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Original Article

Factors pertaining to long-term mortality following emergency visits for head and neck cancer

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KEYWORDS

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Abstract *Background/purpose:* Avoiding mortality has been the ultimate goal in the management of head and neck cancer (HNC) patients with emergency department (ED) visits, however, risk factors and causes of mortality are not well studied. The objective of the present study is to verify the factors associated with long-term mortality of patients with HNC who visited ED.

Materials and methods: We retrospectively collected data of 1660 HNC patients who made ED visits from the Longitudinal Health Insurance Database 2000 during 2000–2012 in Taiwan. The multivariate Cox proportional hazard model was used to measure the mortality-associated risk factors in HNC patients who made ED visits.

Results: The prognostic factors associated with mortality risk were age (≥ 65 vs. < 65 y; HR = 1.58, $p < 0.0001$), geographic region (central vs. northern; HR = 1.20, $p = 0.0384$; southern vs. northern; HR = 1.38, $p = 0.0001$), surgery (yes vs. no; HR = 0.61, $p < 0.0001$), radiotherapy (yes vs. no; HR = 1.80, $p < 0.0001$), chemotherapy (yes vs. no; HR = 1.68, $p < 0.0001$), acute myocardial infarction (yes vs. no; HR = 2.01, $p = 0.0303$), diabetes mellitus (yes vs. no; HR = 1.60, $p < 0.0001$), chronic obstructive pulmonary (yes vs. no; HR = 1.51,

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$p = 0.0002$), number of ED visits (≥ 4 vs. 1; HR = 0.69, $p = 0.0003$), and number of admissions (1 vs. 0; HR = 1.54, $p < 0.0001$; ≥ 2 vs. 0; HR = 1.48, $p = 0.0002$).

Conclusion: Higher mortality was associated with older age, living in southern Taiwan, not having undergone surgery, having received radiotherapy and chemotherapy, comorbidities, and more hospital admissions. A coordinated and extended multidisciplinary approach including ED care is required to improve the long-term survival and further decrease the economic burden of HNC treatment.

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Introduction

Head and neck cancer (HNC) includes malignant tumors that occur in the oral cavity, paranasal sinuses, nasal cavity, pharynx, and larynx.¹ HNC is the sixth most common cancer, accounting for approximately 6% of all cancer cases.^{2,3} It has been estimated that in Taiwan alone, there were 7248 newly oral cavity, oropharynx and hypopharynx cancer patients diagnosed, representing about 7.31% of all cancers in 2013.⁴

There are two aspects to cancer patients' visiting the emergency department (ED). One aspect may be considered suitable care while we assess and manage acute onset problems, but the other may be unable to adequately manage during routine outpatient or inpatient treatment.⁵ Nevertheless, new treatment strategies for cancer patients has resulted in prolonged life-spans and increased numbers of visits to EDs by cancer patients.

Few studies have investigated the factors associated with mortality following visits to EDs by cancer patients. Previous studies had reported 48% of advanced non-small-cell lung carcinoma (NSCLC) patients had visited the ED within the 30 days preceding their deaths.⁶ Lung cancer patients who were admitted to the intensive care unit (ICU) survived were 32% and 11% of those who received mechanical ventilation were still alive after 6 months.⁷ Additionally, long-term survival was lower and costs of care were higher for patients who were hospital readmitted.⁸ In general, hospital readmissions are costly, lead to fragmentation of care, poorer prognoses, and reduce the window of opportunity for recommended adjuvant therapy types.^{9,10} These results can instruct us on how to reduce hospital admissions resulting from poor prognoses.

In our previous literature,¹¹ we found that survival rate of HNC patients significantly decreased over time in the ED visitor group compared with the non-ED visitor group. In addition, HNC patients had higher rates of ED visits and admissions than other cancer patients, particularly, the May, June, and July were three top-ranked months for ED visits. Moreover, evaluating survival time and verifying factors related to mortality after HNC patients' ED visits is important and could lead to better patient prognoses through the induction of appropriate interventions. Therefore, the present study is further to investigate risk factors associated with long-term mortality of patients with HNC who visited ED by using the nationwide population-based data set of the Taiwan National Health Insurance Research Database (NHIRD).

Materials and methods

Data sources

We used the Longitudinal Health Insurance Database 2000 (LHID2000), which is a subset of the National Health Insurance Research Database (NHIRD) and comprises registration files and medical claims data for 1,000,000 patients are randomly sampled from all enrollees. Beginning in 1995, Taiwan had established NHI program and covered approximately 99% of the entire population. Prior studies demonstrated the validity of the claims data in the NHI database.^{12,13}

All information are confidential that encrypts patients' personal information to protect privacy and provides researchers with anonymous identification numbers in accordance with the data regulations of the National Health Insurance Bureau (NHIB) and the Taiwan National Health Research Institute (NHRI). This study was approved by the Institutional Review Board of Kaohsiung Veterans General Hospital (VGHKS15-EM4-01).

Study population

The HNC patient subpopulation was identified using the Catastrophic Illness Patient Database. To select the retrospective cohort study, we identified 1660 patients aged 20 years or older at time of HNC (ICD-9-CM codes 140–149) diagnosis who made ED visits between January 1, 2000, and December 31, 2012.

Identification of sample

The index date for each patients was newly diagnosed with HNC date. Study were observed until death, withdraw of the database or the end of December 31, 2012.

The research collected categorical sociodemographic factors, including gender, age group (< 65 years and ≥ 65 years), hospital characteristics (medical center hospitals; others: regional or district hospitals), geographic region (northern, central, southern, or eastern Taiwan) diagnostic site of the HNC (oral cavity: unspecified parts of mouth, tongue, gum, lip, floor of mouth; non-oral cavity: oropharynx, hypopharynx, unspecified parts of pharynx), number of ED visits (1, 2–3, ≥ 4 times) and number of admissions (0, 1, ≥ 2 times).

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