

## Distribution and Clinicopathologic Characteristics of Spinal Column Lesions (A 10-Year Study)

### Abstract

**Introduction:** Spine is a critical component of the musculoskeletal system, and lesions involving vertebrae may significantly affect patients' quality of life. Benign spinal lesions, such as infections, can be curable but are often difficult to diagnose, whereas malignant lesions—including sarcomas and metastatic tumors—carry a poor prognosis.

**Materials & Methods:** This descriptive cross-sectional study included 114 patients diagnosed with benign and malignant spinal lesions between 2008 and 2018 in 2 teaching hospital. Data were collected using a structured questionnaire and analyzed using SPSS version 22. Variables included age, sex, pathology type, lesion type (benign/malignant), size, anatomical origin, and year of diagnosis.

**Results & Discussion:** 114 patients with mean age of  $52.1 \pm 20.5$  years (range: 1 month–89 years) were studied. Males accounted for 80 (70.2%) of cases. Of all the lesions, 63 (55.3%) were benign and 51 (44.7%) malignant. Lumbar involvement was the most location frequent (64%), followed by thoracic (20.2%), sacral (13.2%), and cervical (2.6%). Pathologically, inflammatory lesions were most common (49.1%), followed by cancers (38.6%), lymphomas (4.4%), benign tumors (3.5%), sarcomas (0.9%), and others (3.5%). No significant association was observed between lesion type and sex, age, lesion site, or age at diagnosis ( $p > 0.05$ ).

**Conclusion:** Benign lesions—particularly inflammatory ones—represented the majority of spinal pathologies, though malignant lesions comprised nearly half of cases. The lumbar region was most commonly affected. These findings underscore the importance of comprehensive diagnostic approaches and points to need for further multicenter studies to improve management of spinal lesions.

**Keywords:** Spine, spinal neoplasms, clinical pathology

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### Introduction

Spinal lesions represent a heterogeneous group of pathologies ranging from benign infectious or inflammatory processes to aggressive malignant tumors. Given the central role of the spine in mobility and neurological function, any pathologic involvement may lead to severe disability, reduced quality of life, and even mortality.<sup>(1)</sup>

Globally, primary spinal tumors are relatively rare compared to metastatic involvement, with only 5–10% of all metastases affecting the vertebral column.<sup>(2, 3)</sup> Benign lesions such as tuberculosis and brucellosis remain prevalent in developing regions, while malignant entities, including multiple myeloma, sarcomas, and metastatic carcinomas, are of major concern in elderly populations.<sup>(4)</sup>

Despite their clinical relevance, few comprehensive studies have been carried out in Iran to investigate the epidemiology and clinicopathological distribution of spinal lesions. The present study aims to fill this gap by analyzing the data of 10 years from hospitals affiliated with Shahid Sadoughi University of Medical Sciences in Yazd.

## Materials & Methods

### Study Design and Setting

This was a descriptive cross-sectional study conducted between 2008 and 2018 at Shahid Sadoughi and Shahid Rahnemoun Hospitals in Yazd, Iran. The patients diagnosed with spinal lesions (benign or malignant) were included using a census sampling approach. Patients with incomplete records or missing pathology data were excluded. Data were collected from hospital archives and pathology departments using a pre-designed questionnaire. The variables included: Age, Sex, benign or malignant tumors, inflammatory lesions, cancer, lymphoma, sarcoma, etc. The tumor size, anatomical origin, related to vertebral distribution were documented.

### Statistical Analysis

Data were analyzed using SPSS version 22. Descriptive statistics (mean, standard deviation, frequencies, percentages) were calculated. Chi-square tests were used to assess associations between categorical variables, while independent t-tests were applied for continuous variables. A p-value <0.05 was considered statistically significant.

## Results

### Demographics

The mean age of patients was  $52.1 \pm 20.5$  years, ranging from 1 month to 89 years. Males comprised 70.2% (n=80) and females 29.8% (n=34). 63 lesions (55.3%) were benign, while 51 (44.7%) were malignant. Lumbar spine was the most affected site (64%), followed by thoracic (20.2%), sacral (13.2%), and cervical vertebrae (2.6%). The most frequent Pathology was inflammatory lesion (49.1%), followed by cancers (38.6%), lymphomas (4.4%), benign tumors (3.5%), sarcomas (0.9%), and others (3.5%).

### Statistical Associations

No significant association was found between lesion type (benign vs. malignant) and sex, age, anatomical origin, or year of diagnosis ( $p>0.05$ ). Mean lesion size did not significantly differ between benign and malignant lesions ( $p=0.134$ ).

## Discussion

This study provides one of the systematic evaluations of spinal lesions in Yazd, Iran. The findings indicate that benign lesions—mainly inflammatory in nature—were more prevalent than malignant ones, though

malignancies accounted for nearly half of cases. The predominance of lumbar involvement is consistent with previous studies, reflecting biomechanical stress and higher blood flow in this region, which may predispose it to infections and metastases. The male predominance observed is similar to reports in literature, although some studies have found no sex-related differences.<sup>(5, 6, 7)</sup>

Inflammatory lesions, including tuberculosis and brucellosis, accounted for nearly half of cases, underscoring the continued relevance of infectious etiologies in Iran, a country where these diseases remain endemic. Malignant lesions, particularly metastatic cancers and lymphomas, also constituted a significant proportion of cases, reflecting global trends in spinal oncology. Interestingly, no significant correlation was found between demographic or anatomical variables and lesion type, suggesting that both benign and malignant lesions can present across diverse age groups and spinal levels.

Our findings are in line with Weinstein et al.,<sup>(8)</sup> who reported similar proportions of benign versus malignant lesions, and Erfani et al.,<sup>(7)</sup> who highlighted the high frequency of metastatic involvement in Iranian populations. However, our study uniquely emphasizes the burden of inflammatory lesions in the region. These results highlight the importance of comprehensive diagnostic workups, including advanced imaging and biopsy, to differentiate between infectious, benign, and malignant spinal lesions. Early diagnosis is essential for preventing irreversible neurological damage and optimizing treatment outcomes.

## Conclusion

Benign inflammatory lesions were the most common spinal pathologies in this study, but malignant lesions comprised nearly half of the cases, with lumbar involvement being the most frequent site. No significant demographic or anatomical predictors were identified. These findings highlight the dual burden of infectious and neoplastic spinal diseases in Iran and underscore the need for early detection, multidisciplinary management, and multicenter studies to better define epidemiological trends and optimize treatment strategies.

### Conflict of interest

The authors declare no conflict of interest.

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