

Classifying outcomes of care for injured patients

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SUMMARY

Many trauma survivors face challenges of impaired functioning, limited activities and reduced participation. Recovery from injury after acute care, therefore, becomes an important public health issue. This commentary discusses a framework for evaluating outcomes of acute care.

Advances in trauma care have increased the number of trauma survivors. In the United States, about 1.5 million injured patients are discharged from hospitals alive each year.¹ The largest trauma survivorship populations include patients treated for injuries to the extremities (survival rate 99%), the spine (96%), torso (95%), system-wide injuries (92%) and the head (89%).² Many of these patients face challenges of impaired functioning, limited activities and reduced participation. Recovery from injury after acute care, therefore, becomes an important public health issue.

Multiple interventions determine the overall outcome of care for trauma survivors. These include occupational and cognitive therapy, physiotherapy and other specialist care. Injured patients may need these interventions for long periods after the acute care phase. However, most evaluations of trauma care rely on data on the outcomes of acute care, such as deaths or complications. This approach provides limited information about the ultimate results of care for injured patients.

Some studies have made recommendations for the evaluation of trauma care using outcomes relevant to disability, including psychological adjustment, attainable functions, return to activities and participation (see the Appendix, available at canjsurg.ca). However, the complexity of care delivery has led to variation in how and when outcomes have been assessed. As a result, information obtained through these assessments reveals differing concepts of the recovery process, making studies noncomparable. At the same time, trauma care interventions are rarely studied in connection with the progress through different recovery states. Furthermore, no recommendation has been based on the outcomes of combinations of interventions. In our view, understanding the utility of disability outcomes for evaluating the quality of trauma care necessitates relating outcomes to progress toward recovery after injury.

Recently, Michael Porter proposed a framework relating outcomes of multiple interventions for treating a medical condition with the intended results of care.³ He argued that no single outcome captures the results of care. Rather, multiple outcomes reflect progress toward the intended result. In his view, outcomes of care form 3 domains of recovery: health status achieved, process of recovery and sustainability of health. These domains capture the entire process of care, rather than an individual intervention or a single care episode. Within each domain, condition-specific outcomes are arranged along the dimensions of recovery.

Using recent examples of Porter’s framework,⁴ the disability outcomes recommended for evaluating trauma care based on group are shown in Table 1. Our guiding principle was relating outcomes of interventions to their intended results. Applying this principle, we arrayed the outcomes along Porter’s dimensions of achieved health and sustained health, 2 ultimate goals of care for the

injured patient. Groups of outcomes in the achieved health dimension measure the success in restoring health and returning to pretrauma activities and participation after acute care interventions. Groups of outcomes in the sustained health dimension measure emotional health, functions, activities and participation resulting from long-term services and support. We also stress a longitudinal aspect

Table 1. Classification of disability outcomes of care for injured patients

| Domain | Dimension | Group | Outcomes |
|------------------------------------|--|-----------------------------|-------------------------------------|
| Health status achieved or retained | Survival | Survival* | Longitudinal indicators of survival |
| | | Achieved mental health† | Emotional adjustment |
| | Pain relief | | |
| | Absence of psychological disorders | | |
| | Achieved functioning‡ | Mental functions | |
| | | Movement functions | |
| | Achieved activities§ | Self care | |
| | | Mobility | |
| | Achieved participation¶ | Domestic life | |
| | | Interpersonal relationships | |
| School or work | | | |
| Social and civic life | | | |
| Process of recovery | Disutility of care | Care-related problems** | Physical and emotional pain |
| | | | Discomfort |
| | | | Postoperative complications |
| | | | Loss of mobility |
| | | | Unresolved conditions |
| Sustainability of health | Sustainability of health or recovery and nature of recurrences | Sustained mental health†† | Emotional control |
| | | | Pain control |
| | | | Absence of relapse |
| | | Sustained functioning‡‡ | Mental functions |
| | | | Movement functions |
| | | Sustained activities§§ | Self care |
| | | | Mobility |
| | | Sustained participation¶¶ | Domestic life |
| | | | Reduced interpersonal relationships |
| | | | Incomplete return to school or work |
| | | | Reduced social and civic life |

