

Emergency Psychiatry in the General Hospital

The emergency room is the interface between community and health care institution. Whether through outreach or in-hospital service, the psychiatrist in the general hospital must have specialized skill and knowledge to attend the increased numbers of mentally ill, substance abusers, homeless individuals, and those with greater acuity and comorbidity than previously known. This Special Section will address those overlapping aspects of psychiatric, medicine, neurology, psychopharmacology, and psychology of essential interest to the psychiatrist who provides emergency consultation and treatment to the general hospital population.

Suicidality and panic in emergency department patients with unexplained chest pain

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Abstract

Objectives: The present study aims to document the problem of suicidality in emergency department (ED) patients with unexplained chest pain and to assess the strength and independence of the relationship between panic and suicidal ideation (SI) in this population.

Method: This cross-sectional study included 572 ED patients with unexplained chest pain. SI, history of suicide attempts, history of SI and the presence of thoughts about how to commit suicide were assessed. Logistic regression analyses were used to quantify the relationship between current SI and panic.

Results: Approximately 15% [95% confidence interval (CI), 12%–18%] of patients reported current SI, and 33% (95% CI, 29%–37%) reported history of SI. Nearly 19% (95% CI, 16%–22%) of patients had thought about a method to commit suicide, and 33% (95% CI, 29%–37%) had a history of a suicide attempt. Panic attacks were diagnosed in 42% (95% CI, 38%–46%) of patients, and 45% (95% CI, 39%–51%) of those had panic disorder. Panic increased the crude likelihood of current SI [odds ratio (OR)=2.53, 1.4–4.5]. This increase in SI risk remained significant after controlling for confounding factors (OR=1.70, 95% CI, 1.0–2.9).

Conclusions: Suicidality and SI were common and often severe in our sample of ED patients with unexplained chest pain.

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1. Introduction

Chest pain is one of the most common primary complaints encountered by emergency physicians [1], and approximately one half of cases remain unexplained at

the time of discharge from the emergency department (ED) [2–4]. However, up to 80% of unexplained chest pain cases evolve into a chronic pain problem [5–11].

Unexplained chest pain often results in significant impairment. Up to 70% of patients with unexplained chest pain report that chest pain episodes limit their ability to work or to engage in daily activities, such as walking, physical exercise and household chores [10,12,13]. Accordingly, these patients report significantly reduced quality-of-life scores for up to 9 years after the initial medical evaluation

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[14,15]. Unexplained chest pain is also associated with repeated ED consultations and frequent use of health care services, such as primary care, cardiology, gastroenterology and neurology subspecialties [12,16–18]. Unsurprisingly, elevated psychological distress and psychiatric morbidity are highly prevalent in this population [4,19,20]. Approximately 15% of patients who present to the ED with unexplained chest pain report suicidal ideation (SI) at the time of the consultation [20]. This prevalence rate is more than twice that of ED patients as a whole (6%) [21]. The elevated rate of SI in ED patients with unexplained chest pain highlights the importance of exploring the frequency and severity of this problem in this population. A better understanding of this phenomenon could help prevent suicidal behavior, as SI is a risk factor for suicide attempts [22]. Moreover, approximately 40% of patients who commit suicide were seen in the ED in the year prior to their attempt [23]. Additional data on suicidality, such as thoughts about how to commit suicide or history of SI and suicide attempts, are essential to understanding the actual risk of suicide attempts within this population.

Psychopathology is an independent risk factor for SI [24,25], and the elevated prevalence of SI in patients with unexplained chest pain may be attributable to the high psychiatric morbidity in this population [4,19,20]. Panic attacks, with or without panic disorder, are the most common psychiatric condition observed in patients who consult an ED physician for unexplained chest pain, with prevalence rates of 20% to 44% [19,20,26,27]. For simplicity, the term “panic” is used throughout this article to refer to panic attacks and panic disorder.

Panic has been found to be an independent risk factor for SI among patients in primary care settings [28–30]. The same relationship has been observed in ED patients with chest pain, but the data refer exclusively to individuals with panic disorder [31], a diagnosis responsible for less than 50% of the cases of panic among patients with unexplained chest pain [19,20,26]. Thus, the association between SI and panic attacks, the most frequently observed psychological syndrome in ED patients with unexplained chest pain [20], remains unknown.

The present study aims to do the following: (a) document the problem of suicidality in patients presenting to the ED with unexplained chest pain and (b) assess the strength and independence of the relationship between panic and SI in this population. We hypothesized that panic is associated with an elevated risk of SI and that this association is independent of sociodemographic characteristics, medical problems and other psychiatric conditions.

