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DISCOVERY
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The effect that physical activity has on reducing cardiovascular risk- a review paper based on a psychiatric syndrome

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ABSTRACT

Physical activity protects against cardiovascular disease (CVD) in high-income countries and primarily is a form of recreation. Cardiovascular disease (CVD) is the leading cause of death worldwide and a significant economic global burden. Anton-Babinski syndrome is a rare manifestation of cortical blindness that occurs after damage to the occipital lobe. The leading cause of Anton Babinski syndrome is various cardiovascular diseases. We described the positive impact of physical activity on the occurrence of cardiovascular risk, which illustrates the risk of developing Anton Babiński syndrome. The patients present as sighted but exhibit visual disturbances. This condition stems from a neurological visual impairment resulting from abnormalities or harm in the brain rather than issues with the eyes themselves. This lack of awareness may be associated with damage to the visual association cortex (Brodmann areas 18 and 19) and main seeing area (Brodmann area 17) despite the anterior visual pathway remaining intact. As a result, these patients often deny their vision loss, offering explanations like inadequate lighting in the room in the setting of noticeable vision loss and cortical blindness.

Keywords: Anton-Babinski syndrome, visual anosognosia, influence of sport, confabulation, exercise

1. INTRODUCTION

The Influence of Sports on cardiovascular disorders is significant (Eguchi et al., 2012). The study and conclusions show an apparent reduction in cardiovascular risk, which is the main factor of Anton Babinski syndrome. Anton Babinski syndrome is an uncommon extension of cortical blindness following damage to the occipital lobe. The patient has regular vision but experiences disruptions in visual function, primarily due to neurological impairments from brain damage or abnormalities, not eye issues (Das and Naqvi, 2023). This unawareness is

attributed to damage in the visual association cortex (Brodmann areas 18 and 19) and the primary visual cortex (Brodmann area 17), even though the anterior visual pathway remains intact. Therefore, these patients deny vision loss and attribute it to poor lighting in the room, which is accompanied by noticeable vision loss and cortical blindness (Maddula et al., 2009).

2. METHODOLOGY

This bibliographic study was conducted using scientific literature from Google Scholar and PubMed. The following keywords were used: Anton-Babinski syndrome, occipital lobe infarction, influence of sport, confabulation, exercise. The observation period is from 2006 to June, 2024.

3. RESULTS AND DISCUSSION

Etiology

The etiologies include the following;

The posterior cerebral artery (PCA) is the most common cause of Anton syndrome (Das and Naqvi, 2023)

After an episode of recovered cardiorespiratory arrest (Juan et al., 2018)

After coronary angiography (Alp et al., 2009)

Secondary to SARS-CoV-2 (COVID-19) pneumonia (Elhassan et al., 2021)

Trousseau syndrome (Cao et al., 2020)

Ischemic stroke or hemorrhage involving occipital lobes (Noor et al., 2020)

Adrenoleukodystrophy (Trifiletti et al., 2007)

Posterior leukoencephalopathy induced by chemotherapy and radiotherapy (Kartsounis et al., 2009)

Preeclampsia (Misra et al., 1989)

Callosal disconnection (Chen et al., 2015)

The positive impact of sport on reducing cardiovascular risk

The analysis involved 18,747 men and 24,263 women aged 40–79 years without coronary heart disease and stroke, and the observation period covered from 2006 to June, 2024. The following lifestyle factors have been assessed: consumption of at least one serving of fruits daily, one serving of fish, and servings of milk each day, exercising for at least 5 hours per week or walking for at least 1 hour daily, BMI 21–25 kg/m2, alcohol consumption of less than 46 g/day, non-smoking, and sleep duration of 5.5–7.5 hours/day. Comparing the group with the most significant number of healthy factors (7–8) with the group with the lowest number (0–2), it showed that the risk of cardiovascular death was 0.35 (95% CI 0.25–0.49) for men and 0.24 (95% CI: 0.16–0.36) for women.