*Includes modified Glasgow Outcome Scale.
 †Includes Bruininks-Oseretsky Test of Motor Proficiency; Brief Symptom Inventory; Child Health Questionnaire Parent Form 28; EuroQolhealth outcome instrument; modified Glasgow Outcome Scale; Mississippi state-verified posttraumatic stress disorder assessment test; Personal Adjustment and Role Skills Scale; Pediatric Quality of Life Inventory; Quality of Well Being symptom scale; 12-item Short-Form Health Survey; 36-item Short-Form Health Survey; Sickness Impact Profile.
 ‡Includes modified Functional Independence Measure; Frankel classification grading system, “generic” study-specific measure of an injury-related disability; modified Glasgow Outcome Scale; Katz Index of Independence in Activities of Daily Living; King’s Outcome Scale for Childhood Head Injury; Modified Barthel Index; Peabody Development Motor Scales; Personal Adjustment and Role Skills Scale; Quality of Well Being symptom scale; Stanford Binet Intelligence Scale; Sickness Impact Profile; Functional Independence Measure for Children; Westmead Hospital Communication and Feeding Outcome Rating Scales; World Health Organization Disability Assessment Schedule II; Wide Range Assessment of Memory and Learning.
 §Includes EuroQolhealth outcome instrument; modified Functional Independence Measure; Modified Barthel Index; Personal Adjustment and Role Skills Scale; Pediatric Quality of Life Inventory; Quality of Well Being symptom scale; 36-item Short-Form Health Survey; Functional Independence Measure for Children; World Health Organization Disability Assessment Schedule II.
 ¶Includes Child Health Questionnaire Parent Form 28; EuroQolhealth outcome instrument; Modified Barthel Index; Pediatric Quality of Life Inventory; Quality of Well Being symptom scale; Sickness Impact Profile; World Health Organization Disability Assessment Schedule II; “work return” includes return to work/school status and/or return to usual or modified work/school status.
 **Includes “generic” study-specific measure of an injury-related disability.
 ††Includes Brief Symptom Inventory; (revised) Center for Epidemiologic Studies Depression Scale; Child Health Questionnaire Parent Form 28; EuroQolhealth outcome instrument; Impact of Events Scale; Mississippi state-verified posttraumatic stress disorder assessment test; Pediatric Quality of Life Inventory; Quality of Well Being symptom scale; 12-item Short-Form Health Survey; 36-item Short-Form Health Survey; Sickness Impact Profile.
 ‡‡Includes modified Functional Independence Measure; “generic” study-specific measure of an injury-related disability; modified Glasgow Outcome Scale; King’s Outcome Scale for Childhood Head Injury; mobility subscale of the Musculoskeletal Function Assessment; Quality of Well Being symptom scale; Sickness Impact Profile; World Health Organization Disability Assessment Schedule II.
 §§Includes Child Health Questionnaire Parent Form 28; EuroQolhealth outcome instrument; modified Functional Independence Measure; “generic” study-specific measure of an injury-related disability; mobility subscale of the Musculoskeletal Function Assessment; Pediatric Quality of Life Inventory; Quality of Well Being symptom scale; 12-item Short-Form Health Survey; 36-item Short-Form Health Survey; Sickness Impact Profile; World Health Organization Disability Assessment Schedule II; “work return” includes return to work/school status and/or return to usual or modified work/school status.
 ¶¶Includes Child Health Questionnaire Parent Form 28; EuroQolhealth outcome instrument; “generic” study-specific measure of an injury-related disability; mobility subscale of the Musculoskeletal Function Assessment; Pediatric Quality of Life Inventory; Quality of Well Being symptom scale; 12-item Short-Form Health Survey; 36-item Short-Form Health Survey; Sickness Impact Profile; World Health Organization Disability Assessment Schedule II.

of trauma care, in which success of 1 intervention may in turn benefit the interventions that follow.

