

## **Osteopenia by Risperidone-Induced Hyperprolactinemia: A Case Report**

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### **Abstract**

**The prolonged use of antipsychotic drugs prolactin-raising such as risperidone and amisulpiride causes hyperprolactinemia with subsequent hypoestrogenism and bone demineralization. When therapy begins at a young age, especially in young women, and continued over time, the possibility of causing osteoporosis is definitely increased. In the present paper, we report a clinical case of osteopenia, in a young woman, induced by hyperprolactinemia because of a prolonged use of risperidone.**

**Keywords:** Osteoporosis, hyperprolactinemia, risperidone

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### **Introduction**

Many evidences show a decrease in bone mineral density (BMD) in women in a state of hypoestrogenism, especially if this condition lasts for a long time. A prolonged condition of hyperprolactinemia is considered one of the cause inducing hypoestrogenism in young women [1]. Patients treated with antipsychotics (AP) typical or atypical, such as risperidone or amisulpiride showed hypoestrogenism by hyperprolactinemia [1,2]. In fact, AP induce hyperprolactinemia by blocking closely D2 receptors for dopamine in the tubuloinfundibular circuit (TIDA) thus reducing the inhibitory action of dopamine at the hypophysial area [3].

The deficiency of estrogen induced by hyperprolactinemia reduces the BMD through a reduction in the length of life of osteoblasts and an increase of osteoclasts. The alteration of bone formation produces a decrease in bone mass [4].

Furthermore, the hypoestrogenism induces the reduction of alpha-1-hydroxylase in the kidney and, then, the synthesis of vitamin D with subsequent reduction of intestinal absorption of calcium. The low levels of estrogens also influence the interleukins activity, which through complex processes, induces an increase in bone remodeling by increasing the mineral absorption and reduction of bone formation [5]. The hyperprolactinemia may reduce the BMD in women, not only through its ability to reduce levels of estrogens, but also through other mechanisms, including altering levels of androgens and direct effect of prolactin (PRL) on the bone [6].

Also, greater is the duration of hyperprolactinemia, greater is the possibility of inducing BMD and thus osteoporosis or osteopenia [7].

Osteoporosis is a disease of bone that leads to an increased risk of fracture. In the osteoporosis the BMD is reduced, bone microarchitecture is disrupted, and the amount and variety of non-collagenous proteins in bone is altered. Osteoporosis is defined by the World Health Organization (WHO) in women as a bone mineral density 2.5 standard deviations below peak bone mass (20-year-old healthy female average) as measured by DEXA; the term "established osteoporosis" includes the presence of a fragility fracture. The subjects, whose bone density values fall at the lower limit of the normal (or a Z-score between - 2.5 and -1), have low bone mass (osteopenia) and may be considered with high risk of osteoporosis [8].

The schizophrenic patients, especially young women, showed hyperprolactinemia because of prolonged treatment with some AP prolactin-raising such as amisulpiride or risperidone: this can cause a reduction in bone mass and the risk of osteoporosis [8,9,10]. Here, we present a case report showing a strong evidence of osteopenia in a psychotic young woman after a prolonged treatment with risperidone.

### **Case Report**

The patient named I.C. was a young woman (33 years old) showing a diagnosis of schizophrenia, according to the criteria of the DSM IV. She was followed by our

MHU (Mental Health Unit) starting by February 2007. Her clinical history indicated a psychotic behavior by 1999, she was treated with haloperidol, first orally and then in the depot form, with a dose of 100 mg i.m. every 28 days, until 2001. Considering the excessive sedation and the slight tremors to the upper limbs, therapy was replaced with risperidone orally (4-6 mg/day). During risperidone treatment, the I.C. patient showed a good clinical compensation of schizophrenic symptoms in all its psychopathological aspects. However, starting by 2001, the I.C. patient showed alteration of menstrual cycles with maximum delays up to 15 days. These alterations lasted up to 2005 and they were significantly accentuated showing marked oligomenorrhea (4-5 annual cycles). Furthermore, at the end of 2006, besides to the oligomenorrhea, we also observed a tension breast, acne, galactorrhea and a significant increased weight (+8 kg, from a BMI of 24 to 27). Also, on March 2007, the I.C. patient showed hyperprolactinemia (plasma PRL: 78 ng/ml), hypoestrogenism (estradiol: 42 pg/ml) anovulatory cycle (progesterone 1.4 ng/ml), normal thyroid function (FT4 1.6 ng/dl, TSH 1.9 mU/ml), RM skull: regular and DEXA with Z-score of -2 DS. Therefore, by April 2007, the I.C. patient was treated with olanzapine (10 mg/day) and, after one month treatment, prolactinemia was lower (26 ng/ml) with disappearance of galactorrhea and from July 2007 the menstrual cycles resulted regular. The compliance to the new drug was good, as well as the control of psychotic symptoms in its various aspects. In October 2007, DEXA did not show further reduction in bone mass.

## Conclusions

In the present case report, our young patient, showed a marked reduction in BMD after prolonged treatment with risperidone thus suggesting a clinical consideration.

Prolonged treatment of young patients with AP prolactin-raising (risperidone) induced hyperprolactinemia, subsequent hypoestrogenism and osteoporosis in later years. In addition, osteoporosis is a disease almost silent until the expression of clinical fracture. Therefore, the psychiatrists, during treatment with AP prolactin-raising, have to control periodically not only plasma levels of PRL but also the possibility of reducing BMD.

## References

1. Haddad P, Wieck A. "Antipsychotic-induced hyperprolactinemia" *Drugs* 2004, 64(20): 2291-2314
2. Maguire G.A. "Prolactin elevation with antipsychotic medications mechanism of action and clinical consequences" *J Clin Psychiatry* 2002, 63 (suppl 4): 56-62
3. Halbreich U., Kanh L. "Hyperprolactinemia and schizophrenia mechanisms and clinical aspect" *J Psychiatric Practice* 2003, 9: 344-353

4. Lindsay R, Cosman F. "Osteoporosis" in L. Jameson Harrison' *Endocrinology* The McGraw-Hill Companies Inc. New York 2006
5. Naidoo U., Goff DC "Hyperprolactinemia and bone mineral density: the potential impact of antipsychotic agents" *Psychoneuroendocrinology* 2003, 28(Suppl 2): 97-108.
6. Abraham G, Halbreich U, Friedman RH, Josiassen RC. "Bone mineral density and prolactin associations in patients with chronic schizophrenia" *Schizophr Res* 2003, 59:17-18
7. O'Keane V., Meaney AN. "Antipsychotic drugs. A new risk factors for osteoporosis in young women with schizophrenia?" *J Clin Psychopharmacol* 2005, 25:26-31.
8. World Health Organization "Guidelines for preclinical evaluation and clinical trials in osteoporosis" Geneva WHO 1998
9. Hummer M., Malik P, Gasser RW, Hofer A, Kemmler G, Moncayo Naveda RC, Rettenbacher MA, Fleischhacker WW. "Osteoporosis in patients with schizophrenia" *Am J Psychiatry* 2005, 162:162-167
10. Becker D., Liver O, Mester R, Rapoport M, Weizman A, Weiss M. "Risperidone but not olanzapine, decrease bone mineral density in female premenopausal schizophrenia patients" *J Clin Psychiatry* 2003, 64: 761-766.

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