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Studying Vertebral Column Cancer Cases in Tripoli Medical Center by Using PET/CAT Scan

Yosef Madee[1]*, Aybaba Hançerlioğulları[2], Hussian Bagi[1], Fatma Montaser[1], Ateiga Montaser[1], Hassan Abdulkareem[1]

[1]*Department of Radiology, Faculty of Medical Technology, Aljufra University, Libya*
[2]*Department of Physics, Arts and Sciences College, Kastamonu University, Turkey*

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ABSTRACT

Cancer remains one of the leading causes of morbidity and mortality worldwide. Among the most prevalent types are breast, lung, cervical, stomach, colorectal, and prostate cancers. This study aims to examine vertebral column cancer cases diagnosed at Tripoli Medical Center. Data were collected from patient records in the Radiology Department of Tripoli Medical Center, Libya, over a 12-month period from January to December 2023. The data were analyzed using Microsoft Excel. A total of 20 patients were identified with vertebral column cancer (100%),, comprising 15 males (75%) and 5 females (25%). The majority of patients were aged between 60 and 69 years (50%). Age distribution revealed that the sixth decade accounted for the highest number of cases (10 patients, 50%), followed by the fifth decade (6 patients, 30%) and the the fourth decade (4 patients, 20%). This epidemiological survey highlights 20 confirmed cases of vertebral column cancer at Tripoli Medical Center during the study period. Adhering to regional and national guidelines is essential to support the planning and development of cancer care services across Libya.

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INTRODUCTION

Cancer is one of the most significant global health challenges, consistently ranking as a leading cause of human mortality. It is characterized by the uncontrolled proliferation of abnormal cells, marked by rapid growth, functional disruption, and atypical morphology [1]. Among the most prevalent cancer types worldwide are breast, lung, cervical, stomach, colorectal, and prostate cancers [2]. Breast cancer is the most commonly diagnosed malignancy in females, while lung cancer predominates among males [3].

The vertebral column is the most frequently affected region of the skeletal system in cases of metastatic disease, owing to its rich vascular network and central anatomical location. Prostate and lung cancers in men, and breast cancer in women, are the primary malignancies that commonly metastasize to the vertebrae [4]. For diagnostic imaging, bone scintigraphy using ^{99m}Tc-methylene diphosphonate remains a widely employed technique for detecting skeletal metastases. However, it has been reported to be less sensitive than ^{18}F-FDG PET in patients with lymphoma and lung cancer [4], highlighting the need for more advanced imaging modalities in certain clinical contexts.

In Libya, cancer incidence data from major medical centers provide insight into regional disease patterns. Tripoli Medical Center recorded 1,051 cancer cases in 2017 (5), while Benghazi Medical Center registered 3,307 cases over three years from January 2003 to December 2005 (6). These figures underscore the growing burden of cancer in the country and the importance of accurate diagnostic tools. This study aims to estimate the incidence of vertebral column metastases among cancer patients at Tripoli Medical Center using PET/CT imaging. This approach is expected to enhance diagnostic accuracy and contribute to a better understanding of metastatic distribution in the Libyan population, thereby informing clinical decision-making and public health strategies.

METHODS

This retrospective survey was conducted over a 12-month period, spanning from January to December 2023, at Tripoli Medical Center, Libya. The primary objective of the study was to estimate the annual incidence of vertebral column malignancies among cancer patients managed at the center. All included patients underwent cross-sectional imaging using computed tomography (CT) and positron emission tomography (PET), specifically PET/CT fusion imaging, to assess for metastatic involvement of the spine. The radiotracer employed in PET imaging was fluorine-18 fluorodeoxyglucose (^18F-FDG), which is widely recognized for its ability to detect areas of increased glucose metabolism associated with malignant lesions.

Inclusion criteria required a confirmed diagnosis of malignancy based on histopathological reports, ensuring diagnostic accuracy and specificity.

*Corresponding E-mail addresses: Youseff77@yahoo.com

Vertebral column cancer cases were identified through imaging findings and corroborated by clinical and pathological data. All relevant patient data—including imaging results, histopathology, and demographic information—were systematically recorded and analyzed using Microsoft Excel for statistical processing and visualization.

18^F-FDG PET/CT has demonstrated superior sensitivity and specificity in detecting osseous metastases compared to conventional bone scintigraphy, particularly in cancers such as lung, breast, and lymphoma. Its ability to localize lesions precisely and detect associated soft-tissue involvement makes it a valuable tool in staging and treatment planning for spinal metastases.

