ORIGINAL PAPER

Enrique Baca-Garcia · Carmen Diaz-Sastre · Antonio Ceverino ·
Eloy García Resa · Maria A. Oquendo · Jerónimo Saiz-Ruiz · Jose de Leon

Premenstrual symptoms and luteal suicide attempts

■ **Abstract** *Objective* If premenstrual symptoms (PMS) are temporally and specifically associated with suicidal attempts, suicide attempts in women with PMS should occur more frequently in the luteal phase. *Method* In a general hospital, 125 fertile female suicide attempters (and 83 blood donors as controls) with regular menstrual cycles were prospectively studied. A retrospective DSM-IV diagnosis of Premenstrual Dysphoric Disorder (PMDD) was made. *Results* Attempts during the luteal phase were not more frequent in females with PMDD (34 %, 23/68) than in those without PMDD (35 %, 20/57). The sample had enough power to detect medium and large effect sizes. As expected, there was a significantly higher frequency of PMDD in suicide attempters than in the controls (54 % vs 6 %; Fisher's exact test, p ≤ 0.001). *Conclusion* This study was limited by the use of retrospective PMDD diagnosis but suggests that PMDD may not be associated with suicidal acts during the luteal phase, when PMS are present.

■ **Keywords** suicide · attempted suicide · premenstrual syndrome · menstrual cycle

E. Baca-Garcia
Department of Psychiatry
Fundacion Jimenez Diaz
Madrid, Spain

C. Diaz-Sastre · A. Ceverino · E. García Resa · J. Saiz-Ruiz
Department of Psychiatry Hospital Ramon y Cajal
Madrid, Spain

M. A. Oquendo, M. D.
Conte Center for the Neurobiology of Mental Disorders
Department of Neuroscience
Columbia University and New York State Psychiatric Institute
New York, NY, USA

J. de Leon, M. D. (✉)
Mental Health Research Center at Eastern State Hospital
627 West Fourth St.
Lexington, KY 40508
Tel.: +1-859/246-7478
Fax: +1-859/246-7019
E-Mail: jdeleon@uky.edu_

Introduction

Premenstrual symptoms (PMS) are common among menstruating women (75 %) (Halbreich and Kahn 2001). Premenstrual Dysphoric Disorder (PMDD) affects 3 % to 9 % of women of reproductive age (Steiner 2000; Halbreich and Kahn 2001). To our knowledge there are only eight studies that explored the relationship between PMS and suicidal behavior (Thin 1968; Tonks et al. 1968; Wetzel et al. 1971; Chaturvedi et al. 1995; Cleckner-Smith et al. 1998; Baca-Garcia et al. 2000; Basoglu et al. 2000; Wittchen et al. 2002). This study was designed to replicate an association between suicide attempts and the onset of menses in menstruating women in a general hospital (Baca-Garcia et al. 2003). In this article, an unpublished set of analyses, the frequency of suicide attempts during the luteal phase in attempters with and without PMDD is described. If premenstrual symptoms (PMS) are temporally and specifically associated with suicidal attempts, suicide attempts in women with PMS should occur more frequently in the luteal phase. Therefore, luteal phase attempters should report more frequently a retrospective diagnosis of Premenstrual Dysphoric Disorder (PMDD) than other attempters.

Methods

■ Sample

The Ramon y Cajal Hospital is a Spanish general hospital that provides medical coverage for a catchment area (population: 500.000) in Madrid. The emergency room evaluates all suicide attempters requesting for medical attention. As recommended by the US National Institute of Mental Health, suicide attempts were defined as self-destructive behaviors with the intent to end one's life, independent of resulting damage (O'Carroll et al. 1996). Subjects were females (n = 125) of fertile age who were not taking hormonal contraceptives and had regular menstrual cycles and were recruited during a one year period from the emergency room. They provided written informed consent and were studied within 24 hours of the attempt (Baca-Garcia et al. 2003).

In addition, eighty three (N = 83) fertile female blood donors at the same hospital, who had no history of suicidal behavior or psychiatric disorder and were not taking hormonal contraceptives, were recruited to serve as controls. Blood donors with scores higher than 5 on the General Health Questionnaire-28 (GHQ-28) were excluded. The GHQ-28 is a psychopathological screening instrument with 28 questions and maximum possible score of 28, validated in this population whose cutoff of 5 represents a sensitivity of 77 % and a specificity of 78 % (Lobo et al. 1998).

▪ Menstrual cycle assessment

Patients and controls were asked about characteristics of their menstrual cycles in the six months prior to the study, including regularity, use of oral contraceptives, maternity status, cycle length (average and range), and menstrual phase length (average and range). The hospital laboratory analyzed sexual hormones (estradiol, progesterone, FSH, and LH) by a chemoluminescent enzyme immunoassay (Baca-Garcia et al. 2000, 2003).

