

**IRON DEFICIENCY WITHOUT ANEMIA AND PSYCHIATRIC DISORDERS IN  
CHILDREN AND ADOLESCENT****B. Aabbassi<sup>\*1</sup> and A. Benali<sup>2</sup>**<sup>1</sup>Child Psychiatric Department, University Hospital Mohamed VI, Marrakesh, Morocco.<sup>2</sup>Mental Health Research Team, University Caddi Ayad, Marrakesh, Morocco.

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**INTRODUCTION**

Iron deficiency is the most widespread nutritional deficiency in the world. The iron deficiency syndrome without anemia interests us first of all by the risk of wandering diagnosis because of its mainly psychic manifestations but also by its association with many psychiatric disorders of the child and the adolescent. We illustrate through two clinical cases that the issue of martial deficiency is major in infanto-juvenile clinic and deserves more attention from practitioners regarding the frequent dosing of ferritinemia and martial substitution in our young patients. The benefits of this non-binding prescription would be manifold (reduction of the adverse effects of psychotropic drugs, reduction of the use of psychiatric hospitalization, reduction of public health costs).

**KEYWORDS:** Iron deficiency, ferritinemia, psychiatric disorders, pediatrics.**Case 1**

Meryam is a fifteen-year-old teenager who we receive in child psychiatry consultation following the recommendation of her general practitioner. For a month, she reported a state of general fatigue, a feeling of morning chest tightness and persistent esophageal ball all day long. She's tense, anxious to be sick. She performed a paraclinical assessment that included: A blood count, a TSH test, fasting blood glucose with a recording of the heart rate and a chest x-ray. All investigations are normal. She has been on antidepressant treatment with Sertraline at 50mg/d for a week. The child psychiatry interview does not conclude to a depressive or anxiety syndrome characterized but rather to a teenager with an anxious temperament. A serum ferritin assay is performed showing a low ferritin at 16 ng/ml. We recommend to Meryam an iron supplement at a rate of 80g of ferrous sulphate once a day in the morning, in oral form for 12 weeks in parallel with psychotherapeutic stress management follow-up. The antidepressant treatment is stopped. After three weeks, the teenager notes a gradual disappearance of the previously reported symptoms. Serum ferritin control at 3 months is at 100 ng/ml.

**Case 2**

Riad is a four-year-old boy who we have been following for a year for a non-verbal medium autism spectrum

disorder. During a family therapy session, the mother describes increasingly marked sleeping difficulties and a sleep that seems restless. However, no change in the ritual of the evening or the living environment is reported. Riad is known for his great food selectivity: he only eats bread with olive oil and milk during the last three months. His weight gain is insufficient for his age while his height is normal. We first request a blood count with serum ferritin dosage. The balance shows a hemoglobin at 12g/dl with low ferritinemia at 15ng/ml. Martial substitution is indicated at the dose of 10 mg/kg with a rapid improvement in the quality of sleep of the child. A dietary opinion is recommended to correct the food deficiencies of Riad in order to guarantee a harmonious development.

**DISCUSSION**

Iron is a necessary element for many vital functions such as oxygen transport, cellular respiration, immune function, energy biosynthesis, DNA replication and repair. It also plays a crucial role in brain development, myelination and regulation of neurochemical circuits involved in behaviours and emotions (glutamate and aminobutyric acid circuit, dopamine synthesis and serotonin).<sup>[1]</sup> Physiological iron needs increase in children and adolescents. Especially in the growth phase and in the puberty phase. Yet iron deficiency is the world's most-met dietary deficiency and appears to affect more than two million people, including 7-18% of

infants and preschool children and 24-36% of adolescents.<sup>[2]</sup> This is usually due to limited dietary intake, a problem of absorption or loss of iron. This article focuses on iron deficiency without anemia, which often goes unnoticed and can have a significant long-term impact on the physical and mental health of our young patients.

