

# Early Removal of Nasogastric Tube is Beneficial for Patients Undergoing Radical Cystectomy with Urinary Diversion

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## ABSTRACT

*Purpose:* Examine the beneficial effect of early nasogastric tube (NGT) removal in patients undergoing radical cystectomy with urinary diversion.

*Patients and Methods:* 43 consecutive patients underwent radical cystectomy with urinary diversion and were randomized into 2 groups. In the intervention group (n = 22), the NGT was removed 12 hours after the operation. Comparatively, in the control group (n = 21), the NGT remained in place until the appearance of the first flatus. The appearance of ileus, patient ambulation, time to regular diet, and hospital discharge of the two patient groups were assessed. Patient discomfort due to the NGT was also recorded.

*Results:* The 2 groups showed statistical homogeneity of their baseline characteristics. Two patients (9.09%) from the intervention and 3 patients (14.3%) from the control group developed postoperative ileus and were treated conservatively. No significant differences in intraoperative, postoperative, bowel outcomes or other complications were found between the two groups. All patients preferred the NGT to be removed first in comparison to their other co-existing drains.

*Conclusions:* This is the first randomized, prospective study, to our knowledge, to assess early NGT removal after radical cystectomy. We advocate early removal, independently of the selected type of urinary diversion, since it is not correlated with ileus and is advantageous in terms of patient comfort and earlier ambulation.

*Key words:* bladder cancer; cystectomy; urinary diversion; nasogastric tube

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## INTRODUCTION

Radical cystectomy with urinary diversion for the management of muscle-invasive bladder cancer, even nowadays, is considered to be an operation that conceals a variety of intraoperative and postoperative hazards. During the last decades, there has nevertheless been an evolution of the surgical experience concerning various techniques. Thus, the risk of complications is much lower, with postoperative ileus being the most common, resulting in prolonged fasting and hospitalization of the patients (1).

A common way to avoid this complication is the use of a nasogastric tube (NGT) which is considered a useful tool that decompresses the intestine and the stomach, increases bowel motility, offering safety to the postoperative care plan. In previous decades, the application of NGTs had become a tradition due to the sense of security it provides to the postoperative outcome. Recently, there have been several prospective randomized trials in the field of general surgery and gynecology supporting the opinion that the benefits outnumber the risks for early NGT removal (2-9). In the last decade there has also been a trend of early

NGT removal after major urologic operations, including radical cystectomy with urinary diversion (10-14). However, a recently published Cochrane Meta-Analysis of 33 studies concluded that NGT decompression should be abandoned in favor of selective use, since it does not accomplish any of its intended goals (15). The purpose of our study was to support this opinion, proving that NGTs can be safely removed shortly after the operation.

**MATERIALS AND METHODS**

Under institutional approval we prospectively evaluated 56 patients from March 2004 to April 2008. Thirteen patients were excluded from the study, 7 due to refusal to participate and 6 patients due to intensive care unit stay, previous history of major abdominal surgery and/or neoadjuvant radiotherapy or chemotherapy. The remaining 43 patients, after providing informed consent, were randomly divided into 2 groups. The intervention and control groups consisted of 22 and 21 patients, respectively. Their demographic

characteristics are listed in Table-1. They underwent radical cystectomy with curative intent for invasive bladder cancer, (30 men and 13 women). The operations were performed by 4 different surgeons.

The perioperative care plan of the two groups is presented in Table-2. The patients of the intervention group followed a common preoperative strategy including admission 2 days before the operation, and counseling regarding the importance of early ambulation and pulmonary physiotherapy compared with the use of NGTs. Bowel preparation was administered the day before the operation, usually with sodium phosphate solution. The night before the operation, a clear liquid diet was administered, and patients received nothing by mouth after midnight. The day of the operation, patients received prophylaxis for deep vein thrombosis including low molecular weight heparin and elastic stockings, as well as chemoprophylaxis usually with intravenous administration of ampicillin and metronidazole. After anesthesia induction a NGT was inserted for bowel and stomach decompression and its correct placement was inspected by the surgeon intraoperatively. We performed an infraumbilical

