Traumatic childhood background, impulsiveness and hypothalamus-pituitary-adrenal axis dysfunction in eating disorders. A pilot study

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Antecedentes traumáticos infantiles, impulsividad y disfunción del eje hipotálamo-hipofisario en los trastornos de la conducta alimentaria. Un estudio piloto

Summary

Introduction. *Some studies have stressed the importance of childhood traumatic events in the etiology of eating disorders (ED), suggesting that the abnormalities in the response mechanisms to stress and in the functioning of the hypothalamus, pituitary-adrenal axis (HPA) could be important in the physiopathology of eating behavior disorders. Some preliminary findings suggest that some ED subtypes, as the post-traumatic stress disorder, have a hyperreactivity state of the HPA axis with increased sensitivity to dexamethasone.*

Method. *A total of 25 patients diagnosed of ED according to DSM-IV criteria, without any major depressive episode or history of bipolar or psychotic disorder were included. To assess the HPA axis, the dexamethasone suppression test was performed with 0.25 mg. The patients were administered the Bernstein childhood trauma questionnaire, the Green trauma history questionnaire, impulsiveness specific questionnaires and the SCID-II questionnaire for personality disorders.*

Results. *12% had a traumatic background that did not show any relationship with the ED subtype. The most impulsive patients with more borderline traits had a significantly greater number of traumatic backgrounds ($p < 0.005$). A significant relationship was found between cortisol suppression and presence of traumatic history ($p < 0.005$). The most impulsive patients with more borderline traits had lower post-dexamethasone cortisol plasma levels ($p < 0.005$).*

Conclusions. *Trauma in ED is associated to greater impulsiveness and presence of borderline personality traits that entails an HPA axis dysfunction and is translated into enhanced suppression of plasma cortisol.*

Key words: *Eating disorders. Trauma. Cortisol. Hypothalamus-pituitary-adrenal axis. Dexamethasone. Childhood abuse.*

Resumen

Introducción. *Algunos estudios han destacado la importancia de los acontecimientos traumáticos infantiles en la etiología de los trastornos de la conducta alimentaria (TCA), sugiriendo que las alteraciones en los mecanismos de respuesta al estrés y en el funcionamiento del eje hipotálamo-hipofisario-adrenal (HHA) pudieran ser de importancia en la fisiopatología de dichos trastornos.*
Algunos hallazgos preliminares sugieren que algunos subtipos de TCA al igual que el trastorno por estrés postraumáticos presentan un estado de hiperreactividad del eje HHA con un aumento de sensibilidad para la dexametasona.

Método. *Se incluyeron 25 pacientes diagnosticados de TCA según criterios DSM- IV, sin episodio depresivo mayor actual ni historia de trastorno bipolar o psicótico. Para valorar el eje HHA se realizó la prueba de supresión de dexametaxona con 0,25 mg. A los pacientes se les administró el cuestionario de traumas infantiles de Bernstein, el cuestionario de antecedentes traumáticos de Green, cuestionarios específicos de impulsividad y el cuestionario SCID-II para trastornos de la personalidad.*

Resultados. *El 12 % presentaban antecedentes traumáticos sin encontrarse relación con el subtipo de TCA. Las pacientes más impulsivas y con más rasgos límites presentaban de forma significativa mayor número de antecedentes traumáticos ($p < 0,005$). Se encontró una relación significativa entre la supresión del cortisol y la presencia de antecedentes traumáticos ($p < 0,005$). Las pacientes más impulsivas y con más rasgos límites presentaban menores niveles plasmáticos de cortisol posdexametasona ($p < 0,005$).*

Conclusiones. *El trauma en los TCA se asocia a una mayor impulsividad y a la presencia de rasgos límites de la personalidad y ello conlleva una disfunción del eje HHA que se traduce en una hipersupresión de cortisol plasmático.*

Palabras clave: *Trastorno de la conducta alimentaria. Trauma. Cortisol. Eje hipotálamo-hipofisario-adrenal. Dexametasona. Abuso infantil.*

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INTRODUCTION

There are many prevalence studies on traumatic childhood background in clinical samples, with very unequal values ranging from 7 % to 70 %.

Prevalence in eating disorders (ED) is similar to that found in other psychiatric disorders, although it is grea-

ter than that found in the general population[1]. The existence of a traumatic childhood background in ED is correlated with its greater seriousness and with the existence of more bulimic symptoms[2].

