

Repair of low anorectal anomalies in female patients: risk factors for wound dehiscence

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Background/purpose Wound dehiscence after rectoperineal/vestibular fistulae repair may have adverse effects on the continence mechanism with delayed functional sequels. We report the incidence of wound complications following the sagittal anorectoplasty in a group of female patients, in addition to studying the effect of some possible risk factors.

Patients and methods This is a prospective cohort study conducted on female patients with rectoperineal or rectovestibular fistula operated during the period from January 2011 to December 2015. Patients were divided into three groups: group A (no dehiscence); group B (minor dehiscence); and group C (major dehiscence). Patients were compared regarding their age at the time of repair, the type of anorectal anomaly, the degree of dilation of the colon, and the prevalence of covering colostomy.

Results The study included 63 female patients. Group A included 34 patients (those with no dehiscence, 52.4%), group B included 17 patients (minor wound dehiscence, 26.98%), and group C included 13 patients (major wound

dehiscence, 20.6%). There was no statistically significant difference between the three groups regarding the studied risk factors.

Conclusion With regard to the wound complications following the repair of rectoperineal/vestibular fistulae in the female patients, none of the studied risk factors appear to have a significant effect on the outcome. *Ann Pediatr Surg* 13:140–144 © 2017 Annals of Pediatric Surgery.

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Keywords: anterior sagittal anorectoplasty, colostomy, posterior sagittal anorectoplasty, rectoperineal fistula, rectovestibular fistula, wound dehiscence

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Introduction

Rectoperineal and rectovestibular fistulae are the most common forms of anorectal anomalies in female patients that usually have a good potential for fecal continence [1,2]. The management of anorectal anomalies has greatly improved over the past decades after the invention of the posterior sagittal anorectoplasty (PSARP) by Peña and deVries [3], followed by the anterior sagittal anorectoplasty (ASARP), which uses the same basic principles of the former [4–6].

One of the serious postoperative complications of the rectoperineal/vestibular fistulae repair is wound infection and dehiscence at the anocutaneous anastomosis, which can lead to severe fibrosis that may affect the sphincteric mechanism. The patient may lose the chance for an optimal functional result, because secondary repair does not have the same good prognosis as a successful primary one [7].

In the literature, many authors tried to explain the causes of wound dehiscence and methods of prevention. Several factors have been suggested to decrease the incidence of postoperative wound complications: early repair in the neonatal period, using a covering ‘protective’ colostomy, parental antibiotics, and delaying oral intake (1–2 weeks) following the repair [4,7–9]. In this study, we report the incidence of wound complications following the sagittal anorectoplasty (either limited PSARP or ASARP) in a

group of female patients, in addition to studying the effect of some possible risk factors.

Patients and methods

Patients

This is a prospective cohort study conducted on female patients with rectoperineal or rectovestibular fistula operated during the period from January 2011 to December 2015. All patients who underwent sagittal anorectoplasty (either limited PSARP or ASARP) with or without protective colostomy were included. Patients who underwent other types of repair or redo operations were excluded from this study. The study was conducted after approval of the internal review board.

Preoperative preparation

Pelviabdominal ultrasound and echocardiography were performed in all patients to detect possible associated renal or cardiac anomalies. Micturating cystourethrogram and contrast enema were performed routinely in some patients. The latter was used to assess the extent of bowel dilatation before the operation (Table 1).

All patients without colostomy were admitted for 2 days before the operation for bowel preparation (clear fluids in the first day, then nothing per os until the time of the operation + rectal washes by 20 ml saline 0.9%/kg every 4 h). Patients with colostomy were admitted 1 day before the operation on normal diet and rectal washes (20 ml

Table 1 Comparison between the studied groups A, B, and C regarding the possible risk factors for wound dehiscence

Variables	No dehiscence (n=33)	Minor dehiscence (n=17)	Major dehiscence (n=13)	Test statistic	Z	P-value
Age at repair (months)	7 (3.4–11)	8 (4.8–13)	11 (7.8–15)	769.0	2.137	0.033^a
Type of anorectal anomaly				0.201	1	0.654 ^b
Rectoperineal	20 (60.6)	10 (58.8)	9 (69.2)			
Rectovestibular	13 (39.4)	7 (41.2)	4 (30.8)			
Colon dilatation on contrast enema				0.187	1	0.665 ^b
No colonic dilatation	1 (12.5)	2 (20.0)	1 (14.3)			
Rectum dilated	2 (25.0)	1 (10.0)	1 (14.3)			
Rectum and lower sigmoid colon dilated	3 (37.5)	6 (60.0)	3 (42.9)			
Rectum, lower, and mid-sigmoid colon dilated	2 (25.0)	1 (10.0)	1 (14.3)			
Rectum and all sigmoid colon dilated	0 (0.0)	0 (0.0)	1 (14.3)			
Protective colostomy	5 (15.2)	3 (17.6)	2 (15.4)	0.006	1	0.940 ^b
Time to dehiscence (days)	–	5 (4–6)	3 (3–3.3)	30.50	3.435	0.0006^c

Data are presented as median (interquartile range) or n (%).

