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ETIOLOGY AND SYNDROMES ASSOCIATED WITH DISABILITY - INTELLECTUAL - LITERATURE REVIEW

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Abstract: Introduction: Intellectual disability is characterized by intellectual deficit and impairment in functions, with early onset, before maturity is reached, usually before the age of 18. It is estimated that 1% of the population has intellectual disability, with the majority classified in mild cases. **Objective:** To review the etiologies and syndromes associated with intellectual disability.
Result: Modifiable risk factors such as infections, exposure to toxic substances such as alcohol, perinatal distress and protein-caloric malnutrition must be widely publicized as conditions that lead to numerous cognitive deficits in developing children.
Conclusion: Among the etiologies of ID, we highlight chromosomal and genetic syndromes, malformations of the central nervous system, infectious and toxic causes, asphyxia, stroke, protein-caloric malnutrition, radiation and traumatic brain injury. Regarding the syndromes associated with ID, the most common is Down syndrome, followed by fetal alcohol syndrome, neurofibromatosis type 1, Rett syndrome and fragile X syndrome.
Keywords: Intellectual disability; Fetal distress; Genetic Diseases Linked to the X Chromosome.

INTRODUCTION

Intellectual Disability (ID), already called "Mental Retardation", gained this nomenclature due to the pejorative character of the previous term, being then adopted in the DSM-5, of 2013 (DE OLIVEIRA JS, 2022).

It is characterized by intellectual deficit and impaired functions, with early onset, before maturity is reached, usually before the age of 18 (DA SILVA AL, et al., 2022).

It is estimated that 1% of the population has intellectual disability, with the majority classified in mild cases. Severe cases are less frequent, estimated at 6:1,000 in the population. In general, ID is more common

in boys than girls (ratio of 1.6:1 in mild ID and 1.2:1 in severe ID) (DA SILVA AL, et al., 2022).

The causes of DI can be prenatal, perinatal and postnatal according to the time of onset.

Prenatal causes are those involving chromosomal and genetic syndromes, malformations of the Central Nervous System and toxic/infectious causes (RAMOS AKS, 2022).

The perinatal causes are asphyxia, stroke and infection. Finally, in postnatal causes, we have: infection, toxins (for example: lead), protein-caloric malnutrition, radiation and head trauma (RAMOS AKS, 2022).

In about 30-50% of cases, even with advanced diagnostic techniques, the etiology remains unknown. This fact is mainly true when we analyze the mild cases, therefore, the probability of causal identification is greater in the more severe cases (DA SILVA AL, et al., 2022).

The main etiologies of intellectual disability are chromosomal disorders, with 22% of cases; Genetic disorders, with 21%; Brain structural malformation; Inborn errors of metabolism; Neurodegenerative diseases; Congenital infections; Family delay: environment, syndromic or genetic; Perinatal causes: hypoxic-ischemic encephalopathy, intracranial hemorrhage, meningitis, periventricular leukomalacia, fetal alcohol syndrome; Postnatal causes: trauma, meningitis, hypothyroidism (RAMOS AKS, 2022).

As for the syndromes associated with ID, the most common is Down syndrome, affecting 1:800 live births, with an average IQ of 50 points (DA SILVA AL, et al., 2022).

Fetal alcohol syndrome encompasses a cluster of physical, behavioral, and cognitive abnormalities that are seen in people exposed to alcohol while still in utero. This condition has been identified as the main cause of ID in developed countries, estimating that up to 8% of cases are attributed to this condition (LIMA A, et al., 2023).

During the early stages of pregnancy, exposure to alcohol impacts organ formation and the development of the face and skull. Meanwhile, throughout the entire gestation, the central nervous system is influenced due to the continuous maturation of neurons. The underlying pathophysiology of fetal alcohol syndrome appears to be related to the generation of free radicals, which, in turn, lead to cellular damage (LIMA A, et al., 2023).

Neurofibromatosis type 1 is characterized by the presence of at least six café au lait spots. Its incidence is approximately 1 in 4000 people, and 4% to 8% of affected individuals have an IQ below 70. In addition, other reported cognitive impairments include impaired visuospatial skills, inattention, and executive dysfunction. However, there does not seem to be a specific cognitive profile associated with neurofibromatosis type 1 (COMBEMALE P, et al., 2019).

Rett Syndrome is a condition caused by mutations in the MECP2 gene located on the X chromosome. Affected girls are heterozygous for the disease allele. To date, more than 70 different mutations have been described in the MECP2 gene, all of which are responsible for the Rett syndrome phenotype. On the other hand, boys affected by the same mutations are hemizygous, which results in intrauterine death or fatal neonatal encephalopathy (XAVIER JS, et al., 2020).

