



# Research Week 2023

## Incidence and risk factors associated with spontaneous vertebral osteomyelitis

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### Keywords

Vertebral Osteomyelitis, Discitis, Risk Factors, Spinal Infection, Incidence

### Abstract

#### Introduction

Spontaneous vertebral osteomyelitis (VO) is a serious spinal infection with a rising incidence. Risk factors have been proposed, but there is limited literature on calculated risk due to small samples. The objective is to use a large national database to determine the incidence and risk factors of developing VO over an 11-year period.

#### Methods

A retrospective database study was conducted using a randomly generated population of 807,415 adult individuals from 2010-2020 in the PearlDiver database. Infection cases were identified using ICD-10 codes, and patients with prior spinal surgery were excluded. The incidence rate was calculated by taking the number of infection cases averaged over 11 years. Extracted data included demographics, alcohol-abuse, steroid-use, osteoporosis, diabetes, tobacco-use, cannabis-use, stimulant-use, and Charlson Comorbidity Index (CCI). Chi-squared analysis and logistic regression determined associated risks and random forest modeling was used to predict the most important factors.

#### Results

The incidence rate was 10.56/100,000 population per year. Spinal infection patients were older ( $61.6 \pm 14.2$  vs  $50.7 \pm 16.2$ ) and had a higher CCI score (CCI  $3.5 \pm 3.3$  vs  $0.1 \pm 0.5$ ). Logistic regression analysis demonstrated that infections were independently associated with stimulant use (OR=4.24), male gender (OR=1.85), cannabis use (OR=1.85), obesity (OR=1.70), alcohol abuse (OR=1.65), diabetes (OR=1.64), tobacco use (OR=1.55) and age (OR=1.01). Osteoporosis and age were weakly associated with spinal infections (OR=1.02, OR=1.01) and no association was found with the patient's CCI score (OR=0.93, 95% CI 0.77-1.08). Random forest modeling gave a good fit (AUC = 0.72) with stimulant use, alcohol use, and diabetes being the most significant contributors to the model.

## Conclusion

This study establishes the incidence rate of vertebral osteomyelitis of the spine and confirms the importance of risk factors such as alcohol abuse, diabetes, and stimulant use by both frequency and machine learning models. Age, osteoporosis, and comorbidity scores were not found to be important factors.