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Clinical Pathway for Laparoscopic Gastric Bypass

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Abstract
Background Patients undergoing bariatric surgery are ideal candidates for a clinical pathway, as it is a standardized, common, and elective procedure and most patients have a predictable clinical course.
Objective The aim of developing this clinical pathway is the result of a wide consolidated experience with patients undergoing laparoscopic Roux-en-Y gastric bypass, the purpose of which is to minimize complications without affecting patient care or the outcome of the procedure.
Patients and Method The clinical pathway was applied to the 311 patients that received a laparoscopic Roux-en-Y gastric bypass. The clinical pathway includes a temporary matrix, which shows the sequence of events that will occur on each of the days between patient admission and discharge. It also includes medical interventions, nursing care, medication, determinations, physical activity, diet, and information for the patient.
Results Complications occurred in 36 patients (11.5%): 14 patients (4.5%) during admission and 22 patients (7%) after discharge. Of the 22 patients presenting with complications after discharge, 12 required readmission to hospital (3.8%), and the other 10 were treated on an ambulatory basis.
Conclusions We can say that, because of its frequency and predictability, laparoscopic Roux-en-Y gastric bypass is nowadays a procedure for systematization using a clinical pathway, providing it is controlled by a team with a wide experience in bariatric surgery. This clinical pathway is to offer our patients with morbid obesity a laparoscopic Roux-en-Y gastric bypass with the smallest possible range of complications.

Keywords Clinical pathway · Bariatric surgery · Outcomes

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Introduction

Clinical pathways are healthcare plans designed to standardize and improve patient care by minimizing delays and the use of unnecessary resources, but without compromising outcomes.

The first clinical pathway was developed by nursing [1] as a plan of healthcare and improved patient attention, but it has evolved and been implemented in all fields of medicine. Currently, there are clinical pathways developed for practically all surgical procedures.

Patients undergoing bariatric surgery are ideal candidates for a clinical pathway, as it is a standardized, common, and elective procedure and most patients have a predictable clinical course.

The aim of developing this clinical pathway is the result of a wide consolidated experience with patients undergoing laparoscopic Roux-en-Y gastric bypass; the purpose of which is to minimize complications without affecting patient care or the outcome of the procedure.

Patients and Method

The clinical pathway for laparoscopic Roux-en-Y gastric bypass was implemented in our hospital in 2004.

Table 1 Clinical pathway for laparoscopic gastric bypass for morbid obesity

Activities	Day −1. Admission to room	Day 0. Operation	Day 0. Reanimation	Day 1 Room	Day 2–3 Discharge
Medical intervention		Surgical procedure	Medical visit	Surgery visit Nutrition visit	Medical visit Assess evolution and wounds Discharge
Nursing care	Admission to room	Check shaving, venous pathways and cross tests	Monitor vital signs and drainage if fitted	Remove catheter	Review wounds
	Check clinical history and preoperative study	Administer antibiotic prophylaxis	Monitor central venous pressure	Remove compression stockings for walking	Remove drainage (<50 cc)
	Informed consent	Fit intermittent pneumatic compression stockings and catheter	Intermittent pneumatic compression stockings	Reduce serum therapy to half	Remove central PIV
	Pre-anesthesia report			Review drainage amount and appearance	Discontinue analgesia y administer only if necessary
	Check vital signs			Review wounds	
	Shave and wash abdomen and folds			Get patient to rise	
Medication	Previous patient medication	Antibiotic prophylaxis (amoxicillin–clavulanic 2 g i.v.) (If allergic: clindamycin 600 mg i.v. and gentamycin 160 mg i.v.)	Serum therapy	Serum therapy to maintain PIV	Heparin 40 mg sc/24 h
	Lorazepam 1 tablet at 23 h	Anaesthetic drugs	Perfusion analgesia (Metamizole 3 amp in 500 ml at 21 ml/h If more analgesia needed or allergic (paracetamol i.v. or tramadol i.v.)	Perfusion analgesia	Omeprazol 1 cap/24 h
	Heparin 40 mg sc at 21 h		Heparin 40 mg sc/24 h		Oral analgesia oral in capsules if necessary
	Ranitidine 1 amp i.v. 30 min before operation				Previous oral medication for Hypertension and diabetes
	Methoclopramide 1 amp i.v. 30 min before operation				
Determinations	Hemogram, biochemistry and coagulation		Hemogram and ions	Hemogram, ions and coagulation	
	Cross tests		Chest X-ray		
	ECG				
	Chest X-ray				
Activity	Usual		Move in bed and move legs	Get up, walk	Walk
	Personal toilet/shower		Respiratory physiotherapy	Respiratory physiotherapy Toilet/shower	Respiratory physiotherapy Shower/toilet
Diet	Liquid diet until 00:00 hrs Absolute diet after 00:00	Absolute diet	Absolute diet	Liquids Water, infusions	Liquids Water, infusions, soups
Information	Present and give out manual	To relatives on leaving operating theatre	At 19 h in reanimation	To relatives Hand out diet manual	Discharge information Diet information

