

Comparison of Malignant and Non-malignant Acquired Tracheoesophageal Fistulae Management Strategies and Outcomes

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ABSTRACT

Aim: To compare the malignant and non-malignant acquired tracheoesophageal fistulae management strategies.

Study design: Prospective study

Place and duration of study: Bolan Medical College Teaching Hospital, Quetta from 1st January 2022 to 31st December 2022.

Methodology: Sixty patients suffering from tracheoesophageal fistulae were enrolled. The patients were then divided into two groups where depending upon convenient sampling the first group was named as malignant while second was non-malignant group. The underlying etiology of each patient was recorded and assessments of clinical conditions were made through imaging and endoscopic techniques. The preoperative, intraoperative and stenting management strategies were applied on the enrolled cases. Single, double stenting was based on case to case.

Results: The mean age of the cases with benign tracheoesophageal fistula was 10.5±1.2 years while those having malignant tracheoesophageal fistula was 51.2±6.5 years. There were total 20 cases of tracheoesophageal fistula with nonmalignant diagnosis while 40 cases with malignant tracheoesophageal fistula. Within the primary outcomes of the cases the preoperative mortality was higher in non-malignant cases than malignant while morbidity was much higher in the malignant cases with 35% in that presenting fistula recurrence.

Practical Implication: Malignancy appeared to be the main cause of TEF in patients and their survival chances are also less.

Conclusion: Stenting is best managing strategy in patients with improved survival rate malignant as well as non-malignant cases.

Keywords: Malignancy, Fistula, Esophagus, Ventilator, Stenting

INTRODUCTION

Tracheoesophageal fistula (TEF) is a congenital deformity which can also occur sometime due to pathological or secondary diseases including carcinoma.¹ It is an abnormal connection between trachea and esophagus and causes airway obstruction in most cases. It is the most common airway fistula and their typical symptoms include choking, feeding disorders, bad coughing and unmanageable pneumonia.² Esophageal malignancy is considered to be the significant cause for the formation of fistula.³ Tumor causes invasion in the wall of trachea and esophagus and forms fistula. It usually occurs during chemotherapy/radiotherapy with subsequent tumor necrosis. Moreover, continuous pressure to esophagus wall after esophageal stenting is another main cause of TEF development.⁴

Management strategy for TEF encompasses various underlying etiological factors that may contribute in the progression of fistula. This can be carried out using radiological techniques and endoscopic approach to get the direct access to definitive surgical method. Numerous treatment options are available for malignant TEF including chemo, radio and immunotherapy as well as surgical methods. Studies have also documented that significant increase in survival chances was observed in recurrent cases. Though, few therapeutic interventions especially radiotherapy leads to long term side effects including tumor occurrence at nearby regions⁵⁻⁷. Advanced stage carcinomas are usually treated with salivary Montgomery prostheses after radiotherapy⁸.

Non-malignant tracheoesophageal fistula usually occurs as a result of mechanical ventilation. It is difficult to manage and also a rare problem that surgeons face in their clinical settings. Most of time non-malignant TEF is diagnosed when patient is still on ventilator. It is highly associated with restenosis.⁹⁻¹¹ Present study was designed for the comparative analysis in the treatment methods for malignant and non-malignant acquired tracheoesophageal fistulas.

MATERIALS AND METHODS

This prospective study was conducted at Bolan Medical College Teaching Hospital, Quetta from 1st January 2022 to 31st December 2022 and 60 patients were enrolled after calculating the sample size of patients suffering from tracheoesophageal fistulae. The sample size calculator was WHO supported and applied 95% CI, 80% power of test and 5% margin of error. Inclusion criteria were based on tracheoesophageal fistulae patients. Patient's consent of participation from them or their attendants was taken before their enrolment. The study was ethically approved from review committee. The patients were then divided into two groups where depending upon convenient sampling the first group was named as malignant while second was non malignant group. The underlying aetiology of each patient was recorded and assessments of clinical conditions were made through imaging and endoscopic techniques. Nutritional status of each patient was also recorded in the preoperative management. During the preoperative management the H receptor antagonists were used as acid suppressive therapy wherein patients were positioned above 45-degree angle with limited intake orally and frequent oral-suctions in combination with pharmacological based therapy. Endotracheal tube was advanced to position the cuff-distal to fistula in ventilated patients. Nasogastric as well as orogastric tubes were removed and gastrostomy-tubes for clearing of remaining gastric contents and also jejunostomy tubes for enteric feeding were used. In the intraoperative management strategy, the formulate strategies was used to minimize spillover of gastric contents into the respiratory tract. Bronchoscopy was performed for visualization of fistula. Suctioning in aggressive manner through bronchoscope was performed. The scoring for dyspnea and dysphagia was performed and quality of life measured by the European Organization for Research and Treatment of Cancer quality-of-life questionnaire (EORTC QLQ-C30) was done. All the required information was entered in form of documentation in the well-structured questionnaire. Stents were acquired into the bridging benign of tracheoesophageal fistula as well as for palliating of the malignant tracheoesophageal fistula. Single, double stenting was based on

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case to case. The management outcomes in terms of mortality, morbidity (primary outcomes) and survival rate (secondary outcomes) were compared between groups and data was analyzed using SPSS-26 with calculations based on mean and standard deviations as well as application of Chi-square test. P value <0.05 was taken significant.

