

Impact of a prison triage system on injuries seen in emergency departments

Nick Kuzak, MD;* Michael O'Connor, MD;† William Pickett, PhD;‡§
Terry O'Brien, MD;¶ Ken Reid, MD;** Mary Pearson, MD††

ABSTRACT

Objectives: 1) To describe injuries experienced by the male prisoner population in the Kingston, Ontario area, and to compare them with those observed in the general population; and 2) to compare the incidence and patterns of prisoner injuries seen in emergency departments (EDs) before and after the introduction of a prison injury triage system.

Design: A chart review.

Setting: The catchment area surrounding 2 hospital-based EDs in Kingston, Ontario, which includes 8 federal and provincial prisons for adult males.

Observations: Injuries to male prisoners (ages 18–75 years) who were treated in the ED during 1996–98 were compared with injuries to the general male population of the same age range. An on-site emergency care triage system was introduced to area prisons in 1993. Prisoner injuries seen in the ED during 1996–98 were compared with those seen during a similar period prior to the introduction of the triage system (1981–84). Available comparators included patient demographics, disposition, intent and nature of injury, the need for surgery, and lengths of hospital stay.

Results: 148 prisoner injuries were identified for 1996–98. Prisoner injuries seen in the ED were relatively severe when compared with the general male population, as indicated by the higher frequency of fractures (31.8% prisoner vs. 13.4% general, $p < 0.001$), blunt head injuries (10.1% vs. 2.2%, $p < 0.001$), hospital admissions (42.6% vs. 4.1%, $p < 0.001$) and deaths (2.7% vs. 0.6%, $p < 0.001$). Since the introduction of the triage system there has been a reduction in the rate of prisoner injuries seen in local hospital EDs (6.1/100/yr [before] vs. 1.6/100/yr [after], $p < 0.001$). There has been an increase in the relative severity of prisoner injuries seen in the EDs as indicated by the increased hospital admission rate (42.6% vs. 22.7%, $p < 0.001$), increased rate of surgical intervention (27.7% vs. 12.1%, $p < 0.001$), and increased length of hospital stay (4.0 days vs. 2.1 days, $p < 0.05$). The mortality rate has remained low and unchanged (0.7% vs. 1.1%, $p = 0.99$).

Conclusions: The introduction of the new triage system appeared to be associated with a decrease in the total number of ED visits by prisoners. The relative acuity of prisoner injuries seen in the EDs appeared to increase following introduction of the triage system.

RÉSUMÉ

Objectifs : 1) Décrire les blessures subies par la population mâle en milieu carcéral de la région de Kingston, Ontario, et de les comparer à celles subies par la population générale; et 2) comparer la fréquence et la nature des blessures subies par les prisonniers traités à l'urgence avant et après la mise en place d'un système de triage des blessures en milieu carcéral.

Conception : Revue des dossiers.

*First-year resident in Emergency Medicine, University of British Columbia, Vancouver, BC. †Director, Department of Emergency Medicine; ‡Department of Emergency Medicine; §Department of Community Health and Epidemiology; ¶Residency Emergency Medicine Program Director; **Department of Cardiothoracic Surgery; and ††Department of Family Medicine, Queen's University, Kingston, Ont.

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Cadre : Le secteur desservi par deux départements d'urgence en milieu hospitalier à Kingston, Ontario, comprenant huit prisons fédérales et provinciales pour hommes adultes.

Observations : Les blessures subies par les prisonniers mâles (âgés entre 18 et 75 ans) traités à l'urgence entre 1996 et 1998 furent comparées aux blessures de la population mâle générale pour le même groupe d'âge. Un système de triage des soins d'urgence sur place fut mis sur pied dans les prisons de la région en 1993. Les blessures subies par les prisonniers vus à l'urgence entre 1996 et 1998 furent comparées aux blessures traitées au cours d'une période similaire avant l'introduction du système de triage (1981–84). Les éléments de comparaison disponibles comprenaient le profil démographique des patients, leur devenir, la nature de la blessure et l'intention derrière celle-ci, le besoin de chirurgie et la durée de l'hospitalisation.