The groups in Table 1 are relevant to disability outcomes achieved and sustained through care. The “survival” group achieves longitudinal indicators of alive status over various periods after injury. The next 4 groups classify outcomes achieved shortly after acute care. The “achieved mental health” group experiences outcomes describing the success in restoring mental status, including emotional adjustment, pain relief and the absence of psychological disorders. The “achieved functioning” group experiences outcomes characterizing the best attainable physiological and anatomical mental and movement functions. The “achieved activities” group experiences outcomes describing the executions of tasks or actions, including self-care, mobility, the ability to live independently and domestic life. The “achieved participation” group experiences outcomes describing the best attainable involvement in life situations, including the extent of return to participation, interpersonal relationships, school, work, as well as social and civic life. The “care-related problems” group experiences disability conditions caused by care that affect outcomes achieved or sustained, including pain, discomfort, postoperative complications, loss of mobility due to ineffective intervention and unresolved conditions needing reintervention. The last 4 groups are relevant to outcomes sustained from long-term services and support. The “sustained mental health” group experiences outcomes describing the extent of permanent psychological problems, including emotional control, pain control and the absence of relapse. The “sustained functioning” group experiences outcomes describing the level of permanent impairment of mental and movement functions. The “sustained activities” group experiences outcomes describing the scope of permanent limitations in self-care, mobility and domestic activities. The “sustained participation” group experiences outcomes describing the scope of permanent restrictions in participation including reduced interpersonal relationships, incomplete return to school or work and reduced social and civic life.

Our concepts for the organization of outcomes of trauma care were adapted from the International Classification of Functioning, Disability and Health.⁵ In addition, we also modified Porter’s framework. First, we dropped dimensions defined by Porter if they were specific to morbidity and not disability, although we retained survival in our classification as it is often measured in relation to the course of rehabilitation, return to normal activities or participation. Second, we dropped dimensions in instances where a corresponding disability outcome was not identified in the literature. Finally, we created 2 new groups related to mental health outcomes following trauma that were not previously defined,³ but are emerging as key outcomes in the trauma literature relevant to patient recovery.

Table 1 also lists currently used disability outcome instruments recommended for evaluating trauma care as

identified from our review. For each outcome group, there are a number of instruments or scales. These include instruments for assessment of health status by clinicians or by patients, such as the Glasgow Outcome Scale or the Euro-QoL health outcome instrument’s visual analogue scale. General instruments, such as the 36-Item Short-Form Health Survey or the Sickness Impact Profile, measure multiple aspects of disability, including abilities, participation and mental health states. Condition-specific instruments, such as the Functional Independence Measure or the Brief Symptom Inventory, supplement general information as they assign clinical relevance to specific medical conditions.

In trauma care, measuring success necessitates monitoring the patient from injury to recovery. Tracking recovery identifies events and emerging trends that can be corrected early (e.g., cognitive deficits following brain injury, gait abnormalities resulting from prosthetic use). Comparing outcomes, such as the effect of early rehabilitation during acute hospitalization on return to work, establishes protocols for future health care. Measuring success also requires tracking outcomes over time and across different parts of the health care delivery system. This requires using the same terminology to define outcomes.

In our view, classifying disability outcomes and recovery-process outcomes in relation to the intended results of interventions creates a powerful tool for research in trauma care. First, such classification complements the concept of disability as a decrement in health,⁵ forming a basis for understanding the effectiveness of trauma care in restoring health. Second, it places the outcomes of multiple interventions within the dimensions of achieved recovery and sustained health after trauma. Third, the classification forms a basis for studying disability outcomes as predictors of subsequent interventions (e.g., readmission resulting from adverse events caused by treatment). Fourth, it advances the standardization of outcome measurement, forming a basis for comparing findings across studies and sites. Finally, the classification provides criteria for appraising the literature on outcomes of trauma care.

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