^aJonckheere–Terpstra trend test. No statistically significant difference among the groups by Dunn's post-hoc test [critical Bonferroni-corrected Z-statistic, 2.394; largest observed Z-statistic (major dehiscence versus no dehiscence), 2.029].

^b χ^2 -test for trend.

^cMann–Whitney test.

Bold values statistically significant ($P < 0.05$).

saline 0.9%/kg every 8h from the distal stoma). Antibiotics in the form of intravenous third-generation cephalosporin (50 mg/kg) and metronidazole (7.5 mg/kg) were given 1 day before the repair and continued for 4–5 days postoperatively.

The surgical technique

The operators were a group of pediatric surgeons (A.M.A., A.A.A.Z., I.E., W.G., A.A.) with at least 5 years of experience in pediatric surgery. The repair was either PSARP or ASARP depending on the surgeon expertise, preference, and convenience. Patients were operated either in the lithotomy (ASARP) or the prone position (PSARP). The site of the sphincter muscle complex is localized and confirmed by the muscle stimulator when available. Multiple 4-0 silk stitches are used for traction on the perineal or vestibular fistula. The incision is made around the fistula and extended backward, splitting the muscle complex open. The incision is deepened down to the fascia covering the rectal wall. Dissection of this fascia is started posterior and lateral to the rectum. Then, the most important step comes, which is the separation of the rectum from the vagina [10–12]. The mobilized anorectum is then placed within the muscle complex. Reconstruction of the perineal muscles is followed by anoplasty. The need to perform intraoperative protective colostomy was recorded.

Postoperative care

Postoperative analgesia and antibiotics were continued for 3–5 days. All patients without protective colostomy were kept nothing per os for 4–5 days, and then oral feeding was started (if there are no wound complications). The occurrence of wound complications would delay oral feeding for further few days. In patients with a preoperative colostomy, oral feeding started after full recovery from the anesthesia, whereas in patients with intraoperative colostomy oral feeding started once the stoma was functioning. Local wound care was performed by saline irrigation and antibiotic ointment in all the cases.

The operative wound was daily inspected for signs of dehiscence. Patients were divided into three groups: group

A (no dehiscence); group B (minor 'partial' dehiscence, less than half the circumference of the anocutaneous anastomosis); and group C (major 'complete' dehiscence with anal retraction, more than half the circumference of the anocutaneous anastomosis) (Fig. 1).

The patients in the three groups were compared regarding their age at the time of repair, the type of the anorectal anomaly (rectoperineal or vestibular), the degree of dilatation of the large bowel in the contrast enema, and the prevalence of covering 'protective' colostomy (whether preoperative or intraoperative).

Data were analyzed using MedCalc, version 15 (MedCalc Software bvba, Ostend, Belgium).

Normality of numerical data distribution was examined using the D'Agostino–Pearson test. Skewed numerical variables were presented as median (interquartile range), and intergroup differences were compared nonparametrically using the Jonckheere–Terpstra trend test (for multiple ranked group comparison) or the Mann–Whitney test (for two-group comparison). The Dunn test was used for post-hoc pairwise comparison whenever the Jonckheere–Terpstra trend test revealed a statistically significant difference among the groups.

Categorical variables were presented as proportion (%) or number (%), and differences were compared using the χ^2 -test for linear-by-linear association.

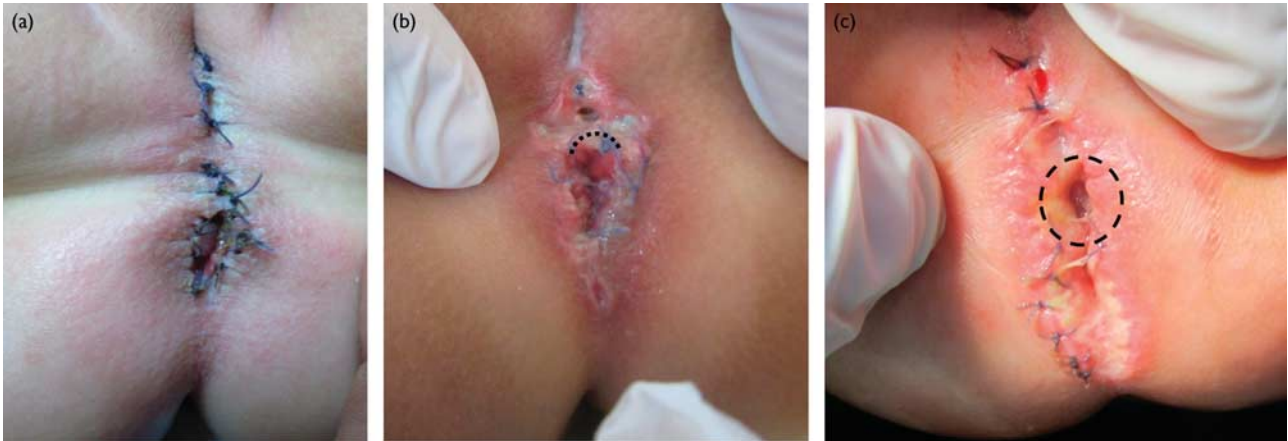
Time to event analysis was done using the Kaplan–Meier method, and the log-rank test was used to compare individual Kaplan–Meier curves.