Résultats : Cent-quarante-huit blessures chez les prisonniers furent identifiées entre 1996 et 1998. Les blessures vues à l'urgence étaient relativement graves comparativement aux blessures au sein de la population mâle générale, comme l'indique la plus grande fréquence de fractures (31,8 % chez les prisonniers vs 13,4 % chez la population générale, $p < 0,001$), de traumatismes contondants à la tête (10,1 % vs 2,2 %, $p < 0,001$), d'hospitalisations (42,6 % vs 4,1 %, $p < 0,001$) et de décès (2,7 % vs 0,6 %, $p < 0,001$). Depuis la mise en place du système de triage, on a constaté une diminution du taux de blessures chez les prisonniers reçus à l'urgence des hôpitaux locaux (6,1/100/année [avant] vs 1,6/100/année [après], $p < 0,001$). On a noté une augmentation quant à la gravité relative des blessures subies par les prisonniers vus à l'urgence comme l'indique l'augmentation du taux d'hospitalisations (42,6 % vs 22,7 %, $p < 0,001$), du taux d'interventions chirurgicales (27,7 % vs 12,1 %, $p < 0,001$), et de la durée d'hospitalisation (4 jours vs 2,1 jours, $p < 0,05$). Le taux de mortalité est demeuré faible et inchangé (0,7 % vs 1,1 %, $p = 0,99$).

Conclusions : L'introduction d'un nouveau système de triage semble associée à une diminution du nombre total de visites à l'urgence par les prisonniers. La gravité relative des blessures subies par les prisonniers reçus à l'urgence semble avoir augmenté après l'introduction du système de triage.

Introduction

Kingston is a city of 113 000 in Eastern Ontario, Canada, and has the distinction of being a regional headquarter for the federal corrections system (Correctional Services of Canada). Nine prisons are located within a 40-km radius of the city core, and 8 of these house adult males. Prior to 1993, all traumatic injuries that occurred in these institutions were referred to the emergency departments (EDs) of Kingston General Hospital or Hotel Dieu Hospital, both in Kingston, for acute care. Violent and unpredictable behaviour has been exhibited by inmates during the course of their ED treatment. This has resulted in threats and physical altercations with staff, an apprehensive working environment and escape attempts.

In response, a triage system was developed in 1993 by these two Kingston hospitals and Correctional Services of Canada staff to provide on-site emergency services to the local prison populations. The goals of this system included the appropriate use of local emergency departments, enhancement of health care for prisoners, increased public and staff safety, and the reduction of health care costs incurred by Correctional Services of Canada. The system includes the involvement of a cadre of on-call community physicians, who screen prisoner injuries via telephone. Nurses and correctional officers at the regional prisons are

able to reach a physician at any time. Verbal instructions are given by the on-call physician to the staff in attendance, or, if the situation warrants, the inmate is seen on site by the physician. In the event that an injury or illness seems to be of an acute nature, or if uncertainty exists, the inmate is referred directly to the ED. Prisoners with non-acute injuries are assessed and treated on site within the prison infirmaries. Prior to the institution of the triage system, this consultation did not occur, and all inmates were referred directly to 1 of the 2 Kingston hospital EDs. To the best of our knowledge, there are no analogous triage systems in place within other Canadian settings, and a recent review of the global biomedical literature failed to identify a similar system elsewhere.

Prison populations have risen significantly during the last decade.¹ ED overcrowding has become an important issue within Canada during this period. Given these conditions, we felt that an examination of the prison injury triage system and its effect on the ED was warranted. The primary objectives of this study were to describe injuries experienced by the male prisoner population in Kingston, Ontario, and compare them with those observed in the general population; and to compare the incidence and patterns of prisoner injuries seen in the Kingston EDs before and after the introduction of a prison injury triage system.

Methods

Injuries to prisoners

Injuries experienced by male prisoners (ages 18–75) were identified for the 30-month period ending June 30, 1998. Retrospective reviews of emergency and inpatient medical charts were conducted within the Kingston General and Hotel Dieu hospitals. The combined hospital database was searched for one of the following: (1) patient middle initial “X” (a sub-code used to indicate a prisoner); (2) the appearance of the phrase “legal circumstances” in the nursing triage note; (3) the ICD-9 Code V62.5 (legal circumstances); and/or (4) a billing record that was not covered by the Ontario Health Insurance Plan. Individual chart record (CR) numbers of the patients fulfilling at least one of these criteria were recorded. The list of CR numbers was then cross-referenced against those contained in a regional injury surveillance program (the Kingston and Region Injury Surveillance Program, or “KRISP”) that is based in the EDs of the 2 hospitals. Medical charts for all cases where CR numbers appeared in both lists were obtained and reviewed manually.