2. Materials and methods

2.1. Setting

Participants were recruited on weekdays between 8 a.m. and 4 p.m. at the EDs of two university-affiliated hospital

centers from March 2005 to May 2008. The ethics committees of both institutions approved the protocol. The detailed protocol of the original study is available elsewhere [20].

2.2. Sample

Patients were eligible to participate if they were at least 18 years old, spoke English or French and had normal serial electrocardiograms and cardiac enzymes (troponin T < 0.06). Exclusion criteria were as follows: objective medical cause explaining the chest pain (e.g., cause identifiable by radiography; objective signs of ischemia, arrhythmia and/or myocardial necrosis), unstable medical condition, psychotic state, ongoing intoxication or presence of a cognitive disorder. Consequently, patients with known cardiac disease were included only if the current episode of chest pain met the aforementioned inclusion criteria. A standardized clinical interview was administered to eligible and consenting patients during their stay in the ED. Patients were subsequently asked to complete a battery of self-report questionnaires during their stay in the ED. All interviews were audio recorded, and a random sample of 25% of the interviews was assessed for interrater agreement on panic diagnoses. Trained personnel extracted information about medical conditions from the patients' files, and a random sample of 8% of the files was evaluated for interrater agreement. All abstractors were blind to the study's objectives and to the patients' diagnoses of panic or SI.

2.3. Measures

2.3.1. Interviews

Sociodemographic data, including date of birth, gender, employment status and civil status, were documented during a brief structured interview. Either the Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV) [32] or its French–Canadian version [33] was used to diagnose the following psychiatric conditions: panic attacks in the past month, panic disorder with or without agoraphobia, social phobia, specific phobia, obsessive–compulsive disorder, posttraumatic stress disorder, generalized anxiety disorder, major depression, dysthymia, bipolar disorder, somatoform disorders, substance abuse and substance dependence. Panic attacks were considered to be present when patients had experienced at least one clinical panic attack in the last month, and panic disorder was diagnosed using strict DSM-IV criteria [34]; 93% of panic disorder patients had experienced at least one clinical panic attack in the month preceding the ED consultation. Trained research assistants conducted these interviews under the supervision of licensed clinical psychologists.

2.3.2. Self-report measures

We used item 9 of the Beck Depression Inventory, second edition (English or French–Canadian version), to evaluate current SI [35,36]. Patients responded to this question by selecting one of the following statements: 0=I don't have

thoughts of killing myself; 1=I have thoughts about killing myself, but I would not carry them out; 2=I would like to kill myself; 3=I would kill myself if I had the chance. For our purposes, endorsement of statements 1, 2 or 3 indicated current SI.

The history of suicide attempts, the history of SI and the presence of thoughts about how to commit suicide were assessed with the *Questionnaire d'évaluation de la problématique suicidaire* (Suicidality Assessment Questionnaire) [37]. This validated questionnaire has good internal consistency (0.77) and convergent validity [37]. Lifetime SI was measured on a scale from 0 to 4 (never=0, rarely=1, sometimes=2, often=3, very often=4). Patients who reported current SI and thoughts about how to commit suicide were identified as having severe SI; we considered thoughts about how to commit suicide to indicate more severe suicidality than SI alone.

2.3.3. Medical file abstraction form

Abstractors used a standardized medical file abstraction form and coding protocol to gather information about any known physical illness at the time of the ED consultation.

2.4. Statistical analyses

All analyses were conducted with IBM SPSS Statistics 18 for Windows (IBM Corporation, Somers, NY, USA). We used bivariate logistic regression analyses to quantify the crude relationship between current SI and each of the variables measured. We conducted a multivariate logistic regression analysis to evaluate the independence of the relationship between panic and SI, controlling for mood disorders, other psychiatric disorders, sociodemographic

characteristics and a number of medical conditions, which are all known predictors of SI [22,24,28,29,38,39]. These analyses were repeated with severe SI as the dependent variable. Mood and other mental disorders were coded as either present or absent. Sociodemographic characteristic included age, sex, annual family income (either <\$60,000 or ≥\$60,000), work status (employed full/part time vs. unemployed/retired), level of education (<12 years vs. ≥12 years) and civil status (single vs. married/common law). Because no significant relationships were observed between current or severe SI and specific illnesses, we created a categorical variable to represent the number of known medical conditions at the time of the ED consultation (0–3 and ≥4). The Hosmer–Lemeshow Goodness of Fit Test was used to confirm the fit of the models. Variable intercorrelations were assessed to identify potential multicollinearity problems. Interrater agreement for ADIS-IV diagnoses and for the data extracted from medical files was evaluated using Cohen's Kappa. The 95% confidence intervals (CIs) for prevalence percentages were calculated.