*Table 1 – Patient demographics.*

	Intervention Group	Control Group	p Value
Total patients (n)	22	21	
Gender (n)			
Male	16	14	
Female	6	7	
Mean age (years ± SD)	66.1 ± 6.73	66.3±4.46	0.932
Type of urinary diversion			0.915
Neobladder	9	9	
Bricker	13	12	
Mean weight (kg ± SD)	78.5 ± 10.77	79.1±15.7	0.886
Mean operation time (hrs ± SD)	4.09 ± 0.79	3.64±0.41	0.026
Mean blood loss (units ± SD)	2.5 ± 1.56	2.61±1.36	0.731
Comorbidities (n)			
None	14	12	
Concurrent malignancy	1	0	
Heart disease	11	14	
Hypertension	3	6	
Diabetes	4	5	
COPD	2	5	

*COPD = chronic obstructive pulmonary disease; SD = standard deviation.*

## Nasogastric Tube and Cystectomy

**Table 2 – Perioperative care plan (POD = postoperative day).**

	Intervention Group	Control Group	p Value
Use of staplers (N)			1.0
Yes	21	16	
No	1	5	
Use of epidural anesthesia			1.0
Yes	3	2	
No	19	19	
Nasogastric tube removal (N)			
12 hrs postoperatively	22	0	
1st POD	0	6	
2nd POD	0	9	
3rd POD	0	5	
4th POD	0	1	
Ambulation (N)			0.289
1st POD	16	12	
2 <sup>nd</sup> POD	6	9	

incision starting just below the umbilical level and extending to the pubic symphysis reaching a maximum length of 12 cm. The operation was performed through an intraperitoneal approach. Removal of the urinary bladder, the prostate, the seminal vesicles and the distal ureters was performed in men, and the bladder with the uterus was performed in women. Bilateral pelvic lymphadenectomy was routinely a part of the operation plan. The urinary diversion was executed with a Bricker ileal conduit (13 patients), or orthotopic bladder substitution (9 patients). The bowel segment that was routinely used was 15-20 cm long, approximately 20 cm away from the ileocecal valve. A longer, ileal loop of 36 cm, formatted accordingly to our personal modification of the S-pouch, was used for the neobladder formation (16). For bowel segment isolation, as well as for restoration of bowel continuity, special staplers were used in most cases. One or two drains were usually applied for postoperative fluid drainage. The simultaneous use of an epidural is not common in postoperative analgesia. Postoperative pain was managed with systemic use of opioids and nonsteroidal anti-inflammatory drugs. Metoclopramide was routinely used in all cases for 48 hours postoperatively. The NGT was removed within 12 hrs postoperatively. Ambulation with respiratory physiotherapy if needed was usually

begun on the first postoperative day along with a clear liquid diet, whereas the patients had their first regular meal after 3 to 4 days. This postoperative care plan was applied irrespectively of the presence of flatus or bowel sounds. Postoperative ileus was defined as the absence of normal flatus or stool for 5 days with accompanying symptoms like nausea, vomiting, gas distention, and confirmation with imaging parameters. The criteria for safe discharge included adequate oral intake, pain control with oral medication and defecation accomplishment. All of the patients that suffered from ileus were treated conservatively with reinsertion of the NGT and modification of the diet.

The 21 patients of the control group were operated on during the same period of time by the same group of surgeons and with identical surgical techniques. Urinary diversion was executed with a Bricker ileal conduit(9 patients) and orthotopic bladder substitution (12 patients). The preoperative plan was identical to those of the intervention group. Postoperatively, the only difference was that the NGT remained until the appearance of the first flatus.

The patients were asked a simple question 12 hours postoperatively about which “tube” (catheter, drain, NGT) they would prefer to be removed first due to its discomfort.