DSM-IV criteria for premenstrual dysphoric disorder were used to assess PMS and PMDD. The PMDD diagnosis was retrospective, and provisional pending confirmation by two cycles of daily ratings. In accordance with DSM-IV, symptoms of PMDD were considered present only if they were of enough severity to interfere with social activities and were present at the end of the cycle. It was required that the subject experience relief after onset of menstruation in most cycles in the past three months.

▪ Patient assessment

Impulsivity of the suicide attempt was measured using two items from the Beck's Suicidal Intent Scale (SIS-I) (Beck et al. 1974). This way of assessing impulsivity of attempt has been used in the literature and in a prior study (Baca-Garcia et al. 2001). Impulsivity as a personality trait was measured using the Barratt Impulsivity Scale (BIS-11). It contains 30 self report, four-option items that comprise three sub-scales of impulsivity: cognitive, motor and non-planning impulsiveness. The BIS-11 total score has good psychometric properties (Patton et al. 1995) and has recently been adapted to the Spanish population (Oquendo et al. 2001).

The Lethality Rating Scale scores lethality across different suicide methods (Beck et al. 1975). A score > 2, attempts that require medical intervention to treat the patient was used to define attempts with significant lethality. The Mini V 4.0 (Mini-International Neuropsychiatric Interview) was used to generate DSM-IV diagnoses (Sheehan et al. 1998).

▪ Statistics

All tests were two-tailed. Fisher's exact tests were used to compare the frequency of sociodemographic characteristics, diagnosis and suicide attempt features between suicide attempters with PMDD and without PMDD (and the frequency of PMS and PMDD between the suicide attempters and controls). Chi square statistics were used to assess the association between menstrual phase cycle during which the attempt was made and PMS and PMDD. T tests were used to compare mean differences in continuous variables. For numeric variables lacking a normal distribution, U-Mann-Whitney tests were used.

Results

▪ Comparison of attempters with PMDD and without PMDD

Demographic and clinical variables associated with suicidal behavior were similar in attempters with and without restrospective diagnosis of PMDD (Table 1). How-ever, female attempters with PMDD presented social phobia (or any anxiety disorder) more frequently and had higher impulsivity trait scores. These differences were no longer significant after Bonferroni correction. Clinical characteristics of the attempts were similar in patients with and without retrospective diagnosis PMDD. There were no differences in the impulsivity of the attempts. Attempts with a score of 2 or greater on the Lethality Scale were less frequent in attempters with retrospective diagnosis of PMDD compared to those without (10 % and 24 %, respectively), although this was not statistically significant (Fisher's exact test, p = 0.06).

▪ Lack of association between PMS and luteal suicide attempts

Luteal phase attempts were not more frequent in females with a retrospective diagnosis of PMDD (34 %, 23/68) than in those without PMDD (35 %, 20/57) ($\chi^2 = 0.81$, df = 3, p = 0.85). Moreover, attempters with and without restrospective diagnosis of PMDD were equally likely to be in the perimenstrual period (luteal phase or menses) (63 % vs 60 %; Fisher's exact test, p = 0.72) or menstruating (29 % vs 25 %; Fisher's exact test, p = 0.69). Finally, our sample had enough power to detect a medium (power = 80.4 % for a rate difference of 25 %) and large (99.4 % for a rate difference of 38 %) effect size, suggesting no greater frequency of luteal phase suicide attempts in patients with a retrospective diagnosis of PMDD.

▪ PMDD in attempters and controls

The most frequent premenstrual symptoms in suicide attempters were irritability 66 %, anxiety 60 %, any physical symptom 59 %, affective lability 53 %, and depressed mood 50 %. The most prevalent symptoms in suicide attempters with PMDD were mood symptoms (irritability 95 %, anxiety 89 %, affective liability 85 % and depressed mood 84 %). No significant differences were found in rates of PMS in suicide attempters with PMDD compared to controls with PMDD. In addition, suicide attempters without PMDD had a similar frequency of PMS as blood donors without PMDD. However, as one would expect, there was a significantly higher frequency of PMDD in suicide attempters than in the controls (54 % vs 6 %; Fisher's exact test, p ≤ 0.001).

