

The Feasible Safety and Clinical Study of Gastrointestinal Decompression After Gastric Cancer Surgery

Wei Jie He^{1*}, Young-Don Min² and Swapnil Pandurang Bhujbal³

¹Department of Surgery, Chosun University Graduate School, Gwangju 501-759, Republic of Korea

²Department of Medicine, Chosun University Graduate School, Gwangju 501-759, Republic of Korea

³Department of Biomedical Sciences, College of Medicine, Chosun University, Gwangju 501-759, Republic of Korea

Case Report

Received: 29/03/2021
Accepted: 06/04/2021
Published: 07/04/2021

*For Correspondence

Wei Jie He, Department of Surgery, Chosun University Graduate School, Gwangju 501-759, Republic of Korea, Ph: +82-10-2669-0661

E-mail: 185684815@qq.com

Keywords: Nasogastric Decompression, Gastric cancer, Nasogastric tube

ABSTRACT

The perioperative routine placement of nasogastric decompression (ND) in gastric cancer patients is a routine and tradition that has been used so far. ND can expel air and stomach contents from the stomach and intestine, thus reducing the risk of postoperative nausea and vomiting. Pulmonary complications and anastomotic leakage and surgical wound complications accelerate the recovery of gastrointestinal function and the overall recovery of patients. The effect of gastrointestinal surgery on gastrointestinal function recovery and anastomotic leakage was a question of debate and the discomfort and fear brought to the patients were progressively obvious. Although many hospitals have continued the routine use of ND, it is believed that ND placement can reduce the internal pressure of anastomotic site and reduce the probability of anastomotic leakage. But so far there is no rigorous scientific medical-based evidence, especially prospective findings. An empirical study was made on the recovery of gastrointestinal function, the rate of re-catheterization and the occurrence of complications in 116 gastric cancer patients without ND, in our hospital in the past two years. The results showed that all kinds of gastric cancer operations were completed safely in the ND state, which greatly reduced the pain of the patients, accelerated the recovery after operation, and there was no significant difference in the first exhaust time and the first eating time after operation. Postoperative symptoms: no respiratory complications, no obvious symptoms of gastroesophageal reflux, no electrolyte disturbance, re-catheterization for a long-term bedridden patient and an obese patient, the catheterization rate is 0.15, can be ignored, abdominal distension and nausea. There were no obvious symptoms of discomfort such as vomiting. ND free technology is safe for gastric cancer surgery and is worthy of wide clinical application. Therefore, this paper summarizes the safety and significance of gastric cancer surgery without gastrointestinal decompression.

INTRODUCTION

With the progress of medical technology and the improvement of peoples' requirements for the quality of life, increasing traditional views in medical treatment are facing challenges and reforms. This is the case whether the perioperative nasogastric decompression (ND) of gastrointestinal surgery is released. The abandoned ND of lower digestive tract surgery has been widely accepted by the medical profession [1-3] and the abandoned ND of gastric cancer surgery is still controversial. The traditional concept of gastric cancer surgery is routine placement ND [4, 5] because the indwelling gastric tube has provided a good field environment, promote wound healing, improve gastrointestinal wall blood circulation [6], help function recovery and various other functions. Perioperative nasogastric decompression of gastric cancer patients has been used as a routine and tradition. However, the effect of gastrointestinal surgery to promote the recovery of gastrointestinal function and reduce anastomotic leakage is questioned to a greater extent [7] and the discomfort and fear brought to patients are progressively obvious. No ND technique in perioperative period of gastrointestinal surgery has become the focus of research. However, in recent

Reports in Cancer and Treatment

years, some medical institutions have noticed that there are many shortcomings in the clinical effect of indwelling gastric tube, among which, postoperative complications are [8, 9] most prominent. The effect of no indwelling gastric tube in patients with gastric cancer resection was analyzed to explore the feasibility of no indwelling gastric tube after gastrectomy. This paper reviews whether routine placement ND will reduce the occurrence of anastomotic leakage in gastric cancer surgery, so as to refer to clinicians.

