

Selective versus Routine use of Nasogastric Tube Following Abdominal Surgery

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Abstract

Background: Routine use of nasogastric tubes, after abdominal operations, is intended to hasten the return of bowel function, prevent pulmonary complications, diminish the risk of anastomotic leakage, increase patient comfort and shorten hospital stay.

Objectives: To investigate the efficacy of routine nasogastric decompression after abdominal surgery, in achieving each of the above goals.

Patients and methods: Two hundred and twelve patients having abdominal operations of any type, emergency and elective have been reviewed prospectively over a period of three years (December 2004_December 2007) in Baghdad teaching hospital, they were randomized to receive a nasogastric tube and keep it in place until intestinal function have been returned, and those receiving no tube or immediately removed following operation. Excluded from the study, were laparoscopic surgeries , gastric and duodenal surgeries.

Results: 1- Earlier return of bowel function and shorter hospital stay in the non tube group.

2-No significant statistical differences concerning the occurrence of postoperative vomiting, pulmonary complications, and anastamotic leakage.

3-There was significant discomfort in the tube group.

Conclusions:Routine nasogastric decompression does not accomplish any of its intended goals and so should be abandoned in favor of selective use of nasogastric tube.

Key word: Nasogastric tube, Nasogastric decompression

Introduction

Routines in surgery have evolved as a way of eliminating as many variables as possible in effecting safe outcomes. One such routine, practiced in the last 50 years has been post operative nasogastric decompression [1].

After celiotomy, ileus occurs after almost every intra-abdominal operation and is characterized by lack of coordinated propulsive gastrointestinal contractions. This is likely to be

caused by the disappearance of cyclic interdigestive myoelectric complexes (IMC) that originate in the stomach and move distally through the small intestine to end in the ileum. These complexes have been hypothesized to serve a "housekeeper" function; that is, to sweep the bowel clean of debris, gas and non digestible solids. When such complexes are abolished, secretions, gas and debris accumulate within the bowel lumen; the bowel distends, and passage of stool and flatus cease [1].

After celiotomy, coordinated small bowel contractile activity returns rapidly within hours, followed by the return of gastric propulsive after 24 hours. Coordinated colonic motility returns after two to four days. The magnitude of small bowel secretory output immediately following surgery however is, unknown. Also, after operation, salivary and gastric secretions are minimal, and without such secretory stimuli, pancreatic and biliary secretions are diminished. It has been thought that secretions and gas accumulating as a result of post operative ileus distend the bowel and these could be removed or reduced by the use of an indwelling nasogastric tube [1].

Since the introduction of nasogastric tube by *Levin* in 1921, its use has remained relatively unchallenged. In 1926, *McIver* demonstrated that post operative distension is a result of swallowed air and could be prevented by the nasogastric tube [2].

In 1930, *Wangensteen*, popularized the use of nasogastric tube after gastric as well as other forms of intra abdominal operations[3]. This dictum remained essentially unchallenged until 1963, when *Cerber* stated that routine use of nasogastric tube for decompression after surgery was not only unnecessary, but also was accompanied by complications specifically related to its use[4].

Levin, described the single lumen nasogastric tube at a time when little was understood about peri operative fluid and electrolyte management, and nausea and vomiting, were a prominent side effects of general anesthesia [5,6].

The concept of prophylactic decompression, following laparotomy, therefore was popularized by *Wangensteen*, with its description of continuous aspiration with a nasogastricduodenal tube. *Cerber* was the first to describe a large series of patients without routine nasogastric decompression in 1958 [7].

Prophylactic nasogastric intubation after abdominal surgery until gastrointestinal function return is a routine post operative procedures. For many years, surgeons believe that intestinal decompression via a nasogastric tube is mandatory following abdominal surgeries. This has been largely, based on the concept that the post operative ileus which develop after most abdominal operations cause distension of the small and large bowel. It has been hypothesized that this

distension is related to an increased incidence of complications as anastomotic leakage, repeated vomiting, pulmonary complications and prolonged hospital stay [8].

Ileus is a normal physiologic response to operative trauma, and frequently persists for 48-72 hours. Although, the nasogastric tube may remove the saliva and gastric content, as well as swallowed air, it certainly has minimal effect on the removal of some 4-5 liters per day of intestinal secretions, pancreatic secretions and bile. These secretions obviously are partially absorbed by the gastrointestinal tract [9].

The routine use of nasogastric tube, after abdominal operations was intended to achieve the following goals; [10]

- 1) Hasten the return of bowel function.
- 2) Prevent pulmonary complications by avoiding vomiting which cause aspiration pneumonia. It should also prevent atelectasis and fever.
- 3) Diminish the risk of anastomotic leak.
- 4) Increase patient's comfort by avoiding abdominal distensions and vomiting.
- 5) Shorten hospital stay.
- 6) Decrease the incidence of wound infection and ventral hernia.