Discussion

▪ Lack of association between PMS and luteal suicide attempts

The presence of PMDD did not increase suicide risk during the luteal phase. If the presence of PMS were specifically associated with luteal suicide attempts, those with PMDD should attempt suicide more frequently in the

Table 1 Demographic and clinical characteristics of suicide attempters

Variables (controls)	Attempters with PMDD	Attempters without PMDD	Statistical tests attempters with vs. without PMDD
Age (30.8 years)	30.6 years	32.7 years	$t = 1.3$, df $= 121$, $p = 0.20$
Marital status: single (48.5 %)	52%	48%	$\chi^2 = 4$, df $= 4$, $p = 0.39$
married (48.5 %)	33%	39%	
divorced (3 %)	15%	13%	
Having children (47 %)	44%	38%	Fisher exact test $p = 0.58$
Economic level: low (0 %)	3%	6%	$\chi^2 = 1.8$, df $= 4$, $p = 0.78$
low-medium(9 %)	17%	18%	
medium (78 %)	70%	60%	
medium-high (13 %)	7%	12%	
high (0 %)	3%	4%	
Educational level: primary (26 %)	25%	30%	$\chi^2 = 8.7$, df $= 4$; $p = 0.07$
high school (43 %)	45%	39%	
college (31 %)	20%	30%	
Occupation: housewife (13 %)	11%	13%	$\chi^2 = 4.7$, df $= 4$, $p = 0.32$
student (20 %)	12%	23%	
employed (60 %)	75%	60%	
self-employed (7 %)	2%	4%	
Working status*: unemployed (15 %)	32%	25%	$\chi^2 = 8.1$, df $= 4$, $p = 0.09$
disabled	15%	29%	
working (85 %)	53%	46%	
Axis-I Diagnosis (MINI interview)[a]	96%	93%	Fisher exact test $p = 0.71$
• Major depressive episode	65%	48%	Fisher exact test $p = 0.08$
• Dysthymia	4%	7%	Fisher exact test $p = 0.71$
• Panic disorder with agoraphobia	10%	2%	Fisher exact test $p = 0.07$
• Social phobia (social anxiety disorder)	19%	5%	Fisher exact test $p = 0.02$
• Generalized anxiety disorder	13%	7%	Fisher exact test $p = 0.25$
• Any anxiety disorder	44%	26%	Fisher exact test $p = 0.04$
• Alcohol dependence	10%	10%	Fisher exact test $p = 1.0$
• Alcohol abuse	7%	13%	Fisher exact test $p = 0.38$
• Substance abuse (non-alcohol)	7%	5%	Fisher exact test $p = 0.72$
• Anorexia nervosa	12%	5%	Fisher exact test $p = 0.22$
• Bulimia nervosa	18%	8%	Fisher exact test $p = 0.19$
• Adjustment disorder	9%	12%	Fisher exact test $p = 0.78$
Barrat Impulsivity Scale TOTAL (41.4)**	62.9	57.2	$t = 2.1$, df $= 121$, $p = 0.04$
• Cognitive (11.8)**	17.6	16.1	$t = 1.7$, df $= 121$, $p = 0.09$
• Motor (14.4)**	23.3	19.1	$t = 3.1$, df $= 121$, $p = 0.003$
• Non-planning (15.3)**	22.0	21.9	$t = 0.60$, df $= 121$, $p = 0.95$
Prior suicide attempts: none	41%	42%	$\chi^2 = 1.5$, df $= 2$, $p = 0.48$
0–2	27%	34%	
more than 2	32%	23%	

Significance control vs patients (* < 0.01; ** < 0.001)
[a] DSM-IV diagnoses were obtained using the Mini-International Neuropsychiatric Interview V 4.0. Only diagnoses with frequencies > 5 % are described in the table. Each patient may have more than one diagnosis

luteal phase than attempters without PMDD. Before Bonferroni correction attempters with PMDD had significantly more impulsive traits than those without. It is possible that PMDD is a risk factor for suicidal behavior due to an association with impulsivity. Further studies are needed to assess this possibility.

■ Limitations and comparison with prior studies

The negative finding of lack of association between PMDD and luteal suicide attempts is probably not influenced by the retrospective assessment since it is unlikely that there is a bias only in women attempting suicide in

luteal phase and not in those attempting suicide in other phases.

The limitations of this study need to be compared to the limitations of the 8 published studies. Four studies focused only on suicidal ideation (Wetzel et al. 1971; Chaturvedi et al. 1995; Cleckner-Smith et al. 1998; Basoglu et al. 2000). Two prior studies focused on suicide attempts and retrospective reports of PMS were conducted in the 1960s. These two studies (Thin 1968; Tonks et al. 1968) have the logical methodological limitations of that time including lack of hormonal assessments to classify the menstrual cycle phases. Thin (1968) studied 100 women admitted to poisoning centers at various English military stations and described that PMS were

more frequent in attempters than in 58 women with medical admissions and 68 healthy women. Tonks et al. (1968) studied 60 female suicide attempters in an English general hospital. PMS were not associated with the occurrence of suicide attempts in the first 21 days of the cycle versus the last week of the menstrual cycle but there was a non-significant trend of less premenstrual attempts in women with PMS.

