



Assessment of prehospital medical care for the patients transported to emergency department by ambulance



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ABSTRACT

Objectives: In our study we aimed to investigate the quality and quantity of medical management inside ambulances for 14 and over 14 years old patients transported to a level three emergency department (ED).

Material and methods: Our study was conducted prospectively at a level three ED. 14 and over 14 years old patients who were transported to the ED by ambulance were included in the study consecutively. "Lack of vital rate" was described as missing of one or more of five vital rates during ambulance transportation. Both of two attending emergency physicians evaluated the medical procedures and management of patients at the ambulance simultaneously and this was recorded on the study forms.

Results: Four hundred and fifty six patients were included in the study. Missing vital signs were identified for 90.1% (n = 322) of the patients that were transported by physicians and 92.4% (n = 73) of the patients that were transported by paramedics. For five patients with cardiac arrest two (33.3%) had cardiopulmonary resuscitation (CPR), one (20%) was intubated, one (20%) received adrenaline. Out of 120 patients, needed spinal immobilization, 69 (57.5%) had spinal board. Cervical collar usage was 65.1% (n = 69) We have revealed that 316 (69.3%) patients did not receive at least one of the necessary medical intervention or treatment.

Conclusion: During ambulance transportation, life-saving procedures like cardiopulmonary resuscitation, vital sign measurement, crucial treatment administration, endotracheal intubation, defibrillation, fracture immobilization were not performed adequately. Increasing the training on the deficient interventions and performing administrative inspections may improve quality of patient care.

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1. Introduction

Primary mission for prehospital emergency services are bringing patients from the scene to the hospitals as soon as possible. In addition to that medical approach during transportation for critically ill patients may be lifesaving.¹ In our country with 20 years of history 112 Emergency and Rescue Services have

designated standards and the quality and quantity of minimum medical equipment and materials, the job description of paramedics and emergency medical technicians (EMTs), the medical management flow charts are also have detailed descriptions.^{2,3} There are limited number of studies that are investigating the adequacy of proper medical management and treatment during ambulance transportation in our country.^{4–8}

In our study, we aimed to investigate the quality and quantity of medical management inside ambulances for 14 and over 14 years old patients transported to a level three emergency department (ED).

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2. Material and methods

Our study was conducted prospectively at a level three ED with around 200.000 annual patients. Prior ethical committee approval was obtained. 14 and over 14 years old patients who were transported to the ED by ambulance, from November 15th to December 15th 2011 were included in the study consecutively. Informed consent was obtained from all of the patients or their relatives. Patients who did not accept to participate or patients without adequate data were excluded from the study. During the study period, overall patient count of all ED patients and patients who were transported by ambulance was obtained from hospital information system.

Patients' demographic variables, initial diagnosis for patients who were transported from the scene, trauma mechanisms, case arrival times and ED arrival times, type of ambulance and medical personnel, prehospital medical approaches and treatments were obtained by the ED resident physicians and recorded at the study form. "Lack of vital rate" was described as missing of one or more of five vital rates (systolic and diastolic blood pressure, respiratory rate, pulse rate, oxygen saturation level and temperature) that should have been evaluated during ambulance transportation. Both of two attending emergency physicians evaluated the medical procedures and management of patients at the ambulance simultaneously and this was recorded on the study forms.

Statistical analyses were performed using "Statistical Package for Social Sciences (SPSS) for Windows version 17.0" (SPSS Inc., IL, USA) program. Quantitative variables were analyzed with one way variance analysis (Anova). Quantitative variables were defined as count and percentage (%), qualitative variables were defined as average \pm standard deviation (SD) or mean (minimum–maximum).

3. Results

During study period, among 30.808 overall ED patients, 2.8% ($n = 873$) were brought in the ED by ambulance. Four hundred and seventeen patients were excluded due to insufficient data or missed recordings as a result of overcrowding at the ED. Four hundred and fifty six patients were included in the study. Two hundred and fifty seven (56.4%) of the patients were male and the average age of all the patients was 53.7 ± 21.8 (range 14–94 years).

