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EFFECTS OF IRON SUPPLEMENTATION IN NEONATAL RATS ON MOTOR DEFICITS AFTER WEANING

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INTRODUCTION

Iron is an essential mineral for several biological processes, such as erythrocyte production, DNA synthesis, and cellular respiration. However, iron deregulation (especially cellular iron overload) is considered a critical condition for neurodegeneration, and is related to the pathogenesis of many neurodegenerative diseases (ND), including Parkinson's disease. Oxidative stress induced by iron via the occurrence of Fenton reaction can generate accumulation of reactive oxygen species and ferroptosis (iron-dependent cell death), which accelerates the process of neurodegeneration.

Previous studies have shown that the neonatal period is crucial for determining iron levels in the brain, considering that during this period the blood-brain barrier is not yet fully formed, allowing the mineral to freely transit to the region and accumulate.

In Brazil, for a long time, there have been public policies for adding iron to 18 foods for the prevention of anemia, as well as oral supplementation for newborns on exclusive breastfeeding. These issues are of concern, since they can contribute to the development of ND. Therefore, the aim of the present study was to investigate the effects of neonatal iron supplementation on the motor function of Wistar rats, evaluating possible motor deficits resulting from iron accumulation.

MATERIAL AND METHODS

Twelve-day-old Wistar rats (20g) received a daily oral dose (30mg/kg) of carbonyl iron or vehicle (distilled water) for 3 days (Day 12, 13 and 14 after birth). After weaning (23 days of life), to evaluate motor function, the animals were subjected to the Open Field (OFT) and Rota Rod tests. All experimental protocols were approved by the Ethics Committee (CEUA 015/24).

RESULTS

Iron supplementation caused a decrease in the number of crossings and rearings in the OFT in males ($p<0.0001$) and females ($p<0.05$), in addition to an increase in the time of immobility in both sexes ($p<0.05$). In the Rota Rod, there was an increase in the number of falls in males and females ($p<0.05$) and a decrease in the time spent on the rod in males ($p<0.01$) but not in females.

CONCLUSIONS

The results demonstrated that male and female rats exposed to iron in the neonatal period presented motor deficits, which were more prominent in males. However, further studies are needed to explore the mechanisms involved and the relationship of sexual dysmorphism.

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