

Posterior sagittal anorectoplasty (PSARP). A new approach for treating anorectal malformations.

Nawfal.S.Dawood CABS-general surgery FICMS pediatric surgery
Kutiaba yahya FICMS pediatric surgery

Summary:

Background:-Anorectal malformation is a congenital anomaly of different varieties and its correction needs good experience, knowledge about this varieties and specific surgical tools, otherwise the child may lose his the only chance to live normally without disastrous complication like incontinence.

Objective:-assessment of the advantage of this procedure in management of anorectal malformations and the percentage for anal continence.

Patients and methods:- This study was carried out in the child's central teaching hospital in Baghdad total number (70) cases were included in the study, 37 males and 33 females: aged 7 days to 6 years. They attended the hospital between October 1998-october 2004.

- **Male defect included:**

- 1) Low type5 cases No colostomy needed.
- 2) Intermediate type.... 23 cases. needed colostomy
- 3) High type.... 9 cases needed colostomy.

- **Female defects:**

- 1) Imperforate anus with vestibular fistula---31 cases.
- 2) Imperforate anus without fistula 2 cases.

Results: From the study we gain the following results:- all the male patients with low and intermediate types 28 cases (40%) show 100% continence. All female patients with imperforated anus with vestibular fistula and without fistula 33 cases (47%) show 100% continence. The combination of male and female patients show 61 patients of 70 show 100% continence in a percentage of 87%. The nine cases (12.85%) with recto bladder neck fistula show poor continence due to their bad sacral contour associated with the poor development of pelvic muscles sphincter. This result was revealed from follow-up together with the presence of external sphincter muscle contraction which occurs during digital PR examination or by the use of surgical dilators.

Conclusion: From the study we found that this procedure gives high percentage of continence and should be used instead of other procedures.

Key word :Posterior sagittal anorectoplasty(PSARP) for Anorectal malformations (ARM).

Introduction:

Imperforated anus is a defect that occurs in approximately 1 to 4 per 5000 live births, it seem to be more frequent in males than females.

In the mid twentieth century, the approach to correct this defect was through abdominal route, called abdomino-perineal rectal pull through (ARP) until the year 1982 when the final development of the new approach for treating such condition through posterior sagittal approach created by prof.Alberto Pena (I,E) (American pediatric surgeon from Mexico).

In comparison with the abdomino-perineal approach, this new one gave fantastic results regarding continence. The main problem in abdomino-perineal method is no guarantee for continence, while this approach reaches up to 65% continence guarantee approved from the patients series operated upon by prof.Pena,that because in this approach correction of the defect is done under direct vision which means fixation of the rectum and anus in their normal anatomical position, while in abdomino-perineal approach, the correction of the defect depends upon the surgeon's expectations of pulling the rectum and

anus through the pelvic sling.

We start operating upon our patient series since 1998 till now, and the patients complaining from different types of this defect, collecting 70 cases of age range between 7 days and 6 years.

Incidence:

This defect occurs with a frequency of approximately 1 to 4 per 5000 newborns. It seems to be more frequent in males than females.

Types of defects (classification)

Anorectal malformations (ARM) have been classified in different ways. Here these defects are grouped mainly on the basis of their specific potential to attain continence which in turn depend on their anatomic characteristics. The following list includes the most common defects:

- Male defects:

Low defects: Cutaneous fistula, anal stenosis, anal membrane and " bucket handle" alformation.

Rectourethral bulbar fistula.

Rectourethral prostatic fistula.

Rectovesical (bladder neck) fistula.

Imperforate anus without fistula.

Rectal atresia and stenosis.

- Female defects:

Cutaneous (perineal) fistula. Imperforated anus with vestibular fistula. Imperforated anus without fistula. Rectal atresia and stenosis.

Persistent cloaca.

