



Anterior or posterior sagittal anorectoplasty without colostomy for low-type anorectal malformation: how to get a better outcome?

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Abstract

Background/Purpose: Usually, anorectal malformations (ARM) are treated in 2 or 3 stages for fear of disturbed wound healing and subsequent damage to the anal sphincter complex. The aim of this study was to assess the feasibility, safety, advantages, and follow-up of an anterior or posterior sagittal anorectoplasty in low-type ARM (rectoperineal or rectovestibular), performed without colostomy.

Materials and Methods: Prospective collection of data regarding demographics, VACTERL (Vertebral-, Anal-, Cardiac-, Tracheo-Esophageal-, Renal-, Limb malformations) screening, perioperative measurements, surgeons, and complications.

Results: In 35 consecutive children (13 boys, 22 girls), repair of a low-type ARM was performed without colostomy. There were 13 boys and 10 girls with a rectoperineal and 12 girls with a rectovestibular fistula. The median age at operation was 4 months (range, 0–73 months); 34% being performed in the newborn period. Seventeen children had one or more other congenital anomaly. Preoperatively, all patients had rectal washouts with oral and rectal neomycin, and perioperative antibiotics, either 24 h (prophylaxis) or for 2 to 5 days. An anterior or posterior sagittal anorectoplasty was performed.

Postoperatively, 9 children had no enteral feeding and total parenteral nutrition (TPN). All children had postoperative anal dilatations according to the Peña scheme. Two children (both with rectoperineal fistula) had a wound abscess; in the first child (with renal insufficiency), a colostomy was performed and in the other child a successful correction of the anoplasty was done. In 7 children (4 rectoperineal, 3 rectovestibular fistulae), the anus eventually healed after minor wound dehiscence. There was 1 anal stricture, after a median follow up of 14 months (range, 1–84 mo). After therapeutic antibiotics (2–5 days), 11% (2/18) had some degree of wound infection, versus 41% (7/17) after either no antibiotics or after prophylactic antibiotics (24 hours). Patients with TPN did not seem to profit with regard to wound healing and one patient experienced a central line related sepsis. At last follow-up, 12 children needed regular laxatives and/or enemas. Anal dilatations were well accepted above 6 months, and a trend was seen towards less need for laxatives when dilatations were continued longer.

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Conclusion: Repair of a low-type ARM without colostomy, with therapeutic antibiotics, and followed by a long period of postoperative anal dilatations has low morbidity and good outcome, which does not seem to be improved with TPN.

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In 1982, de Vries and Pena [1] introduced the posterior sagittal anorectoplasty (PSARP) for infants and children with anal atresia. They advocated to perform a colostomy in all cases of anorectal malformation (ARM) to prevent wound infection and thus prevent harm to the anal sphincter complex after reconstruction of the ARM. It must be taken into account, however, that colostomies have complications [2,3]. Besides the extra operation that is needed for colostomy closure (as well as creating one), there are complications such as prolapse, skin excoriation, and the burden for parents in dealing with an enterostomy. The question is whether these disadvantages outweigh the protective effect of a colostomy on wound healing after anal reconstruction. Therefore, a protocol was developed to reconstruct ARM's with rectoperineal or rectovestibular fistula in the neonatal period, provided total parenteral nutrition (TPN) and antibiotics were administered in the postoperative period [4,5]. For children with a low-type ARM (rectoperineal and rectovestibular fistulae) we perform a one-staged procedure.

The aim of this analysis was to assess the feasibility, safety, advantages, and follow-up of an anterior or posterior sagittal anorectoplasty (ASARP or PSARP) in low ARM's performed without colostomy, and to evaluate the role of TPN and antibiotics in the postoperative course. The acceptance and outcome of anal dilatation during a long period was also analysed.

1. Materials and methods

In this prospective study between 1999 and 2006, 35 consecutive children were operated in one stage for a low ARM. After admission, children with a rectoperineal or rectovestibular fistula were scheduled for a reconstruction at short term. In some children, anal dilatations by the parents were started to evacuate meconium while awaiting reconstruction. All children were screened for associated anomalies. Preoperatively, rectal washouts and oral and rectal neomycin were administered. Either an ASARP (33) or a miniPSARP [4] (2) was performed according to the preference of the surgeon. Operating surgeons were experienced pediatric surgeons or general surgeons in training for pediatric surgery. Perioperative antibiotic prophylaxis was given in the operating room and was continued for either prophylactic treatment (24 h) or therapeutic treatment (2-5 days), depending on the operating surgeon. Feeding was withheld for 3 days or for 5 days in which case TPN was

started via a central venous line. The reconstructed anus was rinsed 5 times a day with normal saline, and anal dilatations were started 2 to 3 weeks postoperatively.

2. Results

In the study period, 35 consecutive children (13 boys and 22 girls) were managed according to protocol. There were 23 rectoperineal (13 boys, 10 girls) and 12 rectovestibular fistulae. The median age at operation was 4 months (range 0 to 73 mo); 12 (34%) children were younger than 1 month at operation. Seventeen children had one or more other congenital anomalies of whom the VACTERL (Vertebral-, Anal-, Cardiac-, Tracheo-Esophageal-, Renal-, Limb malformations) association in 9. Although 2 children had sacral anomalies, neither had a tethered cord (Table 1).