This study contributes to the growing body of evidence on cancer epidemiology in Libya and highlights the importance of advanced imaging modalities in the early detection and management of vertebral metastases. The findings are expected to support clinical decision-making and inform future strategies for cancer surveillance and resource allocation within the region.

RESULTS

The result shows 20 patients have vertebral column cancer (100%), including 15 males (75%) and 5 females (25%), as shown in Figure 1.

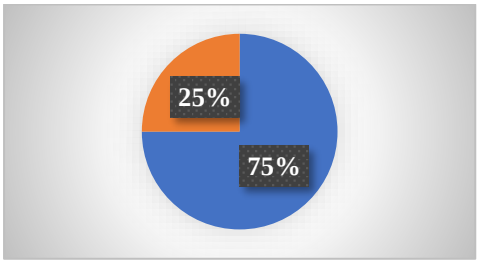

Figure 1. Male and female vertebral column cancer distributions

The majority of patients are between 60 – 69 years (50%). The vertebral column cancer cases' age distribution demonstrated the sixth decade and the highest number of vertebral column cancer cases at 10 (50%), then the fifth decade at 6 (30%), and the fourth decade at 4 (20%). As shown in Figure 2. As a result, the increasing age of people gives evidence and a higher probability of being affected by vertebral column cancer than young people.

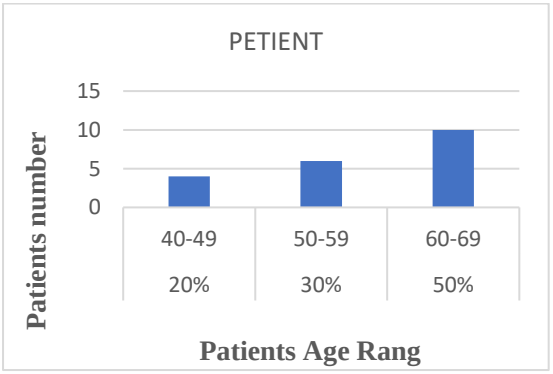

Figure 2. Cancer Decade's distribution

DISCUSSION

The present study revealed that all twenty patients diagnosed with vertebral column cancer were distributed across a distinct gender and age profile. Notably, males constituted the majority, with fifteen cases (75%), while females accounted for five cases (25%), as illustrated in Figure 1. This gender disparity is consistent with existing literature, which frequently reports a higher prevalence of spinal malignancies among males. Sciubba et al. [7] emphasized that metastatic spinal disease is more commonly observed in men, often due to primary cancers such as prostate and lung carcinomas that exhibit a predilection for vertebral metastasis. Similarly, Elsamadicy et al. [8], in their SEER-based analysis of vertebral and sacral chordomas, found that over 60% of cases occurred in males, reinforcing the notion of gender-based susceptibility.

Age distribution in this cohort further underscores the epidemiological trend that vertebral column cancer predominantly affects older adults. Half of the patients (50%) were aged between 60 and 69 years, followed by 30% in the 50–59 age group and 20% in the 40–49 age group, as shown in Figure 2. This pattern aligns with findings from Fourney et al. [9], who reported that spinal tumors are most frequently diagnosed in individuals over the age of 50, with peak incidence in the sixth and seventh decades. The increased prevalence in older age groups may be attributed to cumulative genetic mutations, prolonged exposure to environmental carcinogens, and age-related decline in immune surveillance mechanisms. Metser et al. [4] further supported this observation by demonstrating that PET/CT imaging frequently detects vertebral malignancies in patients aged 60 and above, often revealing metastatic involvement that was previously undiagnosed.

Moreover, Wewel and O'Toole [10] highlighted that the most common primary sources of spinal metastases—namely prostate, breast, lung, and gastrointestinal cancers—are typically diagnosed in middle-aged and elderly populations. This reinforces the conclusion that vertebral column cancer is not only more probable in older individuals but also closely linked to the natural progression of systemic malignancies. Dawes [11] also notes that vertebral metastases are significantly more frequent in patients over 50 years, often discovered incidentally during imaging for unrelated conditions.

Taken together, the findings of this study corroborate existing evidence that vertebral column cancer exhibits a marked predilection for older males. This demographic pattern should inform clinical screening strategies, resource allocation, and public health interventions aimed at early detection and management. The consistency of these results with prior research underscores the importance of age and gender as critical factors in the epidemiology of vertebral malignancies.

CONCLUSION

The vertebral column cancer identified 20 cancer cases in Tripoli Medical Center during a 12-month survey period from January to December 2023. Monitoring cancer effects is essential. Awareness and following regional and national instructions are essential to support planning and development of cancer care in Libya.

Conflict of interest. Nil

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