Many studies have suggested that routine nasogastric decompression is unnecessary following abdominal surgeries and may, even be associated with an increased incidence of complications as;[9,11]

- 1) Slowing recovery from postoperative ileus.
- 2) Increase patients discomfort, by introducing and feeling a tube in his nasopharynx.
- 3) Local complications related to nasogastric tube insertion as making wounds in the mucosa of the nose and nasopharynx with bleeding.
- 4) Increase incidence of gastro esophageal reflux by disturbing the function of the gastro esophageal junction caused by the presence of the tube inside this junction.
- 5) Increase the incidence of pulmonary complications by increasing the incidence of aspiration.

The current study was undertaken to answer three questions.

- 1) Was the tube beneficial in a large enough percent of cases to justify its routine use?
- 2) Were there any postoperative complications that were eliminated by the routine use of nasogastric tube?
- 3) Were there any significant complications directly related to the nasogastric tube?

Aim of the study

To investigate the efficacy of the nasogastric tube in:

- 1) Hastening the return of bowel function, preventing vomiting, ileus, and leakage from repaired site of bowel and pulmonary complications.
- 2) Achieving patient's comfort, and shortening hospitalization.

Patients and Methods

Two hundred and twelve patients who undergone elective or emergency laparotomies had been reviewed prospectively over a period of three years (December 2004-December2007) in the surgical ward in Baghdad teaching hospital, reviewed for determining the need for prophylactic nasogastric decompression following laparotomy, again, elective or emergency laparotomy.

The patients were randomized into two groups each is 106 patients.

Group 1, had a nasogastric tube introduced routinely and maintained till;

- 1) The bowel function return back to normal (Positive bowel sound on auscultation) or;
- 2) The patient passed flatus, or;
- 3) For fixed time, depending on the type of operation (e.g. bowel surgeries).

These variations in the timing of removal of nasogastric tube largely depending upon the surgeon's policy in managing patients with different surgeries.

Group 2: Include patients who had no nasogastric tube or removed immediately following the operation.

Excluded from the study, the following surgeries:

Surgeries that are achieved laparoscopically

The nasogastric tube may need to be re-introduced in group 1, following its removal.

- 1) Gastric surgeries.
- 2) Duodenal surgeries.
- 3) Pancreatic surgeries.
- 4) Surgeries for conditions which have nasogastric decompressions as part of the management as:
 - a) Surgeries for perforated duodenal ulcer.

b) Surgeries for intestinal obstruction of any cause.

5- While in group 2, it is introduced when the patient develops:

- 1) Acute gastric dilatation, on abdominal examination prior to the development of vomiting, or when the patient develops vomiting which is projectile and of large volume even once.
- 2) Paralytic ileus (prolonged post operative ileus beyond 72 hours).
- 3) Repeated vomiting, more than three times and of moderately large amount, over short period, with or without associated ileus.

Different types of surgeries included in the study, both elective and emergency.

Total number of patients undergone elective surgeries is 60. (Table 1)

Total number of patients undergone emergency surgeries is 152. (Table 2 and 3)

Emergency surgeries are subdivided into two types;

One type, include emergency surgeries for acute abdomen cases not due to trauma, that are operated on through midline or Para median incision.

The other types of emergency surgeries include those done for acute abdomen cases due to trauma, penetrating or blunt.

The two groups are tested for

- 1) Timing of return of bowel function.
- 2) The development ileus.
- 3) The development of repeated vomiting.
- 4) The development of chest infection.
- 5) Duration of hospital stay.
- 6) Development of leakage from an anastamotic site or, site of repaired bowel perforation.

Forma of work

Name of the patient

Sex

Age of the patient

Date of admission

Date of discharge

Type of surgery

Elective

Emergency

Due to trauma

Not due trauma

Type of anesthesia

Always GA

Type of trauma

Blunt

Penetrating

Intraoperative injury details

Nasogastric tube placed

Nasogastric tube not placed

Return of bowel function

First 24 hours

Second 24 hours

Third 24 hours

Development of ileus

Development of repeated vomiting

Development of chest infection

Reinsertion of nasogastric tube in the tube group

Selective insertion of nasogastric tube in the non tube group

Development of leakage from the site of anastomosis

Results

With regard to the variables studied for our patients sample who undergone elective operations;

26/30 patients(86.7%),in group 1 developed return of bowel function in the first 24 hours **(Table 4)** , while 27\30 patients (90%), in group 2 developed return of bowel function in the first 24 hours.

