Headache Medicine

Neuroimaging in Headaches: A Literature Review on Diagnostic Advances

Bruna Verdi Scabeni[1], Isabela Colissi Habowski[2], Júlia Ragone Vieira[3], Larissa Melo Faiad Graciliano[4], Waleska Krishna Macedo Corrales[5]

[1]Centro Universitário de Pato Branco, Pato Branco, PR
[2]Universidade Positivo, Londrina, PR
[3]Centro universitário de Caratinga, Caratinga, MG
[4]Universidade Federal do Rio Grande, Rio Grande, RS,
[5]Universidade Nove de Julho, Aclimação, SP

Introduction

Headaches have become one of the most common conditions worldwide and are a primary reason for seeking medical attention. It is estimated that seven out of ten people in Brazil suffer from some form of headache. Accurate analysis of the disease is crucial for developing effective treatment strategies, as there are various types of headaches. Neuroimaging techniques such as magnetic resonance imaging (MRI), computed tomography (CT), functional magnetic resonance imaging (fMRI), and positron emission tomography (PET) have revolutionized medicine. Their analysis provides a comprehensive view of current and future diagnostic trends, allowing for differentiation of headache types and aiding in their treatment.

Objective

To understand the diagnostic advances in neuroimaging for headaches.

Methods

This study was a literature review utilizing PubMed, Scielo, and Scopus databases. Articles containing information on neuroimaging and headaches published in the last 20 years were selected.

Results

Advances in neuroimaging provide a better understanding of headaches and improve differential diagnosis. Functional magnetic resonance imaging (fMRI) can identify functional changes in specific brain regions during migraine attacks (Dodick, 2018), revealing patterns of different types of headaches and enabling the understanding of chronic headaches. The use of techniques such as magnetic resonance spectroscopy (MRS) has also shown promise. This technique can assess metabolic changes in the brain during headache episodes, providing insight into the associated biochemical changes (Zhang et al., 2020). The use of artificial intelligence stands out for its potential to enhance diagnostic accuracy and personalize treatments. These algorithms can help predict treatment response in patients with chronic headaches, allowing for personalized therapeutic approaches (Chen et al., 2021).

Conclusion

These findings emphasize that advances in neuroimaging have made it possible to gain a deeper understanding of headache types and the biochemical changes that cause them. Furthermore, it is possible to expedite the diagnostic process and provide personalized treatment, thereby improving the patient's quality of life.