

EVALUATION OF POISONING CASES ACCEPTED AT INTENSIVE CARE UNITS 5 YEAR RETROSPECTIVE ANALYSIS

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ABSTRACT

Intoxication has been an important problem concerned social groups closely since old ages. According to Ministry of Health, in 2001, it was figured out that 11 672 people consulted in health institutes because of the intoxication. Nowadays, most of these cases occur by reason of medical drugs, recreational drug, industrial and agricultural toxics. In this retrospective study, between 2007-2011, we followed up individual properties, etiological factors, the period of admission to the hospital after intoxication, the period in intensive care unit, patients clinical situation during intensive care, type of toxicity, seasonal distribution of the acute poisoning cases admitted to the intensive care unit and these factors were evaluated if they were related to mortality

or not. Last 5 years, the number patients admitted intensive care unit with the reason of intoxication was 114. Female male ratio was 45,6 /54,4%. Single married ratio was 35/65%. Their average age was 36,1. Cause of the toxication was mostly medicines 52,6%. Herbicide was the second reason (32,5%). The main reason of toxication was suicide (77%). The most common way of poisoning was oral ingestion (90,4%) and 75,2% of patients used activated carbon in initial treatment. Only 15,3% of patients needed mechanic ventilator treatment and average day was 4 days. Glaskow Come Scale 13,13 on admission APACHE II score was 6,6. Mortality rate was 9,6%. There was no seasonal variation. Mortality rate was higher in the groups which, the admission time was more than 12 hours, in cases poisoned by methyl alcohol, needed mechanic ventilator, low GKS was and high APACHE II on admission. As a result, this retrospective study shows paralel results poisoned patient profile in Turkey. The

most common cause of poisoning is medical drugs. As a predictor of mortality; patients GKS and APACHE scores on admission, type of toxicity, by which way it is taken and the time of the admission to the hospital may lead the way.

KEYWORDS: Medical Drugs, Toxicology, Intensive Care, Poison.

INTRODUCTION

Intoxication term may be defined as exposure to substances that may have potential adverse effects on the body.^[13] It is known that the health of people has deteriorated by the introduction of various harmful substances to the organism since the time of mankind. Intoxication is an important public health problem and it is one of the most common reason in admission to the hospital.^[13] The annual incidence of poisoning cases in developed countries is between 0.2-0.93 in 1000 patients^[9-10-53] Reliable morbidity and mortality statistics are difficult to achieve in our country, despite being one of the major problems that emergency services often face. According to the data from the Ministry of Health, in 2001 11.672 people were referred to health institutions due to poisoning.^[31] Considering the limited number of epidemiological studies, the rate in Turkey of patients gone to the hospital for poisoning is between 0.8-5%.^[10-21-53] Nearly 5-30% of the multidisciplinary intensive care units have been used for poisoning cases.^[19-26-27-56]

The most common factors of acute poisoning cases in Turkey are respectively, medical drugs, pesticides, household chemicals, toxic gases and other chemicals, plants and foods (mushrooms) and venomous animal bites and stings.^[4] Mortality rates are reduced when timely and necessary interventions are made. The majority of patients only need supportive care. The main purpose of emergency intoxication therapy is to remove life-threatening elements. Besides symptomatic and supportive treatment for maintaining vital functions throughout the process of poisoning, special treatment is given by removing the poison from the body and administering antidotes in some poisonings.^[8]

In this retrospective study, it was aimed to evaluate the demographic and clinical features of acute poisoning cases accepted in the intensive care unit of Pamukkale University Faculty of Medicine, Department of Anesthesiology and Reanimation in the last 5 years.

MATERIALS AND METHODS

Our study was carried out with the aim of evaluating the cases of poisoning accepted to the Anesthesiology and Reanimation Intensive Care Unit of Pamukkale University Hospital after the approval of the Ethics Committee of Pamukkale University Faculty of Medicine. Patients admitted to intensive care unit at 18 years of age or older were included in the study. Demographic data of toxic events (sex, marital status, age), The type of substance causing the poisoning (medical drug, agricultural medicine, toxic gas, methyl alcohol and others), toxicity type (accident, suicide), time of arrival to the hospital, the duration, the way in which the poisoning occurred, and whether the patients used active charcoal in the first intervention have been recorded. Patients' intensive care stay periods, the presence of mechanical ventilation needs during this period, the neurological status during admission (GCS assessment), and the APACHE 2 score during admission were also included in the records. Clinical outcomes were determined as home discharge, other service cycle or death, and the seasonal morbidity of poisoning cases were recorded. The mortality effects of the parameters were evaluated separately.

