

Serum serotonin levels are not useful in diagnosing fibromyalgia

Gabriel Jaschko, Urs Hepp, Magdalena Berkhoff, Margrit Schmet, Beat A Michel, Steffen Gay, Haiko Sprott

Ann Rheum Dis 2007;**66**:1267–1268. doi: 10.1136/ard.2006.058842

Altered concentrations of circulating serotonin have been implicated in several pathological conditions such as fibromyalgia,^{1–4} rheumatoid arthritis^{2,4,5} and major depression.⁶ In fibromyalgia in particular, several investigators have reported low serum serotonin levels as compared to the general population.^{1,3}

We analysed sera from 20 patients with fibromyalgia, and compared the data with that obtained on analysis of sera from age- and gender-matched controls, including 20 patients with rheumatoid arthritis, 20 with osteoarthritis, 20 with major depression, and 20 healthy individuals. The patients with fibromyalgia had a mean number of tender points of 16.3 and a mean duration of the disease of 9.65 years. Thirteen patients with rheumatoid arthritis exhibited erosive arthritis. The severity of depression in the patients with major depression

had been determined by the Hamilton rating scale (HDRS)⁷ and the Beck depression inventory (BDI)⁸ with the following results: mean HDRS 25.4 (15–39); mean BDI 29.0 (15–42). Five patients in the depressive group reported pain. All patients were free of anti-depressive treatment. The study was approved by the local institutional ethics committee.

The levels of serotonin in each serum sample was determined three times; twice using a commercially available enzyme immunoassay (ELISA; Serotonin-ELISA Kit, IBL Immuno Biological Laboratories, Hamburg, Germany) and once in a standard reference laboratory using a reversed phase high performance liquid chromatography (HPLC) with electrochemical detection.

Abbreviations: BDI, Beck depression inventory; HDRS, Hamilton rating scale; HPLC; high performance liquid chromatography

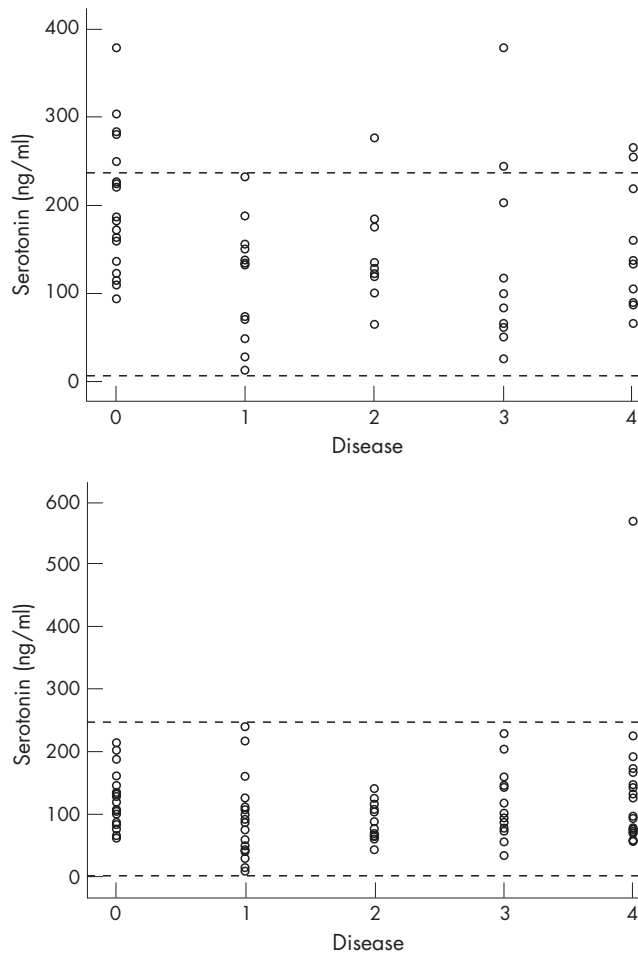


Figure 1 Measurement of the concentration of serotonin in the serum using a scrambled ELISA panel (A) and using reverse-phase HPLC (B). Dots show individual patients. The scattered lines show the minimum/maximum of the fibromyalgia group. 0, control group; 1, patients with fibromyalgia; 2, patients with rheumatoid arthritis; 3, patients with osteoarthritis; 4, patients with major depression.