History

The use of ND tubes for decompression of gastrointestinal tract was first described by Levin in 1921 [10]. Pain and Wangesteen later suggested this to become a routine procedure [11] and has been continued to the present. The use of ND can relieve the symptoms of gastrointestinal dilatation [12, 13]. Aspiration of gastrointestinal gases and contents can reduce pressure and abdominal distension and promote the recovery of digestive system function [14, 15]. It is considered as the most effective means of intestinal rest, but so far there is no rigorous scientific evidence of circulatory medicine, especially prospective findings. From the 1970s onwards, some western scholars began to doubt its true role and value but reported cases of throat pain, pulmonary infection, severe or even paralysis of vocal cord injury and respiratory asphyxia are more often [16]. There have been reports of deaths from pneumonia and asphyxia due to phlegm thrombus in gastric surgery patients related to ND. Prospective research results of many studies conducted in Europe, America, South Korea and Japan revealed that ND is not a necessary perioperative procedure and link for elective gastrectomy. Early in 1963, Gerber [17] studied 2000 patients who did not undergo ND after operation. Not only is it unnecessary to perform routine ND after surgery, but it is often associated with it. Coming with some complications, he conducted a randomized study on the value of indwelling ND after gastrectomy. By comparing postoperative gastrointestinal function recovery, postoperative recovery process and complication rate, he proposed that routine postoperative preventive ND is effective for elective Gastrectomy and is not necessary for patients. It is difficult for patients to use ND to effectively reduce gastrointestinal pressure.

Beginning in 2002, the International Association of Gastric Cancer, School of Medicine, Yonsei University, Korea, reported early gastric cancer surgery without gastrointestinal pressure. The results showed that except for acute gastric hemorrhage and individual gastric cancer with obstruction, all gastrectomy: proximal end, total stomach, partial resection and short circuit, exploration, biopsy, etc., were not required and safely completed without gastrointestinal decompression and the patient's pain was greatly alleviated, the patient's recovery time was accelerated, and the medical workload was relatively reduced [18, 19]. Headed by Professor Noh SH, Chairman of the International Gastric Cancer Association and the Korean Gastric Cancer Association, Yonsei University School of Medicine, Korea, reported earlier in 2002 that ND-free technology for gastric cancer surgery [20]. A phase II single-center retrospective clinical study was started and published articles showed that gastric cancer resection can be safely completed without ND. A prospective phase III randomized controlled study was followed by nearly 150 cases. Their research results have begun to be examined and recognized by the global surgical community and they are frequently exchanged around the world. They have completed more than 15000 Cases of various gastric cancer surgery without ND, has long been a routine operation [21].

Status

In recent years, the concept of rapid rehabilitation surgery (Fast Track Surgery, FTS) has been widely used in the clinical practice of general surgery. During long-term clinical practice, it was found that the incidence of complications after total gastrectomy in gastric cancer patients did not increase significantly even if the gastric tube was not retained [22]. Therefore, the practice of not keeping gastric tube should be paid more attention to and applied. Because of the existence of indwelling gastric tube, it causes interference to the patient's breathing, resulting in throat pain, nausea and vomiting and other symptoms of gastric tube irritation and discomfort, which is unfavorable to the recovery of postoperative rest [23, 24] For the most part, the ND has been stimulated, rubbed, pulled and compressed for a long time in the patient's body, which can easily lead to acute inflammation and ulcer formation in the patient's pharynx. At the same time, this discomfort will reduce the tolerance of patients, but also cause certain psychological stress [25-27] to patients and their families. In addition, persistent gastrointestinal pressure causes the decrease or loss of digestive fluid secretion, which may also cause water, electrolyte and acid-base imbalance in patients, which has a little negative effect on postoperative recovery [20]. At the same time, long-term friction and stimulation of ND to the pharynx can cause vocal cord paralysis, edema, inflammation and ulcers in the pharynx and larynx, the patient cannot drink water and it is easy to feel dry oropharyngeal and sore throat [28]. This may be related to the placement of the stomach tube stimulating the throat leads to increased mucus secretion and fear of coughing.

Reports in Cancer and Treatment

Gastric surgery patients do not need routine indwelling gastric tube

Since 2003, our hospital has tried to use selective gastric cancer surgery without gastrointestinal decompression. A retrospective study and discussion of the past 2 years found that there was no preoperative indwelling gastric tube in the perioperative treatment. As per the doctor's advice, except for some patients with special gastric bleeding and intestinal obstruction, the obvious poor visual field during the operation and the side effects of general anesthesia intubation, the catheter was placed again during the operation (Table 1).