(Table 5)

No patient in both groups developed ileus, repeated vomiting or chest infection.**(Table 6)**

No patient in group 2 needed the nasogastric tube to be inserted. **(Table 6)**

No patient in both groups developed leakage from the site of repaired bowel or site of anastomosis. **(Table 6)**

The average hospitalization for patients in group 1 was 3.5 days, while it was 2.9 days for patients in group 2.

With regard to variables studied for our patients sample who undergone emergency operations;

33\76 (43.4%) of patients in group 1 developed return of bowel function in the first 24 hours **(Table 7)** , while 39\76 (51.3%) , of patients in group 2 developed return of bowel function in the first 24 hours .**(Table 8)**

2\76 (2.63%), of patients in group 1 developed ileus **(Table 7)**, while 3\76 (3.94%), of patients in group 2 developed ileus. **(Table8)** 2\76 (2.36%), of patients in group 1 developed repeated vomiting, while 3\76 (3.94%), of patients in group 2 developed repeated vomiting. **(Table 9)**

3\76 (3.94%), of patients in group 1 developed chest infection, while 2\76 (2.63%), of patients in group 2 developed chest infection in group 2. **(Table 9)**

6\76 (7.9%), of patients in group 2, needed the nasogastric tube to be inserted selectively for ileus or repeated vomiting. (Table 9).

While 2\76 (2.7%) of patients in group 2 needed the nasogastric tube to be reinserted for repeated vomiting following its removal. **(Table9)**

No patient in both groups developed leakage from the site of repaired bowel or site of anastomosis. **(Table 9)**

Table (1):Types of elective surgeries included in the study

Type of operation	With nasogastric decompression	Without nasogastric decompression	Total
Closure colostomy	12	13	25
Splenectomy	2	1	3
Open cholecystectomy	6	5	11
Closure ileostomy	1	2	3
Oophorectomy	2	2	4

Incisional hernia	3	3	6
Para umbilical hernia	2	2	4
Liver hydatid	2	2	4
Total	30	30	60

The average hospitalization for patients in group 1 was 4.6 days, while it was 3.8 days for patients in group 2.

101 patients out of 106 developed discomfort from the presence of the nasogastric tube.

Table (2):Types of emergency surgeries for acute e abdomen cases not due to trauma

Type of operation	With nasogastric decompression	Without nasogastric decompression	Total
Perforated appendix	5	6	11
Purulent peritonitis due to primary peritonitis or secondary to other causes as pelvic inflammatory disease	1	1	2
Twisted ovarian cyst or ruptured ovarian cyst	3	2	5
Perforated typhoid ulcer	1	1	2
Appendicular abscess	1	1	2
Total	11	11	22

Table (3):Types of injuries encountered during laparotomies for penetrating or blunt trauma

Type of injury	With nasogastric decompression	Without nasogastric decompression	Total
Injuries to the liver, spleen, kidney, each alone or together with or without diaphragmatic injury.	14	14	28
Injuries to the small bowel alone.	17	17	34

Injuries to the large bowel alone	11	11	22
Injuries to both small & large bowel	8	7	15
Multiple associated injures	8	8	16

Variable studied	WITH NASOGASTRIC DECOMPRESSION	WITHOUT NASOGASTRIC DECOMPRESSION	P-Value
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Negative laparotomies	7	8	15
Total	65	65	130

Table (4):Timing of return of bowel function Elective surgeries with nasogastric decompression

First postoperative 24 hours	Second postoperative 24 hours	Third postoperative 24 hours	Total number of patients
26	4	0	30

Table(5):Timing of return of bowel function Elective surgeries without nasogastric decompression

	NUBER	PERCENT	NUBER	PERCENT	
RETURN OF BOWEL FUNCTION IN THE FIRST 24 HOURS	26	86.7	27	90	1
DEVELOPMENT OF ILEUS	0	0	0	0	
DEVELOPMENT OF REPEATED VOMITING	0	0	0	0	
DEVELOPMENT OF CHEST INFECTION	0	0	0	0	
THE NEED FOR INSERTION OF NASOGASTRIC TUBE	0	0	0	0	
DEVELOPMENT OF LEAK FROM THE SITE OF REPAIRED BOWEL OR SITE OF ANASTAMOSIS	0	0	0	0	

Table (6): Selective versus routine use of nasogastric tube in elective surgeries

First postoperative 24 hours	Second postoperative 24 hours	Third postoperative 24 hours	Total number of patients
27	3	0	30

Table (7): Timing of return of bowel function Emergency surgeries with nasogastric decompression

First postoperative 24 hours	Second postoperative 24 hours	Third postoperative 24 hours	Ileus	Total number of patients
33	38	3	2	76

Table (8):Timing of return of bowel function Emergency surgeries with out nasogastric decompression

First postoperative 24 hours	Second postoperative 24 hours	Third postoperative 24 hours	ileus	Total number of patients
39	32	2	3	76