SPSS (Statistical Package for Social Sciences) for Windows 17.0 program was used for statistical analysis. Descriptive statistical methods (Frequency, Percentage, Mean, Standard deviation) were applied when examining the parameters of the patients. In the comparison of the quantitative data in case of two groups, Mann Whitney U test was used for the comparison of the groups with no normal distribution, chi-square analysis was used between the cut-off variables. The results were evaluated at 95% confidence interval, $p < 0.05$ significance level and $p < 0.01$ advanced significance level.

FINDINGS

114 Of the 1153 patients admitted to intensive care unit over a 5-year period, were patients admitted to the hospital for poisoning (%9,8). 52 (45.6%) of the cases accepted as intoxication in intensive care unit were men, 62 (54.4%) cases were women. 74 (64.9%) of the patients admitted to intensive care unit with intoxication diagnosis were married, 40 (35.1%) were not married. 33 (63.5%) of the female cases were married, 19 (36.5%) were single; 41 (66.1%) of the male cases were married and 21 (33.9%) were single. The average age of the cases admitted to intensive care unit was $36,14 \pm 15,45$. Due to the fact that our study was performed with retrospective data, this data of 1 patient could not be reached. When the group of patients accepted intensive care with intoxication reason was evaluated in

terms of the substances they are exposed to; 60 patients (52.6%) imposed from medical medication, 37 patients (32.5%) imposed from pesticides, 2 patients (1.8%) imposed methyl alcohol, 5 patients imposed from gas exposures and 10 patients (8%,8) imposed from other substances.

When consider the seasons that intoxication cases came to the hospital. it has been determined that 35 (30.7%) of the patients were seen in spring, 29 (25,4%) of the patients were seen in summer, 27 (23,7%) of the patients were seen in fall and 23(20,2%) of the patients were seen in winter. When the time of cases admitted in the intensive care unit coming to the hospital was evaluated, 42 patients (38%) came between 00: 00-08:00, 19 (17.3%) came between 08: 00-16:00 and 49 (44.5%) came between 16: 00-24:00 hours. 4 patients' data were not available. It was determined that 97 (85,1%) of the cases admitted to intensive care unit applied to hospital in 0-6 hours, 10 (8,8%) of them applies to hospital in 6-12 hours and 7 (6,1%) of them applied to hospital in 12 hours and more. When the causes of intoxication in the intensive care unit were evaluated, 26 cases (22.8%) were found to be accidental and 88 cases (77.2%) were found to be poisoned after the items taken with suicide caste. It was determined that 103 (90,4%) patients were poisoned after peroral subject, 10 (8,8%) patients were poisoned as a result of inspiratory exposure and 1 (0,9%) patient was poisoned by parenteral way which is in the other ways classification. Transcutaneous intoxication hasn't been shown in our cases. Active coal was used at the first intervention period of 85% (75,2%) of the cases. The data about 1 people cannot be reached. The average duration of intensive care unit stay for patients admitted to intensive care due to poisoning was 3.1 ± 2.4 (1-18) days. While 17 (15,3%) patients were required ventilation, for 94(84,7%) spontaneous breathing was enough.. The data for 3 People couldn't be reached. The average duration of mechanical ventilation for the 17 patients who required mechanical ventilation was 4 ± 4.74 days.

The Glasgow Coma Score at the time of admission to the intensive care unit was $13,13 \pm 3,49$; the APACHE II score at the time of admission was 6.63 ± 6.04 . 2 patients' GCS and 5 patients' APACHE II scores were not obtained. After the treatment of patients admitted to intensive care unit because of intoxication, 93 (81.6%) of the cases were discharged home, 10 (8.8%) were transferred to another service and 11 (9.6%) resulted with death. When the relationship between the exposed substance and mortality was evaluated statistically, the significance in the methyl alcohol group was significantly higher than the other groups (%50,

$p < 0,05$). There was no statistically significant difference between the groups when the relation between the application time intervals and the mortality of the patients admitted to intensive care poisoning was evaluated. However, the mortality rate was found to be significantly higher in the patient group who applied to the hospital after 12 hours and when the mortality relation was evaluated between the time until the admission to the hospital and the mortality rate ($p < 0,01$). When the statistical relation between poisoning and mortality was evaluated in patients, the mortality rate was significantly higher in patients poisoned by parenteral route without poisoning by oral route and inhalation as poisoning route ($p = 0,005$). When the mortality relation and mechanical ventilation requirement was evaluated, it was found that the mortality was significantly higher in patients who received ventilator treatment ($p < 0,01$). When the relationship between GCS and APACHE II score and mortality was evaluated at the time of admission, GCS was significantly lower ($p < 0,01$) and APACHE II score was significantly higher in the patient group resulting in death ($p < 0,01$).