Statistical “homogeneity” of the two patient groups was explored using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Pearson’s chi-square test was used to examine the “relationship” between the time of NGT removal and the operative techniques (type of operation, use of staplers). The use of epidural anesthesia was examined using the Fisher’s exact test. We also performed the parametric test (independent samples t-test) to compare the (mean) operation time with a 95% confidence interval. Finally, the Mann-Whitney U test was used to examine the surgical outcomes.

## RESULTS

No statistical difference was found in any demographic or clinical parameter between the 2 groups. No patients were lost to follow-up during the intervention, nor discontinued the intervention. Likewise, no difference was recorded in the postoperative course, especially concerning bowel movement, ambulation or patient diet. The main results are listed in Tables 2 and 3.

The only parameter which showed a statistically significant difference was the mean operative time ( $p = 0.026$ ). Complications (Table-3) were rare and comparable between the two groups ( $p = 0.69$ ).

Concerning the tube removal question, all patients (100%) answered that they would prefer the NGT to be removed first.

## COMMENTS

The 90-day morbidity and mortality rates for radical cystectomy have been reported to reach the non-negligible rates of 64% (17) and 5.6% (18). This is the main reason why many urologists prefer being more conservative in their postoperative treatment plan. A major postoperative concern is related to postoperative ileus. In many cases, to avoid this complication, a NGT remains in place for several days after the operation. The preservation of the NGT for more than one day though, is associated with patient discomfort, increased pulmonary complications like atelectasis and respiratory tract infections, gastro-

esophageal reflux and electrolyte imbalances (10). Early patient ambulation has been traditionally encouraged to stimulate the bowel and prevent respiratory events, but despite the strong clinical bias, it seems to have little or no effect on NGT removal (11).

There have been alternative methods used for gastrointestinal (GI) tract decompression. Some centers have tested the use of tube gastrostomy with positive results [19-22]. In 1976, the first trial comparing tube gastrostomies and NGTs was published concluding that gastrostomies have a definite place in surgical urology (19). Fifteen years later, Van Poppel et al. reported that tube gastrostomies can be an easy procedure for gastric decompression after urinary diversion procedures but can be used only as an alternative to NGTs (20). Finally in 2000, Buscarini et al. presented a clinical trial with 709 patients, suggesting the tube gastrostomy with the Stamm technique as an effective method with a low complication rate (0.05%) (22). Currently, this technique is not so popular among urologists due to its high level of invasiveness and the reduced need for long lasting gastric decompression.

Early NGT removal has been a matter of controversy. In 1999, Donat et al. presented the first prospective study comparing 27 patients receiving intravenous metoclopramide combined with NGT removal before 24 hours, with 54 control patients. Their results focused on the importance of metoclopramide with early NGT removal in the reduction of postoperative atelectasis, early return of bowel function, and safety to the small bowel anastomosis (10). In 2003, Pruthi et al. with a relatively small sample of patients, was the first to focus on a specific preoperative plan with bowel preparation and patient education, combined with a limited incision length, preperitoneal approach, use of staplers, and early NGT removal, in the early hospital discharge of their patients (12). Inman et al. during the same year, with a large sample of 430 patients, retrospectively compared patients who received postoperative NGTs with those who did not, suggesting that NGTs may prolong GI recovery and increase duration of hospitalization (13). Finally, in 2005, Park et al. pointed out the importance of sodium phosphate for bowel preparation in the reduction of the incidence of postoperative ileus and supported the opinion that early NGT removal after cystectomy is not related with ileus (14). Other authors propose the

Table 3 – Outcomes.