More recently, Wittchen et al. (2002), in a prospective community survey of young German women found that the DSM-IV PMDD was associated with increased suicidality by retrospective report. The percentage of report of suicide attempts was 16 % in PMDD subjects versus 5 % in subthreshold subjects and 3 % in non-PMDD females. The timing of the attempts during the menstrual cycle was not studied. In our prior study of suicide and the menstrual cycle (Baca-Garcia et al. 2000), there was no significant association between retrospective report of premenstrual symptoms and the phase of the menstrual cycle when the women attempted suicide.

The limitations of any study on suicide and the menstrual cycle using a cross-sectional naturalistic design have been described previously (Baca-Garcia et al. 2003). This catchment area's sample was highly representative of the suicide attempters seeking medical help. However, it did not reflect female attempters not seeking medical help and a small number (16 %) of non-consenting subjects (Baca-Garcia et al. 2003).

■ PMDD in attempters and controls

These data confirmed the old study by Thin (1968) and the more recent survey by Wittchen et al. (2002) that suicide attempters have remarkably higher prevalences of PMS and PMDD than the general population. It is possible that the higher frequency of retrospective diagnosis of PMDD may be, partly or totally, explained by the presence of psychiatric diagnoses in attempters and the lack of them in controls. New studies should also include psychiatric patients without a history of suicide attempts as additional controls.

References

1. Baca-Garcia E, Diaz-Satre C, Basurte E, Prieto R, Severino A, de Leon J, Saiz-Ruiz J (2001) A prospective study of the paradoxical relationship between impulsivity and lethality of suicide attempts. J Clin Psychiatry 62:560–564
2. Baca-Garcia E, Diaz-Satre C, Ceverino A, Saiz-Ruiz J, Diaz FJ, de Leon J (2003) An association between the menses and suicide attempts: a replication study. Psychosom Med 65:237–244
3. Baca-Garcia E, Diaz-Satre C, de Leon J, Saiz-Ruiz J (2000) The relationship between menstrual cycle and suicide attempts. Psychosom Med 62:50–60
4. Basoglu C, Cetin M, Semiz UB, Agargun MH, Ebrinc S (2000) Premenstrual exacerbation and suicidal behavior in patients with panic disorder. Compr Psychiatry 41:103–105
5. Beck AT, Beck R, Kovacs M (1975) Classification of suicidal behaviors: I Quantifying intent and medical lethality. Am J Psychiatry 132:285–287
6. Beck AT, Schuyler D, Herman I (1974) Development of suicidal intent scales. In: Beck AT (ed) The Prediction of Suicide. Charles Press, Philadelphia, PA, pp 45–56
7. Chaturvedi SK, Chandra PS, Gururaj G, Pandian RD (1995) Suicidal ideas during premenstrual phase. J Affective Disor 34:193–199
8. Cleckner-Smith CS, Doughty AS, Grossman JA (1998) Premenstrual symptoms. Prevalence and severity in an adolescent sample. J Adolesc Health 22:403–408
9. Halbreich U, Kahn L (2001) Role of estrogen in the etiology of mood disorders. CNS Drugs 15:797–817
10. Lobo A, Pérez-Echevarria MJ, Artal J (1998) Validity of the scaled version of General Health Questionaire (GHQ-28) in Spanish population. Psychol Med 16:135–140
11. O'Carroll PW, Berman AL, Maris RW, Moscicki EK, Tanney BL, Silverman M (1996) Beyond the Tower of Babel: a nomenclature for suicidology. Suicide Life Threat Behav 26:227–235
12. Oquendo MA, Baca-Garcia E, Graver R, Morales M, Montalvan V, Mann JJ (2001) Spanish adaptation of the Barratt Impulsiveness Scale (BIS-11). Eur J Psychiatry 15:147–155
13. Patton JH, Stanford MS, Barratt ES (1995) Factor structure of the Barratt Impulsiveness Scale. J Clin Psychol 51:768–774
14. Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, Hergueta T, Baker R, Dunbar GC (1998) Mini-International Neuropsychiatric Interview (M. I. N. I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. J Clin Psychiatry 59 (Suppl 20):22–23
15. Steiner M (2000) Premenstrual syndrome and premenstrual dysphoric disorder: guidelines for management. J Psychiatry Neurosci 25:459–468
16. Thin RNT (1968) Premenstrual symptoms in women who attempt suicide. J Royal Army Med Corps 114:136–139
17. Tonks CM, Rack PH, Rose MJ (1968) Attempted suicide and menstrual cycle. J Psychosom Res 11:319–323
18. Wetzel RD, McClure JN Jr, Reich T (1971) Premenstrual symptoms in self-referrals to a suicide prevention service. Br J Psychiatry 119:525–526
19. Wittchen HU, Becker E, Lieb R, Krause P (2002) Prevalence, incidence and stability of premenstrual dysphoric disorder in the community. Psychol Med 32:119–132