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Cervical Esophageal Anastomotic Leak in Patients with Esophageal Cancer with Single Layer Method and Double Layers Method

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ABSTRACT

Introduction: *Annually, 14500 new cases of esophageal cancer are diagnosed in the United States of America. Surgical resection of the tumor is considered as the gold standard therapy immediately after the diagnosis. The stomach is used most commonly for esophageal replacement. Complications in the location of anastomosis have negative effects on patients' survival. The aim of this study is comparison of anastomotic leak in single and double layer suturing.*
Methods: *Through a prospective study, 100 patients admitted at the Emam Reza hospital of Tabriz, for esophagectomy with cervical esophagogastric anastomosis was investigated. Patients divided to single layer anastomosis group (A) and double layer anastomosis group (B). The duration of the research project was 14 months, beginning from 3.2008 to 4.2009, assessing patients and analyzing data.*
Results: *the mean age of the patients was 60.7 ± 12(Mean ± SD), with the age ranging from 24 to 83 years. 48 patients were men (48%) while 52 patients were women (52%) investigated in two groups. The greatest prevalence of tumor location was in the lower third of the esophagus. No anastomotic leak was detected in group A, 4 anastomotic leak (8%) were detected in group B. there was significant statistical difference in terms of leakage rate between single-layer and double-layer anastomosis. The correlation between the anatomical location of the tumor and anastomosis leak wasn't meaningful statistically.*
Conclusion:*Single layer anastomosis is safer and can be performed in shorter time and at a lower cost than the double layer anastomosis.*

Keywords: *Anastomosis leak, Esophagectomy, esophageal cancer*

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INTRODUCTION

Annually, 14500 new cases of esophageal cancer are diagnosed in the United States of America. Surgical resection of the tumor is considered as the gold standard therapy immediately after the diagnosis. A significant decrease in perioperative mortality rates has been reported but relatively high postoperative morbidity remains (Shanda and et al, 2007).
The stomach is used most commonly for esophageal replacement either intact or tubularized by excision of the cardia and lesser curvature. Complications in the location of anastomosis have negative effects on patients' survival, anastomisos leakage being one of them (Akbar and et al 2006). Anastomotic leaks and strictures can show the quality of the anastomosis (Junemann-Ramirez and et al, 2005).
After resection, esophagogastric anastomosis can be performed in the chest or neck. Overall survival for patients with esophageal carcinoma at 5 years remains poor but Surgicalresection remains the only chance for cure(Chunwei and etal, 2005) .
Anatomic factors contributing to leakage are lack of serosa in anastomosis, Inadequate blood flow in the area, fragile longitudinal muscle layer.some diseases including diabetes, Cirrhosis, cardiopulmonary diseases and surgical techniques including tension in suture line and infection are involved in anastomosis leakage(Narendar and et al, 2006).
The techniques used in the anastomosis are single-layer and double-layer anastomosis. Single-layer anastomosis, reduces the time and cost of operation(Orringer and et al, 2000).
The double-layer anastomosis needs to greater length of the esophagus for anastomosis that it can cause less esophageal resection and thus increase possibility of recurrence. The double-layer anastomosis creates tension on anastomosis and increase possibility of anastomosis leakage (Singh and et al, 2001).
Due to the different studies with varied results about anastomosis techniques in the world and on the other hand there was not similar study in patients of our region, we studied Effects of single-layer and double-layer anastomosis on anastomosis leakage in the patients with esophageal carcinoma undergoing esophagectomy in the Emam Reza hospital ofTabriz.

MATERIALS AND METHODS

This study was a prospective, randomized trial. Between march 2008 and february 2009, 100 patients with esophageal carcinoma undergoing transhiatalesophagectomy with cervical esophagogastric anastomosis were studied in the Emam Reza hospital. With convenience sampling, Patients divided to two

groups. For group A (50 patient), single-layer anastomosis was performed and for group B (50 patient), double-layer anastomosis was performed. Exclusion criteria of our study included patients with non-operable esophageal carcinoma and upper third esophageal carcinoma. After surgery, patients were evaluated for neck wound drainage. After patients discharge, every week for a month patients were evaluated in the thoracic surgery clinic. Data was analyzed by SPSS19 software and using the t-test, chi square test and Mann-Whitney U test. Statistical results were considered significant in $P< 0.05$. Name and personal details will remain confidential subjects and if patients did not consent, were excluded. All patients after explaining the project and obtaining informed consent were enrolled.