2.5. Results

2.5.1. Sample characteristics

The total sample included 572 ED patients with unexplained chest pain. Patients who did not consent to participate were older, more likely to be female and more likely to be retired than participants. Patients who began but did not complete the evaluation were significantly less educated, more likely to be female and more likely to report panic than completers. See Fig. 1 for details of the sample-selection process. Characteristics of the final sample are presented in Table 1.

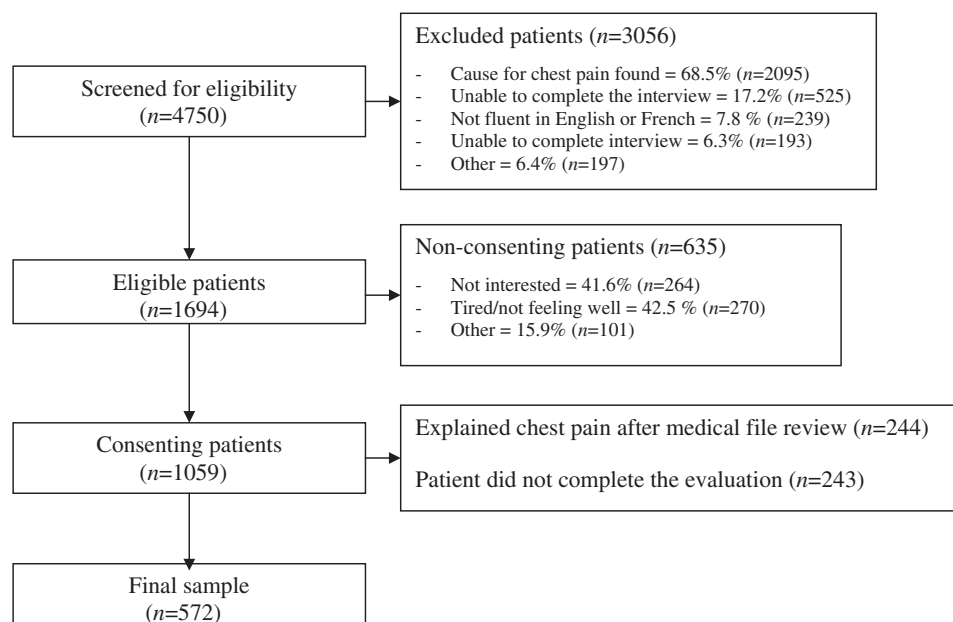


Fig. 1. Patient flowchart.

Table 1
Sociodemographic characteristics of the sample

Characteristics	Value
Age (years), mean (S.D.)	54.2 (14.5)
Male, <i>n</i> (%)	318 (56)
Civil status: married or common law, <i>n</i> (%)	369 (65)
Education, <i>n</i> (%)	
Elementary school/high school	306 (54)
College/university	266 (47)
Employment status, <i>n</i> (%)	
Employed	332 (58)
Unemployed	66 (12)
Disabled	14 (2)
Retired	160 (28)

S.D.=Standard deviation.

2.5.2. Psychiatric diagnoses

Panic was the most common psychiatric condition reported in our sample, with a prevalence of 42% (95% CI, 38%–46%; *n*=238), of which 45% (95% CI, 39%–51%; *n*=107) had panic disorder. Major depression and dysthymia were diagnosed in 6.6% (95% CI, 5%–9%; *n*=38) and 2.1% (95% CI, 1%–3%; *n*=12) of patients, respectively; these patients were combined to create a mood disorder variable (8%; 95% CI, 6%–10%; *n*=45). No patients were diagnosed with bipolar disorder. Finally, 26% (95% CI, 23%–30%; *n*=151) of patients presented with one or more anxiety disorders (other than panic disorder), somatization disorders or substance-related disorders. Interrater agreement for panic diagnoses was very good (*k*=0.85) in 150 (26%) randomly selected interviews.

2.5.3. Suicidality

Approximately 15% (95% CI, 12%–18%; *n*=87) of patients reported current SI, and 33% (95% CI, 29%–37%; *n*=186) reported lifetime SI. Almost all patients who reported current SI also reported lifetime SI (98%; 95% CI, 94%–100%; *n*=85), and 21% (95% CI, 12%–29%; *n*=18) of patients who reported current SI had a history of suicide attempts. Sixty-one percent of patients with current SI (*n*=53) met our criteria for severe SI. See Table 2 for details.