DISCUSSION

Poisoning cases are frequently encountered in emergency services and serious follow-up and treatment are required in intensive care units. The rate of intoxication cases to patients admitted to intensive care unit determined 10,06% in retrospective analysis made by Özayar *et al.*^[6] and 12,96% in a study made by Demir *et al.*^[3] In this study, poisoning cases constituted 9.8% of the patients who were accepted as intensive care, similar to the above studies. We see that in general in Turkey 10% of the patients admitted to intensive care unit is intoxication. If acute toxicity is suspected clinically, etiology and demographic features become very important in early diagnosis and treatment.^[7] In a study including 2004-2009, Yıldız *et al.*^[15] found man/woman patient rate as 30,7/69,3, Yüce *et al.*^[7] found this rate 28/72 as similar with the other one in the study made in Giresun region. In our study, unlike these studies, 54.4% of the patients were males and 45.6% were females. Regional and socio-economic factors may play a role in this difference. When we evaluate the marital status of intoxication cases, -marriage status was determined in the study of Avşaroğulları *et al.*^[42] 59,2%, it was determined in the retrospective study of Ayan *et al.*^[43] 60%. In Şanlıurfa in a study conducted by Cengiz *et al.*, the marriage rate in suicide intoxication was found to be 34,% and in the case of intoxication by accident it was found as 58.8%.^[44] In our study, 64.9% of the patients were married and 35.1% were single. This fact reveals the fact that intoxication cases throughout our country are generally seen in the married population.

It is known that 95% of the patients who are followed up for intoxication due to intensive care in large scale studies are poisoned as a result of attempted suicide.^[15] In a study conducted by Tüfekçi et al. around İstanbul, they found that 72% of intoxication cases were caused by suicide and 27% by accident.^[18] In our study, 77.2% of the cases of intoxication were suicide attempts and 22.8% of them were caused by accident. These values are compatible with our country and the world in general. However, in the study conducted by Kurt et al. at Aydın Adnan Menderes University Hospital emergency department^[46], most of the cases of intoxication are accidents. While 65,4% of the patients applied to the hospital with accidental intoxication, 34,6% applied after the poisoning due to suicide. The reason for this may be the fact that the region is dealing with agriculture and accidental intoxication are more frequent. The route of contact with the poison can usually be by oral, inhalation, intensive and parenteral route. In a study conducted by Göksu et al.^[4] oral intake was the most common type of poisoning with 78.8%. While inhalation toxicity was found to be 15.1%, skin contact was 3.4%, intravenous injection of toxic substance was found to be 2.7. In the analysis made in India, oral exposure was found to be 97.8%, intravenous exposure was 1.4%, skin contact was 0.7%.^[17] In our evaluation, the rates of intoxication were 90.4% oral, 8.8% inhalation and 0.9% parenteral exposure. The most frequent cause of intoxication is in our country where suicide attempt is the most common and in our study it is expected that oral route is the most common route of exposure. Oral pathway is also the easiest way to tolerated by patients, and this may explain why suicides are the most commonly made with oral route. In a review about intoxications, it was reported that the highest doses of drugs (analgesics and antidepressants) were taken for the purpose of suicide in developed countries, mortality was about 0.5% in these cases, pesticides were frequently used in developing countries and mortality could reach 20%.^[47] In a study covered Marmara region and conducted by Akköse et al., drugs ranked first with 59.68%; food poisoning was second with 11.28%; mushroom poisoning in third place with 3.35% and respiratory poisoning with carbon monoxide in fourth place with 6.93%.^[5] In the Aegean region, in the evaluation of Şencan et al.^[16], organophosphates are in the first place with 45.4% whereas medical drugs are in second place with 40.3%. In the study of poisoning outside of our country, Lee et al.^[49] determined that the drugs were reported as first as the cause of poisoning (49.9%) and the second was pesticides (14.5%). In Iran, the drugs are ranked first with 60,8%, second was pesticides (20,49%), third was opioids (4,5%) and fourth was cleaning substances (4,24%).^[10] Although exposure of substances varies locally, today medicines are receiving the first line. In our study, medicines were ranked in the first place with 52,6%, pesticides were ranked in

