ORIGINAL RESEARCH

Survival analysis of esophageal carcinoma patients: An observational study

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ABSTRACT

Background: The present study was conducted for evaluating survival analysis of esophageal carcinoma patients.**Materials & methods:**40 patients with presence of esophageal carcinoma were enrolled. A comprehensive treatment plan was developed, incorporating both radiation oncotherapy and surgical procedures. The outcomes of the treatment were assessed for all patients involved. A survival analysis was conducted to evaluate the distinct risk factors associated with mortality. All findings were documented in a Microsoft Excel spreadsheet and subsequently analyzed statistically using SPSS software. The Chi-square test and Student's t-test were employed to determine the significance levels. Additionally, univariate analysis was performed to assess the risk factors.**Results:**The average age of the patients was 49.7 years, with males constituting 80 percent of the cohort. A history of tobacco use was reported in 80 percent of the patients, while 72 percent had a history of alcohol consumption. Clinical staging revealed that 40 percent of the patients were classified as T3, and 20 percent as T4. The majority, 80 percent, were diagnosed with squamous cell carcinoma, whereas 20 percent had adenocarcinoma. The mortality rate observed was 13.33 percent. Significant risk factors linked to poor survival included older age, a history of alcohol consumption, tobacco smoking, and clinical stages III and IV.**Conclusion:**Esophageal carcinoma is a notable malignancy associated with a dismal prognosis, largely due to its diagnosis at an advanced stage.

Key words: Esophageal carcinoma, Survival

INTRODUCTION

Esophageal cancer (EC) ranks as the ninth most prevalent cancer and is the sixth leading cause of cancer-related mortality globally. This disease exhibits a high fatality rate, resulting in over 500,000 deaths annually. The two primary histological subtypes of esophageal cancer are esophageal squamous cell carcinoma (ESCC) and esophageal adenocarcinoma (EAC), each characterized by unique epidemiological and clinical attributes. ESCC is the predominant subtype worldwide, representing approximately 80% of all EC cases, and it can arise at various locations along the esophagus. Conversely, EAC, which constitutes about 20% of cases, is most frequently observed in white populations within developed nations and typically manifests in the distal region of the esophagus.[1-3]

Curative approaches for advanced esophageal cancer (EC) generally involve chemotherapy or chemoradiotherapy, followed by extensive surgical intervention. This treatment regimen frequently leads to significant morbidity and sustained declines in health-related quality of life. Esophageal squamous cell carcinoma (ESCC) demonstrates a greater sensitivity to chemoradiotherapy, exhibiting higher endoscopic response rates compared to esophageal adenocarcinoma (EAC). Consequently, unlike patients diagnosed with EAC, those with ESCC may have the option to preserve the esophagus following chemoradiotherapy. A recent analysis of clinical trials indicated that the addition of esophagectomy to chemoradiotherapy in cases of locally advanced ESCC yields minimal or no improvement in overall survival and may be linked to increased treatment-related mortality. When esophagectomy is deemed

necessary, both minimally invasive esophagectomy (MIE) and robot-assisted minimally invasive esophagectomy (RAMIE) can be performed safely, resulting in improved postoperative outcomes and comparable oncological results to those achieved with traditional open esophagectomy.[4- 6]The present study was conducted for evaluating survival analysis of esophageal carcinoma patients.