RESULTS

All patients have survived operation and were available for follow-up of their postesophagectomy symptomatology with at least 1 months of postoperative follow-up from their esophagectomy. 100 patients with esophageal carcinoma undergoing transhiatalesophagectomy with cervical esophagogastric anastomosis were evaluated. There were a total of 50 patients in single layer anastomosis group (A) and 50 patient in double layer anastomosis group (B). In the group A, 26 patients (52%) were male and 24 patients (48%) were female; and the mean age was 58.5 years. In the group B, 22 patients were male (44%) and 28 patients (56%) were female and the mean age was 63 years. in the group A, 52% of esophageal cancers arose from the lower esophagus, 48% from the middle third.in the group B, 76% of esophageal cancers arose from the lower esophagus, 24% from the middle third. In group A, no one had an anastomotic leak. In group B, postoperative anastomotic leaks after esophagectomy were diagnosed in 4(8%) patients at a mean of 7.75 days after surgery.

In patients with anastomotic leak, mean age was 68 years and 3 patients were female (75%); and 2 patients had cancer of middle third and 2 patients had cancer of lower third. there was not significant statistical correlation between the anatomical location of the tumor and the leakage rate ($P=0.24$). there was significant statistical difference in terms of leakage rate between single-layer and double-layer anastomosis($P<0.05$).

DISCUSSION AND CONCLUSIONS

There are two stated advantages for cervical esophagogastric anastomoses after esophagectomy: leaks are less severe in the cervical location and the proximal resection margin is more generous (total esophagectomy) than with thoracic anastomoses. Leaks that complicate a cervical esophagogastric anastomosis are usually simpler to manage, and less dangerous than leaks occurring within the thorax. Drainage can be established by opening the cervical incision at the bedside. The resulting fistula usually heals with conservative management. (Urschel JD, 1995)

Thoracic esophagogastric anastomotic leaks are generally more serious than cervical anastomotic leaks, but most investigators have shown a lower incidence of leaks in the thoracic location (Urschel, 1995). The reported high incidence of cervical esophagogastric anastomotic leaks is often cited as a major disadvantage of the cervical anastomosis. (Muller and et al, 1990)

A number of factors have been indicated as favoring or determining esophageal anastomotic leakage; the type of anastomosis, esophageal substitute, location of anastomosis (cervical or intrathoracic), whether it is a single or double layer, done manually or with stapling, the organ used in the anastomoses, the stage of the tumor, the distance from the anastomoses line to the tumoral tissue, additional radiotherapy or chemotherapy used in the treatment, the blood levels of hemoglobin and serum albumin.(Mitchell , 2006)

In 4 extensive series, (Rizk and et al, 2004; Nardella and et al, 2009; Nguyen and etal 2008; Schubert and et al, 2006) with 3129 patients undergoing surgery, the leak rate fluctuated between 12% and 21%. In our study, the incidence of cervical leak after double layer anastomosis is 8% and no leakage is observed after double layers anastomosis.

Vigar et al found 4.2% anastomotic leak rate in single layer anastomosis group and 7.7% in double layers anastomosis group. Mean anastomosis time was 10.04 minutes in group A and 19.2 minutes in group B ($p = 0.0001$) (Viqar and etal, 2008). In our study leakage rate is 8% in single layer anastomosis group and no leak in double layer anastomosis group.

The double-layer anastomosis needs to greater length of the esophagus for anastomosis that it can cause less esophageal resection and thus increase possibility of recurrence. The double-layer anastomosis creates tension on anastomosis and increase possibility of anastomosis leakage (Singh and et al, 2001). The double-layer anastomosis needs to greater time for anastomosis(Viqar and et al, 2008).

Our results and those of others lead us to recommend single layer technique is safer and can be performed in shorter time and at a lower cost than the double layer technique.

Conflict of interest: the author has no conflict of interest to declare.

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