Use of the "crash room" in a rural hospital: case review of 100 cases

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Introduction: There is little published literature about the characteristics of patients with high triage levels seen in the emergency departments of rural hospitals. We sought to determine the demographics of patients brought into the "crash room" of a rural hospital, to assess the pathologies that brought them to the hospital and to study their final disposition.
Methods: We conducted a retrospective chart review of visits to the crash room of our rural hospital. We used the hospital's crash room register to compile a list of the last 100 consecutive visits to the crash room as of July 20, 2011. We extracted initial data from the register and additional data by chart review.
Results: Patients with triage levels 1 to 3 were brought to the crash room at a rate of 0.36 cases/wk/1000 population. Although circulatory disease, respiratory disease and "chest pain" accounted for 44.6% of final diagnoses, a wide range of pathology was seen in the crash room. Trauma and poisonings, and mental disorders accounted for 21.0% and 9.0% of diagnoses, respectively. The final diagnosis was nonspecific, vague or "unknown" in 20% of the visits. Of the crash room cases, 17% required transfer to a secondary care hospital.
Conclusion: Crash room visits in this rural hospital occurred at a rate of 0.48 cases/wk/1000 population. Most patients seen in the crash room were not given the traditional triage levels 1 or 2 that are usually associated with crash room care. The final diagnosis was nonspecific in 17.0% of cases, and mental disorders accounted for 9.0% of crash room visits.

Introduction : Peu de choses ont été publiées sur les caractéristiques des patients de niveaux de triage élevés qui sont vus à l'urgence dans les hôpitaux ruraux. Nous avons voulu analyser les caractéristiques démographiques des patients admis à la « salle de choc » de l'urgence d'un hôpital rural pour évaluer les pathologies les y ayant conduits et pour déterminer l'issue de la consultation.
Méthodes : Nous avons procédé à une analyse rétrospective des dossiers des patients conduits à la salle de choc de l'urgence de notre hôpital rural. Nous avons utilisé le registre de la salle pour compiler les dernières 100 visites consécutives précédant la date du 20 juillet 2011. Nous avons extrait les données initiales à partir de ce registre et des données additionnelles provenant de l'examen des dossiers.
Résultats : Les patients des niveaux de triage 1 à 3 ont été amenés à la salle de choc à raison de 0,36 cas/semaine/1000 habitants. Même si les cardiopathies, les maladies respiratoires et les « douleurs à la poitrine » ont compté, en bout de ligne, pour 44,6 % des diagnostics, les patients vus à la salle de choc ont présenté un grand éventail de pathologies. Les traumatismes, les empoisonnements et les problèmes de santé mentale ont représenté respectivement 21,0 % et 9,0 % des diagnostics. Le diagnostic final s'est révélé non spécifique, vague ou « inconnu » pour 20 % de ces 100 consultations à l'urgence. Parmi les patients vus à la salle de choc, 17 % ont nécessité un transfert vers un hôpital de soins secondaires.
Conclusion : Les consultations à la salle de choc de cet hôpital rural sont survenues à raison de 0,48 cas/semaine/1000 habitants. La plupart des patients vus à la salle de choc n'ont pas été assignés à des niveaux de triage habituels, soit 1 ou 2, généralement associés aux soins prodigués en salle de choc. Le diagnostic final s'est révélé non spécifique dans 17,0 % des cas, et les problèmes de santé mentale ont représenté 9,0 % des consultations en salle de choc.

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INTRODUCTION

During the fiscal year 2009/10, the Canadian Institute for Health Information (CIHI) reported that 0.8 million (14%) of 5.8 million Canadian emergency department (ED) visits were triaged at Canadian Triage and Acuity Scale (CTAS) level 1 or 2.[1] This finding is similar to that of the Ontario Ministry of Health and Long-term Care, which reported that 13.5% of patients seen in Ontario EDs were triaged at CTAS level 1 or 2, and an additional 39.0% were triaged at level 3.[2] Information about the characteristics of patients with high triage levels seen in the EDs of rural hospitals is important in terms of skills, staffing and continuing medical education (CME) needs, yet there has been little systemic study of this subject.

We sought to determine the basic demographics of patients brought into the "crash room" of a rural hospital, to assess the pathologies that brought these patients to the hospital and to study the final disposition of patients seen in the crash room.

METHODS

The Centre de santé et de services sociaux du Témiscamingue-et-de-Kipawa is a rural hospital staffed by family physicians offering 24-hour ED service in Témiscaming, Que., a paper-milling town on the Quebec–Ontario border. It serves a catchment area of 5000 people.