- Basic anatomy:

Normal individual

Voluntary muscles

In a normal individual the voluntary striated muscle structure responsible for rectal control are represented by a funnel-like muscle structure that insert in the pubic bone, the lowest part of the sacrum, and the middle portion of the pelvis. From there, this diaphragm-like muscle structure extends medially surrounding the rectum all the way down to the perianal skin. The upper portion of this funnel-like structure is known as "Levator muscle" and the lowermost part as the "external sphincter". Different slings and subdivisions of these structures have been described, including the "ischiococcygeus", and the "iliococcygeus", "pubococcygeus", "puborectalis", "deep external sphincter", and "superficial external sphincter"

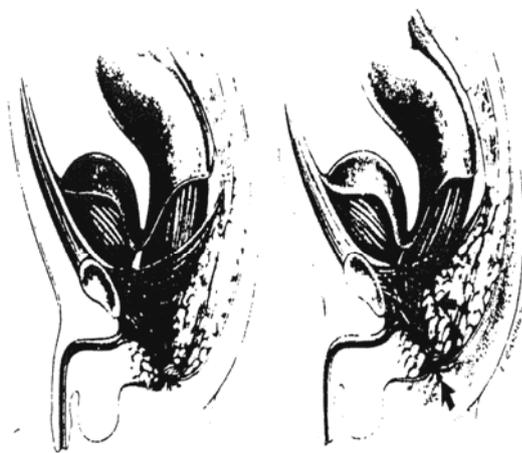


FIGURE 1-1. Normal male anatomy, sagittal view (relaxation).

FIGURE 1-2. Male anatomy (contraction).



FIGURE 1-3. Female anatomy, sagittal view.

Materials & methods:

At central teaching hospital for children and during the period from Oct.1998 till Oct. 2004 our study has been conducted on 70 cases complaining from different types of ARM. The series consist of 37 males and 33 females and their ages at operation time ranges from 7 days to 6 years

Different types of ARM falls into the following categories:

1- Imperforated anus with perineal fistula:

5 cases (7%) are males; tow of five males, their fistulae opened at the base of the scrotum.

2-Imperforated anus with recto urethral fistula:

23 cases (32.85%) ; 13 of whom(18.57%) the fistula opened in the bulbar urethra and 10 of them (14.28%) the fistula opened in the prostatic urethra.

3- Imperforated anus with vestibular fistula:

31 cases(44.28%) The rectum opened at the vestibule.

2 cases(2.85%) females without fistula.

4- Imperforated anus with recto- bladder neck fistula:9 cases (12.85%) .

Surgical considerations:

Initial management:

In about 80% of the cases, the physical exam (perineal inspection) and urinalysis of a newborn male baby with ARM will allow us to obtain enough clinical evidence to determine whether the patient needs a colostomy or not. The presence of subepithelial midline raphe fistula through which we can see meconium coming out, the presence of bucket - handle type of defect, as well as anal stenosis or anal membrane, are all defects that are easily detectable by inspection and all of them are considered low. The treatment of these defects dose not require a previous protective colostomy. The child can be treated during the newborn period with a minor perineal operation, and is considered as (minimal posterior sagittal anoplasty).

On other hand, if we see a patient with a flat perineum or the patient has meconium in the urine or air in the bladder, we consider these to be evidence of defect that require a protective colostomy prior to the definitive treatment. A flat perineum translate to a poor muscle and, therefore , poor prognosis in contrast to a good- looking perineum.

Perineal inspection in female babies with ARM is even more valuable than in male patient.The presence of cloaca(single perineal orifice), which is easy to diagnose by simple inspection, mean that this baby has a very serious condition; Her chances to having an associated urological defect are as high as 90% and an emergency urological evaluation is require.

If the patient has got a vestibular fistula, it

recommended to open a protective colostomy, and 4 to 8 weeks after that, once we have ruled out the presence of associated important defect, the patient can subjected to a PSARP considered as (limited posterior sagittal anorectoplasty).

Sometimes these vestibular fistula are widely patent, and the patient dose not have symptoms of distal obstruction, if that is the case the patient can allowed to grow and develop without having to open a colostomy. However, eventually these patients will need a colostomy prior to the PSARP, not so much for the compression, but for the purpose of protection, to avoid infection after the main repair.

• **Colostomy**

We perform sigmoid double-barrel colostomy rather than loop transverse colostomy

• **Distal colostogram:**

Prior to the final repair, it is highly desirable to determine the precise of anatomic defect as it has important prognostic and therapeutic implication. For this , we have found the distal colostogram to be the best study. This consist of the injection of water- soluble contrast material through the distal stoma . The study must be done under fluoroscopy, in the lateral position using a Foley catheter with the balloon inflated in the distal stoma. The dye must be injected with a syringe connected to the Foley catheter. Under enough hydrostatic pressure to overcome the contraction of the funnel- like muscle structure that surrounds the lowest part of the rectum. The lower the defect, the more hydrostatic pressure the surgeon must apply to fill up the distal part of the colon.

