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Pain perception in emergency department patients with and without headache

有和無頭痛急診患者的疼痛知覺

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Objectives: Adequate pain management of emergency department (ED) patients is an important clinical goal. Pain perception in ED patients with headache has been reported to differ from that of other patients with pain. If this were true in our setting, we might interpret pain scores and response to analgesics differently. We compared pain perception in ED patients without pain, patients with headache, and patients with non-headache pain who had blood pressure (BP) measurement and intravenous (IV) cannulation for any reason. ***Methods:*** The study design was approved by our hospital's Ethics Committee. The patients were asked to describe their pain while undergoing BP measurement and IV cannulation with a 0 through 10 (11-point) numerical rating scale. Pain scores were analysed according to the patient's group: no pain, headache pain, or non-headache pain. ***Results:*** For the 278 participating patients (95 patients without pain, 77 patients with headache, and 106 patients with non-headache pain), the pain scores as reported during BP measurement and IV cannulation was not significantly different between the patient groups. On sub-group analysis, females reported higher pain scores during IV cannulation than males (2.8±2.6 vs. 2.3±1.9, p=0.06). In addition, married patients had higher pain scores than unmarried patients during both BP measurement (1.31 vs. 1.03, p=0.004) and cannulation (2.73 vs. 2.16, p=0.089). ***Conclusion:*** The differences in pain experienced in patients with or without headache or other causes of pain during IV cannulation and BP measurement were minor. Based on our findings, gender and marital status should be recorded during studies recording pain levels in ED patients. (Hong Kong j.emerg.med. 2011;18:131-135)

目標：充分治療急診（ED）患者的疼痛，是一個重要的臨床目標。有報告指出，頭痛的 ED 患者，與其他疼痛病人有不同的疼痛感知。如果這是真的，我們對患者的疼痛評分和對止痛藥反應，應有不同的解讀。我們比較三組 ED 患者在接受靜脈置管時和測量血壓時的疼痛知覺：沒有疼痛患者，頭痛患者，與非頭痛患者。**方法：**本研究的設計得到了醫院倫理委員會的批准。在測量血壓（BP）和靜脈置管時，病人以 0 到 10（11 分）數值評定量表，描述他們的疼痛知覺。疼痛評分的分析，是根據病人的組別：無疼痛，頭痛或非頭痛。**結果：**參加患者有 278 名（95 例無疼痛，頭痛 77 例，106 例非頭痛疼痛），在測量血壓（BP）和靜脈置管時的疼痛評分，三組患者群體之間無顯著不同的。分組分析顯示，在靜脈置管時，女性的疼痛評分高於男性（2.8±2.6 對比 2.3±1.9，p 值 =0.06）。此外，已婚者的疼痛評分，在血壓測量（1.31 對比 1.03，p 值 =0.004）和靜脈置管（2.73 對比 2.16，p 值 =0.089）時，均高於未婚患者。**結論：**無疼痛和有無頭痛的患者，在測量血壓和靜脈置管時的疼痛評分，只有輕微不同。根據本研究的結果，在 ED 進行疼痛程度研究期間，應記錄患者的性別和婚姻狀況。

Keywords: Pain assessment, visual analog scale

關鍵詞：疼痛評分、視覺類比量表

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Introduction

Pain is the most common chief complaint of patients presenting to the emergency department (ED), and has been called the "5th vital sign" by many.[1-3] Great efforts are made to measure pain using a variety of scales and scores and to decrease pain in ED patients in a timely fashion. The perception of pain includes not only sensorial input, but also the context in which it occurs, as well as the patient's level of anxiety, memories, expectations, and beliefs.[4] For instance, treating the anxiety that contributes to a patient's suffering from pain has been shown to decrease pain scores.[5] Similarly, the presence of depression, anxiety and anger has been found to affect the frequency of headache attacks and the perception of headache pain.[6]

Headache is a common pain complaint that results in varying levels of disability; its lifetime prevalence has been reported to be up to 99% in women and 94% in men.[7] Using a 10-point numerical rating scale, Marco et al reported that pain perception in ED patients with headache was significantly different from those without headache in a study performed in the USA.[8] If this result is also validated in our setting, the evaluation of our success in decreasing pain in ED patients might be significantly altered. Based on their study, we compared pain perception in ED patients whose chief complaint was headache, non-headache pain, or a non-painful condition who had blood pressure (BP) and IV cannulation for any reason.