Of the 16 children operated on by supervised trainees, there were 5 minimal wound infections and 1 needing reoperation. 3/19 Children had superficial wound infections when operated by an experienced pediatric surgeon of which 1 needed revision anoplasty afterwards. After prophylactic antibiotics (24 h), 43% (6/14) had superficial wound infections (1 PSARP), versus 11% (2/18) after therapeutic antibiotics (2-5 days) (Table 2A). There was no difference between the patients with no antibiotics and those with antibiotic prophylaxis (24-hour administration) (Table 2A). However, comparing the latter 2 groups with the administration of therapeutic antibiotics (2-5 days), there was a significant difference ($P = .05$) in favor of therapeutic antibiotics (Table 2B). In 7 children (4 rectoperineal, 3 rectovestibular fistulae) the anus eventually healed after a minor wound dehiscence (Table 3). In one child (prophylactic group, perineal fistula) who had a wound abscess, a

Table 1 VACTERL screening

*Vertebral anomaly	5 (sacral anomaly: 2, no tethered cord)
*Anal anomaly	In all
*Cardiac anomaly	12
*Tracheoesophageal anomaly	2
*Renal anomaly	6
*Limb anomaly	4
*VACTERL association (3 or more anomalies)	9

Table 2A Effect of the duration of antibiotics on Wound infection

		Duration of antibiotics			
		no AB	24 hrs	2-5 days	
Wound infection	No	2	8	16	26
	Yes	1 (33%)	6 (43%)	2 (11%)	9 (26%)
	Total	3	14	18	35

Two-sided χ^2 , NS.**Table 2B** Effect of prophylactic or therapeutic AB on Wound infection

		no AB or 24 hrs	2-5 days	
Wound infection	No	10	16	26
	Yes	7 (41%)	2 (11%)	9 (26%)
	Total	17	18	35

Two-sided χ^2 , $P = .049$.

colostomy was performed (this child had renal insufficiency), and in another child (therapeutic group, perineal fistula), a successful secondary correction of the anoplasty was done without colostomy. All the others healed primarily (Fig. 1).

Total parental nutrition was administered in 9 patients, but patients with TPN did not seem to profit regarding wound abscess (Table 4). Unfortunately one child developed a central venous line related sepsis. She recovered after antibiotic treatment. There was one anal stricture after a median period of dilatation of 14 months (range, 1-84 months). According to the parents the dilatations were well accepted. At the last follow up, 12 (34%) children needed regular laxatives and/or enemas. But the majority of these patients were still too young to be fully assessed with regard to continence.

3. Discussion

Traditionally, ARMs are reconstructed with a protective colostomy because of fear of failure of wound healing and subsequent loss of the anal sphincter complex, with the risk of impairment of future continence. The belief that a protective colostomy may prevent wound infection, is questionable. In the recent literature, more surgeons tend to do a one-staged procedure for the rectoperineal fistulas

and in some developing countries even high type ARMs are treated without colostomy [6-9]. In the western world, Albanese [10] (United States) successfully performed a PSARP-procedure in four boys with high anomalies, without colostomy. It should be borne in mind that a colostomy has potential complications, both minor and major, in up to 40% of cases [11]. Of these, peristomal excoriations, prolapse, parastomal hernias, leakages, intra-abdominal adhesions or even worse, or bowel obstruction are the most common.

Another argument in favor of early and immediate use of the neoanus is the so-called brain-defecation reflex that may remain intact following the biological “use it or lose it” principle [11]. By early usage, the perineal musculature is trained early, and synapses and neuronal networks may be formed which may enhance the chance of normal or near-normal function [10]. When patients present late this advantage is clearly unattainable. Because of the time

**Fig. 1** Aspect of neoanus 8 months postoperative.**Table 3** Wound infection in relation to type of fistula

		Type of fistula		
		Rectoperineal	Rectovestibular	
Wound infection	No	17	9	26
	Yes	6 (2 abscesses)	3	9
Total		23	12	35

Table 4 Effect of TPN on Wound infection

		TPN		
		no	yes	
Wound infection	No	19 (73%)	7 (77%)	26 (74%)
	Yes	7	2	9
Total		26	9	35

Fishers Exact test $P = .579$ (NS).

needed for the precise definition of the fistula in the high ARM, we started to treat the low anorectal anomalies (rectoperineal and rectovestibular fistulas) in the neonatal period without colostomy. The parents were always told that in case of significant wound infections, a colostomy would be constructed. In this series, it had to be done once; all the other wounds healed primarily, even in the older children.

There is still continuing debate whether bowel rest, with administration of either elemental diet or total parental nutrition, might reduce the risk of wound infection [11]. In our series, we tried both, and the trend shows that the group without TPN did as well as the group to whom TPN was given, be it that groups were not randomized. Also, the duration of antibiotic coverage is a matter of debate [6]. In the Netherlands, antibiotics are reluctantly administered for fear of inducing bacterial resistance, but a period of 2 to 5 days of antibiotic coverage may be advisable for this type of surgery, since patients given a therapeutic regimen showed a slight but significant lower wound infection rate.

In summary, we advocate 1-stage repair for rectoperineal and rectovestibular fistulas, since we have the increasing experience that this surgical strategy is safe, has low

morbidity, a good outcome, and is of obvious advantage for both the child and its parents. The use of perioperative therapeutic antibiotics seems to be beneficial, but TPN did not alter the incidence of wound infection.

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