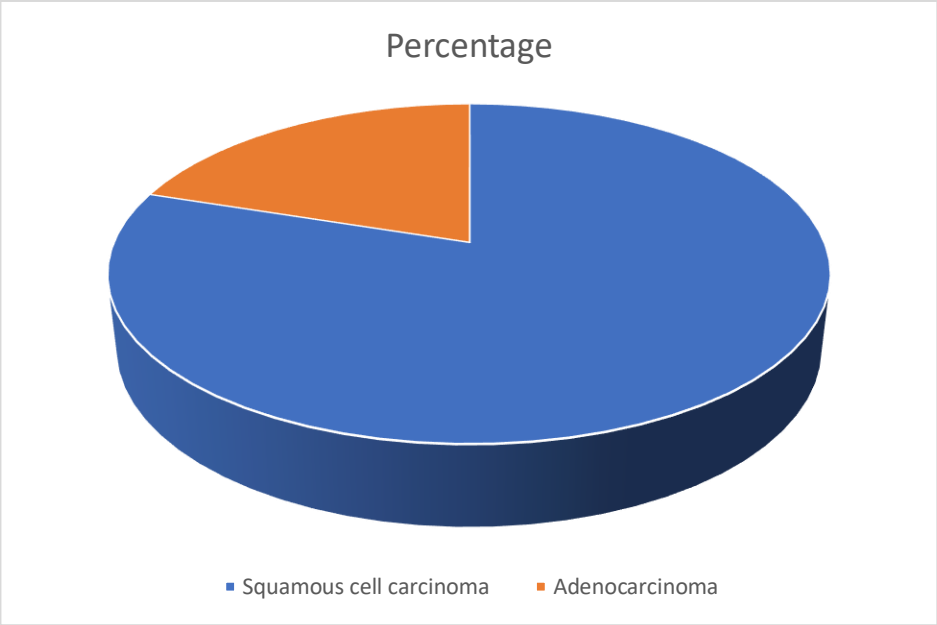
MATERIALS & METHODS

The present study was conducted for evaluating survival analysis of esophageal carcinoma patients. 40 patients with presence of esophageal carcinoma were enrolled. A comprehensive treatment plan was developed, incorporating both radiation oncotherapy and surgical procedures. The outcomes of the treatment were assessed for all patients involved. A survival analysis was conducted to evaluate the distinct risk factors associated with mortality. All findings were documented in a Microsoft Excel spreadsheet and subsequently analyzed statistically using SPSS software. The Chi-square test and Student's t-test were employed to determine the significance levels. Additionally, univariate analysis was performed to assess the risk factors.

RESULTS

The average age of the patients was 49.7 years, with males constituting 80 percent of the cohort. A history of tobacco use was reported in 80 percent of the patients, while 72 percent had a history of alcohol consumption. Clinical staging revealed that 40 percent of the patients were classified as T3, and 20 percent as T4. The majority, 80 percent, were diagnosed with squamous cell carcinoma, whereas 20 percent had adenocarcinoma. The mortality rate observed was 13.33 percent. Significant risk factors linked to poor survival included older age, a history of alcohol consumption, tobacco smoking, and clinical stages III and IV.

Graph 1: Histopathological diagnosis



Graph 2: Outcome

Outcome	Number	Percentage
Died	7	14
Survived	43	86

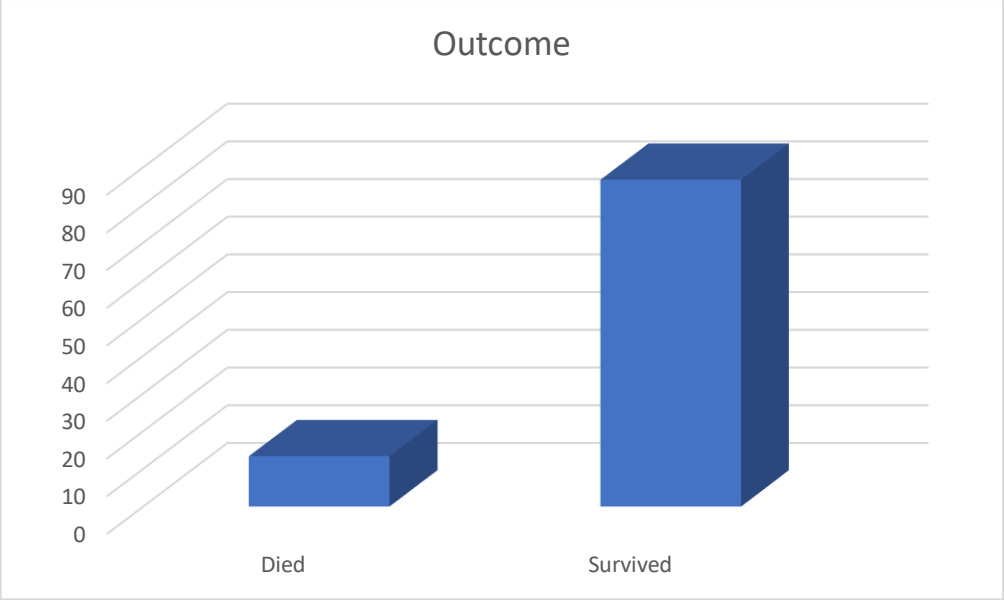


Table 1: Survival analysis

Variable	r-value	p-value
Age of more than 65 years	2.120	0.010*
Male gender	-0.325	0.690
Smoking history	2.275	0.001*
Alcohol history	-2.087	0.002*
Clinical staging of III and IV	-2.339	0.000*