The ED contains 3 treatment areas: a large 2-patient crash room with full monitoring and resuscitation equipment, 2 small rooms for ambulatory care, and 1 surgical room for lacerations and minor procedures. There is also a 6-patient unit for short-term care for patients being admitted to hospital. There is no specialty care or advanced imaging (i.e., emergency ultrasonography or computed tomography) available locally. A crash room register that lists times of admission and departure, as well as diagnosis and treatment details, is maintained for all patient visits.

We conducted this study under the assumption that the crash room visits would involve patients with the highest triage levels. Beginning on July 20, 2011, we reviewed the crash room register for the last 100 visits. We obtained initial data from the register and extracted further data by review of individual charts. We used the International Statistical Classification of Diseases and Related Health Problems, Ninth Revision, to classify diagnoses.

The Conseil des medecins et dentists gave ethical approval of this study.

RESULTS

We analyzed 100 crash room visits (involving 87 patients) over a 41-week period (Sept. 29, 2010, to July 20, 2011), which represented a crude rate of 0.48 crash room cases/wk/1000 population.

Basic patient characteristics are presented in Table 1. Seventy-seven patients were seen once, 7 patients were seen twice and 3 patients were seen 3 times. Of the visits, 21% involved patients who had no identified family physician. This is a high rate compared with that published in 2008 in a study by the Institut de la statistique du Québec, which stated that 12% of the rural population in Quebec did not have a family physician.[3]

Of the 100 visits to the crash room, 75 occurred during on-call hours (i.e., 34 at night and 41 on weekends) (Table 2), at a rate of about 1 patient arriving during on-call hours every 20 days per 1000 population. Only 43 (43%) of the cases were triaged on arrival as levels 1 or 2 (rate = 0.2 cases/wk/1000 population). However, 74% of the cases were triaged as levels 1, 2 or 3 (crude rate 0.36/wk/1000 population).

"Chief complaints," as recorded at triage, are presented in Table 3. Out of the 100 visits to the crash room, 79 patients listed 1 chief complaint, 19 listed 2 complaints and 2 listed 3 complaints, for a total of 123 chief complaints. Three chief complaints (i.e., chest pain, shortness of breath and loss of

Table 1. Patient characteristics in 100 crash room visits

Characteristic	No. of cases*
Age, yr	
0–19	11
20–39	17
40–59	22
60–79	34
> 80	16
Age, mean (median), yr	55.4 (59.5)
Sex	
Male	56
Female	44
Marital status	
Single	31
Married/common-law partner	44
Widowed	11
Divorced/separated	11
Unknown	3
Identified family physician	
Yes	79
No	21

*Unless stated otherwise.

consciousness) accounted for about 40% of the visits. Seven patients had fallen, 2 had been involved in a motor vehicle crash and 1 had been involved in a physical assault.

Final diagnoses at the time the patient left the crash room are shown in Table 4. Of the 100 cases, 75 were attributed to a single diagnosis, 22 were given 2 diagnoses, 2 were given 3 diagnoses and 1 was given 4 diagnoses, for a total of 129 individual diagnoses. Circulatory disease (23.2%), trauma and poisoning (21.0%), and respiratory disease (16.0%) constituted most cases. No single diagnosis accounted for more than 6.2% of cases (exacerbation of chronic obstructive pulmonary disease) and 38 of the 129 diagnoses were made only once.

Two deaths occurred in the crash room during the study period.

Table 2. Characteristics of 100 crash room visits

Characteristic	No. of cases*
Time of arrival	
Morning (9:30 am to 12:30 pm, Mon–Fri)	11
Afternoon (12:30 pm to 5:30 pm, Mon–Fri)	14
Night (5:30 pm to 9:30 am)	34
Weekend (5:30 pm Fri to 9:30 am Mon)	41
Mode of arrival	
Ambulance	60
Ambulatory	39
Unknown	1
Time spent in the crash room, min	
< 30	6
30–59	11
60–89	21
90–119	19
120–149	14
150–179	6
180–239	8
≥ 140	8
Unclear	7
Time spent in the crash room, mean (median), min	125 (111)
Final disposition	
Discharge from hospital	16
Transfer to another hospital	17
Admission locally	61
Transfer for imaging or consultation and accepted back	6
Direct admission, length of stay	55
1 d	35
2–7 d	17
1 wk–1 mo	5
> 1 mo	1
Unknown	3
Death	2
Departure without discharge or refusal of treatment	3
Transfer to another area in the emergency department for further examination	1
Triage level	
1: Resuscitation	17
2: Very urgent	26
3: Urgent	31
4: Less urgent	20
5: Nonurgent	1
Unknown or unclear	5

*Unless stated otherwise.