More than 63% (95% CI, 53%–74%; *n*=55) of patients with current SI had panic or a mood disorder; the majority had panic (58%; 95% CI, 47%–68%; *n*=50), and 24% (95%

Table 2
Suicidality

	Frequency % (95% CI)
Lifetime SI (<i>n</i> =562)	33 (29–37)
Past suicide attempt (<i>n</i> =570)	7 (5–9)
Current suicidal ideation (BDI-II question 9) (<i>n</i> =572)	15 (12–18)
Thoughts about how to commit suicide (<i>n</i> =567)	19 (16–22)
Severe SI ^a (<i>n</i> =567)	9 (7–12)

^a Patients with current SI and thoughts about suicide method.

CI, 18%–37%; *n*=21) had a mood disorder. The proportion of these disorders increased to 68% (95% CI, 55%–81%, *n*=36) for severe SI; panic remained the most prevalent disorder (62%; 95% CI, 49%–75%; *n*=33), with mood disorders being approximately half as frequent (30%; 95% CI, 17%–43%; *n*=16).

2.5.4. Medical diagnoses

Three hundred fifty-five patients (62%; 95% CI, 58%–66%) reported at least one known medical condition, and 9% (95% CI, 6%–11%) reported four or more conditions. The most commonly reported conditions were high blood pressure (31%; 95% CI, 27%–35%), hypercholesterolemia (27%; 95% CI, 23%–31%) and coronary artery disease (CAD) (26%; 95% CI, 22%–30%). Interrater agreement on presence of medical conditions was very good (*k*≥0.8) in 45 (8%) randomly selected medical files.

2.5.5. Risk factors for current and severe SI

The crude odds ratio (OR) for current SI was 2.14 (95% CI, 1.30–3.40) in panic patients. The crude OR was slightly higher for severe SI (OR=2.53, 95% CI, 1.44–4.53) in these patients. Having a mood disorder and being single were also independent risk factors for at least one type of SI. As indicated in Table 3, the increase in the odds of SI was less marked when we controlled for confounding variables (i.e., other psychiatric conditions, comorbid medical conditions, sociodemographic characteristics), but it remained significantly elevated for panic, mood disorders and being single. However, being single was not an independent predictor of severe SI. The presence of a mental disorder, other than a mood disorder or panic, and having completed less than 12 years of education were statistically significant predictors of current SI. This association was no longer significant in the multivariate analysis. Detailed results are presented in Table 3. The Hosmer–Lemeshow Goodness of Fit Test indicated that all regression models were a good fit (*P*=.77–.94). All intercorrelations of variables were less than 0.50, eliminating the potential problem of multicollinearity.

3. Discussion

The present study reported the frequency of suicidality in patients who consulted an ED physician for unexplained chest pain. This study also explored the strength and independence of the relationships between panic and current SI and between panic and severe SI.

The results presented here indicate that suicidality and SI are very common among ED patients with unexplained chest pain. This finding is consistent with reports of significant psychological distress in this population [4,19,20,26,40]. The lifetime prevalence rate of SI in our sample was 30%, and 7% of patients reported past suicide attempts. Approximately 15% of patients reported current SI, and 60% of those patients had considered methods of committing suicide. In comparison, the prevalence rate of SI is between

Table 3
Crude and adjusted OR for current and severe suicidal ideation

	Crude OR for current SI (95% CI)	Adjusted OR for current SI (95% CI)	Crude OR for severe SI ^a (95% CI)	Adjusted OR for severe SI ^a (95% CI)
Panic	2.14 (1.30–3.40)	1.73 (1.03–3.90)	2.53 (1.41–4.53)	1.94 (1.02–3.70)
Mood disorders ^b	8.42 (4.43–16.00)	7.31 (3.61–14.80)	7.23 (3.61–14.50)	6.61 (3.02–14.47)
Civil status: single	1.88 (1.18–2.98)	1.71 (1.04–2.83)	1.45 (0.82–2.57)	1.29 (0.69–2.41)
Age	1.00 (0.98–1.02)	1.01 (0.98–1.03)	0.99 (0.97–1.01)	1.00 (0.97–1.02)
≥4 medical conditions	0.74 (0.31–1.80)	0.58 (0.22–1.54)	1.09 (0.41–2.87)	1.14 (0.38–3.39)
Currently unemployed	1.21 (0.77–7.92)	1.04 (0.57–1.92)	0.91 (0.51–1.6)	0.83 (0.39–1.76)
<12 years of scholasticity	1.60 (1.00–2.57)	1.60 (0.96–2.67)	1.64 (0.91–2.96)	1.71 (0.9–3.02)
Other mental disorders	1.68 (1.04–2.71)	0.95 (0.54–1.65)	1.57 (0.87–2.84)	0.81 (0.40–1.62)

^a Presence of current SI and thoughts about suicide method.