Table 1: Analysis of postoperative complications

Patients	Male	Female	Proportion
	74	42	
ND	0	0	0
Tube again	1	1	0.01%
Complication	1	0	0.01%
Pneumonia	0	0	0
Atelectasis	0	0	0
Fever	12	14	0.24%
Nausea	4	4	0.06%
Vomiting	1	2	0.18%
Bloating	2	3	0.04%
Wound dehiscence	0	0	0
Deaths	0	0	0

In our hospital, most of the early gastric cancers do not have these conditions (no cases of anastomotic fistula), it can be ignored, and the rest have no ND. The average postoperative hospital stay is 5-7 days. There is no evident medical record of anastomotic leakage cases and a small amount of abdominal effusion in the abdominal cavity was seen. It was improved after the accurate puncture and drainage using ultrasound sonography. During this period, ND was not used and there was no obvious other case showing significantly earlier first exhaust time (20-40 hours) after the operation (Figure 1).

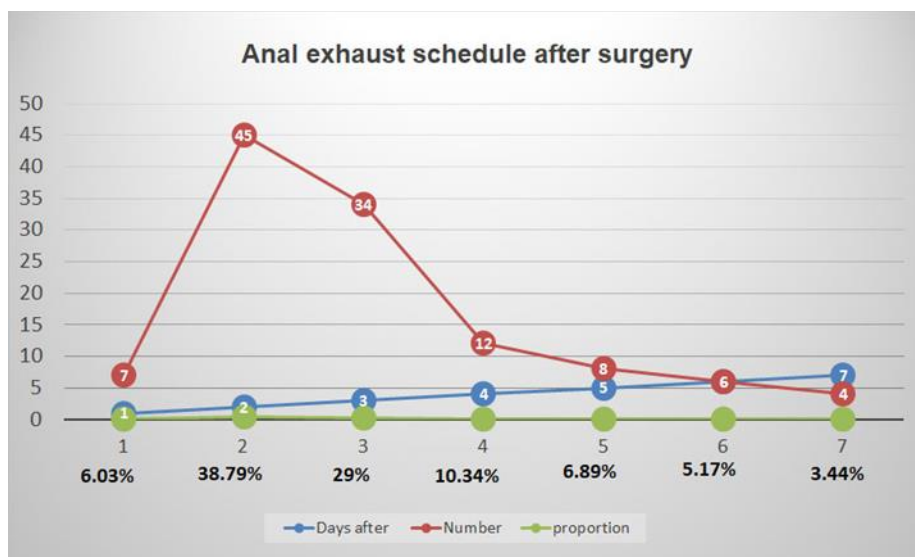


Figure 1: Postoperative anal exhaust time

Reports in Cancer and Treatment

The patients were allowed to drink a little water on the second day after routine operation and a fluid diet on the third day (Figure 2). Most importantly the postoperative patients had no postoperative pain, discomfort, nausea, vomiting and lung infection symptoms, greatly reducing postoperative discomfort, no gastrointestinal decompression to avoid a large amount of digestive juice loss. It avoids postoperative electrolyte and acid-base imbalance [29]. It also improves the recovery of gastrointestinal function. Conventional indwelling gastric tube seems unnecessary, regardless of the scope of resection and the type of digestive tract reconstruction.