Once confirmed as a prisoner injury, data abstracted from the patient records included the following: patient age, disposition (discharged to prison, admitted, death), intent (accidental, assault, self-inflicted), nature of injury (e.g., open wounds, fractures, stabs), surgery required (yes/no) and length of hospital stay (admitted cases). All data were collected using a standardized abstraction form. Following coding, they were computer-entered into a commercially available spreadsheet (Microsoft Excel, Redmond, Wash., Version 6.0, 1994). Denominator data for the male prisoner population were obtained from Correctional Services of Canada Offender Management System records (Mr. John Emerton, Staffing Officer, Human Resources Department, Correctional Services of Canada, Ontario Regional Headquarters, Kingston, Ont.: personal communication, 2000).

We were also interested in comparing the post-triage injury patterns with those experienced by Kingston and area prisoners in an earlier, pre-triage time period (1981–84). These comparisons were limited to data elements included in a published analysis:³ intent of injury (accidental, self-inflicted, assault), hospital admission rate, rate of surgery, average length of hospital stay, and deaths in hospital.

Injuries to the general population

Population-based data for injuries to the general population are available through KRISP, one site of the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP). CHIRPP is a computerized injury surveillance

program that operates in the EDs of selected Canadian hospitals.⁴ Information on the circumstances in which all injuries seen in the ED occur is provided by the patient, or accompanying adult, who completes a 1-page self-administered CHIRPP questionnaire. This occurs approximately 85% of the time. In KRISP, additional clinical information is abstracted from the patient’s medical chart by trained nurse researchers. The latter information is available for all (100%) of the patients presenting with an injury.

Injuries (24 931) to resident males (aged 18–75 years) in the Kingston and area population were identified from the KRISP database for the 3-year period ending Dec. 31, 1998. Data abstracted for these injuries included all of the variables listed for prisoners (above). Denominator data for this population was obtained from the *Canada Census of Population for Kingston Area*.⁵

Analysis

Objective 1. Comparison of injuries experienced by prisoners and general male populations 1996–98) seen in the emergency department

Descriptive statistics (rates/percentages with associated 95% confidence intervals; means and standard deviations, as available) were used to describe the injuries experienced by prisoners seen in the EDs, and then these were compared with injury patterns for the general male population. Stratified analyses were also performed within the 3 injury-intent categories. Chi-squared and Fisher’s exact tests were used, as appropriate, to quantify the statistical significance of any differences in proportions between the 2 populations.⁶

Objective 2. Comparison of prisoner injuries before and after the introduction of triage

The number, rate and characteristics of prisoner injuries experienced before (1981–84) and after (1996–98) introduction of on-site prison care were summarized using descriptive statistics, as above. Chi-squared and Fisher’s exact tests were used, as appropriate, to quantify the statistical significance of any differences in proportions before and after the introduction of triage.

Results

Prisoner vs. general population injuries

A total of 148 prisoner injuries were treated in the 2 Kingston EDs during the 1996–98 study period (Table 1). Prisoner injuries seen in the ED were relatively severe when compared with those in the general male population, as indicated by the higher frequency of fractures (31.8% prisoner vs. 13.4% general, $p < 0.001$), blunt head injuries

(10.1% vs. 2.2%, $p < 0.001$), hospital admissions (42.6% vs. 4.1%, $p < 0.001$) and deaths (2.7% vs. 0.6%, $p < 0.001$). Higher proportions of the prisoner injuries were caused by assaults (49.3% vs. 2.8%, $p < 0.001$) or were self-inflicted (11.5% vs. 0.6%, $p < 0.001$). Open wounds (including stab wounds) as defined by CHIRPP criteria were equally common in the prison and general populations.

Pre-triage vs. post-triage

After the introduction of the triage system there were reductions in the rate of prisoner injuries seen in the ED (6.1/100/yr [before] vs. 1.6/100/yr [after], $p < 0.001$; Table 2). There was also increase in the relative severity of prisoner injuries seen in the ED as indicated by the increased hospital admission rates (42.6% vs. 22.7%, $p < 0.001$), increased rate of surgical intervention (27.7% vs. 12.1%, $p < 0.001$), and increased length of hospital stay (4.0 days vs. 2.1 days, $p < 0.05$). The mortality rate remained low and unchanged (0.7% vs. 1.1%, $p = 0.99$). The proportion of injuries attributable to assaults rose following the introduction of the triage system (49.3% vs. 39.0%, $p = 0.03$), while self-inflicted injuries declined (11.5% vs. 21.2%, $p = 0.01$). Accidental injuries occurred in similar proportions. Within the categories of accidental injuries and assaults, there was a significant increase in the proportion of prisoners with injuries who were admitted to hospital and the proportions requiring surgery.

