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Time of Jejunostomy after Upper Gastrointestinal and Respiratory Tract Cancers would be Affecting on Complications of Jejunostomy

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The aim of study was to estimate factors affecting the complications of jejunostomy procedure and suggest a new program for reducing complications of this procedure. Jejunostomy is a common route for enteral nutrition in patients with upper respiratory or gastrointestinal surgery. In a prospective study, patients with gastrointestinal or upper respiratory tract malignancies underwent jejunostomy procedures in Amir-Alam Hospital for a 3 years period. The patients divided in two groups and the outcome and complication rates compared if jejunostomy do at the same session or some days after the main surgery. Ninety cases (41 men; mean age: 55 years; range: 10-90 years) were studied. Twenty seven patients (30%) did not complain any side effects during enteral nutrition in either co-operative or postoperative groups. Adverse effects of post-operative jejunostomy nutrition were registered in 13/53 patients (24%) vs. 12/37 patients (32%) in co-operative jejunostomy group. Significantly higher incidence of abdominal distention and fever was observed in patients who underwent co-operative jejunostomy ($p = 0.005$ and $p = 0.001$, respectively). No significant differences in other complications were observed between the two groups. Jejunostomy few days after the main surgical procedure shows lower adverse effects and because of its well toleration in upper gastrointestinal and respiratory tract cancer patients recommend for enteral nutrition in these situations.

Key words: Jejunostomy, surgery, complications, enteral nutrition

INTRODUCTION

The first to accomplish a jejunostomy for nutritional purposes was Bush in 1958 in a patient with nonoperable gastric cancer (Gerndt and Orringer, 1994; Han-Geurts *et al.*, 2005; Curtis and Kudsk, 2007). Postoperative enteral nutrition has gained considerable popularity due to a low complication rate, favorable effects on the digestive tract and its cost-effectiveness compared to parenteral feeding. Many access routes for enteral feeding purpose have been described, of which the feeding jejunostomy tube is most often advised (Tapia *et al.*, 1999). Jejunostomy is a surgical procedure by which a tube is situated in the lumen of the proximal jejunum, primary to administer nutrition or sometimes medications and on rare occasion to aspirate intestinal contents.

If possible, the enteral route is preferred over the parenteral route; but surgeons often prefer postoperative parenteral nutrition because of adverse effects of enteral nutrition such as diarrhea, bloating, increased risk of anastomotic leakage or other complications related to enteral nutrition. Construction of a feeding jejunostomy is a method that is widely used for enteral nutrition in patients with functionally intact gut. Several different surgical techniques and tube types are presently used and despite its technical simplicity, serious complications associated with the feeding tube have been reported by Tapia *et al.* (1999), Date *et al.* (2004), Han-Geurts *et al.* (2005) and Biffi *et al.* (2000). In this study for the first time in Iran, the results of jejunostomy were reported, factors affecting the complications of the procedure were estimated and a new program for reducing complications of this procedure was suggested.

MATERIALS AND METHODS

Between April 2004 and September 2007, 90 consecutive patients with gastrointestinal or upper respiratory tract malignancies underwent elective Stamm jejunostomy performed by two dedicated surgeons in Department of Surgery, Amir-Alam Hospital. The subjects were randomly assigned to two groups. In the co-operative group (group A) the procedure was performed

at the same session with the main surgical procedure while in the post-operative group (group B) jejunostomy was performed 3 days after the main surgical procedure. Jejunal nutrition program was started on postoperative day within 12 h after surgery in the surgical intensive care unit with 10 mL h⁻¹ DW5% and progressed to 10 mL h⁻¹ DW10% on day 2 for 24 h and increased on day 3, until reaching the daily nutritional goal that was set at 25 kcal kg⁻¹. On postoperative day 3, for all patients additionally commenced a nutritionally complete, whole protein (1 kcal kg⁻¹) enteral feeding (Fresubin Original, Fresenius Kabi, Runcorn, Cheshire, UK).

Gastrointestinal adverse effects reported by the patients that influenced the feeding protocol including bloating, abdominal cramp, vomiting and diarrhea were managed by reducing the concentration and rate of feeding. Postoperative complications consist of peritonitis due to anastomotic leakage, abdominal distention, infection, obstruction and displacement of jejunostomy tube were compared in two groups. Outcome was defined as successful if the total protein and albumin would not reduce compare to two weeks before jejunostomy. All patients signed their informed consent and the ethics committee in our university approved the study protocol. Data were analyzed with the SPSS statistical program (SPSS Inc., SPSS/PC+, Chicago: Illinois, USA). Student's t-test and the Chi-square test were performed to assess the relationship between the studied variables. All tests were two-sided and p<0.05 was considered statistically significant.