Table 2 Indicators of outcome

Indicators
Hospital stay
Overall rate of complications before 30 days
Percentage of reoperations before 30 days
Percentage of patient readmission before 30 days
Rate of complications treated on an ambulatory basis

The pathway included all patients meeting the criteria established by the National Health Insurance in 1991 for the surgical treatment of patients with morbid obesity [2].

The clinical pathway includes a temporary matrix (Table 1) that shows the sequence of events that will occur on each of the days between patient admission and discharge. It also includes medical interventions, nursing care, medication, determinations, physical activity, diet, and information for the patient.

The criteria for hospital discharge are the following: clinically stable patient, stable hematocrit, bowel movements, and oral intake tolerance. Most importantly, patients were give preoperative education and preparation for discharge, including the following recommendations for the patient's control:

- If the patient during the first week developed abdominal pain or fever, he will be admitted to the hospital to perform computed tomography (CT) scan with oral contrast to rule out leakage of gastrojejunostomy or intraabdominal or wound collection.
- If the patient developed oral intolerance with nausea and vomiting, he again will be admitted to perform an endoscopy to rule out stricture of gastroentero anatomosis.
- If the patient have any other symptom, he is instructed to phone to the unit for a consultation. In any other situation, the patient will come directly to the unit.

During the first consultation in the outpatient clinic, the patients are asked about any symptom and if they need to consult to other hospital.

This pathway shows the most habitual evolution of this pathology but does not substitute the doctor's clinical judgement, as the doctor has to adapt the recommendations to the each particular patient.

With a step-by-step review of the process between the moment the patient is admitted and the time of discharge, we have defined the following indicators of outcome (Table 2).

Results

Between January 2004 and March 2007, 311 patients received a laparoscopic Roux-en-Y gastric bypass. The clinical pathway was applied to all of them. Mean age was 41.3±11.9 years (16–69) and mean body mass index was 47.4±6.2 (35–74). The ratio of men to women was 1:3. There were no conversions to open surgery.

Complications occurred in 36 patients (11.5%): 14 patients (4.5%) during admission and 22 patients (7%) after discharge (Table 3).

Of the 14 patients presenting with complications in the immediate postoperative period, 2 had to undergo reoperation: one for intraabdominal hemorrhage secondary to bleeding of the trocar (first day postoperatively [p.o.]) and one for dehiscence of the gastrojejunoanastomosis (sixth day p.o.), which was resolved via laparoscopy.

Four of the five patients with upper gastrointestinal bleeding required endoscopic sclerosis and blood transfusion because of bleeding in the gastrojejunoanastomosis. There were also two patients with lower gastrointestinal bleeding, one of whom needed blood transfusion.

Five cases revealed intraabdominal bleeding through the drainage, of which two had transfusion.

One patient died (0.3%) of a nosocomial sepsis of respiratory origin.

The mean length of hospital stay was 2.48±1.9 days (1–25).