The operation:

Pena has been classified methods of PSARP into 3 categories and these are:

- 1- Minimal posterior sagittal anorecto plasty.
- 2-Limited posterior sagittal anorecto plasty.
- 3-Full posterior sagittal anorecto plasty.

80 to 85 % of all these anomalies need posterior sagittal approach without laparatomy and they have a very good chance of continence because the patient have good sacrum, good looking perineum and good pelvic muscle development. 15% of the cases needs abdomino- perineal approach because their rectum is high to be reached via the posterior sagittal route.

Results:

From the study conducted, we gain the fallowing results :

- 1- Imperforated anus with perineal fistula.

In male 5 patients (7%) 100% develop full continence over stool and flatus and this result was revealed from the fallow up together with the presence of sphincter muscle contraction which occurs during digital PR examination or by the use of surgical dilators

2- Imperforated anus with recto-urethral fistula 23 patients, 16 of them (22.85%) are fully continent, since their age were become more than 3 years and according to their parents statements about their bowel habits no one of them is incontinent for the stool or flatus. The other 7 patient (10%) are younger than this age but regarded continent by revealing the presence of external sphincteric anal contraction after PR or using dilators

- 3- Imperforated anus with vestibular fistula and without fistula

33 patients classified in this group,, 20 of them(28.57%) were fully continent from follow up for more than 2 years after operation and depend upon history and statements taken from their parents The other 13 (18.57%) were younger than this age and again we regarded them continent depending on the results of the same procedure applied to the patients in the above group .

- 4- Imperforate anus with recto-bladder neck fistula;

All the 9 cases of this group have poor continence due to their bad sacral contour associated with the poor development of pelvic muscles, this group makes (12.85%) of the 70 cases in our patient series. So by arranging the final results, we found that 61 patient out of 70 (87%) are all continent beside the 9 patients (12.85%) that were not continent .

↓ male

ARM	No. of patient	Age range	%	Continent
Imperforated anus With perineal fistula	5	Below 1.M	7.15%	+ GOOD
Imperforated anus With recto-urethral fistula	23	1.5- 3 Y	32.85%	+ GOOD
Imperforated anus With recto-bladder Neck fistula	9	1.5- 3 Y	12.85%	±unsatisfactory
MALES (TOTAL)	37		52.85%	TOTAL % OF CONTINENCE 39.99%

↓ Females

ARM	No. of patient	Age range	%	Continent
Imperforated anus with vestibular fistula	31	6. M- 6Y	44.28%	+ GOOD
Imperforated anus without fistula (Rectal atresia)	2	6.M- 4 Y	2.85%	+ GOOD
FEMALES (TOTALE)	33		47.13%	TOTAL % CONTINENCE 47.14%
PATIENTS IN TOTAL	70	<1M - 6 Y>	100%	87%

Discussion:

1-PSARP vs. Abdomino- perineal rectal pull through (ARP)

In 1982 prof. Alberto Pena put the final development of the PSARP (1,2) which in our opinion has many advantages over the old ARP. This is because this approach depends on direct vision of the surgeon to the pelvic floor muscles and reconstruction of these muscles over the pulled rectum in its new proper anatomical position. This is in contrast to the ARP procedure which depend on the expectation of the pulling the rectum through the pelvic sling which may not be performed through the exact point of the muscle complex which may finally lead to many undesired complication. Anorectal malformations encompass multiple congenital defects or urinary and/or sexual structures with varying degree of complexity that required different types of treatment. Patients operated for this malformation may achieve bowel control or may suffer different degree of fecal incontinences. The indicators for good prognosis of bowel control normal sacrum, permanent midline groove(good muscle) rectal atresia, vestibular fistula and low defects. The indicators for poor prognosis of bowel control are abnormal sacrum(more than 2 vertebrae missing), flat perineum(poor muscles) and high defects(3).

Bowel continence depends on the integrity and normal function of three important elements: sensation, sphincters and colonic or recto sigmoid motility (4,5)

Traditionally, it has been said that one has to wait 12-13 years before one can have a real evaluation of patients subjected to a repair of an ARM but Keily and Pena so as us do not believe that, children's have better fecal control as time passed, They said that future continence may be predicted within weeks of stoma closure in most patients⁽⁸⁾.

