

## ORIGINAL ARTICLE

# Prognostic factors in falls from heights: the injury pattern of death

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## ABSTRACT

**BACKGROUND - AIM OF THE STUDY:** Falls from heights are common causes of multisystemic injuries. It is not easy to predict the prognosis of these cases because many factors are involved. Although there are suggested injury patterns, a great importance is given to the height of the fall. Aim of this study is to investigate the prognostic factors in falls from heights, through a retrospective study.

**METHODS:** During the period 1996-2005, 120 fall victims were admitted in the Surgical Department of Sismanoglion Hospital, Thrace, Greece. In total, 97 patients had a fall from a height > 2 metres and were included in the study. The age of the study subjects varied from 5 to 77 years (mean age 37 years old). We collected information on the injuries recorded, the interventions made, the severe injury patterns and the mortality. For statistical analysis we used the Chi-Square Test (Yates corrected).

**RESULTS:** Head injuries were present in 85 patients and maxillofacial injuries in 15 patients. Thoracic injuries were diagnosed in 27 cases, pelvic fractures in 15 fall victims (with synchronous retroperitoneal haemorrhage and spine injury in 13 patients). Extremities' fractures were found in 86 cases. Abdominal injuries were present in 11 cases (a rupture of spleen or liver was diagnosed in 9 cases). An urgent thoracotomy was needed in 2 cases, and orthopaedic operations were executed in 12 cases. Neurosurgery was needed in 8 patients while maxillofacial surgical repair was performed in 12 cases. A number of 14 patients were admitted in the Intensive Care Unit (ICU), for 12 days to 5 months. The mortality of our study group was 2 deaths in the first post traumatic week and 2 more deaths in the first post-traumatic month. All fatal accidents happened after a fall from a height > 15 metres. A severe head injury was present in all patients admitted in ICU, while a haemorrhagic shock was present in all lethal cases and in 9 critically injured patients admitted in the ICU.

**CONCLUSIONS:** According to our results and the international bibliography, if the height of the fall is more than 15 metres, then prognosis is poor. Fall victims with hemorrhagic shock at the admission and concomitant brain

injuries represent a lethal injury pattern. We suggest that one injury pattern cannot represent all cases of falls from heights, and that only a combination of trauma scale scores and personalized complementary information including Hospital competency and need for teamwork, may predict the final prognosis.

**Keywords:** *free fall, vertical deceleration, vertical deceleration injuries, prognosis.*

## INTRODUCTION

Thousands of cases of very serious injury and death resulting from falls has been reported in construction industry, most from elevation and including stairs and lack of training and supporting equipment. The fall accidents assessment have led to improved engineering designs and numerous training courses for workers. Fall protection has become essential knowledge for any engineer designing structures and buildings since only the engineer can evaluate the effect of potentially high forces on his designs and reasonably prevent damage by planning. All fall protection products are scientifically designed to protect from fall hazards and are categorized according to the kind of use and maximum protection ability. Special safety standards are reported about the preventive maintenance of the old equipment against heat, chemical substances, ultraviolet rays, flames, paints and solvents.

If a personal fall protection system that prevents a fall is to be used, it should be one designed to prevent the user reaching zones where the risk of a fall exists, or one that prevents the onset of a fall. Where it is not applicable to use a system that prevents a fall, then, as a last resort, a fall arrest system should be used. Many deaths could have been avoided if construction companies had ensured safe conditions of work. Through governmental organizations, important progress has been recorded to solve and resolve fall hazard situations, worldwide. The security planning is developed in three main areas of protection; head protection, fall protection and body protection. Also, there are 3 categories according the height (6 feet, 10 feet and 15-30 feet).<sup>1</sup>

Engineers have worked for understanding the physics of a fall, more that medical researchers have. This is proved by the small number of medical publications in this field during the past 45 years, which in Pubmed database has a ratio 1:219 in comparison to the publications

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