careful anal dilatation program for a few weeks until the elasticity of the sphincter fibers is secured and the anus is growing itself are vital to avoid severe complications.

These complications encountered following PSARP are listed in Table 1. This list does not include the complications that may be encountered with the opening and closure of colostomy. The associated malformations in ARM also have an important bearing on postoperative results and morbidity. This article discusses the management of complications following PSARP. It also stresses the technical points which are important to avoid most of the complications listed in Table 1. Anorectal malformations and the PSARP procedure are not usually associated with mortality. The overall mortality of patients with ARM is between 10-20% and is usually related to associated cardiac defects, and associated cerebral malformations, neonatal septicemia and very low birth weight. Severe early complications following PSARP are rare. In a series of 792 patients reported by Alberto Pena, only 2% cases had complications requiring major re-operative surgery. It is important to note, however, that lack of experience and adherence to the finer details of PSARP procedure can lead to significant and serious complication, many of them may continue even life long.

The most important long time complications after PSARP procedure is chronic constipation. It is astonishing that in the period from 1953 when Stephens presented first his sacral approach, being very similar to Pena's technique, up to 1982 when Pena and de Vries introduced PSARP, fecal incontinence represented the main postoperative problem. After the introduction of PSARP primary fecal incontinence disappeared almost completely but secondary chronic constipation with overflow incontinence became the most important postoperative

Table 1 Early and late complications following PSARP

<table>
<thead>
<tr>
<th>Early</th>
<th>Delayed</th>
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<tbody>
<tr>
<td>1</td>
<td>Wound infection, bleeding</td>
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<tr>
<td>2</td>
<td>Mis-located anus</td>
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<tr>
<td>3</td>
<td>Wound dehiscence</td>
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<td>4</td>
<td>Bowel retraction</td>
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<tr>
<td>5</td>
<td>Recurrent fistula</td>
</tr>
<tr>
<td>6</td>
<td>Transient femoral nerve palsy</td>
</tr>
<tr>
<td>7</td>
<td>Injury to urethra, bladder, vas deferens, ureter</td>
</tr>
<tr>
<td>8</td>
<td>Peritonitis</td>
</tr>
<tr>
<td>9</td>
<td>Perineal skin excoriation</td>
</tr>
<tr>
<td>10</td>
<td>Bladder dysfunction</td>
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problem. The reconstruction of the anal sphincters was now improved but bowelrectal motility became disturbed. 

II  Evaluation of A Child with Fecal Incontinence Following PSARP

1. Clinical examination

All children with fecal incontinence should be evaluated systematically to identify the causative factors. In this connection it is most important to distinguish between problems arising from insufficiency of the sphincter/levator muscle complex leading to true or primary incontinence and disturbed rectal motility resulting chronic constipation with secondary overflow incontinence. The situation is similar to the problem of vesticourethral reflux where we have to distinguish between reflexive and obstructive ureters.

According to the treatment a classification of the type of post PSARP sequelae can be introduced which seem to be more practical and more objective than the usual grading of the severity of postoperative incontinence (Table 2).

There are no aspects of clinical examination considered in these two score because there is unfortunately only a very poor correlation between morphology and function. However, rectal palpation of the sphincter tone and its elasticity are the first and most important examination in children with PSARP.

As shown in Table 2, three main and five subgroups of continence problems can be distinguished. One should not speak any more of degrees of continence. The main groups are:

1. Patients who are continent
2. Patients who are partial continent (either due to chronic constipation or incontinence)
3. Patients who are incontinent

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Type of anorectal continence according to the postoperative treatment if necessary</th>
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<tbody>
<tr>
<td>I</td>
<td>Total continence</td>
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<tr>
<td>II</td>
<td>Partial continence</td>
</tr>
<tr>
<td>Type A:</td>
<td>continent with dietary management and/or laxatives</td>
</tr>
<tr>
<td>Type B:</td>
<td>constipation with overflow soiling, clean with enemas</td>
</tr>
<tr>
<td>Type C:</td>
<td>partially insufficient muscle complex, occasional soiling, no constipation</td>
</tr>
<tr>
<td>III</td>
<td>Incontinence</td>
</tr>
<tr>
<td>Type D:</td>
<td>complete insufficient muscle complex, encopresis</td>
</tr>
<tr>
<td>Type E:</td>
<td>severe motility problems, constipation not manageable</td>
</tr>
</tbody>
</table>

2. Physical examination

Besides clinical evaluations, the investigation of patients with anorectal malformations involves a complete review of the history including the type of defect, the pre-PSARP findings on distal cologram, the initial assessment of the spine and the gluteal cleft, and the quality of sphincter muscles noted during surgery. It is very important to review details of the PSARP technique especially the extent of the preparation on the rectal muscle wall because this part of the mobilization cuts the neurovascular fivers of the Nn. erigentes resulting in disturbed rectal motility. A plain radiograph of the spine and the sacral ratio according to Pena might be calculated. A detailed history of the bowel pattern, soiling pattern and constipation is noted. Physical examination should assess the location and caliber of the neoanus, the anal tone and the configuration of the perineum and the buttocks. A barium enema and defecography can delineate the length and elasticity of the anal canal, the caliber of the bowel, the anorectal angle and the descent of the pelvic diaphragm.

3. Manometry & other examinations

Electromanometric investigations are very useful to distinguish between fecal incontinence due to an insufficiency of the anorectal sphincter structures and overflow incontinence. With special regard to incontinence, the most important parameters are the anorectal resting pressure profile and the squeezing pressure profile where as in chronic constipation the adaptive reaction/compliance of the rectum and the course of propulsive waves with are important. Manometry is the ideal objective means to assess anorectal function, however it does not always correlated well with the clinical status because not only the force of the anorectal sphincters are
measured but the force of gluteal- and adductor muscles as well\textsuperscript{10,18}.

