# Focus on: Diagnostic and Prognosis of Severely Traumatized Patients

Major trauma, usually associated with hemorrhagic shock, requires the utmost effort to ensure survival and optimal rehabilitation. While the event that caused trauma cannot be influenced, and primary resuscitation depends on various circumstances, emergency room algorithms can be defined and learned. These standards, however, are influenced by advances such as those due to the introduction of new diagnostic methods (ultrasound, CT scan) [1, 2] or therapeutic protocols (damage control surgery) [3–6]. However, severely traumatized patients suffer from a wide variety of injury patterns, a common problem with clinical studies in this field.

Predicting survival by determining physiological parameters such as base excess, lactate and pH is one way of defining the severity of hemorrhagic shock. These physiological parameters, which are accounted for in trauma scores, appear to be of the greatest prognostic value when assessed during the first hour after admission, as reported in this issue by Abt et al. [7] from the Zurich Trauma Center. As well as physiological scores, anatomical scores are also very important, and combining both scores seems a reasonable approach. However, the tremendous variety of injury patterns, both anatomically and physiologically, makes them difficult to grade. A further step towards improving trauma scores is presented by Lefering [8], who describes the revised injury severity classification score (RISC), an outcome prediction score that takes the individual pattern of injury into account. This new score allows severely traumatized patients to be compared while accounting for their individual patterns. It is one of the main evaluative tools used in the German Trauma Registry, and shows great promise [1, 9–12].

Furthermore, comparisons between trauma centers can be problematic, since trauma patterns differ significantly between countries and areas [13]. In the paper of Wyen et al. [14], the injury patterns and diagnostic algorithms in an urban German university trauma center are depicted. The predominance of blunt trauma and importance of diagnostic timeliness over a five-year period are discussed. In this respect, optimized diagnostic procedures are warranted to ensure that important pathologies are not overlooked. It seems that missed injuries only lead to a fatal outcome in a minority of cases, as the important study of Söderlund et al. [15] demonstrates in an eight-year evaluation of early deaths in the emergency room. In certain cases, however, missing diagnoses or interpretations could have saved individual patients.

Interestingly, optimal diagnostic procedures not only prevent early trauma deaths; they can also predict the amount of posttraumatic inflammation. Maier et al. [16] demonstrated that the initial detection of lung contusions by spiral CT caused an immediate enhanced inflammatory response in combination with severe lung dysfunction. Moreover, patients with comparable injury severities but without initial visible lung contusions developed this degree of inflammation and lung dysfunction five days later in most cases. This indicates that early CT diagnostics may also be of value in initiating appropriate intensive care treatment.

Taken together, standardized algorithms and appropriate clinical, laboratory and technical diagnostic tools must be applied during initial clinical trauma care. These data can be used in individualized prognostic trauma scores, allowing improved clinical studies in the future.

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