Urinary Neopterin and Biopterin Levels in Patients with Depression

Chen–Jee Horng, Kwang–Jen Hsiao, Chia–Hsiang Chen, Shyh–Ren Tsai, Cho–Boon Sim

憂鬱症患者尿中新喋吟與生物喋呤之分析

洪成志 蕭廣仁 陳嘉祥 蔡世仁 沈楚文

中華精神醫學 第五卷 第一期 第20～28頁
中華民國精神醫學會發行
民國八十年三月

Chinese Psychiatry Vol 5, No 1, P20-28, March 1991
The Society of Psychiatry, R.O.C. (Taiwan)
Original Article

Urinary Neopterin and Biopterin Levels in Patients with Depression

Chen-Jee Horng, Kwang-Jen Hsiao* #, Chia-Hsiang Chen, Shyh-Ren Tsai, Cho-Boon Sim

This study was designed to test the hypothesis that depression is related to tetrahydrobiopterin (BH₄) dysregulation, and to determine if the activity of depression is associated with changes in urinary neopterin levels. Metabolites of BH₄, neopterin and biopterin were determined by reverse-phased high-performance liquid chromatography with fluorometric detection to evaluate the metabolism of BH₄. Urine from 26 patients with active depressive symptoms and 45 normal control subjects were determined. The results showed that the urinary biopterin level in depressed patients (635 ± 281 nmol/mmol creatinine) was similar to that in controls (614 ± 267) (p < 0.05), while the neopterin level was significantly lower in acutely depressed patients (441 ± 261) compared with controls (604 ± 318); (p < 0.05). Twelve of the depressed patients also had their urine analyzed when they returned to a remission phase. The urinary neopterin level tended to increase along with the improvement of depressive symptoms (360 ± 203 vs. 576 ± 181, paired t test, p < 0.02). The significance of changes in the urinary neopterin level in depression deserves further exploration.

Key words: depression, tetrahydrobiopterin, neopterin, biopterin (Chinese Psychiatry 1991; 5: 20–8)

Introduction

Tetrahydrobiopterin (BH₄) metabolism in patients with depression has been studied by various groups of investigators in an attempt to identify its relationship with depression. BH₄ is a cofactor of the aromatic amino acid hydroxylases which catalyze the initial and rate-limiting reactions in the synthesis of biogenic amines—serotonin, norepinephrine and dopamine¹⁻². Thus BH₄ is of considerable importance in regulating synthesis of these biogenic amines³ which are proposed as important neurotransmitters in the pathogenesis of affective disorders ⁴⁻⁵. After reports that BH₄ was effective in the treatment of some depressives⁶⁻⁷ and that the BH₄ concentration was reduced in the post-mortem brain samples of depressive patients⁸, the issue of the

Department of Psychiatry and * Medical Research, Veterans General Hospital, Taipei
# Institute of Genetics, National Yang-Ming Medical College, Taipei, Taiwan 11217, R.O.C.
憂鬱症患者尿中新喋吟與生喋吟之分析

洪成志  蕭廣仁**  陳嘉祥  蔡世仁  沈楚文

四氫生喋吟（BH₃）是環狀胺基酸水解酶的輔因子，而此水解酶又是合成生物胺（biogenic amines）：5-羥色胺（serotonin）、正腎上腺素（norepinephrine）與多巴胺（dopamine）的速率決定酵素，所以，依“生物胺代謝失調與憂鬱症病因之一”的假說推論，四氫生喋吟之代謝亦可能與憂鬱症的病理相關。
本研究以高效液相層析法（HPLC）測定尿液中四氫生喋吟之代謝物新喋吟（neopterin）與生喋呤（bipterin）之濃度，以探究憂鬱症患者之喋吟類化合物代謝是否與正常人不同。本研究共收集45個正常人與26個有憂鬱症狀之思者的尿液，其中12個患者在憂鬱症狀緩解後再次接受尿液分析。結果顯示尿液中之生喋呤濃度與憂鬱症狀不相同，但憂鬱症患者（441 ± 261 nmol/mmol creatinine）尿中之新喋呤濃度則顯著比正常人（604 ± 318）低（P < 0.05），且在憂鬱症狀緩解後明顯回升（P < 0.02, paired t test, n = 12），這個現象無法以原始的假設解釋。本文在討論中嘗試探討憂鬱症，免疫功能與新喋呤間的可能關係，並提出進一步之研究方向。（中華精神醫學1991；5：20～8）

台北榮民總醫院精神病部，*醫研部
**國立陽明醫學院遺傳所