Childhood abuse also contributes to certain psychopathology forms, such as personality disorders (PD), which, in turn, have a frequent comorbidity with the EDs[3,4]. Patients with ED and childhood abuse have greater comorbidity with borderline personality disorders and dissociative symptoms[5].

Several studies have demonstrated that impulsiveness is increased in impulse control disorders (ICD), in borderline personality disorders and in some EDs. Within these, greater impulsiveness is observed in bulimic forms than in the anorexic ones, although the latter also have an important percentage (28%) of impulsive behaviors in regards to 51% of the bulimic ones[6].

In bulimia nervosa (BN), almost all the biological findings indicative of serotoninergic dysfunction that have been associated to the presence of high impulsiveness and ICT have been retorted. On the other hand, repeated association between BN and borderline personality disorder could also be explained by serotoninergic hypofunction that is traditionally associated to impulsiveness and that is increased in both disorders[7].

This comorbidity with borderline personality disorders, that generally have a higher rate of traumatic background, has given rise to the fact that some studies have tried to relate EBDs with post-traumatic stress disorders (PTSD) and with alterations of the response mechanisms to stress.

Some preliminary findings suggest that some ED subtypes[8] as well as PTSD[9] have a hyperreactivity state of the HPA axis with increased sensitivity to dexamethasone.

The suppressor response of cortisol was study in this present work using a minimum stimulus of dexamethasone with 0.25 mg in order to investigate the relationship between different ED subtypes, the presence of traumatic background, personality traits and response to stress of ED patients.

METHODS

A total of 25 female patients with ED according to DSM-IV criteria from the eating behavior disorders unit were included. The patients selected did not have an associated diagnosis of bipolar disorder or psychotic disorder in their life history and did not have a major depressive episode or active disorder due to toxic dependence at the time of the study. The patients had not received drug psychiatric treatment in the last month and no occasional consumption of any drug was permitted in the week prior to the study onset.

All the sample patients were interviewed by a psychiatrist with the DSM-IV diagnostic interview for axis I and II (SCID I and II)[10]. In addition, they filled out the Bernstein childhood trauma questionnaire (Bernstein, 1986), the Green trauma history questionnaire (Green, 1996) and the impulsiveness specific questionnaires (Barrat, Karolinska, Columbia).

Blood was drawn at 9 a.m. to measure plasma cortisol on the first day of the study. That same night, the patient took 0.25 mg of dexamethasone orally, and blood was drawn the next day at 9 a.m. to measure cortisol. Suppression criteria were considered to be the usual ones in the clinical aspects, that is, post-dexamethasone cortisol less than or equal to 5 µg/dl.

Statistical procedures were performed with the SPSS, version 10.0.0 statistical program.

RESULTS

All the patients selected gave their consent to undergo the suppression test with 0.25 mg of dexamethasone. No adverse effects occurred during the test or in the subsequent days.

A total of 12%[3] of the 25 patients had traumatic background that had no relationship with the ED subtype. The most impulsive patients with more borderline traits had significantly greater number of traumatic background ($p < 0.005$) (figs. 1 and 2). A significant relationship between cortisol suppression and presence of traumatic background was found ($p < 0.005$). The most impulsive patients with more borderline traits had lower post-dexamethasone cortisol plasma levels (figs. 3 and 4).

DISCUSSION

EBD trauma is associated with greater impulsiveness and presence of borderline personality traits and this entails HPA axis dysfunction that becomes enhanced suppression of the plasma cortisol.

The idea of investigating HPA axis functioning with low dexamethasone doses in ED comes from the finding of an enhanced suppression response in PTSD patients[11]. In these patients, a cortisol suppressant response has been described with 0.5 mg of dexamethasone. The relationship between ED and PTSD is a conse-

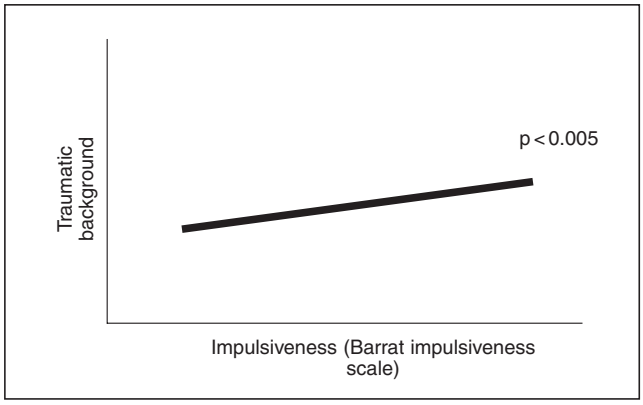

Figure 1. Correlation between the presence of traumatic background and impulsiveness.

