



Epidemiological Characteristics of Road Traffic Injured Patients Transferred by Air Medical Service

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Dear Editor,

The rapid transport of severe road traffic traumatic injured patients and access to a definitive trauma care center is the principle of trauma care (1). Air medical transport (AMT) usage brings advanced care to critically injured patients. The patients that receive the most benefits from air transport have not been clearly identified (2). Iran has one of the greatest mortality rates due to road traffic accidents. The second leading cause of death in Iran is attributed to traffic accidents (3). AMT in Iran is very young and mostly works in the capital city of Iran. This was a retrospective cross-sectional study conducted from January 1st, 2015 to January 1st, 2016 at Taleghani hospital, Mashhad, Iran. Taleghani hospital is the only referral center for (RTI) trauma patients transferred by air in the northeast of Iran. All hospital records from AMT during year 2015 were gathered. Demographic data and other variables were analyzed using SPSS version 16 (statistical package for scientific studies). All AMTs were done according to the Iranian emergency medical service (EMS) law.

A total of 43 patients were transported via AMT during year 2015. Overall, 35 patients (81.4%) were male and eight (18.6%) were female. Mean age was (year) = 25.87 ± 14.1 . Thirty-two (74.4%) patients were aged 15 to 55 years old. These data show that most trauma patients are young and represent the economically active part of the society. This result is similar with other air transported traumatic patient studies (4). The most common mechanism of injury in this study was car rollover, which totaled 24 (55.8%). The most common injury was head trauma (36; 83.7%) yet most of them had no findings in brain CT scans. However, 10 (23.3%) had GCS < 15, and the only death in this study occurred due to severe brain injury. The current results

are consistent with a survey that was done in the capital city of Iran (5). Also, 60% of patients with GCS < 15 had a rollover mechanism. It is well known that car rollovers have a higher mortality and morbidity rate than any other crash type (6). All patients with GCS < 9 were intubated and ventilated via the rapid sequence intubation technique. Most patients were discharged home with no complications (37; 86.4%).

One of the most important rules in trauma care is the golden hour after injury, which helps in transferring patients to a proper trauma center. Access to trauma care within this period of time can decrease morbidity and mortality (7). In this study, the mean time of transport was 56 ± 19.47 minutes and mean injury severity score (ISS) was 12.07 ± 13.17 . In the survey that was done in the capital city of Iran, the mean time of transport was 54 minutes and the mean ISS score was 8.6. About half of the patients had minor trauma (5). Mean hospital stay was 4.2 ± 4.8 days and 17 (39.5%) patients had hospital stay durations of less than 24 hours. All of them had ISS < 5, which indicates minor trauma. In total, 24 (55.8%) patients had ISS < 5 and 14 (32.6%) had ISS > 15.

It is also important to emphasize that head trauma was the most common injury with adverse consequences, and serious injuries, and only primary GCS evaluation, could not be ruled out at the scene of the accident. Another important emphasis is that car rollover consists of a considerable part of the mechanism of injury in this study. It is known as the most dangerous mechanism and may be one of the leading causes of excessive triage of patients.

The diagnosis of patients, who benefit most from AMT, has always been debated. Recently, some studies have attempted to develop more specific criteria for air trans-

Table 1. Description of GCS, Outcome, ISS and Rate of ICU Admissions

GCS	No. (%)
GCS = 15	33 (76.7)
8 < GCS < 15	7 (16.3)
GCS < 9	3 (7)
ICU admission	11 (25.6)
Outcome	
Discharge with no complication	37 (86.4)
Discharge with complication	5 (11.6)
Death	1 (2.3)
ISS > 15	14 (32.6)

Abbreviations: ICU, intensive care unit; ISS, injury severity score.

port (8). Despite these criteria, approximately 50% of traumatized patients transported by helicopters in the United States had minor traumas. This revelation imposes unnecessary costs on the health system (9). In this study, 24 (55.8%) patients had minor trauma. Therefore, there is a serious need for the advent of more specified criteria and consideration all possible situations for more efficient air transport to prevent unnecessary costs of AMT.