second place, the other causes including mushroom poisonings were third, and carbon monoxide poisonings were ranked fourth. In developed countries, the reason of intoxication is primarily medicines, while in developing countries the situation is different.^[47] Poisonings for the purpose of suicide are made mainly by agricultural drugs in developing countries.^[47] In a study conducted by Göksu *et al.*^[4], it is seen that organophosphate intoxication was the most common occurrence of poisoning incidents.^[4] In our study, the reason of pesticides to be ranked in second place may be accessing to pesticides is easy and most of the community in region do agriculture. The length of stay in intensive care unit in poisoning with pesticides was found to be longer than in other patient groups. Mushroom intoxication is a problem seen in a worldwide.^[29] Our country is very rich in terms of mushroom flora due to its environment-related conditions.^[30] In our study, a total of 6 patients (5.26%) reported a mushroom eating story. As in all other studies, autumn period has been a season in which the mushroom toxication has been seen most frequently. The way to prevent mushroom poisoning can be provided by not eating the uncultivated mushrooms (52Carbon monoxide (CO) poisoning is a common cause of poisoning in hospitals during the winter months. In a 20 month retrospective study, Ayan *et al.* determined that CO toxication forms the 22,2% of the total intoxication cases. In our study, 4.4% of patients were exposed to CO intoxication. Only 1 of them needed mechanical ventilation for 8 hours, and the other patients protected their spontaneous respiration. All of our cases were discharged home. In the studies carried out in our country; in a study made by Tüfekçi *et al.* in İstanbul the alcoholic poisoning rate was determined as 17% and the alcohol and illegal drug use was determined as 12%.^[18] In a study in which 16 cases methanol intoxications were made in Tunisia, Brahmi *et al.* determined the average age of methanol poisoning as 21.5 and assessed the clinical symptoms most commonly associated with central nervous system symptoms, gastrointestinal findings, visual loss, metabolic acidosis. 3 patients required mechanical ventilation and resulted in death.^[55] In a study of Şencan *et al.*, in İzmir region methanol poisoning was seen in 11 (9%) patients and 6 of these patients died. In this study, methanol has the highest mortality rate with 54.5%.^[16] In our study, 3 (2.6%) patients were poisoned with alcohol and illegal drugs; these patients did not require mechanical ventilation and the patients were discharged to home.

Poisoning constitutes an important part of applying for emergency services. In the study of Deniz *et al.*^[53] the time of admission to the hospital was between 16: 00-24: 00 as 55.6%. In the study of Yeşil *et al.*, the time of admission to the hospital was 53.1% and the nighttime

rate was 46.9% (2). In our study, 44.5% of the patients were admitted to the hospital between 16: 00-24: 00 and 38.2% of the patients were admitted between the hours of 00: 00-08: 00. These application times is compatible with the studies of Kılıçarslan *et al.*^[39] who determine that most common emergency application are made between 19.00-22.00.

When the time of appliance to the hospital is assessed after the substance the patients are exposed to;in a study of Kekeç *et al.*^[13], 63.2% of the patients applied to hospital in the first 5 hours; 4.4 hours in the study of Özayar *et al.*^[6] and it was determined as 7,61 hours in the evaluation of Yeşil *et al.*^[2] In our study, 85.1% of our patients applied to the hospital in the first 6 hours. Mortality was found to be significantly higher in the patient group who applied to the hospital 12 hours later.

Antidotes have a vital preventive effect on the cause of severe poisonings and to reduce the disease and mortality rates that come after it. Active coal, which is a local antidote, is the most common.^[6] In a study of Ozayar *et al.*, 100 of the 108 patients who were followed for poisoning reasons were used active carbon as antidote and 50 gr of activated charcoal was applied every 6 hours.^[6] It was stated that Cengiz *et al.* applied gastric lavage and activated charcoal to all patients who received oral ingestion in case of intoxication which accepted intensive care.^[44] In our study, 75.2% of the patients were using active charcoal in the first visit to the hospital and 24.8% were not used in our patients.

