

# Enteral vs parenteral nutrition in reconstructive anal surgery – a prospective-randomized trial

A. K. Joos\*, P. Palma\*, J. O. Jonescheit\*, T. Hasenberg\* and A. Herold†

\*Department of Surgery, University Clinic of Mannheim and †Enddarm-Zentrum Mannheim, Mannheim, Germany

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## Abstract

**Objective** Early defecation after reconstructive anal surgery may influence the outcome negatively. Different methods are used to avoid bowel movements in the early postoperative period. We questioned whether stool behaviour is influenced by total parenteral nutrition as opposed to enteral nutrition with resorbable sip feeds. Furthermore, satisfaction of patients with each nutrition regime, cost differences and influence of the postoperative outcome were evaluated.

**Method** Between January and October 2004, 32 patients were evaluated in a prospective randomized, surgeon-blinded trial. The parenteral group (PG,  $n = 16$ ) received 1250 ml Nutriflex lipid basal™ (B. Braun Comp., Melsungen, Germany) intravenously. The enteral group (EG,  $n = 16$ ) was offered a total amount of three cups of Clinutren fruit™ (Nestle Nutrition GmbH, Frankfurt, Germany), two boxes of OPD (oligopeptid diet) Elemental 028 extra™ (SHS, Liverpool, UK) and two

cups of OPD Peptamen™ (Nestle Nutrition GmbH). Both groups received 1000 ml of isotonic crystalloid solution and were allowed to drink up to 1000 ml of tea or water per 24 h.

**Results** The satisfaction of patients was significantly higher in the EG. In regard to stool behaviour both groups showed no differences, in the number of bowel movements or in the time to the first postoperative defecation. Enteral feeding resulted in a minimum saving of €220. Postoperative results in the case of plastic fistula closure did not differ between both groups.

**Conclusions** Sufficient bowel confinement during the early postoperative period after anal reconstructive surgery may be achieved by using resorbable sip feeds rather than parenteral nutrition.

**Keywords** reconstructive anal surgery, bowel confinement, nutrition, proctology

## Introduction

Early postoperative defecation after reconstructive anal surgery may influence the outcome negatively [1–7]. It may lead to mechanical strain on the sutures [1,3]. Wound infection due to the contamination of stool may also occur [8]. Both these factors might endanger suture integrity and thus the operative result. The question whether bowel confinement after anorectal reconstructive surgery is necessary is still unanswered as the available literature is very limited [8–10]. Currently, bowel confinement is routinely used without evidence to support this practice.

Several different methods of preventing bowel movements are used. The most invasive is a defunctioning stoma. Medical bowel confinement alone or in combination with total parenteral nutrition or an elemental diet is also applied. These methods are unpleasant for the patient. We therefore looked for a more acceptable way to reduce bowel movements. If the assumption that early defecation influences the surgical outcome negatively is correct, a non-invasive, inexpensive and less unpleasant procedure for reducing defecation should be sought.

Postoperative stool frequency and consistency and time to the first postoperative bowel movement are the relevant end points to compare alternative regimes. We set out to answer the following questions: Is there a difference between total parenteral and enteral nutrition with regard to bowel behaviour? Which is the more satisfactory for the patients? Do these regimes differ in terms of expense? Do they influence the surgical result?

Correspondence to: Andreas K. Joos, MD, Department of Surgery, University Hospital Mannheim, Theodor-Kutzer-Ufer 1-3, 68167 Mannheim, Germany.  
E-mail: andreas.joos@chir.ma.uni-heidelberg.de

## Method

Between January and October 2004, 32 patients were included in a randomized study. All subjects underwent reconstructive anal surgery at the Division of Colorectal Surgery of Mannheim University Hospital, Germany. The patients were randomized prospectively, by opening an envelope immediately after surgery with the surgeon blinded to postoperative nutritional regime, to one of our two study groups. These included total parenteral nutrition (PG, 16 patients) and enteral nutrition (EG, 16 patients). The only exclusion criteria were inflammatory bowel disease and previous large bowel resection. The preoperative diagnosis was confirmed by an independent specialized coloproctologist through clinical examination, proctoscopy, rectoscopy and endorectal ultrasound. Both groups preoperatively received the same bowel lavage solution (3 l Delcoplep<sup>TM</sup>, DeltaSelect GmbH, Dreieich, Germany) and a single dose of Cefazolin (2g i.v.), or Ciprofloxacin in patients with penicillin allergy, and Metronidazol (2g i.v.) immediately before surgery.