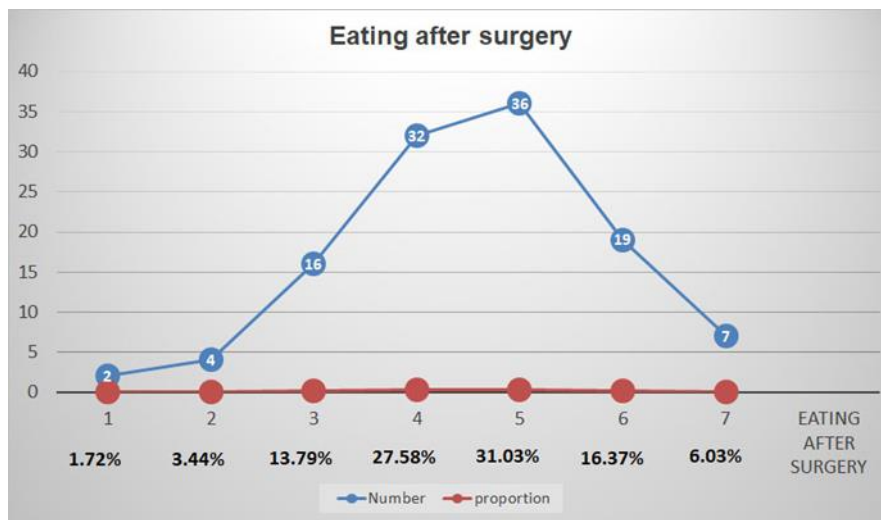


Figure 2 : Postoperative diet

Absence of gastric tube will not affect the first postoperative exhaust time, postoperative hospitalization time, pulmonary complications, anastomotic fistula, total complications and mortality [30].

Some studies [31-33] showed that anal exsufflation and eating time in patients without ND are earlier than those in patients with conventional indwelling ND, which may be related to the inability of patients to get out of bed early. The peristalsis of the stomach and small intestine during fasting is a slow, and it is a powerful, frequent and regular systolic wave when eating. Frequent and regular contraction wave promotes gastrointestinal function recovery. The conclusion also shows that ND cannot shorten the recovery time of intestinal function. Altogether, studies have shown that failure ND does not increase the risk of anastomotic leakage [9, 34, 35]. After analysis it is observed that anastomotic ischemia is the cause for anastomotic leakage. Longitudinal tension is the main cause of ischemia. Therefore, it is a powerful measure to avoid leakage to keep the anastomosis without longitudinal tension during operation. When the chyme passes through the anastomosis, it doesn't affect the anastomotic blood supply. Therefore, it will not increase the occurrence of leakage. It is crucial to understand that surgical techniques should be the best way to prevent anastomotic leakage. Clevers et al [36] reported that ND cannot eliminate intestinal paralysis. It was reported in the literature [37-39] that do not place ND after gastrointestinal surgery, and resume eating as soon as possible. It will not increase the incidence of complications and has no significant impact on the prognosis. Gralla and others reported that [40] ND lung infection after abdominal surgery is 10 times higher than ND. Considering that conventional ND is inappropriate, it can only be used as a treatment for intestinal paralysis and gastric dilatation. Therefore, gastric cancer surgery does not need routine ND which is safe and reliable. It not only simplifies preoperative preparation, but also avoids the unsuitable fear of ND. In recent years, the concept of rapid rehabilitation surgery has been paid even more attention and was successfully applied [26, 41] ND should not be routinely placed if there is no preoperative pyloric obstruction or bleeding before surgery. If it is placed before operation, it can be removed once the patient regains consciousness. Hence, no ND technology is worthy of clinical promotion.

For patients with laparoscopic elective gastric cancer resection, the unconventional use of gastric tube is safe and feasible for patients with gastrectomy [42, 43]. Gastric cancer surgery can be chosen without applying

Reports in Cancer and Treatment

gastrointestinal decompression [44-46] If the special visual field is found to be poor and other measures such as needle puncture and exhaust can then unconventional use of gastric tube can significantly improve postoperative throat discomfort, reduce the total incidence of postoperative discomfort, accelerate the recovery process, improve the quality of life, shorten the average postoperative hospitalization days, reduce medical costs, and be used for reference clinically [47, 48].

Conclusion

To sum up, no ND is the development trend of gastrointestinal surgery in the future. Clinical practice has found that indwelling gastric tube has the advantages of preventing and judging anastomotic leakage and anastomotic bleeding, which may have significant benefits in relieving gastric symptoms. For individual elderly patients, it can also effectively prevent aspiration pneumonia caused by bile reflux. However, indwelling gastric tube cannot effectively reduce and prevent the [49, 50] postoperative complications. At the same time, the phenomenon that indwelling gastric tube is easy to cause discomfort, also affects the functional recovery of patients during perioperative period. By summarizing the research results, this paper proves that all kinds of gastric cancer surgery without ND, has become a routine operation of gastrointestinal surgery. Begin to be watched and recognized by the surgical community, ND will not increase postoperative complications [51]. There are 780000 new gastric cancer patients in the world every year which are in need of surgery, reducing the use of medical consumables such as gastric tubes and nasogastric tubes. Various gastric cancer operations can be safely completed without ND, which greatly reduces the pain of patients, accelerates postoperative recovery, and the workload of medical staff can significantly be reduced [20, 52, 53]. For environmental protection, low carbon, cost reduction and so on, it has a positive role. Therefore, it is suggested that the routine practice of no indwelling gastric tube should be adopted in the later gastrectomy of gastric cancer patients.