Discussion

Prisoners are known to be a high-risk group for medical⁷⁻⁹ or psychiatric¹⁰⁻¹² illness, infectious diseases,¹³ and physical

injuries.^{10-12,14-16} According to a 1984 study conducted in British Columbia, the average prisoner required service by a physician 6.7 times per year, a rate that was 2.4 times higher than that of the average non-incarcerated Canadian adult.⁹ Recent Ontario data suggests that prisoners' medical needs are significantly greater than those of the general public, but they have much less access to health care. In spite of these facts, Canadian studies on prisoner health care are sparse and date from the 1970s to 1980s. Canadian research related to prison injuries is limited largely to 2 studies conducted more than 15 years ago.^{3,9} World litera-

Table 2. Comparison of prisoner injuries seen at emergency departments before (1981-84) and after (1996-98) the introduction of the prison injury triage system

| Category | Period, no. of injuries | | <i>p</i> |
|---|-------------------------|------------------|----------|
| | Before, 353 | After, 148 | |
| Rate/100/yr (95% CI) | 6.1 (4.9-7.3) | 1.6 (1.2-2.0) | <0.001 |
| Disposition: n (% of total) | 353 (100) | 148 (100) | |
| Admitted to hospital | 80 (22.7) | 63 (42.6) | <0.001 |
| Surgery required | 43 (12.1) | 41 (27.7) | <0.001 |
| Deaths | 4 (1.1) | 1 (0.7) | 0.99 |
| Intent: n (% of total) | 353 (100) | 148 (100) | |
| Accidental injury | 140 (39.6) | 52 (35.1) | 0.34 |
| Assault | 138 (39.0) | 73 (49.3) | 0.03 |
| Self-inflicted | 75 (21.2) | 17 (11.5) | 0.01 |
| Accidental injury: n (% of subtotal) | 140 (100) | 52 (100) | |
| Admitted to hospital | 13 (9.3) | 12 (22.6) | 0.01 |
| Surgery required | 0 | 10 (19.0) | <0.001 |
| Deaths | 0 | 1 (1.9) | 0.27 |
| Assault: n (% of subtotal) | 138 (100) | 73 (100) | |
| Admitted to hospital | 50 (36.2) | 41 (56.1) | 0.01 |
| Surgery required | 31 (22.4) | 28 (38.4) | 0.01 |
| Deaths | 4 (2.9) | 0 | 0.30 |
| Self-inflicted: n (% of subtotal) | 75 (100) | 17 (100) | |
| Admitted to hospital | 17 (22.7) | 6 (35.3) | 0.28 |
| Surgery required | 12 (16.0) | 3 (17.6) | 0.87 |
| Deaths | 0 | 0 | 1.00 |
| Length of stay: mean days (95% CI) | | | |
| Total injuries | 2.1 (*) | 4.0 (3.4-4.7) | <0.05 |
| Accidental injury | 0 (*) | 4.8 (2.6-7.0) | <0.05 |
| Assault | 3.2 (*) | 4.0 (3.3-4.7) | <0.05 |
| Self-inflicted | 3.1 (*) | 2.5 (2.1-2.9) | <0.05 |

CI = confidence interval

*Based upon previous publication; raw data not available upon which to base calculation.

Table 1. Comparison of prisoner injuries (148) versus injuries in the general male population (24,931) seen at local emergency departments in Kingston, Ont., between 1996-98

| Category | Population, n (%) | | <i>p</i> |
|---------------------------------|-------------------|---------------|----------|
| | Prison | General | |
| Disposition | | | |
| Admitted to hospital | 63 (42.6) | 1 022 (4.1) | <0.001 |
| Death | 4 (2.7) | 150 (0.6) | <0.001 |
| Intent | | | |
| Accidental | 52 (35.2) | 23 651 (94.9) | <0.001 |
| Assault | 73 (49.3) | 709 (2.8) | <0.001 |
| Self-inflicted | 17 (11.5) | 142 (0.6) | <0.001 |
| Unknown | 6 (4.0) | 429 (1.7) | |
| Nature of primary injury | | | |
| Open wound | 46 (31.1) | 6 657 (26.7) | 0.23 |
| Fracture | 47 (31.8) | 3 341 (13.4) | <0.001 |
| Blunt head injury | 15 (10.1) | 549 (2.2) | <0.001 |

ture is also scant and focuses primarily on psychiatry, suicide, and infectious diseases. Few studies have described the occurrence of trauma among prisoners, and even fewer discuss their subsequent management by local hospitals. Kingston is in a unique position to study prison health care due to the proximity of the tertiary care centres (Kingston General and Hotel Dieu hospitals) to 9 penal institutions. This is the first paper in 15 years to investigate Canadian prison injuries and their management. The prison injury triage system described here is the first to be noted or evaluated in the biomedical literature.

