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Trauma case management: Improving patient outcomes

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Summary

Background: The purpose of the study was to measure the effect of trauma case management (TCM) on patient outcomes, using practice-specific outcome variables such as in-hospital complication rates, length of stay, resource use and allied health service intervention rates.
Methods: TCM was provided 7 days a week to all trauma patient admissions. Data from 754 patients were collected over 14 months. These data were compared with 777 matched patients from the previous 14 months.
Results: TCM greatly improved time to allied health intervention ($p < 0.0001$). Results demonstrated a decrease in the occurrence of deep vein thrombosis ($p < 0.038$) and a trend towards decreased patient morbidity, unplanned admissions to the intensive care unit and operating suite. A reduced hospital stay LOS, particularly in the paediatric and 45–64 years age group was noted. Six thousand six hundred twenty-one fewer pathology tests were performed and the total number of bed days was 483 days less than predicted from the control group.
Conclusion: The introduction of TCM improved the efficiency and effectiveness of trauma patient care in our institution. This initiative demonstrates that TCM results in improvements to quality of care, trauma patient morbidity, financial performance and resource use.
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Introduction and background

Trauma patient care is universally recognised as extremely time and resource intensive, and thus very costly.[21,3,16] The plan of care for trauma patients can become fragmented because the complex health

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care needs of the trauma patient and their family are not usually amenable to the actions of a single health care discipline.[14] The need for multiple caregivers and specialties can lead to inefficiency, missed injuries, duplication of effort, and suboptimal care.[19] A lack of planning, advocacy, coordination and communication also lead to fragmentation, uncertainty, decreased patient and staff satisfaction[6] and increased complications.[1] In addition increased length of stay, cost and resource use prevent more appropriate allocation and effective utilisation of current resources.[8]

While patients may be satisfied with each individual health professional, they recognise that the overall episode of care is often poorly coordinated or managed.[15] To counter this phenomenon, various surgical specialties have implemented the concept of case management, and its use is now being recommended in wider clinical applications.[1] Harrahill[12] states that to increase the efficiency of a trauma service many trauma centres in the USA have implemented the role of trauma case manager and that it appeared to be an effective option to augment the traditional activities of the trauma nurse coordinator. The trauma case manager's role is to negotiate, arrange and coordinate clinical services and to intervene at key points in the patient's inpatient stay so to improve quality care while at the same time conserving hospital resources.[10]

Previous analysis of trauma case management (TCM) in our institution demonstrated that it improved the efficiency and effectiveness of trauma patient care.[7] However, the study was limited by its small sample size, making extrapolation on the ultimate merits of TCM difficult. The current study was designed to overcome some of the shortcomings of the original investigation.

In a survey of Australian trauma centres, most trauma coordinators identified a TCM as a desirable asset that would potentially improve trauma care efficiency and clinical outcomes.[8] The minimal time that the trauma nurse coordinators had available for clinical service management implies that there might be a role for trauma case managers in busy trauma centres.

Aim

The aim of this study was to determine the effect of trauma case management on patient outcomes such as length of stay (LOS), complications, missed injuries, and usage of allied health, pathology and radiology services. It was hypothesised that TCM would diminish morbidity, length of stay and resource utilisation, and would increase allied health referral rates.

Materials and methods

The study hospital is a 600 bed urban teaching hospital of a major NSW University. It is a designated Level One Trauma Centre, admitting over 2500 injured patients per year, of which approximately 220 have an ISS $>$ 15. This ambispective descriptive cohort study compared two groups of patients: the first group comprised of consecutive patients admitted to the trauma centre during the 14 months prior to implementation of the TCM program (control group); the second group comprised of those admitted during the first 14 months after implementation of the TCM program (TCM group). All patients who fulfilled pre-existing trauma database entry criteria (Table 1) during the study period (1st March 2002 to 8th May 2003) were included in the study. Full approval by the hospital ethics committee was applied for and granted. The trauma service data-

Table 1 Trauma activation criteria

Trauma triage/activation criteria
(a) History/mechanism of injury:
(1) Motor vehicle collision at speed $>$60 kph
(2) Pedal cyclist struck by motor vehicle at $>$30 kph
(3) Adult pedestrian struck by motor vehicle at $>$30 kph
(4) Child pedestrian struck by motor vehicle at any speed
(5) Fall greater than 3 m
(6) Patients presenting via the ambulance service executing protocol 4 (i.e. bypassing another hospital)
(b) Vital signs:
(1) Shallow or retractive breathing
(2) Cyanosis or oxygen saturation $<$90%
(3) Skin pallor or delayed capillary refill
(4) Systolic blood pressure $<$90 mmHg (if age $>$5 years) or $<$80 + {2 $\times$ age in years} for children
(5) Heart rate $<$50 or $>$130 beats per minute
(6) Decreased level of consciousness or fitting
(7) Pupil(s) dilated or unreactive
(c) Injuries:
(1) Injury to two or more body regions (i.e. hand, neck, chest, abdomen, pelvis, back or long bones)
(2) Fracture of two or more long bones
(3) Spinal cord injury (actual or suspected)
(4) Crush injury or amputation of limb
(5) Penetrating injury to head, neck, chest, abdomen, groin or back
(6) Facial and/or airway burns
(7) Burns $>$15% in adults
(8) Burns $>$10% in children

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