Girls affected by Rett Syndrome show deceleration of head growth after the onset of symptoms, leading to acquired microcephaly (XAVIER JS, et al., 2020).

This syndrome is a common cause of ID in girls. The first symptoms usually appear after six months of normal development, when the child begins to lose previously acquired skills. Symptoms include loss of speech, stereotyped

writhing hand movements, epileptic seizures, respiratory irregularities, and autonomic instability. As the syndrome progresses, there is a late motor deterioration, affecting the child's mobility (XAVIER JS, et al., 2020).

Fragile X syndrome is the most common hereditary cause of ID in males, with an estimated prevalence of 1:4,000 boys and 1:6,000 girls. It is the second most common chromosomal cause leading to ID (after Down syndrome) (KARAM S, et al., 2021).

They show excessive shyness, aversion to thanks and greetings. Autistic-like behavior: social isolation, language deficit, stereotypies, echolalia, gaze aversion. Some may have aggressive behavior and symptoms of hyperactivity and impulsivity. About 20% to 30% of female carriers have ID or some specific dysfunction, such as a parietal syndrome (dyscalculia, dysgraphia, agnosia, disorientation) (KARAM S, et al., 2021).

Regarding brain malformations, the main ones associated with ID are cortical dysplasia, corpus callosum dysplasia, ventriculomegaly, and minor brain and cerebellar abnormalities. The presence of microcephaly or macrocephaly must raise the suspicion of a malformation of the central nervous system (FALCÃO AB, 2023).

Inborn errors of metabolism are well-known causes of intellectual disability and are particularly remembered because early detection and treatment make it possible to prevent DI, as in the cases of phenylketonuria, galactosemia and hypothyroidism (LISE F, et al., 2019).

MATERIAL AND METHODS

The search was carried out in the PubMed database and was limited to articles between 2019 and 2023 that met the criteria of being literature reviews and case reports.

Then, the keywords of the titles of the articles were analyzed and those whose theme best fits our objective were selected.

Nine articles were selected for full reading.

DISCUSSION

Modifiable risk factors such as infections, exposure to toxic substances such as alcohol, perinatal distress and protein-caloric malnutrition must be widely publicized as conditions that lead to numerous cognitive deficits in developing children.

CONCLUSION

Among the etiologies of ID, we highlight chromosomal and genetic syndromes, malformations of the central nervous system, infectious and toxic causes, asphyxia, stroke, protein-caloric malnutrition, radiation and traumatic brain injury.

Regarding the syndromes associated with ID, the most common is Down syndrome, followed by fetal alcohol syndrome, neurofibromatosis type 1, Rett syndrome and fragile X syndrome.

REFERENCES

1. Ramos, Anna Karolina Silva. Busca Da Etiologia Genética Da Deficiência Intelectual Pelo Sequenciamento De Nova Geração. 2022.

2. Karam, Simone Et Al. Deficiência Intelectual E Dismorfias Em Criança Com Deleção 14q32. 31-Q32. 33: Relato De Caso. 2021.

3. Da Silva, Antonio Luiz Et Al. A Deficiência Intelectual Em Debate: Do Conceito Ao Diagnóstico. Revista Campo Do Saber, V. 8, N. 2, 2022.

4. Lima, Adressa Et Al. Síndrome Alcoólica Fetal: Relato De Caso: Fetal Alcohol Syndrome: Case Report. Ulakes Journal Of Medicine, V. 3, N. 1, 2023.

5. Combemale, P.; Lion-François, L.; Pinson, S. Neurofibromatosis De Tipo 1 Y Formas Variantes. Emc-Dermatología, V. 53, N. 3, P. 1-12, 2019.

6. De Oliveira, Janaína Soares. Inteligência Fluida E Cristalizada, Interligada A Deficiência Intelectual–Transtorno Do Desenvolvimento Intelectual. Apae Ciência, V. 17, N. 1, P. 59-66, 2022.

7. Xavier, Jucineide Silva Et Al. Indicadores De Vocabulário Receptivo De Meninas Com Síndrome De Rett Com O Uso De Equipamento De Rastreio Ocular. 2020.

8. Falcão, Arthur Bezerra. Resposta Satisfatória Ao Uso De Clozapina No Controle Da Agitação E Agressividade Em Um Adolescente De 16 Anos Com Deficiência Intelectual Grave: Um Relato De Caso. 2023.

9. Lise, Fernanda Et Al. Erros Inatos Do Metabolismo Do Recém-Nascido: Atualização De Enfermagem. Revista Recien-Revista Científica De Enfermagem, V. 9, N. 25, P. 37-42, 2019.