Our study found no significant difference in the incidence of systemic routine ND and ND postoperative complications after gastric cancer (Clavien-Dindo classification grade II or higher). This suggests that the feasibility of abandoning gastrointestinal decompression after routine gastric cancer surgery is safe.

Conflicts of Interest: The authors declare no conflict of interest.

REFERENCES

1. Kneuert P J, H A Pitt, K Y Bilimoria, J P Smiley, et al., Risk of morbidity and mortality following hepato-pancreato-biliary surgery. *Journal of Gastrointestinal Surgery* 2012; 16: 1727-35.
2. Okada K i, M Kawai, S Hirono, T Fujii, et al., Evaluation of the efficacy of daikenchuto (TJ-100) for the prevention of paralytic ileus after pancreaticoduodenectomy: A multicenter, double-blind, randomized, placebo-controlled trial. *Surgery* 2016; 159: 1333-41.
3. Sharib J M and E K Nakakura. Randomized Clinical Trial of Nasogastric Tube Placement After Pancreaticoduodenectomy. *JAMA surgery* 2020; 155: e202305-e.
4. Bu J, N Li, X Huang, S He, et al., Feasibility of fast-track surgery in elderly patients with gastric cancer. *Journal of Gastrointestinal Surgery* 2015; 19: 1391-8.
5. Jiang Z, N Li, and J Li. On conception and clinical significance of FTS. *J Chin Mod Surg* 2007; 27: 131-3.
6. Sersar S I and L A Maghrabi. Respiratory-digestive tract fistula: two-center retrospective observational study. *Asian Cardiovascular and Thoracic Annals* 2018; 26: 218-23.
7. Guyton K and J C Alverdy. The gut microbiota and gastrointestinal surgery. *Nature Reviews Gastroenterology & Hepatology* 2017; 14: 43.