The Serotonin-ELISA kit has a detection limit of 4.1 ng/ml. The results of this assay indicated a significantly lower concentration of serotonin in the sera of patients with fibromyalgia (minimum 10 ng/ml, maximum 115 ng/ml) compared to the control group ($p = 0.001$; minimum 131 ng/ml, maximum 322 ng/ml), the rheumatoid arthritis group ($p = 0.012$; minimum 20 ng/ml, maximum 245 ng/ml), and the major depression group ($p = 0.028$; minimum 16 ng/ml, maximum 299 ng/ml). The levels of serotonin in the sera of patients with major depression were significantly lower ($p = 0.03$) than those in the sera of the control group (data not shown). The question remained as to whether this

statistically significant difference was robust enough to be informative clinically. We therefore repeated the ELISA using a scrambled panel of sera (fig 1A). The results of the ELISA using a scrambled panel, confirmed a significant difference between the fibromyalgia group and the control group ($p = 0.01$) as well as the rheumatoid arthritis group ($p = 0.02$). Analysis of the sera at the reference laboratory using reversed phase HPLC (fig 1B) failed to indicate a significant difference in the levels of serotonin in the patients with fibromyalgia and any of the other groups.

Thus, although the levels of serotonin in the sera of patients with fibromyalgia appears to exhibit a tendency to be lower than in patients with rheumatoid arthritis and healthy controls, at least when measured by ELISA, the variation of serotonin levels within the disease groups is too broad to differentiate fibromyalgia from other conditions, and most especially clinical depression. We therefore conclude that measurement of the concentration of serotonin in the serum is not a useful tool for the diagnosis of fibromyalgia.

Authors' affiliations

G Jaschko, M Schmet, B A Michel, S Gay, H Sprott, University Hospital Zurich, Department of Rheumatology and Institute of Physical Medicine, Zurich

U Hepp, M Berkhoff, University Hospital Zurich, Department of Psychiatry, Zurich, Switzerland

U Hepp, Psychiatrische Dienste Aargau AG, Baden, Switzerland

Competing interests: None declared.

Correspondence to: Haiko Sprott, University Hospital Zurich, Department of Rheumatology and Institute of Physical Medicine, Gloriastrasse 25, CH-8091 Zurich, Switzerland; haiko.sprott@usz.ch

Accepted 26 September 2006

REFERENCES

- Russell IJ, Michalek JE, Vipraio GA, Fletcher EM, Javors MA, Bowden CA. Platelet ^3H -imipramine uptake receptor density and serum serotonin levels in patients with fibromyalgia/fibrositis syndrome. *J Rheumatol* 1992;**19**:104–9.
- Stratz T, Samborski W, Hrycaj P, Pap T, Mackiewicz S, Mennet P, Muller W. Serum serotonin concentrations in patients with generalized tendomyopathy (fibromyalgia) and rheumatoid arthritis. *Med Klin* 1993;**88**:458–62.
- Wolfe F, Russell IJ, Vipraio G, Ross K, Anderson J. Serotonin levels, pain threshold and fibromyalgia symptoms in the general population. *J Rheumatol* 1997;**24**:555–9.
- Russell IJ, Vipraio GA, Lopez YG. Serum serotonin [5HT] in fibromyalgia syndrome, rheumatoid arthritis, osteoarthritis and healthy normal controls. *Arthritis Rheum* 1993;**36**(Suppl 9):S222/C208.
- Kopp S, Alstergren P. Blood serotonin and joint pain in seropositive versus seronegative rheumatoid arthritis. *Med Inflamm* 2002;**11**:211–7.
- Fajardo O, Galeno J, Urbina M, Carriera I, Lima L. Serotonin, serotonin 5-HT1A receptors and dopamine in blood peripheral lymphocytes of major depression patients. *Int Immunopharmacol* 2003;**3**:1345–52.
- Hamilton M. A rating scale for depression. *J Neurol Neurosurg Psych* 1960;**23**:56–62.
- Beck AT, RA Steer. *Manual for the Beck Depression Inventory*. San Antonio, TX: The Psychological Corporation, 1993.

Forthcoming events

VI Meeting of the European Forum on Antiphospholipid Antibodies

12–13 October 2007, Ljubljana, Slovenia

Informal meeting of the clinicians, scientists that are active in the field of antiphospholipid antibodies and antiphospholipid syndrome

Vodnikova 62, 1000 Ljubljana, Slovenia

Tel: +386 1 5225533

Fax: +386 1 5225598

Email: info.apl2007@revma.net

Web: <http://www.revma.net>