Similar relationships showed for strokes — mortality rate ratios were respectively 0.36 (95% CI: 0.22–0.58) and 0.28 (95% CI: 0.15–0.53) for gender and coronary deaths 0.19 (95% CI: 0.08–0.50) and 0.20 (95% CI: 0.09–0.47). The authors conclude that the risk of death from CVD, stroke, and coronary heart disease in the group characterized by a high category of healthy lifestyle is 1/3 for men and 1/4 for women compared to deaths in the low category of healthy lifestyle group (Table 1). The studies mentioned above suggest that CVD prevention should be achieved through lifestyle modifications. The observations made by the Japanese author were part of the Japan Coronary Artery Disease (JCAD) study, which included 11,893 patients with ischemic heart disease (stenosis ≥ 75% in at least 1–3 main coronary arteries).

After considering age, gender, hypertension, hyperlipidemia, diabetes, obesity, alcohol consumption, smoking, and medication use, it has been demonstrated that physical activity and dietary intervention have a beneficial effect on overall mortality, reducing it. The risk of death in patients undergoing physical exercise or dietary intervention, compared to groups not subjected to lifestyle modification, was respectively 0.73 (95% CI: 0.55–0.96) and 0.74 (95% CI: 0.58–0.95). The authors argue that lifestyle changes should also be encouraged among patients with coronary heart disease (Table 2) (Eguchi et al., 2012). According to the etiology of Anton-Babiński syndrome, many cases have a cardiovascular origin, which allows us to conclude the impact of physical activity on the condition of the circulatory system (Lear et al., 2017; Porter et al., 2019).

Table 1 The positive impact of a healthy lifestyle on the risk of death

Gender/Risk of death	Cardiovascular	Strokes	Coronary
Men	0.35 (95% CI 0.25–0.49)	0.36 (95% CI: 0.22–0.58)	0.19 (95% CI: 0.08–0.50)
Women	0.24 (95% CI: 0.16–0.36)	0.28 (95% CI: 0.15–0.53)	0.20 (95% CI: 0.09–0.47)

Table 2 The positive impact of a healthy lifestyle in patients with coronary heart disease on the risk of death

Lifestyle	Physical exercise or dietary intervention	Without lifestyle modification
Risk of death	0.73 (95% CI: 0.55–0.96)	0.74 (95% CI: 0.58–0.95)

Pathophysiology of blindness

The ability to recognize visually presented objects based on the integrity of specific components:

- Visual information is transmitted through intricate neural networks from the retina to processing areas of the brain.
- Primary visual cortex (Brodmann area 17): This area manages initial visual processing and analysis.
- Secondary visual cortex is located anterior to area 17 (Brodmann areas 18 and 19) in the occipital lobe, these regions manage advanced visual processing.
- Angular gyrus (Brodmann area 39) - visual association area: This region integrates and interprets information from various visual cortex areas (Table 3) (Das and Naqvi, 2023; Adam et al., 2018; Fujimoto et al., 2017).

Table 3 Pathophysiology of blindness

Component	Visual pathways	Primary visual cortex (Brodmann area 17)	Secondary visual cortex (Brodmann areas 18 and 19)	Angular gyrus (Brodmann area 39)
Function	Transmit visual information from the retina to the processing areas of the brain	Initial visual processing and analysis	Manage advanced visual processing	Integrates and interpret information from various visual cortex areas

Theories in Anton-Babinski Syndrome

- Disconnection phenomenon describes a group of neurological impairments that can appear in patients with Anton-Babinski Syndrome (ABS).
- Conscious Awareness System (CAS): The Conscious Awareness System plays a key role in regulating sensory inputs within the brain. When this system is hurt patients might lose awareness of their sight problems which makes their state worse.
- Disconnection from Language Area: A break in the brain's talk part can make patients give made-up or wrong answers, hurting their skill to explain or share what they see.
- Excessive activity of Secondary Visual Pathway: The Secondary Visual Pathway can become unduly active without adequate transmission through other specific pathways. This increased activity can result in fabulation, causing patients to unknowingly invent or exaggerate their perceptions and experiences (Das and Naqvi, 2023; Gainotti, 2019).

