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Early versus late reconstruction of cloacal malformations: The effects on postoperative complications and long-term colorectal outcome

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ABSTRACT

Introduction: Patients with a cloacal malformation generally undergo reconstructive surgery within the first years of life. However, the ideal age for surgery has rarely been mentioned. The aim of this study was to report differences in outcome between early (<6 months) and late repair of cloacal malformations.
Methods: Charts of patients with a cloacal malformation treated in 5 pediatric surgical centers between 1985 and 2009 were retrospectively studied for associated anomalies, postoperative complications, and colorectal and urological outcome.
Results: Forty-two patients were eligible for this study, giving a mean exposure of less than 1 patient yearly per center. Forty-five percent of the patients had a short common channel (>3 cm), and 14% had a long common channel. Length of common channel was missing in 41% of the patients. Median age of the cloacal reconstruction was 9 months (range 1–121 months). Twelve patients (29%) underwent an early surgical repair (within the first 6 months of age; median 3 months), and 30 (71%) patients underwent a late repair (after 6 months of age; median 14 months). Eighteen postoperative complications (<30 days) had been documented in 15 patients (35%), with significant more perineal wound dehiscences in patients with an early repair (42% vs. 10%, $p = 0.031$). There were no differences in complication rate between patients with short and long common channels. Mean follow-up was 142 months (range 15–289). At the last follow-up, 10 patients (24%) had voluntary bowel movements. Fourteen patients (33%) had complaints of soiling, 25 (60%) were constipated, with no differences between the early and late repair groups. Patients in the late repair group as well as the group of patients with a short common channel were more frequently able to void spontaneously.
Conclusions: Postoperative complications are common in patients with cloacal malformations. Early repair is associated with more wound dehiscences, however, without affecting long-term functional outcome. All centers had limited annual exposure of less than 1 patient. In these clinical settings, ideal age of cloacal reconstruction seems to be between 6 and 12 months. In general, centralized care for these complex malformations may be the crucial factor for reducing postoperative complications and better long-term outcome.

The most complex anorectal malformation in females is a cloacal malformation, in which the rectum, vagina, and urethra drain into a common channel [1]. The most commonly used surgical approach to reconstruct a cloaca is a posterior sagittal anorectoplasty (PSARP), extended with either a posterior sagittal anorecto vagino urethroplasty (PSARVUP), or the total urogenital mobilization (TUM) [2,3]. Mobilization of the rectum by laparotomy or laparoscopy may be necessary depending on the length of the common channel.

The aim of surgery is to achieve best possible colorectal, urological, and gynecological function. In the largest study by Peña et al. presenting outcome of patients with cloacal malformations, the patients are operated on between the first and 12th month of age [4]. However, when born within their institution and with an uncomplicated course, the authors prefer to operate earlier, even after 1 month of age. The optimal age for cloacal reconstruction,

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Table 1
Krickenbeck classification for postoperative results [5].

International classification (Krickenbeck) for postoperative results	
1. Voluntary bowel movements	Yes/No
Feeling of urge,	
Capacity to verbalize,	
Hold the bowel movement	
2. Soiling	Yes/No
Grade 1	Occasionally (once or twice per week)
Grade 2	Every day, no social problem
Grade 3	Constant, social problem
3. Constipation	Yes/No
Grade 1	Manageable by changes in diet
Grade 2	Requires laxatives
Grade 3	Resistant to laxatives

however, has not been studied, particularly not in centers with less exposure to these patients. The aim of this study was to evaluate differences in postoperative complications and long-term outcome between patients who underwent early reconstruction of the cloaca versus late reconstruction.

1. Materials and methods

Medical records of all 55 patients with a cloacal malformation treated between January of 1985 and December of 2009 in five pediatric surgical centers in the Netherlands were retrospectively reviewed. Each center employs between 5 and 7 pediatric surgeons of whom 1 or 2 are experienced in conducting reconstructive surgery for cloacal malformations. Only patients born after the introduction of the posterior sagittal approach in the Netherlands (1985) were included. Furthermore, patients born after 2009 were excluded because continence was not assessable in them due to young age. Cloacal malformations were classified as having a short common channel (less than 3.0 cm) or a long common channel (more than 3.0 cm) [5]. For this study we recorded information regarding associated anomalies, type of surgery, postoperative complications and long-term outcome. Long-term outcome was defined as colorectal function assessed according to the Krickenbeck classification (Table 1), use of a bowel management program, and the presence of a colostomy. Also urological function, e.g. the need for clean intermittent bladder catheterization and the ability to void spontaneously, was recorded, but is more extensively reported separately. For analysis patients were divided in two groups: one with patients who underwent early reconstruction of the cloaca (0–6 months of age) and one with patients who underwent late reconstruction (after more than 6 months of age). Groups were compared using Fishers' exact test in SPSS 17.