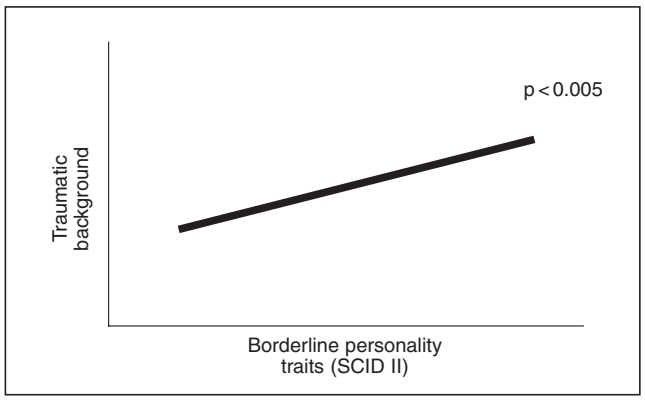

Figure 2. Correlation between traumatic background and borderline personality traits.

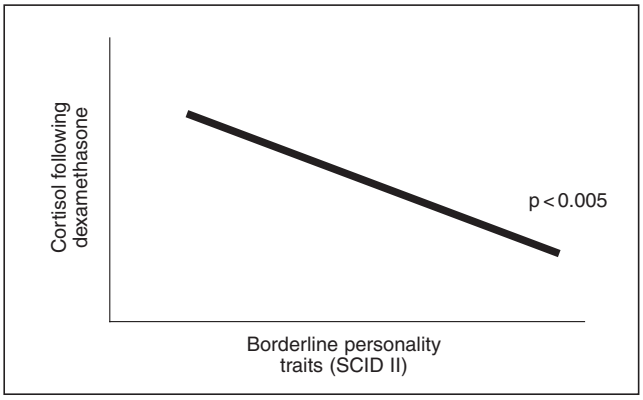

Figure 4. Correlation between cortisol levels following 0.25 mg of dexamethasone and borderline personality traits.

quence of the relationship between ED and childhood trauma. Some studies have found a high prevalence of childhood abuse in the history of ED patients and have correlated it with their greater seriousness and with the existence of more bulimic symptoms[2]. Although this does not mean that all the patients who have experienced abuse in childhood have PTSD symptoms, the biological investigation of the same phenomena may give an idea of the relationship between both disorders as well as the role that trauma has in the ED neurobiology.

The results of this pilot study suggest that there is some biological characteristic in the functioning of the HPA axis, related with some ED subtypes that cause an enhanced suppression response following dexamethasone. This hypothalamus-pituitary-adrenal dysfunction has been supported by studies with a more complex HPA axis methodology[12], coinciding with more recent studies performed with the dexamethasone test[13].

This response indicates increased response for retroinhibition and is probably related with an increased density of glucocorticoid receptors (GR), as suggested in studies performed in the PTSD. Use of cytosolic radioligand analysis has made it possible to describe an increased density of GR in the plasma lymphocytes of PTSD patients[11], which is considered to be an indicator of the GR density in the central nervous system[14].

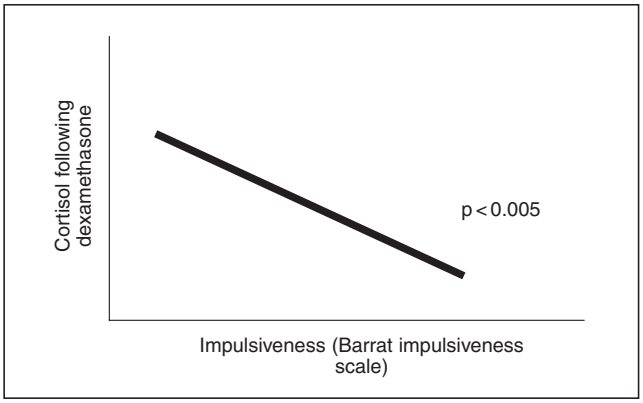

Figure 3. Correlation between cortisol levels following 0.25 mg of dexamethasone and impulsivity.

The alterations of stress response mechanisms and in the functioning of the HPA axis are consistent with serotonin activity dysfunctions described consistently in some ED subtypes[15-17]. Serotoninergic pathways constitute one of the main HPA axis modulators. Thus, the serotoninergic activity alteration associated with impulsive behaviors of patients with ED could alter modulation and its HPA axis.