Reports in Cancer and Treatment

8. Wang D, T Li, J Yu, Y Hu, H Liu and G Li. Is nasogastric or nasojejunal decompression necessary following gastrectomy for gastric cancer? A systematic review and meta-analysis of randomised controlled trials. *Journal of Gastrointestinal Surgery* 2015; 19: 195-204.
9. Wei Z W, J L Li, Z S Li, Y T Hao, et al., Systematic review of nasogastric or nasojejunal decompression after gastrectomy for gastric cancer. *European Journal of Surgical Oncology (EJSO)* 2014; 40: 1763-70.
10. Lau C and D RD. *Sabiston's Textbook of Surgery*. 17th chapter 56. 2004, Philadelphia, Pa, USA: Elsevier.
11. Montgomery R C, M F Bar-Natan, S E Thomas and W G Cheadle. Postoperative nasogastric decompression: a prospective randomized trial. *Southern medical journal* 1996; 89: 1063-6.
12. Cheadle W G, G C Vitale, C R Mackie and A Cuschieri. Prophylactic postoperative nasogastric decompression. A prospective study of its requirement and the influence of cimetidine in 200 patients. *Annals of surgery* 1985; 202: 361.
13. Kingma B F, E Steenhagen, J P Ruurda and R van Hillegersberg. Nutritional aspects of enhanced recovery after esophagectomy with gastric conduit reconstruction. *Journal of surgical oncology* 2017; 116: 623-9.
14. Rosa F, G Quero, C Fiorillo, M Bissolati, C Cipollari, S Rausei, D Chiari, L Ruspi, G de Manzoni and G Costamagna. Total vs proximal gastrectomy for adenocarcinoma of the upper third of the stomach: a propensity-score-matched analysis of a multicenter western experience (on behalf of the Italian Research Group for Gastric Cancer–GIRCG). *Gastric Cancer* 2018; 21: 845-52.
15. Zhu Z, P Wu, N Du, K Li, B Huang, Z Wang and H Xu. Surgical choice of proximal gastric cancer in China: a retrospective study of a 30-year experience from a single center in China. *Expert Review of Gastroenterology & Hepatology* 2019; 13: 1123-8.
16. Akbaba S, C Kayaalp and M Savkiloglu. Nasogastric decompression after total gastrectomy. *Hepato-gastroenterology* 2004; 51: 1881-5.
17. Gerber A. A N APPRAISAL OF PARALYTIC ILEUS AND THE NECESSITY FOR POSTOPERATIVE GASTROINTESTINAL SUCTION. *Surgery, gynecology & obstetrics* 1963; 117: 294-6.
18. Makama J. Uses and hazards of nasogastric tube in gastrointestinal diseases: An update for clinicians. *Annals of Nigerian Medicine* 2010; 4: 37.
19. Smith, N.L., M. Park, and R. Freebairn. Case report and review: Nasogastric tube complications. *Crit Care Shock* 2012; 15: 36-42.
20. Lee J H, W J Hyung and S H Noh. Comparison of gastric cancer surgery with versus without nasogastric decompression. 2002.
21. An J Y, J H Cheong, W J Hyung and S H Noh. Recent evolution of surgical treatment for gastric cancer in Korea. *Journal of gastric cancer* 2011; 11: 1-6.
22. Xinli Z. Influence of removing gastric tube earlier on postoperative recovery of gastric cancer patients. *Chinese Nursing Research* 2012; 9.
23. Lian D h, Y m Fang and X p Zhang. The effect of early gastrointestinal decompression and enteral nutrition on very low birth weight infants. *Chinese Journal of Nursing* 2005; 40: 652.
24. Tez M. Who does benefit from nasogastric decompression? Patient or Surgeon. *World journal of surgery* 2017; 41: 1399
25. Park J S, J Y Kim, J K Kim and D S Yoon. Should gastric decompression be a routine procedure in patients who undergo pylorus-preserving pancreatoduodenectomy? *World journal of surgery* 2016; 40: 2766-70.

Reports in Cancer and Treatment

26. Yoo C H, B H Son, W K Han and W K Pae. Nasogastric decompression is not necessary in operations for gastric cancer: prospective randomised trial. *European Journal of Surgery* 2002; 168: 379-83.
27. Wu C C, C R Hwang, and T J Liu. There is no need for nasogastric decompression after partial gastrectomy with extensive lymphadenectomy. *The European journal of surgery= Acta chirurgica* 1994; 160: 369-73.
28. del Campo, B V D M Pérez and D S Garrido. Nasogastric tube syndrome: a case report. *Acta Otorrinolaringologica (English Edition)* 2010; 61: 85-6.
29. Mattei P and J L Rombeau. Review of the pathophysiology and management of postoperative ileus. *World Journal of Surgery* 2006; 30: 1382-91.
30. Song J x, X h Tu, B Wang, C Lin, et al., "Fast track" rehabilitation after gastric cancer resection: experience with 80 consecutive cases. *BMC gastroenterology* 2014; 14: 147.
31. Pacelli F, F Rosa, D Marrelli, P Morgagni, et al., Naso-gastric or naso-jejunal decompression after partial distal gastrectomy for gastric cancer. Final results of a multicenter prospective randomized trial. *Gastric cancer* 2014; 17: 725-32.
32. Li C, J W Mei, M Yan, M M Chen, et al., Nasogastric decompression for radical gastrectomy for gastric cancer: a prospective randomized controlled study. *Digestive surgery* 2011; 28: 167-72.
33. Khan N A, S R Choudhury, P S Yadav, R Prakash and J N Patel. Role of nasogastric tube in children undergoing elective distal bowel surgery. *Pediatric surgery international* 2017; 33: 229-34.
34. Doglietto G B, V Papa, A P Tortorelli, M Bossola, M Covino and F Pacelli. Nasojejunal tube placement after total gastrectomy: a multicenter prospective randomized trial. *Archives of surgery* 2004; 139: 1309-13.
35. Clevers G and A Smout. The natural course of postoperative ileus following abdominal surgery. *The Netherlands journal of surgery* 1989; 41: 97-9.
36. Guilbaud T, D J Birnbaum, S Loubière, J Bonnet, et al., Comparison of different feeding regimes after pancreatoduodenectomy-a retrospective cohort analysis. *Nutrition journal* 2017; 16: 42.
37. Gouzi J and B Moran. Nasogastric tubes after elective abdominal surgery is not justified. *Journal de Chirurgie* 1998; 135: 273-4.
38. Desiderio J, S Trastulli, V D'Andrea and A Parisi. Enhanced recovery after surgery for gastric cancer (ERAS-GC): optimizing patient outcome. *Translational Gastroenterology and Hepatology* 2020; 5.
39. Gralla O, F Haas, N Knoll, D Hadzidiakos, et al., Fast-track surgery in laparoscopic radical prostatectomy: basic principles. *World journal of urology* 2007; 25: 185-91.
40. Gaignard E, D Bergeat, L Courtin-Tanguy, M Rayar, et al., Is systematic nasogastric decompression after pancreaticoduodenectomy really necessary? *Langenbeck's Archives of Surgery* 2018; 403: 573-80.
41. Cao L X, Z Q Chen, Z Jiang, Q C Chen, et al., Rapid rehabilitation technique with integrated traditional Chinese and Western medicine promotes postoperative gastrointestinal function recovery. *World Journal of Gastroenterology* 2020; 26: 3271.
42. Ran C and G Gong. Clinical Application and Research Progress of Accelerated Rehabilitation Surgery in Perioperative Period of Advanced Gastric Cancer in the Elderly. *International Journal of Clinical Medicine* 2020; 11: 101.
43. Wei X, Y Zhang, Y Jiang and X Wang. Effect of Rapid Rehabilitation Nursing on Postoperative Stress and Rehabilitation of Patients with Gastric Cancer. *Investigación Clínica* 2020; 61: 1591-600.

