

The Utility of Predictive Traumatic Scores in Abdomino-Pelvic Trauma and "Open Book" Fracture Simulation Using a Three-Dimensional Pelvic Model

The thesis addresses the fundamental issues related to stadialisation of the abdomino-pelvic injuries using predictive scores and describes a new method for modeling pelvic fractures using informatical soft-wares.

The general part of the thesis is divided into four chapters:

Chapter 1 describes the anatomy of the pelvis, focusing on the vessels of the pelvis and the pelvic diameters.

Chapter 2 presents the classifications of pelvic fractures.

Chapter 3 describes in detail the physiological, anatomical and mixed trauma scores most frequently used in trauma.

Chapter 4 highlights the characteristics of symptoms, clinical examination, imaging and treatment of patients with severe trauma involving abdominal organ injuries and fractures of the pelvis.

The special part of the thesis contains two studies:

Study I is entitled **Prediction of the evolution of polytrauma patients using trauma scores and identification of the factors which influences the survival**. This retrospective study addresses research on the utility of predictive trauma scores (GCS, RTS, ISS, TRISS and ASCOT) in the staging of trauma and in evaluating treatment efficiency in patients with severe trauma. The study includes 38 patients with abdominal injuries associated with pelvic fractures, which required emergency surgery. The predictive scores were calculated. Mean survival probability based on TRISS methodology was 62.58%. According to ASCOT methodology the probability of death was 31.64%. There was no statistically significant difference in the prediction of survival with the two methodologies ($p=0.5401$). The mortality in the study group was 39.47% (15/38). W score in TRISS methodology was -1.8 and -7.8 in ASCOT methodology. Differences between actual and predicted mortality were not significant ($p=0.8555$ and $p=0.3335$ in TRISS, respective ASCOT). Bleeding was the most important cause of death. Factors influencing survival were systolic blood pressure ($p<0.0001$), anemia ($p=0.0061$) and blood pH ($p<0.0001$). Factors which had not influenced statistically the survival were as follows: age of the patients ($p=0.1022$), platelet count ($p=0.7926$), INR ($p=0.2359$) and body temperature ($p=0.3869$). The study concluded that the use of predictive scores can help in evaluation of the treatment efficiency in trauma patients with abdomino-pelvic injuries. We recommend the use of these scores in trauma to develop a common language that could be the basis for improving the treatment of trauma patients.

Study II is entitled **"Open book" pelvic fracture simulation with a tridimensional model**. This study presents a new approach in pelvic volume calculation. This chapter describes a tridimensional pelvic model that was constructed using computer soft-wares and permits the simulation of pelvic fracture, with the help of engineering programs. Pelvic volume was recalculated after each degree of disjunction of the pubis. Average pelvic volume was 1005.97cm³. Transverse pelvic diameter increased significantly at 2 cm disjunction ($p=0.0283$), promonto-suprapubic and

biischadic diameters increased significantly at 6 cm disjunction ($p=0.0014$ and $p=0.0088$). The pelvic volume presented an exponential growth, a significant difference was noted at 6 cm pubic disjunction ($p=0.0088$). A 10 cm disjunction of the pubis resulted in 51.36% increase of the original volume. We concluded that in case of "open book" pelvic fracture it could be helpful to measure the disjunction of the pubis on the computer tomography image. It could guide the traumatologist in taking decision regard reducing the pelvic volume.