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DST non-suppression predicts suicide after attempted suicide

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Abstract

Most prospective studies of HPA axis have found that non-suppressors in the dexamethasone suppression test (DST) are more likely to commit suicide during the follow-up. Attempted suicide is a strong clinical predictor of suicide. The aim of this study was to assess the predictive value of DST for suicide in a group of depressed inpatients with and without an index suicide attempt. Historical cohort of 382 psychiatric inpatients with mood disorder admitted to the department of Psychiatry at the Karolinska University Hospital between 1980 and 2000 were submitted to the DST and followed up for causes of death. During the follow-up (mean 18 years), 36 suicides (9.4%) occurred, 20 of these were non-suppressors and 16 were suppressors. There was no statistically significant difference in suicide risk between the suppressors and non-suppressors for the sample as a whole. An index suicide attempt predicted suicide. In suicide attempters with mood disorder, the non-suppressor status was significantly associated with suicide indicating that HPA axis hyperactivity is a risk factor for suicide in this group. The dexamethasone suppression test may be a useful predictor within this population.

Keywords: Suicide; Suicide attempt; Dexamethasone suppression test; Depressive disorder; Prediction

1. Introduction

Suicide is a major cause of mortality worldwide, according to WHO estimates approximately one million people die from suicide worldwide every year (WHO, 2001). Prediction of suicide risk is important for suicide prevention and inpatients with mood disorder are the obvious high-risk group with a lifetime prevalence of suicide of approximately 9% if ever hospitalized for suicidality (Bostwick and Pankratz, 2000). There is a need for predictors among depressed inpatients to assist the clinician to focus on those most at risk. Clinical, psychological and demographic factors such as prior suicide attempt (Nordström et al., 1995), hopelessness (Beck et al., 1985), suicide intention (Harriss et al., 2005), age, gender, marital status, social and occupational functioning, and psychiatric comorbidity have all been identified as risk factors (Roy, 1983; Fawcett et al., 1990; Sokero et al., 2003). Still, the task of mental health professionals is difficult due to the many factors involved and the limited specificity of clinical predictors.

Incorporating a biological test to increase specificity and sensitivity of suicide prediction would be of clinical value if use of such a marker could enhance detection of

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high-risk patients and thereby improve clinical suicide prevention. Although the serotonin system has been the major focus of biological research on suicide (Nordström et al., 1994; Samuelsson et al., 2006), there is now substantial evidence that HPA axis abnormalities may be connected with serotonin abnormalities in the biology of suicidal behaviour (Lopez et al., 1998; Mann, 2003).

Elevated activity of the hypothalamic–pituitary–adrenal (HPA) axis is one of the most replicated biological findings in major depression. Relative to healthy control subjects, people with depression have consistently been reported to have elevated levels of cortisol in 24-h collections of plasma and urine, hypertrophy of the adrenal and pituitary glands and exaggerated cortisol response to adrenocorticotropic hormone (ACTH) stimulation (reflecting adrenal hypertrophy) (Garlow et al., 1999). The diathesis toward HPA axis dysfunction in major depressive disorder appears associated with both a negative feedback disturbance and an increased drive by central processes (Drevets et al., 2002). Interest in cortisol functioning in psychiatric patients led to the development of the dexamethasone suppression test (DST) as a formal test of HPA function (Carroll et al., 1968).

The DST offers a clinical way to measure disturbance in the HPA axis. After its initial demonstration as a potential marker of endogenous depression (Carroll et al., 1976), the DST was extensively studied as a diagnostic tool. However, it failed to demonstrate utility as a diagnostic tool for depression, due to low sensitivity and variable specificity (American Psychiatric Association, 1987) and interest then waned.

Beginning with Bunney and Fawcett who suggested a possible association between HPA disturbance and suicide in 1965, a body of research has focused on such associations (Bunney and Fawcett, 1965). The most robust finding using dexamethasone suppression test (DST) is that suicide but not suicide attempt is associated with non-suppression on the DST (Lester, 1992).

Disturbances in the HPA system measured with DST have been associated with increased risk of suicide in depressed patients in several prospective studies. In one 15-year follow-up study by Coryell and Schlesser (2001) of 78 patients, DST non-suppression increased the likelihood of suicide 14-fold. The suicide risk was 27% compared with 3% among patients with a normal DST in this sample of mood disorder patients.

This hypothesis that an abnormal DST, which indicates a problem with the HPA or stress axis, is an indicator of heightened suicide risk has been replicated in several studies (Norman et al., 1990; Yerevanian et al., 2004). A review of 101 patients re-examined over 2 years confirmed the higher risk for suicide and higher risk for hospitalization for suicidality in those with abnormal DST (Yerevanian et al., 2004).

However, not all studies have been able to show that non-suppressors are more likely to commit suicide (Träskman-Bendz et al., 1992). In a study of 423 mood disorder patients administered the DST from 1978 to 1981 Black et al. (2002) found that suppressors and non-suppressors did not differ significantly with respect to frequency of suicidal ideations or suicides. A recent study by Coryell et al. (2006) suggests, however, that DST results may not be a useful predictor for mood disorder outpatients or for those with no clinical evidence of suicidality.

In a recent meta-analysis Mann et al. (2005) concluded that non-suppressors have more than 4-fold increased risk of suicide compared with suppressors.

1.1. Aims of the study

The aim of the present study was to try to replicate the earlier finding of association between DST non-suppression and suicide and to assess the predictive value of non-suppressor status in the dexamethasone suppression test for suicide in a large group of depressed inpatients with and without history of a suicide attempt using the suicide mortality as the outcome criterion.

2. Methods

2.1. Subjects

This is a historical cohort study involving 382 psychiatric inpatients (126 men and 256 women, mean age 52 years, S.D. = 16,4) admitted to the psychiatric clinic at the Karolinska University Hospital between 1980–2000 with a DSM diagnosis of mood disorder: unipolar, major depressive disorder, single episode or recurrent, bipolar disorder, depressed or dysthymic disorder. Patients with substance abuse or psychotic disorder (schizophrenia spectrum) were excluded. Information about the index suicide attempt was registered. One hundred fourteen patients had attempted suicide just before admission.

Patients with a medical condition (or taking medication) known to interfere with the results at the time of the DST were excluded.

2.2. Dexamethasone test

At admission 1 mg of dexamethasone was given orally at 11:00 p.m., and plasma cortisol levels were determined from blood samples drawn the following day at 8:00 a.m., 4:00 p.m., and 11:00 p.m. The predictive