Reports in Cancer and Treatment

44. Hahl T, P Peromaa-Haavisto, P Tarkiainen, O Knutar and M Victorzon. Outcome of laparoscopic gastric bypass (LRYGB) with a program for enhanced recovery after surgery (ERAS). *Obesity Surgery* 2016; 26: 505-11.
45. Park J S, J Y Kim, J K Kim and D S Yoon. Should gastric decompression be a routine procedure in patients who undergo pylorus-preserving Pancreatoduodenectomy?: reply. *World Journal of Surgery* 2017; 41: 1400-.
46. Tsao J I, R L Rossi and J A Lowell. Pylorus-preserving pancreatoduodenectomy: Is it an adequate cancer operation? *Archives of Surgery* 1994; 129: 405-12.
47. Kleive D, M A Sahakyan, K J Labori and K Lassen. Nasogastric tube on demand is rarely necessary after Pancreatoduodenectomy within an enhanced recovery pathway. *World journal of surgery* 2019; 43: 2616-22.
48. Bruna Esteban M, P Vorwald, S Ortega Lucea and J Ramirez Rodriguez. Grupo de Trabajo de Cirugía Esofagogástrica del Grupo Español de Rehabilitación Multimodal (GERM). Enhanced recovery after surgery in gastric resections. *Cir Esp* 2017; 95: 73-82.
49. Vorwald P, M B Esteban, S O Lucea, J M R Rodríguez, et al., Grupo Español de Rehabilitación Multimodal. Rehabilitación multimodal en la cirugía resectiva del esófago. *Cirugía Española* 2018; 96: 401-9.
50. Verma R and R L Nelson. Prophylactic nasogastric decompression after abdominal surgery. *Cochrane database of systematic reviews* 2007; 3.
51. Nelson R, B Tse and S Edwards. Systematic review of prophylactic nasogastric decompression after abdominal operations. *British Journal of Surgery* 2005; 92: 673-80.
52. Rawla P and A Barsouk. Epidemiology of gastric cancer: global trends, risk factors and prevention. *Przegląd gastroenterologiczny* 2019; 14: 26.
53. Han Yu, Qu Xinglong, and Fu Hong. The safety and significance of gastric cancer surgery without gastrointestinal decompression. *World Chinese Journal of Digestion* 2014; 22: 4075-80.