Materials and methods

The study design (prospective, case-control) was approved by our hospital's Ethics Committee and the study was conducted in accordance with the Declaration of Helsinki and the standards of good clinical practice as defined by the European Union. Over a three-month period (March-April-May 2006), patients over 18 years of age with a grossly normal mental status presenting to our community hospital ED (approximately 20-25 total patients/day) and undergoing IV cannulation for any reason were asked to participate in the study. In those granting consent, the following data were recorded: presence (and location, for example, headache) or absence of pain as a reason for coming to the ED, age, sex, level of education, medical history, marriage and employment status. Patients were categorised as having headache as a primary complaint, pain other than headache as a primary complaint, or no pain as a primary complaint. The location of the 'other' pain was not recorded on the data form used for the study.

Using the same procedure as used by Marco et al, while undergoing BP measurement, patients were asked to describe their pain with a 0 (no pain at all) through 10 (the most severe pain imaginable) on an 11-point numerical rating scale.[8-11] The same pain measurement procedure was used when patients then underwent IV cannulation.

Pain scores were analysed according to the patient's group: no pain, headache pain (as the patient's primary complaint), or non-headache pain. Data were analysed with SPSS version 15.0 (SPSS, Inc., Chicago, USA). Pain scores in the three groups during the two procedures were compared by means of student t-test, Kruskall-Wallis and Mann-Whitney U test. Significance level was taken at 5%.

Results

During the study period, 1638 patients over 18 years old presented for care to our ED, and 781 had IV lines placed. Of these, 279 patients granted consent to participate in the study, but the record of one patient was incomplete. Thus, results were analyzed from the remaining 278 patients: 77 patients who had a chief complaint of headache, 106 patients with a chief complaint of non-headache pain, and 95 patients without a chief complaint of pain.

The mean±SD age of our patients was 41±15 years (range, 18-81 years) and 60.2% were female. Of the participants, 44% had at least a high school education, 56% were employed and 79% were married. The proportion of females, patients over age 65, and education level higher than high school were significantly different between the three groups, when compared using Kruskal-Wallis testing; the proportion of patients in each pain group,

according to employment or marital status, were not significantly different (Table 1).

Table 2 shows the mean pain score reported during BP measurement and IV cannulation in the three patient groups. Pain was not significantly different between the headache and no pain groups when BP was measured (p=0.43) or when IV cannulation was performed (p=0.13). Likewise, pain levels were not significantly different between headache and non-headache pain groups (BP measurement, p=0.26; IV cannulation, p=0.09) or between non-headache pain and no pain groups (BP measurement, p=0.70; IV cannulation, p=0.86).

Females reported higher pain scores during IV cannulation than males (2.8±2.6 vs. 2.3±1.9; p=0.06). Married patients had significantly higher pain scores than unmarried patients during both BP measurement and IV cannulation (p=0.004 and p=0.089, respectively) (Table 3).

Discussion

As pain (headache or non-headache) is the symptom most frequently mentioned when patients present to EDs, emergency physicians are familiar with many aetiologies and degrees of pain. The integration of pain intensity as the "5th vital sign" within hospitals has been promoted by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO).[12] Pain intensity can be elicited and documented using a numerical rating scale like visual analog scale (VAS), graphical rating scale and/or verbal rating scale.[8-11] These instruments have been validated and are sensitive to short-term changes in pain intensity occurring during and ED stay.[9,13,14]

Table 1. Numbers of patients with various demographic characteristics in different groups

Demographic category	Headache	Non-headache	No pain	p
Gender				
Female (n=167)	57	52	58	0.001
Male (n=110)	20	53	37	
Age				
Age <65 years (n=255)	77	99	79	0.022
Age >65 years (n=23)	0	7	16	
Education				
High school or greater (n=152)	31	60	61	0.021
Less than high school (n=123)	46	44	33	
Employment status				
Employed (n=155)	51	65	39	0.665
Unemployed (n=117)	26	38	54	
Marital status				
Married (n=221)	62	85	74	0.732
Unmarried (n=52)	15	18	19	