Of the 22 patients presenting with complications after discharge, 12 required readmission to hospital (3.8%), and the other 10 were treated on an ambulatory basis (Table 3).

Two of the readmitted patients required reoperation via laparoscopy: one for dehiscence of the gastrojejunoanastomosis, which occurred on postoperative day 22 and one for intense abdominal pain on postoperative day 4, with no etiology found.

Another two patients had gastrointestinal bleeding: one upper, which was treated with endoscopic sclerosis, and one lower, which was treated expectantly. Low molecular weight heparin prophylaxis was discontinued in both, and they were given transfusion of two units of red blood cell concentrate.

Five patients were readmitted with respiratory problems: two with clinical symptoms and a diagnosis of pulmonary thromboembolism, which evolved satisfactorily; two with a diagnosis of pneumonia, which was resolved with antibiotic treatment; and one patient who had a pulmonary atelectasis.

There were two cases of abdominal pain and pancreatic reaction, which diminished with intestinal rest and serum therapy and were asymptomatic on discharge, with normal pancreatic enzymes, ultrasound and abdominal CT. Another patient was readmitted with a gastrojejunoanastomosis leak, diagnosed by CT with gastrograffin, which evolved favorably with radiological drainage, intestinal rest, and antibiotic therapy.

Ten patients (3.2%) were treated on an ambulatory basis. Six patients had drainage of a collection at the trocar wound in the left hypochondrium (five abscesses and one hematoma), and four patients had endoscopic dilatation because of stenosis of the gastrojejunostomy with no need for readmission.

Table 3 Complications

During admission (4.5%)		Complications on discharge (7%)			
		Readmission (3.8%)		Ambulatory (3.2%)	
Upper gastrointestinal bleeding	5	Dehiscence of the anastomosis	2	Wound problems	6
Lower gastrointestinal bleeding	2	Abdominal pain	1	Endoscopic dilatation	4
Intraabdominal hemorrhage	5	Pulmonary thromboembolism	2		
Dehiscence of the anastomosis	1	Pneumonia	2		
Nosocomial sepsis[a]	1	Pulmonary atelectasis	1		
		Pancreatic reaction	2		
		Upper gastrointestinal bleeding	1		
		Lower gastrointestinal bleeding	1		

[a] Died

Discussion

Clinical pathways should be designed using a combination of medical daily work experience and existing scientific evidence [3]. The aim of developing a clinical pathway is to improve the standards of quality of a surgical procedure such as bariatric surgery, reduce the length of hospital stay with the lowest number of complications, and improve coordination between professionals.

Nowadays, because of the great epidemic of the twenty-first century, i.e., morbid obesity, bariatric surgery has become one of the most common surgical procedures in clinical practice. Laparoscopic Roux-en-Y gastric bypass is considered the gold standard based on weight loss outcomes of 70% at 7–10 years, improved life expectancy, resolution of associated chronic illnesses, improved life quality, and reduction in the risk of cancer [4–7].

Different authors have reported on the evolution of laparoscopic gastric bypass over the years in terms of progress in laparoscopy, operating equipment and techniques, type of gastrojejunostomy, length of hospital stay, need for nasogastric tube (SNG), etc. [8–11].

There are studies [7, 12, 13] that justify the efficiency of this clinical pathway in terms of hospital stay, costs, and patient satisfaction, although most of these studies have been published in the USA, which has a different health system and different type of patients and eating habits, which is why the results should not perhaps be extrapolated to our own health system. The important thing is to standardize a procedure that can be reproduced by the majority of surgeons.

The aim of this clinical pathway is to offer our patients with morbid obesity a laparoscopic Roux-en-Y gastric bypass with the smallest possible range of complications. The results of a team devoted to this form of surgery for years suggest that the range of complications and side effects can be reduced to a minimum with the use of preoperative medication and specific postoperative care.

In conclusion, we can say that, because of its frequency and predictability, laparoscopic Roux-en-Y gastric bypass is nowadays a procedure for systematization using a clinical pathway, providing it is controlled by a team with a wide experience in bariatric surgery.

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