The study is limited by the reduced sample, from which many conclusions cannot be obtained. In spite of it, it is deduced from the results that hypersensitivity to retroinhibition of the HPA axis could be an element of the EBD pathophysiology (differentiating the more impulsive patients with more personality borderline traits from these) and this should be more extensively investigated. To do so, larger samples of patients are needed. It would also be necessary to know if these alterations reflect a factor of the ED state or a trait factor. Since the dexamethasone test is a simple test to perform, it could become, if the results are confirmed, a valuable indicator of aspects of eating behavior disorders.

REFERENCES

1. Welch SL, Fairburn CG. Childhood sexual and physical abuse as risk factors for the development of bulimia nervosa: a community-based case control study. Child Abuse Negl 1996;20(7):633-42.
2. Lacey JH. Incest, incestuous fantasy & indecency. A clinical catchment area study of normal-weight bulimic women. Br J Psychiatry 1990;157:399-403.
3. Grilo CM, Levy KN, Becker DF, Edell WS, McGlashan TH. Comorbidity of DSM-III-R axis I and II disorders among female inpatients with eating disorders. Psychiatr Serv 1996; 47(4):426-9.
4. Díaz-Marsa M, Carrasco JL, Saiz J. A study of temperament and personality in anorexia and bulimia nervosa. J Personal Disord 2000;14(4):352-9.
5. Waller G. Childhood sexual abuse and borderline personality disorder in the eating disorders. Child Abuse Negl 1994;18(1):97-101.

6. Fahy T, Eisler I: Impulsivity and eating disorders. Br J Psychiatry 1993;162:193-7.
7. Steiger H, Leonard S, Kin NY, Ladouceur C, Ramdoyal D, Young SN: Childhood abuse and platelet tritiated-paroxetine binding in bulimia nervosa: implications of borderline personality disorder. J Clin Psychiatry 2000;61(6):428-35.
8. Steiger H, Gauvin L, Israel M, Koerner N, Ng Ying Kin NM, Paris J, Young SN: Association of serotonin and cortisol indices with childhood abuse in bulimia nervosa. Arch Gen Psychiatry 2001; 58(9):837-43.
9. Diaz-Marsa M, Molina R, Lozano MC, Carrasco JL. Biological basis of posttraumatic stress disorder. Actas Esp Psiquiatr 2000;28(6):379-84.
10. Spitzer RL, Williams JB, Gibbon M, First MB. The Structured Clinical Interview for DSM-III-R (SCID). I: History, rationale, and description. Arch Gen Psychiatry 1992;49(8): 624-9.
11. Yehuda R, Southwick SM, Krystal JH, Bremner D, Charney DS, Mason JW. Enhanced suppression of cortisol following dexamethasone administration in posttraumatic stress disorder. Am J Psychiatry 1993;150(1):83-6.
12. Rinne T, de Kloet ER, Wouters L, Goekoop JG, DeRijk RH, van den Brink W. Hyperresponsiveness of hypothalamic-pituitary-adrenal axis to combined dexamethasone/corticotropin-releasing hormone challenge in female borderline personality disorder subjects with a history of sustained childhood abuse. Biol Psychiatry 2002;52(11): 1102-12.
13. Carrasco JL, Díaz-Marsa M, Ignacio Pastrana J, Molina R, Brotons L, Horcajadas C. Enhanced suppression of cortisol after dexamethasone in borderline personality disorder. A pilot study. Actas Esp Psiquiatr 2003;31(3):138-41.
14. Siever L, New A, Kirrane M, Novotny S, Koenisberg H, Grossmam R. New biological strategies for personality disorders. En: Biology of personality disorders. JM Oldham and MB Riba (editors). Washington DC: American Psychiatric Press, 1998; p. 27-62.
15. Goldbloom DS, Hicks LK, Garfinkel PE: Platelet serotonin uptake in bulimia nervosa. Biol Psychiatry 1990;28(7): 644-7.
16. Díaz-Marsa M, Carrasco JL, Hollander E, César J, Saiz-Ruiz J. Decreased platelet monoamine oxidase activity in female anorexia nervosa. Acta Psychiatr Scand 2000;101(3): 226-30.
17. Carrasco JL, Díaz-Marsa M, Hollander E, César J, Saiz-Ruiz J. Decreased platelet monoamine oxidase activity in female bulimia nervosa. Eur Neuropsychopharmacol 2000;10(2): 113-7.