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ORIGINAL ARTICLE / *Telediagnosis*

Discovery of a biological and behavioural marker in chronic stress



Découverte d'un marqueur biocomportemental des états de stress chroniques

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Summary

Introduction. – The importance of pathologies linked to stress no longer needs to be proven. Despite this, the diagnostic evaluation of adjustment disorder only relies on clinical factors. The purpose of this study was to obtain objective biological and behavioural data in chronic stress.

Patients and methods. – Over 2 years, we systematically measured the plasma concentrations of the cortisol cycle, glycaemia, cholesterol, and triglycerides for all patients hospitalised in the Lyon-Champvert clinic (France) for adjustment disorder (F4322 of the ICD-10 [International classification of diseases]). For the last 6 months of our study, we added continuous diurnal and nocturnal actimetry with connected wrist devices.

Results. – They show that 66% of the patients suffering from clinical adjustment disorder have a biological anomaly of the cortisol cycle. In this case, there are different correlations between the metabolic parameters that are not present in the groups of patients without a disorder of the cortisol cycle. Furthermore, in this group, we can observe a reverse coupling of diurnal and nocturnal activities.

Discussion. – We discuss if this reverse coupling is a feature marker or a state marker for pathologies linked to chronic stress.

Conclusions. – This observational study enabled us to differentiate two subsets within adjustment disorders, subsets which differ as much on the biological aspect as on the behavioural

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aspect. Continuous, objective and non-invasive measurement of daytime and night-time behaviour allowed us to discover a statistically significant reverse coupling between the two types of behaviour.

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MOTS CLÉS

Actimétrie ;
Dépression ;
Sommeil ;
Lipides ;
Adaptation ;
Poignet

Résumé

Introduction. – L'importance des pathologies liées au stress n'est plus à démontrer. Malgré cela, l'évaluation diagnostique des troubles de l'adaptation ne repose que sur des arguments cliniques. Le but de cette étude était d'obtenir des données biocomportementales objectives sur des états de stress chroniques.

Patients et méthodes. – Pendant deux ans, nous avons mesuré systématiquement les concentrations plasmatiques du cycle du cortisol, de la glycémie, du cholestérol et des triglycérides pour tous patients hospitalisés à la clinique Lyon-Champvert pour troubles de l'adaptation F4322 du CIM 10 (classification internationale des maladies). Au cours des six derniers mois, nous avons rajouté l'actimétrie diurne et nocturne par des bracelets connectés.

Résultats. – Ils montrent que 66 % des patients souffrant cliniquement de troubles de l'adaptation ont une anomalie biologique du cycle du cortisol. Dans ce cas, il existe différentes corrélations entre les paramètres métaboliques qui ne sont pas présentes dans le groupe de patients sans anomalie du cycle du cortisol. De plus, dans ce groupe, nous observons un couplage inverse des activités nocturnes et diurnes.

Discussion. – L'ensemble pose la question de l'existence d'un marqueur de trait ou d'un marqueur d'état des pathologies liées au stress chroniques.

Conclusions. – Cette étude observationnelle a permis de différencier deux sous-groupes au sein des troubles de l'adaptation, sous-groupes qui diffèrent tant sur le plan biologique que comportemental. La mesure continue, objective et non invasive du comportement de jour et de nuit a permis la découverte d'un couplage inverse statistiquement significatif entre les comportements de jour et de nuit.

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Introduction

The importance of pathologies linked to stress no longer needs to be proven. In 2001, the French National Institute of Health and Medical Research (Institut national de la santé et de la recherche médicale [Inserm]) published the results of a survey answered by 78 general practitioners (GPs) all over France, corresponding to 7759 consultations [1]. Almost 10% of the GP consultations concerned adjustment disorder. This prevalence is between 11 and 18% for adjustment disorder in GP consultations and 38% for psychiatrist consultations [2]. According to a study by the SMEREP (the French healthcare organisation responsible for students in the Paris region), in 2009, 35.4% of French students stated having difficulties dealing with their stress. We also know that the somatic and psychological consequences of adjustment disorders are secondary to the chronic absorption of circulating corticosteroids according to Chrousos and Gold [3]. These consequences are serious according to Mc Ewen and Gianaros [4] and are responsible for coronary pathologies [5], digestive pathologies [6], endocrinal pathologies [7], for pain according to Gibson [8], for immunological pathologies according to Restak [9], and for cancerous pathologies according to Ronson [10]. The cerebral consequences are just as serious. We can notice a remodelling and an atrophy

of the hippocampus [11], the key structure in dealing with emotions, neuronal malleability involving the prefrontal cortex and the amygdala [12]. All of these alterations disturb cognitive functions. But adjustment disorder symptoms can just be psychiatric and concern insomnia, anxiety, depression, and post-traumatic stress disorder.

Despite this, the diagnostic evaluation of adjustment disorder or "burn-out" only relies on clinical factors [13,14]. According to Casey, the research still lacks, especially concerning the biological aspects and the treatment [15]. Yet, for the first time in psychiatric history, the prescriber has the possibility to continuously measure the diurnal and nocturnal behaviour that might always have been missed.

Patients and methods

This study was carried out in accordance with the rules of the World Medical Association International Code of Medical Ethics. It consisted in a long-term observational, monocentric study with a sole investigator with the intention to treat as closely as possible to real exercise conditions.

Subjects were recruited between October 2013 and August 2015 from hospitalised patients who responded to the diagnostic criteria of adjustment disorders (F4322 of the

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