^b Includes major depression and dysthymia.

6% and 9% in patients who consult a primary care physician or an ED physician for reasons other than unexplained chest pain [21,28,29,41]. We also found that severe SI was nine times more frequent in our sample than it was in a large, cross-national sample (9% vs. 1%) [22]. The total sample size for this general-population study was 54,992, and participants were recruited from 21 countries (10 developed and 12 developing countries). Suicidality and psychiatric disorders were assessed with the Composite International Diagnostic Interview Version 3.0, which is a validated structured diagnostic interview [42].

The present study supports the hypothesis that panic constitutes a risk factor for current SI and severe SI, independently of patients' other characteristics. In fact, the presence of panic more than doubled the likelihood of current or severe SI in the sample studied here. Although major depression and dysthymia are more significant predictors of SI and severe SI than panic, the present findings demonstrate that panic increases the risk of SI and severe SI independently of sociodemographic characteristics, mood disorders, other psychiatric conditions and medical conditions. Moreover, while depression is linked primarily to SI onset, panic is associated with both SI onset and the transition from SI to suicide attempt [22,24,25].

Why might panic be independently associated with an increased risk of SI and suicidal behavior? While there is no definite answer to this question, one hypothesis has been proposed [31,43]: repeated panic attacks and the absence of explanation and treatment for these symptoms could engender hopelessness, a concept associated with suicide attempts [44]. If this is the case, early identification and treatment of panic could help prevent both SI and suicide attempts in patients with unexplained chest pain.

To this day, suicide is the second most common cause of injury-related death in the USA and in Canada [45,46]. While suicide prevention is a complex process, the identification of mental health conditions during medical visits may improve preventive efforts. In light of the findings presented here, psychiatrists may wish to promote greater attention to panic, mood disorders and SI in ED patients with unexplained chest pain. Increased awareness

on the part of ED physicians could promote suicide prevention by ensuring that these patients are referred for appropriate treatment. However, a change in general practice may be required to meet this objective; currently, less than 8% of individuals with mood disorders or panic are identified during ED consultations motivated by chest pain [19,20,40]. Furthermore, approximately 75% of patients with SI remain unidentified at the time of discharge from the ED [21].

Several methodological limitations must be considered when interpreting the results of the present study. First, the rates of refusal to participate and drop out among potentially eligible patients were 37% and 30%, respectively. The patients who dropped out or declined to participate differed from participants in the prevalence of panic and in several sociodemographic characteristics. Furthermore, the most common reasons cited for declining participation were lack of interest and feeling tired or unwell. It is possible that these patients were, in fact, depressed. If this was the case, it might have led to an underestimation of SI in our sample. However, our mood disorder rate is within the same range as the rates reported in other ED chest pain studies [19,26], while our SI rate is higher [31], making this bias unlikely.

Second, all participants in the present study were recruited during the daytime; it may be difficult to generalize these results to the entire population of individuals who present to the ED with unexplained chest pain. However, the results of the present study are consistent with those of other studies in this area, suggesting that our results remain valid.

Another factor that may limit the validity of our conclusion is the inclusion of patients who reported a history of CAD in the sample (26%). While unexplained chest pain in a CAD patient is a clinical reality, one might suggest that a cardiac cause for the pain was present but remained undiagnosed. However, results from the main study showed that less than 5% of patients had a cardiac cause for their pain identified during medical follow-up [20]. This low rate represents the actual "acceptable" miss rate for CAD in ED patients, thus supporting that our sample is composed of low-risk patients with unexplained chest pain. Furthermore, few patients had a confirmed

history of CAD (i.e., a positive stress test, nuclear imaging perfusion study or at least one $\geq 50\%$ stenosis) [20]. Finally, both this work and a previous study showed that the rate of SI did not change according to CAD status in chest pain patients [31].

ED patients diagnosed with unexplained chest pain presented with an elevated prevalence of SI and severe SI. This population should be systemically assessed for SI. Early identification and treatment of panic and mood disorders in ED patients with unexplained chest pain would decrease the impact of these conditions in this population and promote the prevention of suicidal behavior. Special efforts should be made to identify unexplained chest pain patients with panic and/or mood disorders, as these individuals have a particularly high risk of SI and severe SI. However, increased identification alone is rarely enough to ensure treatment [47]. Patients must therefore be referred for appropriate evaluation and treatment. In the best of cases, the panic diagnosis would be confirmed on-site by a psychiatrist, who could then initiate treatment. Preliminary data have shown that this approach could be both helpful and feasible [48,49]. If this service is not available, patients should be sent to a primary care physician or a mental health professional depending on the locally available resources and clinical presentation.

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