DISCUSSION

A wide variety of chief complaints were assessed in our crash room, and a total of 129 final diagnoses were made in 100 cases. The percentage of cases due to trauma and poisoning (21.0%), and respiratory disease (16.0%) may be compared with findings from the United States that 22.5% and 9.8% of all US visits to EDs in 2010 were for trauma and respiratory disease, respectively.[4] That 23% of our crash room diagnoses were of circulatory disease did not come as a surprise given the potential seriousness of this disease.

Table 3. "Chief complaints" listed by the patient in 100 crash room visits

Chief complaint, *n* = 123*	No. (%) of cases
Chest pain	22 (17.9)
Shortness of breath	16 (13.0)
Loss of consciousness	11 (8.9)
Weakness	6 (4.9)
Dizziness	7 (5.7)
Fall (elderly patient)	6 (4.9)
Seizure	5 (4.1)
Vomiting	4 (3.3)
Intoxication	3 (2.4)
Headache	3 (2.4)
Lower limb pain	3 (2.4)
Upper limb trauma	3 (2.4)
Cough	3 (2.4)
Abdominal pain	2 (1.7)
Back pain	2 (1.7)
Drowsiness	2 (1.7)
Palpitations	2 (1.7)
Confusion	2 (1.7)
General discomfort	2 (1.7)
Motor vehicle crash	2 (1.7)
Hypoglycemia	2 (1.7)
Miscellaneous†	16 (12.8)

*Some patients reported more than 1 chief complaint.
†One case each: nose bleed, vomiting of blood, hypothermia, suicidal thoughts, fall (not specified), heartburn, hemiplegia, foreign-body aspiration, physical assault, burn, heat exposure, labour contractions, fever, skin redness, right hand pain and wrist pain.

The finding that 75% of crash room visits occurred during on-call hours, coupled with the finding of a rate of 1 patient visit during on-call hours every 20 days per 1000 population, may help administrators address the requirements for on-call staffing and proximity of on-call physicians during these hours.

Interestingly, 11 of 129 (9.0%) of the final diagnoses were of mental disorders. This finding could be interpreted in light of the recommendations of the Rural Critical Care Course[5] to initially evaluate serious mental disorders in the crash room, or it could also reflect the fact that the initial presentation (e.g., palpitations) of disorders such as anxiety states may mimic that of potentially more serious disease. Our reported diversity of diagnoses might well be kept in mind by physicians and administrators planning for CME, nurse-training and equipment purchases.

Table 4. Final diagnoses in 100 crash room visits (part 1 of 2)

Diagnosis, *n* = 129	No. (%) of cases
Circulatory system	30 (23.2)
Syncope	5 (3.9)
Angina	5 (3.9)
Acute myocardial infarction	4 (3.1)
Atrial fibrillation	3 (2.3)
Congestive heart failure	3 (2.3)
Essential hypertension	2 (1.6)
Cardiac arrest	2 (1.6)
Miscellaneous*	6 (4.7)
Respiratory system	20 (16.0)
COPD exacerbation	8 (6.2)
Pneumonia	5 (3.9)
Malignant neoplasm of bronchus and lungs	2 (1.6)
Dyspnea and respiratory abnormalities	2 (1.6)
Miscellaneous†	3 (2.3)
Nervous system and sense organs	10 (8.0)
Convulsions	4 (3.1)
Febrile convulsions	3 (2.3)
Occlusion of cerebral artery	2 (1.6)
Miscellaneous (sciatica)	1 (0.8)
Trauma and poisoning	27 (21.0)
Head injury	4 (3.1)
Fracture of neck of femur	3 (2.3)
Heat stroke and sunstroke	2 (1.6)
Contusions	2 (1.6)
Poisoning by drugs, medicines and biologic substances	3 (2.3)
Miscellaneous‡	13 (10.1)
Mental disorders	11 (9.0)
Alcohol abuse	5 (3.9)
Anxiety states	4 (3.1)
Miscellaneous§	3 (2.3)

Continued

The low proportion of crash room cases triaged at levels 1 or 2 was surprising and may have been due to one or a combination of several reasons. First, the system of assigning a triage level may not correspond to the subjective visual assessment of the patient by staff. Second, patients given lower triage levels may be brought to the crash room because of the spacious nature of our crash room. Third, ambulance crews may routinely bring their patients to the crash room. Fourth, the present triage system may be inappropriate for use in rural hospitals. Finally, errors in triaging may occur. An Ontario report found that 44% of ED patients in 2008/9 were incorrectly triaged (38% were undertriaged and 6% were overtriaged) and that "visual patient presentation is an essential element of assigning a CTAS level."[2]

