



Clinical Study

Suicidal ideation and risk factors in Korean migraine patients

Sun-Young Kim^a, Sung-Pa Park^{b,*}^a Department of Neurology, University of Ulsan, College of Medicine, Ulsan, Republic of Korea^b Department of Neurology, School of Medicine, Kyungpook National University, 101 Dongin-dong 2 Ga, Jung-gu, Daegu 700-422, Republic of Korea

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ABSTRACT

Population-based studies have reported an increased risk of suicidal ideation in patients with migraine. However, there is some controversy as to whether migraine itself is a risk factor for suicidal ideation after adjusting for psychiatric comorbidities. We calculated the frequency of suicidal ideation among patients with migraine visiting a tertiary care hospital and determined its risk factors. Patients with migraine and healthy controls completed self-report questionnaires to assess depression, anxiety, and suicidal ideation, and the frequency of suicidal ideation. Risk factors for suicidal ideation were investigated in terms of demographic, clinical, and psychiatric variables. One hundred eighty-five patients with migraine (156 females and 29 males; mean age 39.1 years) and 53 age and education-matched healthy controls participated in the study. The frequency of suicidal ideation was significantly greater in patients with migraine than healthy controls (odds ratio [OR] = 5.09, 95% confidence interval [CI] 1.17–22.10, $p = 0.003$), but this significance was not sustained after adjusting for comorbid depression and anxiety. The risk of suicidal ideation in patients with migraine was associated with lower education levels, higher frequency of migraine attacks, stronger intensity of headaches, and presence of phonophobia, chronic migraine, depression, and anxiety. The strongest predictor was depression (OR = 15.36, 95% CI 5.39–43.78, $p < 0.001$), followed by the intensity of headache while completing the questionnaire (OR = 1.293, 95% CI 1.077–1.553; $p = 0.006$). The contribution of migraine-specific variables to suicidal ideation is trivial compared to that of depression and headache intensity.

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1. Introduction

Migraine is a common disease experienced by 8–12% of the general population [1]. The prevalence of migraine is highest between the ages of 20 to 45 years, and sufferers face significant socio-economic disadvantages [1,2]. Patients with migraine have been reported to be at higher risk of suicide than non-migraine populations, similar to other populations with neurological disorders such as epilepsy [3,4], stroke [5], and multiple sclerosis [6,7]. However, the potential link between migraine and suicide is not fully elucidated and controversy remains over whether it is directly related to migraine itself or its comorbid psychiatric disorders. The link between migraine with aura and suicidal ideation and suicide attempts was first described in a cohort of young adults aged 21–30 years [8,9]. This study showed that patients suffering from migraine with aura had a higher likelihood of lifetime suicide attempts (odds ratio [OR] = 4.3) or suicidal ideation (OR = 2.3) than those without migraine, and the risk of suicidality was increased with comorbid depression [9]. Other community-based studies in

adolescents found that the presence of migraine attacks, particularly migraine with aura, was a significant predictor of suicide risk [10,11]. Furthermore, the authors reported that the presence of migraine was highly associated with psychiatric comorbidities and that the association with psychiatric disorders was stronger in patients with migraine with aura than in those without aura [10,11]. A recent 2 year observational cohort study estimating suicide attempt in patients with migraine found that the risk of suicide attempts was elevated in both patients with migraine (OR = 4.43, adjusted for sex, psychiatric disorder, and previous history of suicide attempt at baseline) and with non-migraine severe headache (OR = 6.20, adjusted for the same covariates) [12]. This result was interesting because it proved that pain severity rather than migraine itself or psychiatric comorbidity could affect in part the increased risk of suicide attempt associated with headache. Although several studies have investigated the impact of migraine on the risk of suicide [8–12]; major predictors of suicide risk among psychiatric comorbidities, headache disability, and psychosocial factors are not known.

Suicide is a major public health issue in Korea. In 2007, 24.8 of every 100,000 deaths were due to suicide, one of the highest suicide rates among Organization for Economic Cooperation and

* Corresponding author. Tel.: +82 11 9593 5769.

E-mail address: sppark@mail.knu.ac.kr (S.-P. Park).

Development (OECD) countries, compared with 10.1 per 100,000 in the USA, 6.0 in UK, and 19.1 in Japan [13]. Suicide is the leading cause of death among young adults 20–30 years of age and the second leading cause of death among middle-aged adults 40–50 years [13]. Because the highest prevalence of migraine is between the ages of 20 and 50 years [1,2], suicide risk may be an important issue for patients with migraine. Although individuals with suicidal ideation do not always commit suicide, frequent thoughts of suicide can be connected to suicide attempts [14]. A recent nationwide study in Korea reported that the lifetime prevalence of suicidal ideation, planning, and attempts were 15.2%, 3.3%, and 3.2%, respectively [14].

Thus, it is quite important for clinicians to recognize comorbid psychiatric symptoms such as depression, anxiety, and suicidality when patients first visit a tertiary care hospital and are diagnosed with migraine. The aims of this study were to identify the prevalence of suicidal ideation among patients with migraine visiting one tertiary care hospital in Korea and to determine its risk factors.

