

# Factors Affecting Mortality and Complications in Mushroom Poisonings Over a 20 Year Period: A Report from Central Anatolia

## Yirmi Yılda Mantar Zehirlenmelerinde Mortalite ve Komplikasyonu Etkileyen Faktörler: Anadolu'dan Bir Rapor

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### SUMMARY

#### Objectives

Mushroom poisoning (MP) is one of the world's leading seasonal and regional health problems. The aim of this study was to analyze the relationship between clinical factors and outcomes of mushroom poisoning.

#### Methods

The study was conducted in the emergency department. The patients who presented between January 1st, 1991 and December 31, 2010 were retrospectively reviewed.

#### Results

599 MP cases were enrolled into the statistical analysis. The elderly group had a higher rate of mortality (8.8%) and complications (12.3%) ( $p=0.005$ ) (OR 3.98, 95% CI: 1.9291 to 8.2290;  $p=0.0002$ ). The patients who presented in summer had a higher rate of mortality (9.5%) and complications (11.9%) ( $p<0.001$ ). (OR: 3.83, 95% CI 1.7068 to 8.6074,  $p=0.0011$ ). The rate of mortality and complications in patients who had eaten self-harvested wild mushrooms (WM) was 6.8%, while those who purchased WM had a mortality and complication rate of 15.2% ( $p=0.016$ ), (Purchased WM OR 2.46, 95% CI 1.1609 to 5.2353,  $p=0.0189$ ). The rate of mortality and complications in the patients who presented with gastrointestinal symptoms was 9.9% (OR: 3.98, 95% CI 1.5503 to 10.2679;  $p=0.0041$ ).

#### Conclusions

Factors such as being elderly, summer season, purchased WM, and gastrointestinal symptoms were significantly associated with mortality and complications in our study.

**Key words:** Elderly; emergency department; mushroom; poisoning; summer season.

### ÖZET

#### Amaç

Mantar zehirlenmeleri (MZ) dünyanın önde gelen mevsimsel ve bölgesel sağlık problemidir. Bu araştırmanın amacı MZ'de klinik faktörlerle sonuçlar arasındaki ilişkiyi incelemektir.

#### Gereç ve Yöntem

Araştırma Acil Tıp departmanında gerçekleştirilmiştir. 1 Ocak 1991 ve 31 Aralık 2010 tarihlerinde başvuran hastalar geriye dönük olarak incelenmiştir.

#### Bulgular

599 MZ olgusu araştırmaya dahil edildi. Yaşlı hastalar daha yüksek mortalite (%8.8) ve komplikasyon (%12.3) oranına sahiptiler ( $p=0.005$ ). (Odd oranı [OO]: 3.98, %95 [Güven Aralığı] GA 1.9291 - 8.2290,  $p=0.0002$ ). Yaz aylarında başvuran hastalar daha yüksek mortalite (%9.5) ve komplikasyona (%11.9) sahiptiler (OO: 3.83, %95 GA 1.7068 to 8.6074,  $p=0.0011$ ). Mantarları kendi toplayıp yemiş olan hastalarda mortalite ve komplikasyon oranı %6.8 iken bu oran satın alınmış vahşi mantarlarda %15.2 idi ( $p=0.016$ ), (satın alınan mantarlar için OO: 2.46, 95% GA 1.1609 - 5.2353,  $p=0.0189$ ). Gastrointestinal semptomları olan hastaların mortalite ve komplikasyon oranı %9.9 olarak saptandı (OO: 3.98, %95 GA 1.5503 - 10.2679,  $p=0.0041$ ).

#### Sonuç

Yaşlılık, yaz mevsimi, satın alınmış vahşi mantarlar ve gastrointestinal semptomlar mortalite ve komplikasyonlar ile anlamlı ilişki göstermiştir.