Iron deficiency syndrome without anemia or IDS (Iron Deficiency Syndrome) is clinically manifested by a set of physical signs such as exhaustion, dizziness, stiff neck, headache, hair loss, brittle nails. But also, by psychic signs such as concentration disorders, anxiety, depressive mood and sleep disorders.<sup>[2,3]</sup> It is these last signs that falsely motivate the mental health consultation and sometimes even an unjustified prescription of psychotropic drugs as was the case for our patient Meryam. Biologically, ferritin is the first parameter affected by a beginner and latent deficiency; while the hemoglobin dosage is within norms. Thus, ferritinemia is the most faithful marker of iron reserves. The WHO defines iron deficiency by ferritinemia less than 120 ng/ml for children under five years of age and ferritinemia less than 150 ng/ml for people over five years of age. For children from one to three years of age, the American Academy of Pediatrics recommends a limit value between 100 and 120 ng/ml. Values are not defined for the 12-month-old infant given the difficult interpretation of ferritin at this age.<sup>[4]</sup>

On the other hand, children and adolescents with iron deficiency have an increased risk of presenting with psychiatric problems, such as: depression, bipolar disorder, anxiety, ADHD, autism spectrum disorders, tics, developmental delay and mental retardation.<sup>[5,6]</sup> This fact relates to the involvement of iron in the central neurochemical circuits (mainly GABA, dopamine and serotonin).

According to the Kassir study<sup>[7]</sup>, the introduction of oral iron therapy in combination with psychotropic therapy in depressed patients with iron deficiency resulted in regression and re-emission of symptoms. This study also concludes that the martial treatment is likely to potentiate the effect of psychotropic drugs and that its continuation is justified until the acquisition of a serum ferritin level greater than 100 ng/ml. Martial deficiency also appears to be responsible for depressive relapses.<sup>[5]</sup> Another study reported that in children with autism spectrum disorder and sleep problems, the level of ferritinemia is often low. Oral iron supplementation at a dose of 6 to 10mg/kg/d significantly improves sleep quality.<sup>[2,7]</sup> The improvement of emotional signs and cognitive performance is observed in several cases of bipolar disorder, ADHD and mental retardation having benefited from iron co-prescription.<sup>[5,6]</sup> The intensity and frequency of seizures are reduced in the event of sob spasm. The symptomatology of restless legs syndrome is improved.<sup>[5,6]</sup>

Finally, it is necessary to systematically research and treat somatic pathology explaining martial deficiency in order to avoid resistance or symptomatic relapse after discontinuation of treatment. In our two patients, no cause was identified. Insufficient dietary intakes seem to explain this deficiency.

## CONCLUSION

It is essential to promote awareness among practitioners about the physiological and clinical implications of iron deficiency in children and adolescents. More particularly in the field of mental health, the practice of martial assessment during psychiatric management should be systematic. He even comes to recommend a rapid implementation of iron so as not to hinder the development and regulation of emotions. The benefits of this non-binding prescription would be manifold (reduction of the adverse effects of psychotropic drugs, reduction of the use of psychiatric hospitalization, reduction of public health costs).

## BIBLIOGRAPHY

1. Siegfried Kasper. Que vient faire le fer en psychiatrie? 3e Iron Academy, 2010.
2. Martius F. Carence martiale sans anémie, un sujet brûlant? Conséquences non hématologiques de la carence martiale: lesquelles sont confirmées, quand sont-elles importantes? Forum med, suisse, 2009; 9(15-16): 294-299.F
3. Haute Autorité de santé. Choix des examens du métabolisme du fer en cas de suspicion de carences en fer; 2011. Disponible sur: URL: [http://www.has.sante.fr/portail/upload/docs/application/pdf/2011/rapport\\_devaluationbilan\\_martial\\_carence\\_2011-11-09\\_17-21-31\\_723.pdf](http://www.has.sante.fr/portail/upload/docs/application/pdf/2011/rapport_devaluationbilan_martial_carence_2011-11-09_17-21-31_723.pdf).
4. Hengartner H, Von der Weid N, Matteillo Diagnostic et traitement de la carence en fer chez l'enfant avec ou sans anémie: résumé et recommandations de consensus du groupe de travail hématologique pédiatrique du SPOG. Euro J Pediatr; Apr, 2020; 179(4): 527-545.
5. Mu-Hong C, Tung-Ping S, Ying-Sheue C, et al. Association between psychia-tric disorders and iron deficiency anemia among children and adolescents: a nation wide population-based study. BMC Psychiatry, 2013; 13: 161.
6. Mteillo V, Sizonenko, Baleyrier F, Fanette B et al. Carence en fer avec et sans anémie chez l'enfant: brève mise à jour pour le praticien. Rev Med Suisse, 2019; 15: 376-81.
7. Kassir A. Carence en fer: une perspective diagnostique et thérapeutique en psychiatrie. L'Encéphale, 2017; 43: 85-89.