Both the ED and prisons have been identified as dangerous settings for physicians and allied staff.¹⁷ As such, violence in the ED at the hands of prisoners can be expected and has been reported in case reports from other settings. In 1980, 2 inmates armed with submachine guns seized a hostage in a Pennsylvania hospital ED.¹⁸ In Brooklyn, NY, in 1982, a convict took 5 hostages during a medical visit to the hospital.¹⁸ On Aug. 31, 1990, a prisoner was shot while under guard at the Tampa General ED in Florida. On Oct. 12, 1991, a pre-planned escape by a prisoner from the Danville ED in Pennsylvania left one guard dead and the ED in emotional shock.¹⁹ These incidents were caused by prisoners presenting to the ED with only minor injuries, some of them intentionally inflicted as part of a pre-planned escape.^{20,21}

The Kingston prison injury triage system was implemented in 1993 and appears to be associated with a decrease in the total number of ED visits by prisoners. The relative acuity of prisoner injuries seen in the ED appeared to increase following introduction of the triage system, suggesting that minor injuries may have been cared for in the prison infirmaries.

Before the institution of the triage system, all injured prisoners were sent to the Kingston EDs.³ During this time, numerous incidents of prisoner violence in the EDs were documented by staff and hospital security. There were also a number of prisoner escapes. This atmosphere rendered staff and patients anxious, detracted from the general working environment and decreased productivity in the ED. With the institution of the triage system, the injuries seen in the ED post triage were on average of much greater severity. The working environment has improved, risks of injury have been ameliorated and there have not been any incidents of prisoner escape.

The study has direct implications for the health care system in Kingston, as well as the federal corrections system in Canada. Various legal conventions have set forth that a prisoner is entitled to the same rights as a free individual with regard to health care.^{9,22} Both the health

care and the penal system need to ensure that the standard of care administered to prisoners is equal to that provided to the Canadian public.²³ Furthermore, both systems have a concurrent responsibility to assure public safety; hospitals should not expose patients to a potentially dangerous environment, and prisons must keep their felons incarcerated. The new prison triage system reported here appears to effectively screen out minor prison injuries, therefore lessening the need for prisoners to present to the ED. The severity of injuries seen in the ED from prisons in the post-triage years was significantly higher. There was no change in the mortality rate of prisoners presenting to the ED, suggesting no compromise in emergent care.

Limitations

The analysis is limited by its retrospective nature and the lack of inclusion of injuries treated in the prison setting. Another limitation was the lack of follow-up; this made it impossible to compare complication rates for the full spectrum of prison injuries, pre- and post-introduction of the triage system. Further, the study population was restricted to males due to the prevalence of injury among male prisoners. Although the federal Prison for Women is situated in Kingston, only one injury was documented as being treated in a Kingston and area hospital during the 1996–98 study period. The comparison of prisoner injuries before and after introduction of the triage system is further limited by the prolonged time period involved. It is possible that the results are confounded by temporal changes to the prisoner population (both in terms of size and nature), prison conditions, institutional policies within prisons, the nature and types of injuries sustained, and general changes to hospital admission practices. It was not possible to account for these changes in the present analysis, and these provide alternative (although in our opinion improbable) explanations for the findings.

Conclusions

We conclude that this new triage system with its on-site provision of emergency services by community physicians has been associated with a reduction in the use of the ED for the treatment of minor injuries to prisoners. The triage model may be adaptable to other hospital settings that wish to provide a similar standard of emergent care to prisoners while not compromising the safety of hospital staff or the public. Further areas of research might include the evaluation and care of injuries sustained by prisoners and treated on site, and the cost-effectiveness of such a system.

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Correspondence to: Dr. H. Michael O'Connor, Professor and Head, Department of Emergency Medicine, Queen's University, Kingston General Hospital, 76 Stuart St., Kingston ON K7L 2V7; 613 548-2368, fax 613 548-1374, occonnorh@kgh.kari.net

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