Table (9):Selective versus routine use of nasogastric tube in emergency surgeries

Variable studied	WITH NASOGASTRIC DECOMPRESSION		WITH OUT NASOGASTRIC DECOMPRESSION		P- Value
	NUBER	PERCENT	NUBER	PERCENT	
RETURN OF BOWEL FUNCTION IN THE FIRST 24 HOURS	33	43.4	39	51.3	0.41
DEVELOPMENT OF ILEUS	2	2.63	3	3.94	1
DEVELOPMENT OF REPEATED VOMITING	2	2.63	3	3.94	1
DEVELOPMENT OF CHEST INFECTION	3	3.94	2	2.63	1
THE NEED FOR INSERTING NASOGASTRIC TUBE	2	2.7	6	7.9	1
THE DEVELOPEMENT OF LEAKAGE FROM THE SITE OF REPAIRED BOWEL OR SITE OF ANASTOMOSIS	0	0	0	0	

Discussion

In this prospective review of 212 patients who were undergone abdominal surgery for elective or emergency causes, half of them managed by routine postoperative nasogastric decompression and the other half managed with selective nasogastric tube insertion.

With respect to the timing of return of bowel function:

90% of patient in the non tube group and 86.7% in the tube group of patients who underwent elective surgery; and 51.3% in the non tube group and 43.4% of patients in the tube group, of patients underwent emergency surgery developed return of bowel function in the first 24 hours There was earlier return of bowel function in the non tube group.

these results are in accordance with those of Koukouras D, Mastronikolis, and those of Pearl ML, Valea FA, and Fischer M. who found earlier return of bowel function following abdominal surgery.[12 ,13]

In respect to the development of ileus, repeated vomiting & development of chest infection;

For patients who underwent elective surgeries, no patients of the two groups developed any of the above complications.

For patients who underwent emergency surgeries:

2.63% of patients in the tube group and 3.94% of patients in the non tube group developed ileus.

2.63% of patients in the tube group & 3.94% of patients in non tube group developed repeated vomiting.

3.94% of patients in tube group and 2.63% of patients in the non tube group developed chest infection

These results are concedes with that of Michowitz M, Chen J, Waiz bard E.

[14] , those of Yoo CH, Son BH & Hanwk.[15] ,those of Nelson R, Edward S.[16],and those of Diniz MT, Campos IC&Fernands VA.[17]who found no significant differences in the incidence of postoperative vomiting, chest infection and ileus between the tube and the non tube group.

With respect to the need for selective insertion of nasogastric tube in the non tube group;

No patient in the non tube group for patients have had elective surgeries, needed its insertion. This zero% not mentioned in the theses.

For patients who have had emergency surgeries, 7.9% need the selective insertion of the nasogastric tube for repeated vomiting or ileus .This result is slightly less than that of Dinsmore JE & Johnson DD who found that 10% of patients in the non tube group needed the selective insertion of nasogastric

tube [18]; and in agreement with that of JOELJ. BAULER, M.D & IRWIN who found that 6% needed the selective insertion of the nasogastric tube[9].

With respect to the need for reinsertion of nasogastric tube following its removal in the tube group;

For patients underwent elective surgeries, no patients needed its re insertion.

For patients underwent emergency surgeries, 2.6% needed its re insertion.

In comparison Macrae Hm, Fischer JD, found that 2% of those who are managed routinely by nasogastric tube needed reinsertion of it following removal[19].

With respect to the duration of hospital stay;

In elective procedure, the average was 3.5days for the tube group while it was 2.9days for the non tube group.

For emergency surgeries, the average hospital stay was 4.6 days for the tube group while it was 3.8 days for the non tube group.

These results are in accord with that of Cunningham J, Temple WJ&Cungevin Jm who found significant shorter hospital stay in the non tube group [20].

With respect to the development of leakage from site of repaired bowel or site of anastomosis;

No patient in both groups whether those undergone elective or emergency surgery developed leakage from a site of repaired bowel or a site of anastomosis.

These results are in accord with that of Cunningham J, Temple WJ&Cungevin Jm who found significant shorter hospital stay in the non tube group [20].

With respect to the discomfort caused by the nasogastric tube;

95.28% of patients developed discomfort due to the presence of the nasogastric tube in place.

Conclusion

Although, abdominal distension and vomiting are slightly increased without nasogastric decompression, selective nasogastric tube insertion is required only in 7-8% of patients undergoing abdominal surgery.

Through the use of selective nasogastric decompression after abdominal surgeries, at least 22-23 patients out of 25 patients can be spared the discomfort of a nasogastric tube.

Routine nasogastric decompression does not accomplish any of its intended goals and so should be abandoned in favor of selective use of the nasogastric tube.

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