2. Methods

2.1. Subjects

Patients with migraine were consecutively invited to our headache clinic from 1 November 2009 to 29 February 2012. Migraine was diagnosed according to the revised version of the International Classification of Headache Disorders second edition [15]. Chronic migraine (CM) was defined as ≥ 15 headache days per month on average over the preceding 3 months, with at least 8 days per month meeting the criteria for migraine without aura [16]. Our study included patients 15 years of age or older with a newly diagnosed or previously diagnosed migraine headache, who had not taken migraine specific medications during the preceding year. Patients with severe medical, psychiatric, or neurological disorders that prevented them from understanding the questionnaires or cooperating with the study, mental insufficiency (Korea Wechsler Adult Intelligence Scale Intelligence Quotient < 70), or alcohol or drug abuse were excluded from the study.

2.2. Study design

This cross-sectional study was approved by the Institutional Review Board of Kyungpook National University Hospital, and all participants provided written informed consent prior to their participation. Each patient was interviewed by a trained neurologist (S.P.P.) who also reviewed the patient's medical charts to collect demographic and clinical information to include in a computerized database. Data were collected on variables such as age, sex, education, job, income, marital status, type of migraine, age at migraine onset, duration of migraine, attack frequency and duration, headache intensity, accompanying symptoms (such as photophobia, phonophobia, and cephalic allodynia), family history of migraine, and concurrent medical history. Patients were divided according to whether they experienced episodic migraine or CM instead of according to whether they experienced migraine with aura or migraine without aura because there were too few subjects in the former group. Headache-related disability was measured with the Migraine Disability Assessment Scale (MIDAS) [17]. Headache intensity was measured using a Visual Analog Scale (VAS) ranging from 0 to 10. Because headache intensity could affect performance on psychometric measurements, it was measured two ways using the VAS_{max} to evaluate the maximum intensity of headaches experienced during the prior 3 months and the VAS_{now} to assess the

intensity of the headache experienced on the day the questionnaire was administered. Cephalic allodynia was defined as scalp or facial pain in response to innocuous stimuli. Age and sex-matched healthy subjects were consecutively recruited as a control group during the enrollment of patients with migraine. All subjects completed reliable and validated self-report health questionnaires, including the MIDAS questionnaire, the Korean versions of the Beck Depression Inventory (BDI), the Beck Anxiety Inventory (BAI), and the Beck Scale for Suicidal Ideation (SSI-Beck) [18–20].

2.3. Questionnaires

2.3.1. MIDAS

The validated Korean version of the MIDAS, a five-item questionnaire designed to evaluate disability within the past 3 months, was used in this study [17]. Patients were asked to report decrease performance in the domains of work/school, household work, and family/social activities. Scores measure the overall level of disability from Grade I, little or no disability (score of 0–5); Grade II, mild disability (6–10); Grade III, moderate disability (11–20); to Grade IV, severe disability (21+). This test exhibited good internal consistency and reliability (Cronbach's alpha of 0.75).

2.3.2. BDI and BAI

The BDI is the most commonly used self-rating scale for depression [18]. It consists of 21 items, each scored on a scale of 0 to 3 according to how the patient feels at the current time. The BAI is a 21-item self-report measure of anxiety severity with each item describing a common symptom of anxiety [19]. The respondent is asked to rate how much they have been bothered by each symptom during the previous week on a four-point scale ranging from 0 to 3. Subjects who score more than 16 points on the BDI are considered to suffer from depression [18], and those who score more than 21 points on the BAI are considered to suffer from anxiety [19]. Cronbach's alpha ranged from 0.8 to 0.9 for both of these assessment tools.

2.3.3. SSI-Beck

The SSI-Beck is a 19-item self-report measure designed to evaluate the current severity of a patient's specific attitudes, behaviors, and plans to commit suicide [20]. The items are rated on a three point scale from 0 to 2 with a possible total score from 0 to 38, with higher scores indicating more intense levels of suicidal ideation. The thresholds for suicidal ideation were > 8 for adult, > 13 for college students, and > 15 for high school students [20]. The SSI-Beck has a Cronbach's alpha of 0.87.

2.4. Statistical analysis

The demographic characteristics and psychiatric symptoms of patients with migraine and healthy controls were compared using independent *t*-tests, Mann–Whitney U tests, and chi-squared tests. Adjusted OR for age and sex were calculated for the control group. Risk factors associated with suicidal ideation in patients with migraine were measured using simple logistic regression analyses. Any variables that were significantly associated with suicidal ideation ($p < 0.05$) were selected for entry into the multiple logistic regressions, and a forward stepwise selection procedure was used to determine the final models (probabilities of entry and exit were 0.05 and 0.1, respectively). The Spearman correlation was used to measure the relationship between the scores on the BDI and SSI-Beck as well as between those on the scores of VAS_{now} and SSI-Beck. The significance level was set to 0.05. Data were analyzed using the Statistical Package for the Social Sciences (version 19.0, SPSS, Inc., Chicago, IL, USA).

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