2. Results

From a total of 55 patients 12 were subsequently excluded for lack of good data on functional outcome. One patient died of a clear cell sarcoma of the kidney at age 10 without having undergone cloacal repair; she was excluded. Thus, final analysis included 42 patients. Median age of the cloacal reconstruction was 9 months (range 1–121 months). Twelve patients (29%) were operated on within the first 6 months of age (median 3 months, range 1–6); 30 patients (71%) underwent surgery more than 6 months after birth (median 14 months, range 7–121).

Mean length of the common channel was 2.3 cm (range 1.0–4.0 cm). Nineteen patients (45%) had a common channel shorter than 3.0 cm (Table 2); 6 patients (14%) had a long (more than 3.0 cm) common channel. Information about length of common channel was missing in 17 cases (41%). Associated anomalies were documented in 37 (88%) of the 42 patients. An abnormal sacrum was seen in 22 patients (52%); 7 patients (17%) suffered from spinal dysraphism. A duplicature of the Müllerian system was seen in 27 patients (64%); agenesis of the Müllerian structures was present in 4 patients (10%). In general, anomalies of the Müllerian structures were seen more often in patients operated after more than 6 months of age (50% vs. 83%, $p = 0.049$). In 24 patients (57%) a PSARVUP was done, in 18 patients (43%) the PSARP was combined with a TUM. In 10 cases (24%) the surgical reconstruction was combined with a laparotomy. Eighteen complications within the first 30 days after the cloacal reconstruction were seen in 15 patients (36%); 7 patients (58%) in the early repair group and 8 (27%) in the group of late repair ($p = 0.078$, Table 3). Perineal wound dehiscences were seen significantly more frequent in the early repair group (42% vs. 10%, $p = 0.031$). Recurrent fistulas were seen once (8%) in the early repair group and 6 times (20%) in the late repair group, however, this difference was not significant ($p = 0.651$). No vaginal complications were seen within 30 days of the surgical repair, although 9 patients needed a secondary vaginoplasty at a later stage due to severe vaginal stricture. Complication rate was regardless of the presence of sacral or spinal anomalies (Table 4A) and, remarkably, there was no difference in complications between patients with short common channels and the patients with long common channels (Table 4B).

Median follow-up was 142 months (range 15–289). Regarding functional outcome voluntary bowel movements (VBM) were seen in 10 patients (24%), with no difference between groups of early repair and late repair (25% vs. 23%, $p = 1.000$, Table 5). Soiling was seen 33% in both the early and late repair groups. Constipation was reported in 60% of the patients with no difference between both groups. Bowel management was needed in 67% of the patients in both the early repair group and the late repair group. An end-colostomy was created in 4 patients (10%) due to recurrent anal stenosis. Seven patients

Table 2
Patient characteristics and type of surgery.

	Early (n = 12)		Late (n = 30)		Total (n = 42)		p-value
	n	%	n	%	n	%	
Short common channel	8	67	11	37	19	45	0.129
Long common channel	0	0	6	20	6	14	
Length missing	4	33	13	43	17	41	0.731
Associated anomalies	9	75	28	93	37	88	0.131
Sacral anomalies	5	42	17	57	22	52	0.499
Spinal anomalies	2	17	5	17	7	17	1.000
Müllerian anomalies	6	50	25	83	31	74	*0.049*
Duplicature	6	50	21	70	27	64	0.292
Agenesis	0	0	4	13	4	10	0.308
PSARVUP	6	50	18	60	24	57	0.732
TUM	6	50	12	40	18	43	
Laparotomy assisted	1	8	9	30	10	24	0.233

PSARVUP Posterior sagittal anorecto vagino urethroplasty; TUM Total urogenital mobilization.