The longer - term studies suggest that good bowel control can be achieved after correction of low anomalies in about 90% of patients⁽⁷⁾, as in our results. Pena In his series found that 43% of all patients born with imperforated anus and subjected to a posterior sagittal approach were totally continent while 57% of them suffered from some degree of incontinence, out of which 19% suffered from moderate degree of incontinence and 38% suffered from severe degree of incontinence⁽⁶⁾

According to the high anomalies(recto bladder neck fistula) our result reveal that the continence were unsatisfactory while Longemeijer and Molennar in their series of studying the high ARM, they concluded that no patient achieved continence, and 20-30 patient achieved, pseudo continence, as they said with the use of daily enemas⁽⁹⁾. Martins and Pinus in their series reveal that the incontinence totally related to the high anomalies

Horjai and Puri in their series concluded that the post operative continence could not be assessed properly because most children were in the age group, which was not toilet trainable, but still the early indication is favorable and encouraging. It is essential to define the type of ARM, associated anomalies and status of perineal muscles at the time of definitive surgery to assess the final outcome (10)

Moreover, Pena approach gives many advantages(beside the high percentage of gaining continence) when compared to the ARP.

A- In 80 to 85 % of patients which ARM there is no need to do laparotomy with the sagittal Approach the procedure that brings many complication

B- There is less pelvic dissection in PSARP to some extent, this will leave pelvic innervation and blood supply intact.

C- this procedure is less painful to the child post-operatively because the sagittal incision is in the midline, the area of least innervation.

D- There is no need to put the child on I. V fluid post-operatively since we can start oral feeding after 6 hours from the operation.

E- Finally there is no need to keep the child more than one to two days after operation which means less time of hospitalization and less chance of cross-infection.

Conclusion:

From the study, this procedure had many advantages and give a high percentage of continence which is a very big problem to the family, child and surgeon also, specially, till now no dependable procedure had been created in the world for the correction of this problem.

References:

- 1- Devries P, Pena A :Posterior sagittal anorectoplasty. *Posterior sagittal anorecto plasty. Pediatric surgery* 17: 638 - 643, 1982
- 2- Pena A, devries P: *Posterior sagittal anorectoplasty. Important technical considerations and new application. Journal pediatric surgery* 17: 796-881, 1982.
- 3-Pena A. *Advances in the management of fecal incontinence secondary to Anorectal malformation In: Nyhus LM, éditer. Surgery Annual, published by Appleten and Lange, Connecticut 1990; 143-67.*
- 4- Lambrecht W, Lierse W. *The internal sphincter in Anorectal malformation: Morphologic investigations in neonatal pigs. Journal pediatric surgery* 1987; 22 :1160- 8.
- 5- Hedlund H, Pena A. *Does the distal rectal muscle in Anorectal malformation have the functional properties of a sphincter ? Journal pediatric surgery* 1990; 25:985-9.
- 6- Pena A. *Anorectal malformation. Seminars in pediatric surgery* 1995; 4: 35 47.
- 7- Rintala R, Lindahi H, Louhimo I. *Anorectal malformations- results of treatment and long term follow up in 208 patients . pediatric surgery international* 1991;6:36-42.
- 8- Kiely EM, Pena A. *Anorectal malformations. In: 0 Neill JAJr, Rowe MI, Grosfeld JL, Fonkalsrud EW, Coran AG, editors. Pediatric surgery, 5th ed st louis, Mosby-Year Book, Inc 1998; 1425-48.*

9- Langemijer RAT Molenaar jc. Continence after posterior sagittal anorecto plasty. *Journal pediatric surgery* 1991; 26:587-90.

10-Fecal incontinent after posterior sagittal anorecto plasty fallow up for 2 year. *Lt Col MM Harger* , *Lt Col Bipin puri* , *Col pj Vincent*, *col BM Nagpal*. *MJAFI* 2003; 56:194-196.

11-Saopaulo *Med J*. 1996 Nov- Dec; 114 (6); 1303-8 clinical postoperative evaluation of posterior sagittal anorectoplasty in patients with upper and intermediate Anorectal malformation.