Two other reliable findings in manometry are:
Presence of an inhibitory recto-anal reflex is a good prognostic factor. Decreased rectal sensitivity to distension is a poor prognostic sign. Anal sphincter myography has also been used to objectively assess sphincter function\textsuperscript{11}. Dynamic defecography has been replaced by CT scan and MRI to assess the location of the pulled through bowel in relation to the sphincters and the anorectal angle\textsuperscript{13,19}. These studies also assess the quality of the sphincter complex and help in ruling out any occult spinal lesions.

III Treatment of Postoperative Complications

Most of the postoperative complications are preventable. It is pertinent to stress the important technical points of the PSARP procedure. These are:

1. Following a strictly midline approach
2. Preservation of rectosigmoid
3. Careful not too extensive preparation of the blind pouch close to the rectal wall
4. Proper relocation of the pulled through bowel in relation to the vertical and parasagittal fibers
5. Skin lined anal canal
6. Post operative good toilet training and dilatation program, early treatment of constipation and avoiding liquid stools.

1. The treatment of chronic constipation following PSARP

The incidence of constipation following PSARP varies between 10-73\%\textsuperscript{10,13,18}. The incidence of constipation is higher in intermediate anomalies as compared to high anomalies. Yeung et al, evaluated 35 children with low anomalies followed up for 1-7 years\textsuperscript{12}. In this study, 17 patients (53\%) constipation and 9\% had soiling. Rintala et al also showed that 42\% children (n=40) with low anomalies had constipation and 10\% had soiling\textsuperscript{3}. Low anomalies, especially rectovestibular fistulas, are frequently associated with constipation following repair. In the same report, Rintala et al using a quantitative scoring method modified from our score system\textsuperscript{4}, showed that only 60\% of patients with low anomalies had good continence while the completely normal bowel function was observed in only 15\%\textsuperscript{10}. This study shows that objective evaluation of bowel function is important as patients and caregivers may not always give the true picture on history. The use of objective scores and of the Wingspread classification is mandatory to compare postoperative results\textsuperscript{15}.

We reported in 2001\textsuperscript{16} continence in 20\% of high, 42\% of intermediate and 79\% of low type ARM. Partially continent were 56\% of the high, 47\% of the intermediate and 21\% of the low deformities. Incontinence was observed in 24\% of the high and 11\% of the intermediate types. Comparing constipation versus the kind of the procedure used, severe constipation occurred much less in abdominoperineal pullthrough procedures (n=0) and perineoproctoplasties (36\%) than in PSARP (52\%) and abdomino-PSARP (52.4\%).

2. Redo-pull through

A redo-pull through operation is indicated in good prognosis defects with a normal sacrum where the pulled through bowel has not been placed correctly in the muscle complex. This is suggested by findings of disparity in the muscle sling thickness on either side of the pulled through bowel on a CT scan. The presence of fat around the bowel also suggests an eccentrically placed bowel. The recommended treatment for this group of patients involves a redo PSARP under colostomy cover.

The reported outcomes in terms of fecal continence have been variable following redo-pull through. Pena reported a significant improvement in 52\% of his 62 patients, mild improvement in 18\% and no improvement in 12\%. Mulder et al reported that 25\% of their 20 patients became continent over a follow up of 3.5 years\textsuperscript{16}. Rintala et al followed-up 16 patients with redo pull through\textsuperscript{17}. The clinical continence status and manometric findings initially improved in 13 patients (81\%). However, on longer follow-up at adulthood, only 4 (25\%) were clinically continent. Therefore, the results of secondary surgery are variable and on long term follow up may not be very encouraging. This further stresses the fact that there lies a considerable responsibility on the surgeon performing the primary reconstructive procedure.

3. Continence improving operations

a. Gracilisplasty has been a common method for secondary sphincter reconstruction\textsuperscript{18,19}. Early results show an increase in the resting and squeeze pressure. However, longterm results are far from encouraging as the muscle wrap tends to weaken over time\textsuperscript{20}. 


Continuous electrical stimulation of the gracilis muscle wrap induced a transition in muscle composition, from fatigable type II fibers to fatigue resistant type I fibers. This so-called dynamic gracilisplasty used an implanted muscle stimulator to maintain a constant anal tone. Beaten et al showed promising results using dynamic gracilisplasty; more than half of the patients became continent and the anal pressure were maintained high but most of them were adults.

b. *Gluteus maximus* transfer operation involves dissecting the medial parts of the muscle bilaterally, splitting the ends and suturing them to each other both anterior and posterior to the rectum.

c. *Levatorplasty* involves detaching the lateral and posterior attachments of the levator muscle and plicating it over the pulled through bowel. The short term results are encouraging. The improvement following levatorplasty is probably related to creation of an acute anorectal angle rather than by increasing the actual resting or squeeze pressures. Long term outcomes in adults have not been encouraging.

d. *Smooth muscle free or flapped transpositions* have also been successfully used.

e. *Other secondary procedures* for attaining fecal continence include free transplantation of palmaris longus muscle, secondary reconstructions of a used gracilis sling and the artificial urinary sphincter.

f. *Mucosal ectopy and sensitivity improvement.* To improve anorectal sensitivity and correct rectal prolaps a three frap anoplasty or Nixon’s scate flap plasty are very useful.

g. *Antegrade continence enema (ACE).* The Malone ACE procedure was initially reported in 1990 and was based on the fact that colonic emptying could procedure fecal continence. The success of the Mitrofanoff principle was applied to provide a continient, intermittent, catherizerable access to the proximal colon. The operation is simple, but attention to detail is very important to avoid complications.

**References**


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