RESULTS

Ninety cases (41 men; mean age: 55 years; range: 10-90 years) were eventually included of whom; 39 cases underwent surgery for laryngeal cancer, 22 for esophageal carcinoma, one for pancreatic carcinoma and the remaining for miscellaneous surgery. There was no significant difference between groups A and B regarding sex, age, type of surgery and pre-operative serum albumin or total protein (Table 1). Twenty-seven patients (30%) did not complain any side effects during enteral nutrition in either group A or group B.

Table 1: Demographic characteristics between the two groups

Characteristics	Group A, co-operative jejunostomy (n = 37)	Group B, post-operative jejunostomy (n = 53)	p-value
Age (year)	56.94±15.68	53.78±16.44	NS
Sex (M:F)	18:19	23:30	NS
Diagnosis			
Esophageal cancer	5	17	
Laryngeal cancer	15	21	NS
Pancreatic cancer	1	0	
Others	13	15	
Pre-operative albumin	3.47±0.56	5.16±1.96	NS
Pre-operative total protein	6.48±8.0	6.0±1.29	NS

Table 2: Gastrointestinal adverse effects related to enteral jejunostomy nutrition

Factors	Group A, co-operative jejunostomy (n = 37)	Group B, post-operative jejunostomy (n = 53)	p-value
Abdominal tenderness (%)	1 (2)	0 (0)	0.41
Abdominal distention (%)	7 (18)	3 (5)	0.85
Vomiting (%)	0 (0)	6 (11)	0.77
Diarrhea (%)	5 (13)	5 (9)	0.51
Anastomotic leakage (%)	11 (29)	5 (9)	0.24
Tube mal-position (%)	11 (29)	14 (26)	0.81
Infection (%)	1 (2)	3 (5)	1.00
Obstruction (%)	8 (21)	6 (11)	0.23

Adverse effects of post-operative jejunostomy nutrition were registered in 13/53 patients (24%) vs. 12/37 patients (32%) in co-operative jejunostomy group. Significantly higher incidence of abdominal distention and fever was observed in patients who underwent co-operative jejunostomy ($p = 0.005$ and $p = 0.001$, respectively). No significant differences in other complications were observed between the two groups. Gastrointestinal adverse effects related to enteral nutrition in two groups are shown in Table 2. The incidence of jejunostomy tube mal-position was significantly higher in patients who presented abdominal distention and abdominal pain in early hours after starting jejunal nutrition ($p < 0.001$ and $p = 0.006$, respectively). There was no significant difference in the level of serum albumin before and after procedure in the two groups.

DISCUSSION

An extensive effort has been made to improve outcome of patients undergoing major surgical procedures on the gastrointestinal or upper respiratory tracts and nutrition support is now recognized an essential component of the clinical management of these patients. The ability to deliver enteral nutritional after operation has been advanced and jejunostomy leading some surgeons to draw special attention to it because of substantial safety and relatively low cost of this additional procedure (Biffi *et al.*, 2000). Despite the advantages of feeding jejunostomy, serious complications do occur and can be life threatening. The present study demonstrated if jejunostomy perform 3 days after the main procedure, the prevalence of abdominal distention and fever following surgery significantly decreased ($p = 0.005$ and $p = 0.001$, respectively) while there was no significant difference in other complications and the outcome of procedure was equal in the two groups.

Previous studies reported major complications rates of 0-3% (De Gottardi *et al.*, 1999; Sarr, 1999; Yagi *et al.*, 1999; Myers *et al.*, 1995) whereas smaller series described higher complication rates of 4-26% (Holmes *et al.*, 1999; Zapas *et al.*, 1998; Sonawane *et al.*, 1997; Gore *et al.*, 1996). In particular, the incidence of bowel necrosis, pneumatosis or obstruction never exceeded 1.5% as well the necessity for re-operation ranged between 0.9% and

1.3% in the largest series (De Gottardi *et al.*, 1999; Schunn and Daly, 1995; Smith-Choban and Max, 1988). In the present study none of the patients encountered significant procedure related complications or death. The adverse gastrointestinal complications are not directly related to jejunostomy and are common symptoms in early enteral nutrition. These adverse effects can be reduced with a good nutritional protocol and diminish of the nutrition flow rate.

Although a good search in the literature but to the best of our knowledge, we couldn't find any study agree or contradict present results. Based upon our experience, we recommend jejunostomy procedure for enteral feeding to be performed a few days following surgery to decrease the rate of abdominal distention which is a common complication of jejunostomy. But there were few limitations; the current investigation studied only cancerous patients and performed on a small group of patients. We hope schedule a larger study to have an opinion about this hypotheses.

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