The duration of intensive care stay period are reported in various studies. In a study of Özayar *et al.*^[6] the duration of intensive care period of the intoxication cases stated as 2,7 days; in a study of Cengiz *et al.*^[44] it was 6,4 days averagely; in the study of Yüce^[7] it was 1,8 days averagely. In the study of Kaya *et al.*, the duration of intensive care stay period was determined as 8,9 days and the length of the stay was based on the substance taken . The average length of stay in organic phosphate-poisoned cases was found to be 13.9 days, 10.9 days for amitriptyline toxication and 9.4 days with antidepressant toxication.^[48] In our study, average duration of stay in intensive care unit was 3.1 days (1-18 days) for all poisonings.

Şencan *et al.*^[16] estimated GKS as 8,47 and APACHE 2 as 15,80. Being corresponding parameters GCS 13,134 and APACHE 2 6,633 in our study; it may indicate that patients are more likely to accept intensive care or that patients may be caught at an earlier stage. Liisanantti *et al.* found in a comprehensive study of acute drug-induced intoxication in elderly patients investigating risk factors for prolonged hospitalizations and deaths in intensive care

units that the intensive care mortality rate of 2755 poisoned patients was 1.5% and the APACHE 2 score is 27.4 GCS was 9.7 in a patients resulted with death.^[57] The low GCS and high APACHE II scores at the time of admission were closely related to mortality. These scores may be helpful in predicting the length of stay in intensive care unit at the time of first admission, planning the treatment of the patient, and in the clinical course of the patient.

In the studies of Cengiz et al., 11 pesticide poisoning, 9 poisoning with medication, 9 poisoning with other reasons were seen, and the average of mechanical ventilator requirement was 3.2 days.^[44] In the studies of Kaya et al. evaluating the mechanical ventilation requirements and durations according to the active substances, the need for mechanical ventilation was found to be the highest (65%) and the duration was found to be 9.7 days in case of poisoning with organic phosphate.^[48] In our study, the need for mechanical ventilation was present in 17 patients (15%) and the average duration of mechanical ventilation was 4 days. Of the patients requiring mechanical ventilation, 8 were poisoned with medication (47.05%), 4 were poisoned with fungal poisoning (23.5%), 3 were poisoned with agrochemical (17.6%) and 2 were poisoned with methyl alcohol (11,7%).11 of our 17 patients (64.7%) who required mechanical ventilation resulted in mortality. The need for mechanical ventilation was significantly associated with mortality. While in a study conducted in Ankara, deaths were observed in 1/108 patients (0,92%) in the analysis of two-year poisonings^[6], in the Eastern Anatolia region, in the study of Katı et al., 83.6% of the patients were discharged in a healthy manner after the follow-up and treatment,16,4% resulted in death and methyl alcohol, fungal poisoning, organophosphate poisoning resulted in death.^[14] In our study, 93 patients were discharged home (81,6%), 10 patients were transferred to psychiatric services (8.8%) and 11 patients died (9,6%). The most common causes of death were medicines with 6 patients. Agricultural medicines (2 patients), mushroom poisonings (2 patients), methyl alcohol (1 patient) are other reasons.

As a result, the most frequent poisonings are with medicines. Deaths in acute poisonings are closely related to poisoning effect. These results also suggest that the general condition of the poison power, the patient's condition, the GCS, APACHE 2 scores may be very effective on the clinical outcome.

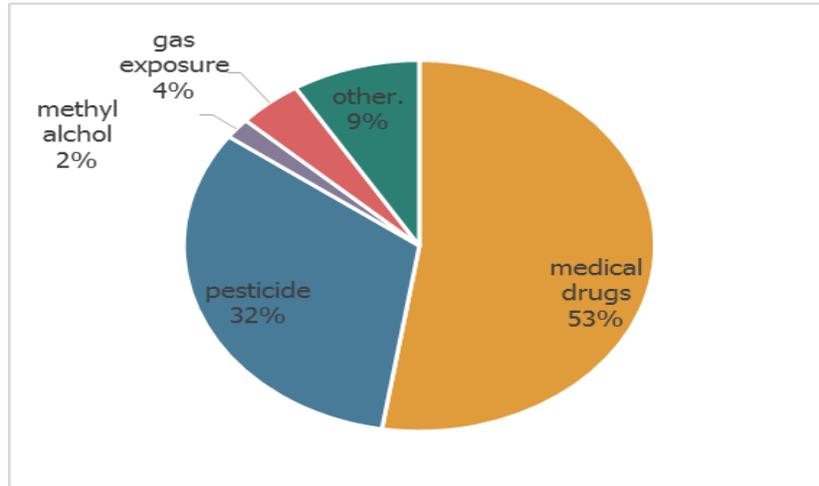


Figure 1.

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