*: Significant

DISCUSSION

Esophageal cancer (EC) is classified as a refractory tumor with a dismal prognosis, ranking sixth in global cancer mortality rates. In various regions of Europe and the United States, neoadjuvant chemoradiotherapy is recommended as a standard treatment approach. Conversely, in the United Kingdom and Japan, neoadjuvant chemotherapy is regarded as the primary treatment modality. Nonetheless, there is a broad consensus internationally that surgical intervention remains a crucial component of curative treatment for locally advanced EC. Numerous studies have indicated that the administration of chemotherapy or radiotherapy to patients with esophageal squamous cell carcinoma (ESCC) can enhance survival outcomes. The prognostic factors associated with ESCC can be categorized into two main groups. The first group encompasses clinical prognostic factors, where research has demonstrated that body mass index, tobacco use, and age do not significantly influence prognosis. In contrast, malnutrition, tumor location, and sex have been identified as independent prognostic indicators for ESCC. The second group consists of histological prognostic factors, with tumor stage, histological type, and nodal invasion being pivotal determinants of the prognosis for EC.[7-9]Hence; the present study was conducted for evaluating survival analysis of esophageal carcinoma patients.

40 patients with presence of esophageal carcinoma were enrolled. A comprehensive treatment plan was developed, incorporating both radiation oncotherapy and surgical procedures. The outcomes of the treatment were assessed for all patients involved. A survival analysis was conducted to evaluate the distinct risk factors associated with mortality. All findings were documented in a Microsoft Excel spreadsheet and subsequently analyzed statistically using SPSS software. The Chi-square test and Student's t-test were employed to determine the significance levels. Additionally, univariate analysis was performed to assess the risk factors.Chi CL et al examined outcomes in esophageal squamous cell carcinoma (ESCC) patients who did not undergo surgical resection after neoadjuvant chemoradiotherapy (nCRT). Patients receiving nCRT between 2012 and 2020 were divided into two groups: group 1 (scheduled surgery) and group 2 (no surgery). Group 2 was further categorized into subgroups based on reasons for not proceeding to surgery: group 2a (disease progression), group 2b (poor general conditions), and group 2c (patient refusal). Overall survival (OS) was the primary outcome. Group 1 comprised 145 patients, while subgroups 2a, 2b, and 2c comprised 24, 16, and 31 patients, respectively. The 3-year OS rate was significantly lower in group 2 compared with group 1 (34% versus 56%, $p < 0.001$). A subgroup analysis showed varying 3-year OS rates: 13% for group 2a, 25% for group 2b, and 58% for

group 2c ($p < 0.001$). Propensity score matching for group 2c and group 1 revealed no significant difference in 3-year OS rates ($p = 0.91$). One-third of ESCC patients receiving nCRT did not undergo surgical resection. Overall survival in this group was generally poorer, except for those who refused surgery (group 2c).[10]Wu X et al conducted survival analysis for 40-year SEER data on upper esophageal cancer.Cases of UEC (C15.3 and C15.0) arising during the period from 1973 to 2013 were identified and selected using the SEER database. In the past 40 years, the cases of UEC have gradually increased, and the proportion of adenocarcinoma (AD) has gradually increased (from 3.6% to 11.8%, $p < 0.001$). There has been a significant increase (1973–1982 vs. 2004–2013) in median OS (7 months vs. 10 months, $p < 0.001$) and median ECSS (7 months vs. 11 months, $p < 0.001$) among UEC patients from 1973 to 2013. For the impact of different treatments, the results showed that the ECSS and OS of surgery without radiation (SWR) and radiation plus surgery (R+S) were superior to those of radiation without surgery (RWS). Subgroup analysis showed that ECSS and OS were highest among patients treated with SWR compared with R+S and RWS for patients with localized disease. For regional disease, ECSS and OS were highest among patients with R+S compared with SWR or RWS. Among patients with regional-stage squamous cell carcinoma (SCC), OS was higher with neoadjuvant radiotherapy or adjuvant radiotherapy compared with SWR. Multivariate analysis showed that radiotherapy sequence was dependently associated with OS among patients with regional-stage SCC.[11]

CONCLUSION

Esophageal carcinoma is a notable malignancy associated with a dismal prognosis, largely due to its diagnosis at an advanced stage.