A two-sided P -value less than 0.05 was considered statistically significant.

Results

The study included 63 female patients (39 patients with rectoperineal fistula, and 24 patients with rectovestibular fistula), who underwent either an ASARP (58 cases) or limited PSARP (five cases). Their age at the time of repair ranged from 3 to 72 months with a median age of 8 months.

Fig. 1



Wound complications following the sagittal anorectoplasty. (a) Intact wound with no dehiscence after 1 week from the repair of rectoperineal fistula in 6-month-old female patient. (b) Minor wound dehiscence affecting about one-third the circumference of the anocutaneous anastomosis (dotted curve) without retraction of the neoanus occurred in a 10-month-old female patient with repaired rectoperineal fistula. (c) Major wound dehiscence affecting the whole circumference of the anocutaneous anastomosis (dotted circle) with retraction of the neoanus occurred in a 3-month-old female patient with repaired rectoperineal fistula.

Group A included 34 patients (those with no dehiscence, 52.4%), group B included 17 patients (minor wound dehiscence, 26.98%), and group C included 13 patients (major wound dehiscence, 20.6%). In all cases with major wound dehiscence and retraction of the neoanus, a rescue colostomy was indicated.

The difference in age in the three groups was statistically significant by Jonckheere–Terpstra trend test, but when Dunn’s post-hoc test was performed no statistically significant difference was found. In addition, there was no statistically significant difference between the three groups regarding the other studied risk factors: type of the anomaly, degree of preoperative colonic dilatation, and even the presence of a covering colostomy does not appear to add extra protection for wound healing (Table 1).

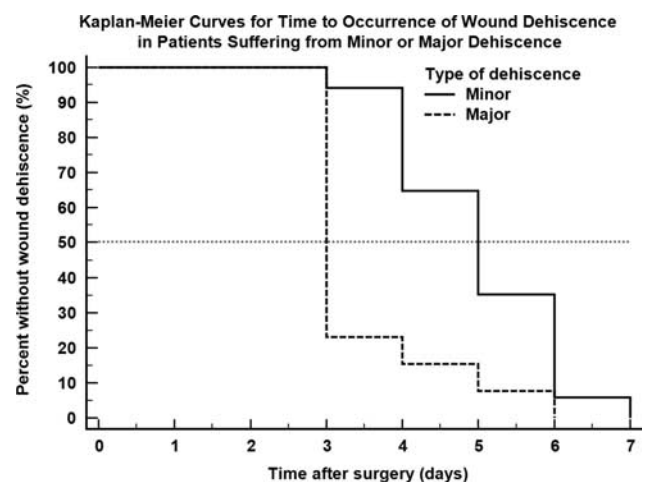
Median time to occurrence of wound dehiscence was 5 days in minor dehiscence and 3 days in major dehiscence (Fig. 2).

Discussion

Most of the reports in the literature are concerned with the management and outcome of high anorectal anomalies, as the outcome of low anomalies has been considered satisfactory [13]. However, the occurrence of wound infection and dehiscence at the anocutaneous anastomosis following the repair of low anomalies may have adverse effects on the continence mechanism with delayed functional sequels (constipation and soiling) [7].

Wound dehiscence can be classified into minor and major. Minor wound dehiscence is a dehiscence affecting less than half the circumference of the anocutaneous anastomosis, and is usually managed conservatively without the need for a rescue colostomy. Major wound dehiscence is a dehiscence affecting more than half the circumference of the anocutaneous anastomosis and is associated with anal retraction. The latter is more liable

Fig. 2



Kaplan–Meier curves for the time to occurrence of dehiscence in patients with major or minor dehiscence. Median time to occurrence of major or minor dehiscence, 3 or 5 days, respectively. Hazard ratio = 2.30 [95% confidence interval: 1.005–5.25; $P=0.001$ (log-rank test)].

to healing complications and anal stenosis, and is usually managed surgically by secondary sutures and/or fecal diversion ‘rescue colostomy’ [14].