On the day of surgery the patients received 3000 ml of isotonic crystalloid solution intravenously and 200 ml of tea or water. From the first postoperative day both groups received 1000 ml of isotonic crystalloid solution and were further allowed to drink up to 1000 ml of tea or water.

From the first postoperative day onwards the parenteral group (PG) received 1250 ml of Nutriflex lipid basal<sup>TM</sup> (B. Braun comp., Melsungen, Germany) during an 18-h period. The enteral group (EG) was offered three cups of Clinutren fruit<sup>TM</sup> (Nestlé Nutrition comp., Frankfurt, Germany), two packs of OPD (oligopeptid diet) Elemental 028 extra<sup>TM</sup> (Fa. SHS, Liverpool, UK) and two cups of OPD Peptamen<sup>TM</sup> (Nestlé Nutrition comp., Frankfurt, Germany). This was the maximum allowed per day. This enteral nutrition added up to a maximum energy intake of 1580 kcal. From the seventh postoperative day onwards the subjects received a regular diet *ad libitum* in both groups (Table 1).

During the period of special nutrition the defecation was recorded in each group as: category 0; no bowel

movement, category 1; liquid stool, category 2; formed stool. The degree of satisfaction with the type of nutrition was also documented using an analogue scale of 1 (very satisfied) to 6 (dissatisfied). Follow-up examination was performed at a median of 6 months after surgery (range 3–13 months). To calculate the expenses for the different types of nutrition, we used the purchase price provided by the department for medical acquisition/purchase. The protocol received approval according to the guidelines of our local Institutional Review Board.

## Statistical analysis

Based on our previous experience we anticipated the occurrence of bowel movements within the first six postoperative days to be 5% in the PG. Due to the lack of any published data we postulated a rate of 40% during enteral nutrition. Accordingly, a sample size of 16 patients in each group was calculated on the basis of 80% power with an alpha error level of 0.05 and a beta error level of 0.2.

The Statistical Package for Social Sciences (SPSS<sup>®</sup> Ltd., Chicago, IL, USA) was used for data analysis. For statistical analysis we used student's *t*-test for independent samples (first defecation), the chi-square test (appearance of any defecation) and the Mann-Whitney *U*-Test (satisfaction with the nutrition regime). A *P*-value < 0.05 was considered statistically significant.

## Results

The thirty-two patients in the study included 15 males and 17 females. The age and gender distribution in both groups are shown in Tables 2 and 3. Both groups underwent 19 plastic anal fistula closures with mucosa advancement flap, four sphincter reconstructions, three Delorme procedures and three other reconstructive anal procedures (Table 4).

In the PG one patient reported transanal mucus secretion on the second and fourth postoperative day. One patient reported mucus secretion on the fifth day,

	Day of operation	Postoperative day 1–6	> Day 7
Parenteral	Starvation	1250 ml Nutriflex lipid basal <sup>TM</sup>	Regular diet
	3000 ml isotonic solution	1000 ml isotonic solution	
	200 ml tea or water	1000 ml tea or water	
Enteral	Starvation	3 cups of Clinutren fruit <sup>TM</sup>	Regular diet
		2 boxes of Elemental 028 extra <sup>TM</sup>	
		2 cups of Peptamen <sup>TM</sup>	
	3000 ml isotonic solution	1000 ml isotonic solution	
	200 ml tea or water	1000 ml tea or water	

**Table 1** Feeding regimes.



the potential risk of mechanical injury of the suture line or bacterial contamination. This could lead to a weakness of the suture and vitiate the surgical outcome [1–7].

If this assumption is correct, stool confinement should be used in all reconstructive anal surgery. In general, there are several methods to achieve this goal.