RESULTS

The mean age of the cases with benign tracheoesophageal fistula was 10.5±1.2 years while those having malignant tracheoesophageal fistula was 51.2±6.5 years. There were total 20 cases of tracheoesophageal fistula with non-malignant diagnosis while 40 cases with malignant tracheoesophageal fistula. There was no difference within gender of both groups (Table 1).

In the present study within the various stenting practices silicon as well as metal stents were used. In a patient there was iatrogenic self-expandable metallic stent in trachea was used for managing the tracheoesophageal fistula (Fig. 1)

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The secondary outcomes showed a poor prognosis and survival rate in the malignant tracheoesophageal fistula cases than in the non-malignant tracheoesophageal fistula cases. The survival rate was improved through stenting in both groups with a longer survival rate in malignant cases (Table 3).

Table 1: Age and gender distribution within malignant and non malignant groups

Variable	Malignant n=40	Non Malignant n=20	P value
Age (years)	51.2±6.5	10.5±1.2	<0.05
Gender			
Male	19 (47.5%)	11 (55%)	<0.05
Female	21 (52.5%)	9 (45%)	

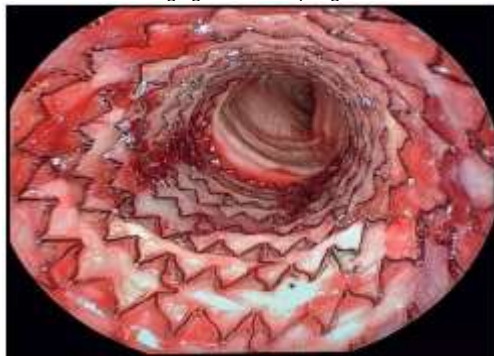
Table 2: Comparison of primary outcomes of malignant and non-malignant tracheoesophageal fistula

Outcome	Malignant (n=40)	Non Malignant (n=20)	P value
Preoperative mortality	1 (2.5%)	1(5%)	0.027
Morbidity			
Respiratory failure	12(30%)	4 (20%)	0.045
Fistula Recurrence	14 (35%)	5 (25%)	0.032

Table 3: Comparison of secondary outcomes of malignant and non-malignant tracheoesophageal fistula cases

Surgical interventions follow up secondary outcomes	Malignant (n=40)	Non-Malignant (n=20)	P value
Survival Rate (months)	2.8	41	<0.05
Esophageal Stenting Survival(months)	3.4	42	

Fig. 1: Metal Stent for managing tracheoesophageal fistula



DISCUSSION

Tracheoesophageal fistula is a congenital problem which sometime can also be occurred due to pathological causes including carcinoma leading to malignant TEF. On the other, mechanical vent is also one of the main causes of uncommon TEF fistula type: non-malignant tracheoesophageal fistula. Both types of fistula can be treating by adopting different surgical approaches according to the etiological factor and overall wellbeing of the patient. Life expectancy is substantially raised in patients after therapeutic interventions and modifications¹²⁻¹⁴. In present study, different treatment strategies were compared for malignant and non-malignant acquired tracheoesophageal fistulae.

At present, airway stenting is considered to be the most common approach that is ideally being used in majority of the patients. However, studies have suggested that it leads give short term effect and due to the possibility of enlargement of fistula, airway stenting with biological or chemical glue needs to be used with caution in TEF patients^{15,16}. Alone esophageal stenting is a better choice for TEF management. It gives even more good results in patients who have lower esophagus TEF without airway stenosis¹⁷. Stent length and diameter is decided after endoscopic imaging.

Adverse effects can be related with almost every surgical procedure. Although, significant results are obtained from stenting and patient can resume their normal diet after surgical procedure but certain complications can be occurred due to air-way stenting and stent replacement. Furthermore, implications of radio and chemotherapy are also associated for malignant TEF management. Malignancy appeared to be the main cause of TEF in patients and their survival chances are also very less. Efficacy and increased life expectancy can be achieved after interventional therapy and proper treatment plan¹⁸⁻²⁰.

CONCLUSION

Stenting is best managing strategy in patients with improved survival rate malignant as well as non malignant cases.

Conflict of interest: Nil

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