Kruskal-Wallis test

Table 2. Pain (mean±SD; median), as reported on a numerical rating scale, during blood pressure measurement (BP) and intravenous catheter placement (IV) in different groups

	Headache	Non-headache pain	No pain	p*	p†	p‡
BP	1.4±1.4; 1.2	1.2±1.0; 1.0	1.2±1.0; 1.1	0.26	0.43	0.70
IV	3.0±2.8; 1.8	2.4±2.2; 1.7	2.5±2.2; 1.7	0.09	0.13	0.86

Student's t-test

*Headache vs. non-headache pain; †Headache vs. no pain; ‡Non-headache vs. no pain

Table 3. Pain reported during blood pressure measurement (BP) and intravenous catheter placement (IV) according to demographic variables

Age	BP	IV
<65 (n: 254)	1.3±1.2	2.6±2.4
>65 (n: 23)	1.1±0.4	2.5±2.3
p*	0.51	0.62
Level of education		
High school or greater (n: 151)	1.3±1.3	2.6±2.4
Less than high school (n: 123)	1.2±0.9	2.6±2.3
p*	0.49	0.74
Employment status		
Employed (n: 155)	1.2±1.1	2.5±2.3
Unemployed (n: 117)	1.3±1.2	2.7±2.5
p*	0.925	0.536
Marital status		
Married (n: 219)	1.3±1.3	2.7±2.4
Unmarried (n: 53)	1.0±0.3	2.2±2.0
p†	0.004	0.089

*value as calculated with Student's t-test; †value as calculated with Mann-Whitney U test

The sensation of pain results from specific neural-biochemical events. Each patient's pain experience is unique because the contributions from affective and evaluative components of pain are often as important as that from the production and transmission of the pain signal from peripheral receptors. Nicholson et al demonstrated that cognition (locus of control and self-efficacy) and negative affect (depression, anxiety, and anger) could influence on the frequency of headache attacks, adherence to prescribed treatment, headache treatment outcome, and headache-related disability.[6] In addition to this, preexisting headache or other pain has been reported to affect the perception of pain in ED patients. For example, one study demonstrated that patients with headache reported higher pain scores from blood pressure cuff inflation, but not from IV catheter placement.[8] As it was performed in a very different setting from ours, we wanted to examine whether this issue also true for our patient population here in Turkey. However, we found that pain perception in ED patients with headache did not differ significantly from that of ED patients with other pain or no pain. Based on these results, we have not made any adjustments to our pain management protocol based on whether the patient's pain is primarily headache or other pain.

Age, sex, ethnicity, accompanying psychiatric problems, and economic status of the patient may affect the way an individual perceives pain and expresses his/her complaints.[4-6,15-19] In this study, females reported higher pain scores than males during IV cannulation, but the level of education, employment status, and age were not found to be significant factors. In a previous unblinded study, female ED patients reported a higher severity of pain than males, and females received more pain medications.[15] In another study, no significant difference in VAS scores was found between pain groups regarding gender, age and cause of pain.[20] Safdar et al, in their multicenter prospective study, found that patient gender did not appear to influence pain management decisions in the ED; baseline pain scores and pain relief were similar in males and females.[21]

We found that married patients had significantly higher pain scores than unmarried patients during both BP measurement and IV cannulation, a finding that has not previously been reported. Until reasons for this finding can be clarified, we recommend recording the marital status of patients during future studies on pain management in ED patients. While pain scores were statistically higher in married patients, the differences were not clinically significant in our opinion. This finding of differences in pain perception between married and unmarried may be specific to the cultures of our patient population.

Limitations of this study include (1) there was no power test/sample size calculation, (2) the pain scores for both procedures were universally very low, and therefore difficult to detect any difference even if the differences did exist, (3) the study was performed in only one emergency department, which was atypically not crowded, (4) locations of 'other pain' were not recorded on our study sheets which could be an confounder, (5) results may not able to translate to other population with a lower or higher level of education or in one which has a different proportion of employed patients.

Conclusion

Levels of reported pain during IV cannulation or blood pressure measurement do not differ in patients with a primary complaint of headache, non-headache pain, or non-painful condition. Because females and married patients (both female and male) in our population report higher levels of pain during IV cannulation and BP measurement, gender and marital status should be recorded during studies recording pain levels in ED patients.

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