Preoperative bowel preparation combined with nil by mouth postoperatively generally causes stool confinement for a couple of days and the entire duration of this period differs from patient to patient. Fasting has a negative influence on wound healing and also patient satisfaction. An alternative to fasting is a parenteral nutrition regime. This maintains nutrition and should also eliminate the potential problems of woundhealing. Patient satisfaction is, however, reduced by the fact that there is no regular food intake and there is a risk of morbidity due to the intravenous catheter.

Another option is to offer a fully resorbable, chemically defined drinkable diet and antidiarrhoeal substances such as loperamide [11].

In recent years, new fibre- and fat-free drinks have been developed, which can be taken orally instead of by a feeding tube. These drinks contain all necessary vitamins and trace elements for balanced and sufficient nutrition. Due to lack of fibre and fat reduction these drinks are totally resorbed in the small intestine and therefore confine defecation for a few days.

The question whether bowel confinement after reconstructive anorectal surgery is necessary cannot be answered due to the limited number of publications. However there is some information in the literature. A prospective, randomized trial demonstrated that regular diet (control group) is as effective as clear liquid diet with antidiarrhoeal agents (laxative group). The control group received a regular diet. A total of 54 patients undergoing sphincter reconstructions, flap repair of anorectal fistulas and anoplastics were studied. The regular diet group showed a faster return of normal bowel movements and higher patient satisfaction without an increase in infection or negative surgical outcome [8]. Another prospective, randomized trial focused on sphincter repair after birth injuries. In this study one group received laxatives, whereas the other group received a pharmacological stool preventative. There was a reduced length of stay and an earlier and less painful first bowel movement in the laxative group. The surgical outcome and the number of wound infections did not differ between the two groups [9]. A retrospective report likewise focused on the postoperative management after sphincter reconstruction [12]. This study divided the patients into three groups: pharmacological stool prevention, protective ileostomy

and normal diet with laxatives. No significant differences were found in the rate of infection, wound dehiscence and surgical outcome. Constipation was more common in the pharmacological stool prevention group. An increased morbidity was observed in the protective ileostomy group. One of the few guidelines on this topic was published by the Royal College of Obstetricians and Gynaecologists. The use of laxatives and stool softeners was suggested but this recommendation is based on evidence level four only [13].

In our study patient satisfaction was significantly higher in the enteral compared with the parenteral nutrition group. This result is not surprising. It is obvious that patients prefer regular oral nutrition rather than a fasting regime. In addition, enteral feeding also has physiological advantages over parenteral nutrition. Furthermore, parenteral nutrition has to be administered via a central venous line which carries some risk of venous thrombosis, pneumothorax and infection. Thus it is uncomfortable for the patient and causes considerable additional cost.

Thus the cost of the parenteral nutrition was €314.44 (including the nutrition itself, the central venous line, the necessary chest X-ray, laboratory testing and dressings). The enteral feeding cost only €95.22. This was even lower considering that not all drinks provided were actually consumed. On average our patients in the EG consumed only five cups per day.

Defecation during the 6-day observation period did not differ between the two groups regarding the first appearance of stool or the total number of bowel movements and there was no difference in incidence of mucous discharge. Importantly there was no fluid or formed stool in either group during the observation period.

If early defecation influences the surgical outcome negatively, it follows that bowel confinement influences the outcome positively. However, the validation of this was not possible in this study. To determine this larger groups of patients undergoing similar surgical procedures would have to be investigated prospectively.

Bowel preparation in colorectal surgery was traditionally considered to reduce the risk of anastomotic and infective complications. The introduction of 'fast track' surgery has shown that this is not necessary. Similarly this study shows that parenteral nutrition or postoperative fasting are probably not advantageous in anal reconstructive surgery.

## Conclusions

The advantages of enteral nutrition are reduced cost, increased patient satisfaction and a smaller risk of severe

side effects compared with parenteral nutrition. No difference between a parenteral and enteral nutrition regime in terms of defecation after anal reconstructive surgical procedures during the observation period of 6 days was found. Furthermore, there was no difference in the surgical outcome between the two groups. Bowel confinement during the early postoperative period is therefore better achieved by an enteral resorbable diet.

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