	Intervention Group	Control Group	p Value
1 <sup>st</sup> bowel sound (N)			0.898
1 <sup>st</sup> POD	9	9	
2 <sup>nd</sup> POD	10	8	
3 <sup>rd</sup> POD	3	3	
4 <sup>th</sup> POD		1	
1 <sup>st</sup> flatus (N)			0.955
1 <sup>st</sup> POD	2	1	
2 <sup>nd</sup> POD	13	14	
3 <sup>rd</sup> POD	4	4	
4 <sup>th</sup> POD	3	2	
Mean time to regular diet (days ± SD)	3.45 ± 0.9	3.43 ± 0.74	0.203
1 <sup>st</sup> defecation (days ± SD)	4.77 ± 1.19	4.33 ± 1.06	0.14
Hospital discharge (days ± SD)	12.6 ± 3.4	12.43 ± 2.71	0.686
Complications (N)		NS	0.69
None	24	26	
Flatulence	2	-	
Ileus	2	3	
Urine leakage from drainage tube	-	2	
Cardiac failure	2	-	
Fever	3	4	
Wound disruption	-	1	
None	19	22	
Ileus	2	3	
Urine leakage from drainage tube	0	2	
Cardiac failure	2	0	
Fever	2	2	

SD = standard deviation.

use of chewing gum for bowel motility stimulation (23).

Postoperative ileus is associated with pre-, intra- and postoperative factors, such as prolonged fasting, the surgical stress along with the sympathetic hyperactivity, uncontrolled pain, hypotension, hypovolemia, surgical dissection and excessive saline administration. We tried to avoid all of the above factors, in cooperation with our anesthesiologists, by creating a careful prospective, preoperative and postoperative care plan, incorporating respective measures.

Preoperatively, we carried-out a meticulous counseling effort to stress the importance of bowel preparation, early ambulation and pulmonary exercise. Sodium phosphate solutions fulfill the criteria

regarding tolerability, adequate preparation of the ileum and reduced morbidity. Even though patients do not benefit from bowel preparation, as a recent meta-analysis in major abdominal surgery suggests (24), we proceeded to use a one-day bowel preparation. Nevertheless, we do not consider bowel preparation as an important factor in the preoperative preparation of the patient. Furthermore, we do not advocate prolonged fasting, because it leads to insulin resistance and it is not recommended by international anesthesiology guidelines (25). Moreover, gastric emptying of water and other clear fluids has an extremely fast exponential curve (50% of intake clearance within 20 minutes) (26). The preoperative care plan rarely included chemoprophylaxis from the previous day

because of the small bowel segment used in most of the cases. In this instance, possible postoperative complications like ileus or superinfection by *Clostridium difficile* resulting in pseudomembranous colitis can be avoided (27).

Intraoperatively, performing radical cystectomy through a limited infraumbilical incision not exceeding 12 cm provided us with several benefits. The bowel loops do not block the surgical field and are better protected inside the abdomen due to the smaller incision of the peritoneum. Finally, the postoperative pain is limited with this type of incision. The use of staplers during all of the stages of the operation offers less operating time, reduced intraoperative blood loss, and improved bowel manipulation (28). In this case, the risk of postoperative bowel edema and ileus is greatly reduced and the early induction of a normal diet is facilitated.

Of the 43 patients, only 5 had GI tract complications. These complications occurred with no significant difference between the two groups, they were not related with increased estimated blood loss, transfusion requirement, or other major complications like fever.

This study is not without limitations. Firstly, our patient sample is rather small, but it is homogeneous. Second, our patients were operated on by 4 different surgeons creating a possible bias. However, the technique used by all surgeons in our department was exactly the same, although it might have created a difference in operative time. Additionally, the tube removal question is rather simple, not subjective, but it does reflect the patient's discomfort accurately. Finally, it is obvious that this study did not follow the multimodal approach of the fast track program (no mechanical bowel preparation, no drainages, epidural analgesia, etc.), but it was done in order to focus entirely on the effects of NGT in the postoperative course of the patient.

To our knowledge, this is the first randomized, prospective trial evaluating the value of early NGT removal in a radical cystectomy with urinary diversion. We believe that NGT does not affect bowel movement and does not prevent prolonged postoperative ileus. Our results are in accordance to the current literature that reducing time to NGT removal can be advantageous in terms of patient comfort.

## CONFLICT OF INTEREST

None declared.

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