References

1. Sampalis JS, Denis R, Lavoie A, Frechette P, Boukas S, Nikolis A, et al. Trauma care regionalization: a process-outcome evaluation. *J Trauma Acute Care Surg.* 1999;**46**(4):565–81.
2. Khurana H, Mehta Y, Dubey S. Air medical transportation in India: Our experience. *J Anaesthesiol Clin Pharmacol.* 2016;**32**(3):359–63. doi: [10.4103/0970-9185.173377](https://doi.org/10.4103/0970-9185.173377). [PubMed: [27625486](https://pubmed.ncbi.nlm.nih.gov/27625486/)]. [PubMed Central: [PMC5009844](https://pubmed.ncbi.nlm.nih.gov/PMC5009844/)].
3. Saadat S, Soori H. Epidemiology of traffic injuries and motor vehicles utilization in the capital of Iran: a population based study. *BMC Public Health.* 2011;**11**:488. doi: [10.1186/1471-2458-11-488](https://doi.org/10.1186/1471-2458-11-488). [PubMed: [21693056](https://pubmed.ncbi.nlm.nih.gov/21693056/)]. [PubMed Central: [PMC3141457](https://pubmed.ncbi.nlm.nih.gov/PMC3141457/)].
4. Thomas SH, Harrison TH, Buras WR, Ahmed W, Cheema F, Wedel SK. Helicopter transport and blunt trauma mortality: a multicenter trial. *J Trauma.* 2002;**52**(1):136–45. [PubMed: [11791064](https://pubmed.ncbi.nlm.nih.gov/11791064/)].
5. Salimi J, Khaji A, Khashayar P, Bande MK. Helicopter emergency medical system in a region lacking trauma coordination (experience from Tehran). *Emerg Med J.* 2009;**26**(5):361–4. doi: [10.1136/emj.2008.060012](https://doi.org/10.1136/emj.2008.060012). [PubMed: [19386878](https://pubmed.ncbi.nlm.nih.gov/19386878/)].
6. Bidez MW, Cochran JE, King D, Burke DS. Occupant dynamics in rollover crashes: influence of roof deformation and seat belt performance on probable spinal column injury. *Ann Biomed Eng.* 2007;**35**(11):1973–88. doi: [10.1007/s10439-007-9355-1](https://doi.org/10.1007/s10439-007-9355-1). [PubMed: [17641975](https://pubmed.ncbi.nlm.nih.gov/17641975/)]. [PubMed Central: [PMC2040176](https://pubmed.ncbi.nlm.nih.gov/PMC2040176/)].
7. Harmsen AM, Giannakopoulos GF, Moerbeek PR, Jansma EP, Bonjer HJ, Bloemers FW. The influence of prehospital time on trauma patients outcome: a systematic review. *Injury.* 2015;**46**(4):602–9. doi: [10.1016/j.injury.2015.01.008](https://doi.org/10.1016/j.injury.2015.01.008). [PubMed: [25627482](https://pubmed.ncbi.nlm.nih.gov/25627482/)].
8. Brown JB, Gestring ML, Guyette FX, Rosengart MR, Stassen NA, Forsythe RM, et al. Development and Validation of the Air Medical Prehospital Triage Score for Helicopter Transport of Trauma Patients. *Ann Surg.* 2016;**264**(2):378–85. doi: [10.1097/SLA.0000000000001496](https://doi.org/10.1097/SLA.0000000000001496). [PubMed: [26501703](https://pubmed.ncbi.nlm.nih.gov/26501703/)]. [PubMed Central: [PMC4841741](https://pubmed.ncbi.nlm.nih.gov/PMC4841741/)].
9. Delgado MK, Staudenmayer KL, Wang NE, Spain DA, Weir S, Owens DK, et al. Cost-effectiveness of helicopter versus ground emergency medical services for trauma scene transport in the United States. *Ann Emerg Med.* 2013;**62**(4):351–364 e19. doi: [10.1016/j.annemergmed.2013.02.025](https://doi.org/10.1016/j.annemergmed.2013.02.025). [PubMed: [23582619](https://pubmed.ncbi.nlm.nih.gov/23582619/)]. [PubMed Central: [PMC3999834](https://pubmed.ncbi.nlm.nih.gov/PMC3999834/)].