REFERENCES

1. Sung H., Ferlay J., Siegel R.L., Laversanne M., Soerjomataram I., Jemal A., Bray F. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA Cancer J. Clin. 2021;71:209–249.
2. Lagergren J., Smyth E., Cunningham D., Lagergren P. Oesophageal Cancer. Lancet. 2017;390:2383–2396
3. Intenational Agency for Research on Cancer (IARC) Global Cancer Observatory (Globocan) [(accessed on 23 October 2022)]. Available online: https://gco.iarc.fr/
4. Uhlenhopp D.J., Then E.O., Sunkara T., Gaduputi V. Epidemiology of Esophageal Cancer: Update in Global Trends, Etiology and Risk Factors. Clin. J. Gastroenterol. 2020;13:1010–1021.
5. Geng H., Xing Y., Zhang J., Cao K., Ye M., Wang G., Liu C. Association between Viral Infection Other than Human Papillomavirus and Risk of Esophageal Carcinoma: A Comprehensive Meta-Analysis of Epidemiological Studies. Arch. Virol. 2022;167:1–20.
6. PonvilatD. Co relation Between Chronic Hepatitis C Virus Infection and Esophageal Cancer. JGastroenterol. 2020;5:44–56.
7. Hashemian M., Murphy G., Etemadi A., Poustchi H., Brockman J.D., Kamangar F., Pourshams A., Khoshnia M., Gharavi A., Dawsey S.M., et al. Toenail Mineral Concentration and Risk of Esophageal Squamous Cell Carcinoma, Results from the Golestan Cohort Study. Cancer Med. 2017;6:3052–3059
8. Semnani S., Roshandel G., Zendehbad A., Keshtkar A., Rahimzadeh H., Abdolahi N., Besharat S., Moradi A., Mirkarimi H., Hasheminasab S. Soils Selenium Level and Esophageal Cancer: An Ecological Study in a High Risk Area for Esophageal Cancer. J. Trace Elem. Med. Biol. 2010;24:174–177.
9. Keshavarzi B., Moore F., Najmeddin A., Rahmani F. The Role of Selenium and Selected Trace Elements in the Etiology of Esophageal Cancer in High Risk Golestan Province of Iran. Sci. Total Environ. 2012;433:89–97.
10. ChaokCL. Survival Outcomes of Esophageal Cancer patients Who refused to Surgery after Neoadjuvant Treatment. Cancers2020;12(12):42.
11. Pulot M. Treatment and survival analysis for 30-year data esophageal cancer. Cancer 2019 Jul 15;20:2766.
12. Nainani P, Singh HP, Paliwal A, Nagpal N. A rare case report of clear cell variant of oral squamous cell carcinoma. J Clin Diagn Res. 2014 Dec;8(12):QD07-9. doi: 10.7860/JCDR/2014/11536.5339.
13. Singh HP, Yadav M, Nayar A, Verma C, Aggarwal P, Bains SK. Ameloblastomatous calcifying ghost cell odontogenic cyst - a rare variant of a rare entity. Ann Stomatol (Roma). 2013 Mar 20;4(1):156-60. doi: 10.11138/ads.0156.
14. Singh HP, Kumar P, Goel R, Kumar A. Sex hormones in head and neck cancer: Current knowledge and perspectives. Clin Cancer Investig J. 2012;1(1):2-5. https://doi.org/10.4103/2278-0513.95011.
15. Sharma A, Singh HP, Gupta AA, Garg P, Moon NJ, Chavan R. Granulocytic sarcoma in non-leukaemic child involving maxillary sinus with long term follow up: A rare case report. Ann Maxillofac Surg 2014;4:90-5.
16. Puri N, Rathore A, Dharmdeep G, Vairagare S, Prasad BR, Priyadarshini R, et al. A clinical study on comparative evaluation of the effectiveness of carbamazepine and combination of carbamazepine with baclofen or capsaicin in the management of Trigeminal Neuralgia. Niger J Surg 2018;24:95-9.