**Anahtar sözcükler:** Yaşlılık; acil servis; mantar; zehirlenme; yaz mevsimi.

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## Introduction

Mushroom poisoning (MP) is one of the world's leading seasonal and regional health problems. Eating poisonous wild mushrooms (WM) can lead to unwanted reactions such as gastroenteritis or more severe pathologies including fatal liver failure. Fatal MP is very well described in the literature.

<sup>[1]</sup> Fortunately, though, the majority of MP cases have a good prognosis.

The Central Anatolian region of Turkey has considerable reputation in terms of MP. MP can be commonly observed in Europe, Anatolia and the Middle East, and the reports from these regions, including incidence and prognosis, have significant differences.<sup>[2-5]</sup>

In our previous studies, we tried to call attention to different aspects of MP.<sup>[6-8]</sup> These studies consisted of short-term data and had no detailed evaluation of the relationship between clinical data and outcome measures (mortality and/or complications). As far as we are aware, in the English literature, the number of studies evaluating this relationship and prognostic criteria is limited. Additionally, other studies have concentrated on different variables.<sup>[9-11]</sup>

The aim of our study was to analyze the relationship between clinical factors and outcomes of MP. In this study, we report MP cases admitted to our hospital serving four Anatolian cities with a total population of approximately two and a half million people over the last 20 years.

## Materials and Methods

### Hospital

The study was conducted in the emergency department of the university hospital, which is a tertiary care center for all medical and trauma patients, as well as for toxicology and environmental cases.

### Patients

The patients who presented or transferred to the emergency department and were diagnosed as MP between January 1st, 1991 and December 31, 2010 were included in the study group. The patients included into the study group were selected according to the inclusion criteria.

### Data acquisition

ICD-10 and 9 codes of MP were entered into the hospital information system. The list of cases was obtained by use of these codes. The detailed information of cases was found retrospectively in electronic health records as well as in archived patient files for cases admitted before 2007.

Basic descriptive data of cases including age (age groups [0-17: child and adolescent, 18-39: young adults, 40-64: middle age, 65 and older: elderly]), gender, presenting months and seasons, presenting symptoms (neurological, gastrointestinal, and other), how WM were obtained (self harvest from nature, purchased from public market), the means of admission (direct presentation or transferred), laboratory results (Blood Urea Nitrogen (BUN, mg/dL), Creatinine (Cr, mg/dL), alanine aminotransferase (ALT, U/L), aspartate aminotransferase (AST, U/L), clinical care area (emergency department, ward, or intensive care unit [ICU]), length of stay in the hospital, and outcome (mortality, complication (end stage renal failure, seizure disorder, etc.), full recovery) were collected.

### Inclusion and Exclusion Criteria

The patients who had the above clinical/laboratory details in their files were included into the study. The patients who had co-ingestion of drugs in overdose, drugs of abuse, missing clinical follow-up or did not have the above clinical/laboratory details in their files were excluded from the study.

### Outcome Measures

Patient data were evaluated for their relationships with mortality, complications (end stage renal failure, seizure disorder, etc.), and full recovery.

### Data Analysis

Statistical Package for the Social Sciences (SPSS, version 18) and Statistical Analysis and Graphics Software (NCSS 2007) were used for statistical analyses. Chi-Square and the Fisher Exact test were used for descriptive analyses. Kolmogorov-Smirnov test was used to show the distribution of the data. Mann-Whitney U-test in binary groups and Kruskal-Wallis One Way Analyses of Variance test for three or more groups of data were used, as the data did not show a normal distribution in the Kolmogorov-Smirnov test. Median values were given for the results of variables that did not show normal distribution. Odds ratio (OR) was calculated for variables that may affect the outcome, such as age, presenting symptoms, the way of obtaining WM, and admission. A p-value less than 0.05 was accepted as significant. SD: standard deviation, SE: standard error.

## Results

721 MP cases were admitted to the hospital within a period of 20 years. 117 cases who did not have clinical/laboratory information in their files and five patients who had been transferred to different cities were removed from the study. 599 cases were enrolled into the statistical analyses.

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