

Polytrauma

Polytrauma and multiple trauma are medical terms describing the condition of a person who has been subjected to multiple traumatic injuries, such as a serious head injury in addition to a serious burn. The term is defined via an [Injury Severity Score](#) (ISS) equal to, or greater than 16.

There is a lack of a uniform definition of the term polytrauma. A consensus process was therefore initiated by a panel of international experts with the goal of assessing an improved, database-supported definition for the polytraumatized patient.

Polytrauma is a syndrome determined by the action of different powerful agents (e.g. mechanical, chemical) that affect at least two regions of the human body, with at least one of the injury having a lethal potential.

The newest definition of polytrauma implies the use of [injury severity score](#) (ISS)

ISS must be equal or greater than 17

Based on several consensus meetings and a database analysis, the expert panel proposes the following parameters for a definition of “polytrauma”: significant injuries of three or more points in two or more different anatomic AIS regions in conjunction with one or more additional variables from the five physiologic parameters. Further validation of this proposal should occur, favorably by multivariate analyses of these parameters in a separate data set ¹⁾.

Etiology

Polytrauma has very much changed in the last century due to the development of mankind (warfare techniques, car industry).

There are many causes of major trauma, blunt and penetrating, including falls, motor vehicle collisions, stabbing wounds, and gunshot wounds. Depending on the severity of injury, quickness of management and transportation to an appropriate medical facility (called a trauma center) may be necessary to prevent loss of life or limb. The initial assessment is critical, and involves a physical evaluation and also may include the use of imaging tools to determine the types of injuries accurately and to formulate a course of treatment.

Evaluation

Age

blood sugar level

vital signs

brain trauma severity

comorbidities

coagulation profile

spine trauma-related neurologic status

spine injury characteristics of the patients.

Scores

[Injury Severity Score](#)

[Abbreviated Injury Scale](#)

Organ Injury Scales

Glasgow Coma Score

Glasgow Paediatric Coma Score

Revised Trauma Score

[Trauma Injury Severity Score \(TRISS\)](#)

spine-injured polytrauma

Early independent risk factors predictive of suboptimal physical health status identified in a level 1 trauma center in polytrauma patients with spine injuries were tachycardia, hyperglycemia, multiple chronic medical comorbidities, and thoracic spine injuries. Early spine trauma risk factors were shown not to predict suboptimal mental health status outcomes ²⁾.

American Spinal Injury Association classification

see [spine trauma](#)

CT Scan

Head – routine head (spiral) in head folder

Lateral topogram

5 mm axial slices over view whole-head recon

1 mm axial slices cranium whole-head recon

1 mm axial slices bone whole-head recon

4d recon whole-head angle to lowest border of occiput and supra-orbital margin

Outcome

Outcome Scores

Glasgow Outcome Score

Injury Severity Score Calculator

Revised Trauma Score Calculator

TRISS Calculator

<http://www.trauma.org/archive/scores/index.html>

Short Form 12-Questionnaire Health Survey (SF-12)

see [intracranial pressure monitoring](#)

Complications

Patients after [polytrauma](#) suffer from posttraumatic [immune system](#) dysregulation and [multiple organ dysfunction syndrome](#). [Genome-wide microarray analysis](#) in [monocytes](#) revealed a regulatory network of [inflammatory markers](#) around the [AP-1 transcription factor](#) in severely injured patients. Recent research focuses on the role of [neutrophils](#) in posttraumatic [inflammation](#). The aim of a study was, to evaluate the impact of this inflammatory network in neutrophils.

Blood sampling and neutrophil separation were performed on admission of the patient and at 6 h, 12 h, 24 h, 48 h, and 72 h after trauma. Neutrophil expression levels of the target genes c-Jun, c-Fos, BCL2A, MMP-9, TIMP-1, ETS-2, IL-1 β , and MIP-1 β were quantified by RT-qPCR. Patients were assorted into groups according to distinct clinical parameters like massive transfusion (>10 RBC units/24 h), injury severity (ISS), 90-d survival, and the presence of traumatic brain injury (defined by ICI on head CT). Statistics were calculated by Mann-Whitney Rank-Sum Test, Receiver Operating Curves, and binary multiple logistic regression.

Forty severely injured patients (mean ISS 36 ± 14) were included. BCL2A, MMP-9, TIMP-1, and ETS2 levels showed a significant correlation to 90-d-survival in the early posttraumatic period (6 h-24 h). Furthermore, differential BCL2A, IL-1 β , MIP-1 β , and MMP-9 regulation was observed in patients requiring massive transfusion. Bogner-Flatz et al. could further show a significant TIMP-1 response in trauma PMN associated with traumatic brain injury.

This study of seriously injured patients highlights very early posttraumatic transcriptional changes in [polymorphonuclear neutrophils](#), which were clearly associated with posttraumatic events and outcomes ³⁾.

Traumatic intracranial and intraabdominal injuries

Patients with loss of consciousness and/or GCS of 14 frequently undergo head CT. The addition of an abdomen CT scan in this patient population should be based on objective clinical criteria such as presence of abdominal tenderness and/or hematuria ⁴⁾.

Patients presenting with traumatic intracranial and intraabdominal injuries often require emergent care. Triage of injuries is based on severity of the individual injuries, but treatment occasionally must proceed simultaneously. Determining an optimal patient position at the time of surgery often produces unnecessary delays and this delay may negatively affect patient outcome.

Photographs of traditional exploratory [laparotomy](#) patient positioning (position A), traditional supine craniotomy patient positioning (position B), and a hybrid patient position (position C) were presented to 29 general surgeons and 12 neurosurgeons at a single institution. Surgeons were asked to rate the positions on acceptability and to rank the three positions according to preference when simultaneous exploratory laparotomy and craniotomy were necessary.

Position C was rated as an acceptable option by 82.8% of general surgeons and 100% of neurosurgeons. In addition, 51.9% of general surgeons and 81.8% of neurosurgeons preferred position C to their respective specialty's traditional patient positioning in situations that required simultaneous exploratory laparotomy and craniotomy.

A novel hybrid operative patient position for use during simultaneous exploratory laparotomy and craniotomy. In doing so, its important of constructive dialogue among trauma surgeons and neurosurgeons in optimizing the care of acutely ill trauma patients with multi system injuries ⁵⁾.

1)

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