Several risk factors have been studied, trying to decrease the incidence of wound dehiscence following sagittal anorectoplasties. Among these factors, the optimum age for operation remains controversial. Some authors advocate operating after the neonatal period to reduce the risk of anesthesia, and to allow enough time to fully investigate other associating anomalies (especially cardiac and renal anomalies). However, operating in the neonatal period has some advantages such as the sterility of the meconium and less bloody operative field compared with operating in older age [9,15]. In this study, all patients

were operated after the neonatal period. Although the median age in group A (with no dehiscence) was younger, it did not reach statistical significance when compared with the other two groups.

Regarding the type of anorectal anomaly, it might be expected to have a higher rate of wound complications with the more severe types of the anomaly (i.e. rectovestibular). However, we did not find this factor to have a significant effect on the outcome in our study. On the contrary, in a previous study, one of the authors has found higher incidence of wound complications following the repair of simpler rectoperineal fistula. This could be explained by the tendency to do much less dissection with these minor forms of the anomaly, resulting in excess tension on the anoplasty. By extending the dissection and mobilization of the anorectum (for about 4–5 cm, as if it were a rectovestibular fistula), the incidence of post-operative wound complications significantly dropped [14]. Pena and colleagues highlighted the importance of having a tension-free anocutaneous anastomosis to guard against anal retraction and wound dehiscence following the sagittal anorectoplasties [10–12].

A preoperative contrast enema may be ordered routinely by some pediatric surgeons for cases of rectoperineal/ vestibular fistula, to assess for the degree of large bowel dilatation. This was also found to have no significant effect on the outcome. Therefore, as contrast enema is an invasive procedure, and because of the hazards of radiation, we do not recommend routine preoperative contrast enema for patients with rectoperineal/ vestibular fistula.

The last and maybe the most important question is whether we need a covering colostomy or not. According to some authors, colostomy decreases the incidence of wound infection and dehiscence, and is considered a safe option for the surgeons in the repair of these types of defect [7,16]. However, colostomies are not free of complications such as prolapse and skin excoriation, in addition to the burden for parents in dealing with the colostomy and extraoperations [17,18]. On the other hand, many authors reported that primary anorectoplasty without a protective colostomy is feasible in cases of rectoperineal and rectovestibular fistulae, while decreasing the rate of complications will depend on the careful surgical technique that preserves the anorectal blood supply and avoids tension at the anocutaneous anastomosis [6,11,14].

Despite the small number of patients who underwent the repair with a covering colostomy in our study, it appears that the colostomy did not offer any extra protection for the process of wound healing. There was no difference in the rate of wound dehiscence (either major or minor) among patients repaired with or without protective colostomy. However, when a major wound dehiscence occurs (with retraction of the neoanus), a rescue colostomy turns to be mandatory.

In this study, the rate of wound complications following the repair of low anorectal anomalies appears to be higher than what has been reported in the literature [5,6,11,15].

However, we believe that this is because the problem has not been sufficiently addressed. The magnitude of the problem can be realized from the recommendation by some authors to perform simple anoplasties rather than formal anorectoplasty for the higher rate of wound complications following the latter procedure [13].

The median time to occurrence of dehiscence was 5 days in minor dehiscence and 3 days in major dehiscence. The early occurrence of major wound dehiscence would suggest the presence of a technical factor (probably resulting in excess tension or a problem with the tissue vascularity) leading to the early and more severe wound complications. Some authors recommended prolonged fasting up to 2 weeks after the repair to guard against wound complications [4,8]. In this study, major wound dehiscence usually occurred 3 days after the repair. Therefore, if no signs of dehiscence has occurred by that time, it would be safe to start oral feeding. If dehiscence occurs later, usually it is minor dehiscence with no anal retraction that can be managed conservatively.

The study is limited by its relatively small sample size, especially those patients who underwent the repair with a covering colostomy (many surgeons nowadays prefer to do a single-stage repair). Another point was the presence of multiple surgeons; however, all operators had comparable experience in pediatric surgery and belonged to the same center. In addition, the report did not address the effect of wound complications on the functional outcome, which is beyond our scope in this study and will need to be discussed in another report. Last, the study may be criticized for its failure to identify any significant risk factor. However, we do believe that the negative results in this study have special importance to avoid unnecessary investigations or procedures in managing cases of rectoperineal/ vestibular fistulae.

Conclusion

Regarding the wound complications following the repair of rectoperineal/ vestibular fistulae in female patients, none of the studied risk factors (age at the time of repair, type of the anorectal anomaly, degree of bowel dilatation, and the presence of protective colostomy) appear to have a significant effect on the outcome.

Conflicts of interest

There are no conflicts of interest.

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