The final diagnosis was nonspecific, vague or unknown in 17 (17.0%) cases (syncope [5 cases], dyspnea and respiratory abnormalities [2 cases],

Table 4. Final diagnoses in 100 crash room visits (part 2 of 2)

Diagnosis, *n* = 129	No. (%) of cases
Toxic–metabolic	9 (7.0)
Drugs, medicines and biologic substances causing adverse effects in therapeutic use	4 (3.1)
Hypoglycemia	2 (1.6)
Miscellaneous¶	2 (1.6)
Digestive system	
Miscellaneous**	3 (2.3)
Infectious and parasitic	
Miscellaneous††	3 (2.3)
Obstetrics–gynecology	
Miscellaneous‡‡	2 (1.6)
Immune system	
Miscellaneous (anaphylactic shock)	1 (0.8)
Symptoms, signs and ill-defined conditions	10 (8.0)
Chest pain not otherwise specified	7 (5.4)
Malaise and fatigue	2 (1.6)
Miscellaneous (unknown)	1 (0.8)

COPD = chronic obstructive pulmonary disease.
*One case each: cardiac tamponade, sinus bradycardia, ventricular premature beats, palpitations, dizziness, hypotension.
†One case each: acute respiratory failure, ingestion of object causing obstruction of the respiratory tract. One diagnosis cannot be found.
‡One case each: burn of the face and hands, concussion, shoulder dislocation, extradural hemorrhage following injury, fall on same level, acute pain due to trauma, fracture of tibia, hypothermia, toxic effect of sulphur dioxide inhalation, fracture of dorsal or lumbar spinal column, necrotizing fasciitis, traumatic amputation of finger, upper back injury.
§One case each: suicide attempt, parent–child problems, senility without psychosis.
¶One case each: weight loss, osteoporosis.
**One case each: alcoholic cirrhosis of liver, esophageal reflux, gastrointestinal hemorrhage.
††One case each: sepsis, pyogenic arthritis, influenza.
‡‡One case each: ovarian cyst, early onset of labour.

chest pain [7 cases], malaise and fatigue [2 cases], and unknown [1 case]) compared with a rate of 21.6% for all ED visits in the US.[4] We do not consider this finding to be worrisome because inability at times to make a specific diagnosis is not inconsistent with the purpose of the crash room, which is to rapidly identify and stabilize life-threatening or critical illnesses, rather than to make definitive diagnoses.

Of the crash room cases, 61% resulted in admission locally to the short-term care unit, 17% resulted in transfer to another health care facility and 16% resulted in the patient being discharged home, as compared with 28%, 3% and 65%, respectively, of ED visits triaged at levels 1 or 2 reported by CIHI in 2009/10.[1] Additionally, the median length of stay in our crash room was shorter (111) minutes, than the 253 minutes (triage level 1) and 290 minutes (triage level 2) that was reported by CIHI.[1]

Our patients' short stays in the crash room compared with CIHI data might be explained by one or a combination of the following. First, as judged by the triage levels, it is likely that many of our patients were not seriously ill and their conditions were stabilized quickly, or our adjacent short-term care unit was used to continue the monitoring and care that might be given in the crash room of an urban hospital. With the crash room's capacity to accommodate only 1–2 patients, there may have been pressure to quickly transfer patients out. Second, it was predictable that a rural health care centre would have a higher transfer rate than the average Canadian hospital, because neither specialty care nor advanced medical imaging is usually available locally.

Limitations

There are several limitations to this type of retrospective study. First, the accuracy of the study depends completely on the quality of the crash room register record-keeping, and only data recorded in charts could be analyzed. It is possible that patients with triage levels 1 or 2 were taken to other areas in the ED (e.g., isolated lacerations are not routinely brought to the crash room), and assigned triage scores may not have been accurate. Further and larger studies of crash room visits, the characteristics of patients brought by ambulance, and the accuracy of triage and its use in the decision of where to put the patient may provide more data about how the care of patients with the highest triage level is managed.

CONCLUSION

In this chart review of crash room use in a rural hospital, we found that visits to the crash room occurred at a rate of 0.48 cases/wk/1000 population and that most patients seen in the crash room were not given the traditional triage levels usually associated with crash room care. A high proportion of visits occurred outside of regular working hours, with 1 patient arriving during on-call hours every 20 days per 1000 population. Only 43% of cases were initially triaged at levels 1 or 2. Circulatory disease was the diagnostic category that accounted for the largest proportion of visits. Mental disorders and nonspecific diagnoses accounted for 9.0% and 17.0% of final diagnoses, respectively.

Competing interests: None declared.

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