We found that 171 (37.5%) of the patients were brought to ED due to trauma and 285 (62.5%) due to non-trauma related reasons. Three hundred and fifty four (77.6%) of the patients were transported from the scene and 102 (22.4%) were transported from other medical facilities. Accompanying medical personnel inside the ambulance were 357 (78%) medical doctors, 79 (17%) paramedics, 13 (3%) EMTs and seven (2%) nurses. 57.7% ($n = 263$) of the patients were discharged from the ED, 29.6% ($n = 135$) were admitted to wards or intensive care units, 7.2% ($n = 33$) were sent to other facilities while 4.4% ($n = 20$) of the patients refused medical attention and left the ED and 1.1% ($n = 5$) have died.

We found that recorded vital signs were missing for 90.1% ($n = 322$) of the patients that were transported by physicians, 92.4% ($n = 73$) of the patients that were transported by paramedics, 76.9% ($n = 10$) of the patients that were transported by EMTs and 100% ($n = 7$) of the patients that were transported by nurses. Most missing vital signs were temperature (88.4%, $n = 403$), oxygen saturation (55.9%, $n = 255$), respiratory rate (48.7%, $n = 222$), pulse rate (21.9%, $n = 100$) and blood pressure (11%, $n = 50$).

Evaluation of two attending emergency physicians revealed that for the patients that needed intravenous (IV) line inside the ambulance 47.6% ($n = 216$) had proper intervention, 27.8% ($n = 126$) had none and 24.7% ($n = 112$) had improper intervention (22 gauge or less IV line or inactive IV line).

Table 1

The medical interventions that needs to be performed by the ambulance personnel and the application rates.

Medical intervention	Necessity of the intervention n	Performed intervention n (%)
Defibrillation	2	–
Endotracheal intubation	6	2 (33.3)
Oxygen administration	161	79 (49.1)
Cardiopulmonary resuscitation	6	2 (33.3)
Airway administration	10	6 (60)
Blood glucose measurement	93	50 (53.8)
Cervical collar administration	106	69 (65.1)
Spinal board administration	120	69 (57.5)
Fracture immobilization	15	4 (26.7)
Bleeding control	18	13 (72.2)
Heating blanket administration	1	–

The medical interventions that needs to be performed by the ambulance personnel and the number of applications and their percentages are shown at Table 1. The medication that needs to be given by the ambulance personnel and the application rates are shown at Table 2.

We have identified that among 456 patients, 316 (69.3%) of them had at least one necessary medical application or treatment that was never performed by the ambulance personnel.

4. Discussion

Prehospital medical services have been established for immediate transfer and treatment of seriously injured and critical patients. In spite of that the recent increased usage of ambulances by the patients with low level injuries and non emergency reasons complicates their capabilities.⁹ In our country, with the development of prehospital services, ambulance protocols for minimum medical equipment and materials and necessary medical interventions have been tried to standardize.^{2,3}

In this study that we aimed to investigate the proficiency of medical management for the patients transported by ambulances, we have revealed that 316 (69.3%) patients did not receive at least one of the necessary medical intervention or treatment. Similarly in 2002 Soysal et al surveyed 58 participants (emergency medicine residents, attending physicians, faculty members) and discovered that 46.6% of the participants defined prehospital emergency interventions as inadequate.¹⁰ The reasons for that may be short

Table 2

The medication that needs to be given by the ambulance personnel and the application rates.

Medication	Necessity n	Performed n (%)
Adrenalin	5	1 (20)
Nitroglycerin	26	6 (23.1)
Salbutamol	15	1 (6.7)
Saline	115	23 (20)
Antihistaminic	1	1 (100)
Antiemetic	10	1 (10)
Active charcoal	5	–
Atropine	3	1 (33.3)
Captopril	28	10 (35.7)
Insulin	12	–
Dextrose	1	1 (100)
Steroid	6	2 (33.3)
Benzodiazepine	1	–
Morphine	6	–
Oxygen	25	7 (28)

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