Neuropsychological Mechanisms in Anton-Babinski Syndrome (ABS)

Neuropsychological mechanisms surround a range of cognitive processes that may be affected in individuals with ABS, resulting in perceptual and interpretive difficulties. ABS may result from lesions involving multiple brain structures, such as the visual cortex, bilateral lateral geniculate bodies, posterior limbs of the internal capsules, optic radiation, and corpus callosum. These spots harm normal brain work, causing a big mix of signs tied to ABS (Das and Naqvi, 2023; McDaniel and McDaniel, 1991; McGlynn and Schacter, 1989).

Defective Visual Monitor

A broken sight checking system can cause mistakes in understanding what we see, leading to mixed up views of the outside world.

False-Positive Feedback

False-positive feedback can make people think about images that aren't there. This anomaly affects visual perception but can also lead to abnormal speech responses, which further complicating communication (Das and Naqvi, 2023; McGlynn and Schacter, 1989).

Pathophysiology of Confabulation

Confabulation is a thing seen in ABS where folks make up false or wrong stories to fill holes in their sense input. Confabulation may occur when functional speech areas become disconnected from damaged visual pathways, causing patients to confabulate and make claims of experiencing unusual visual hallucinations (Image 1).

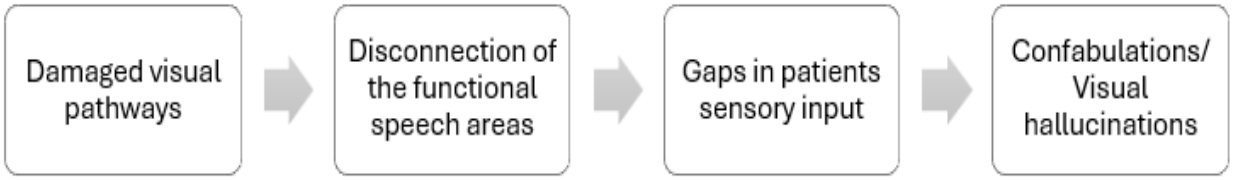

Image 1 Pathophysiology of confabulation

Treatment of Anton Syndrome

Reclamation of visual function can be anticipated if the essential factor is posterior reversible leukoencephalopathy or cortical hypoperfusion and it is corrected quickly (Misra et al., 1989; Argenta and Morgan, 1998). The initial step in rehabilitating patients with Anton-Babinski syndrome involves establishing awareness of their blindness. Although the literature frequently emphasizes the difficulty in attaining this awareness, there are cases where patients recognize their blindness reasonably quickly. For example, one report noted awareness within two weeks despite no improvement in vision (Chen et al., 2015; Gaber, 2010).

Early diagnosis of Anton-Babinski syndrome allows for prompt initiation of antiplatelet therapy, which may improve vision or awareness of blindness, even in elderly patients (Chen et al., 2015; Eby et al., 2012). Treatment of ABS was based on its underlying cause. If the stroke is due to a cardiovascular condition, the standard treatment involves antiplatelet agents. It is essential to rule out any underlying cardiovascular issues that may have led to the stroke (Das and Naqvi, 2023).

Prognosis

In cases where ABS is caused by conditions like hypertensive hypoperfusion, recovery of visual function is possible. Correcting the underlying cause can lead to symptom resolution. However, prognosis factors include the patient's age, underlying cause, severity and duration of the condition, initial recovery time, and medical history (Das and Naqvi, 2023; McDaniel and McDaniel, 1991).

4. CONCLUSIONS

One of the leading causes of Anton-Babinski syndrome is cardiovascular disorders, which lets us see clear facts that exercise makes a significant impact on the condition of the circulatory system. Higher physical activity reduces mortality and the incidence of cardiovascular diseases. ABS results from brain abnormalities rather than eye issues, often due to damage to the visual association and primary visual cortex. Various etiological factors, including posterior cerebral artery issues, COVID-19 pneumonia, strokes and other conditions, can lead to ABS. The syndrome connects to ideas that affect thinking awareness language places and other vision paths leading to not understanding, making up answers and wrong views.

Treatment is based on the underlying cause, with possible recovery seen in conditions such as hypertensive encephalopathy and cortical hypoperfusion. Overall prognosis states that factors like consumption of at least one serving of fruits daily, one serving of fish, and servings of milk each day, exercising for at least 5 hours per week or walking for at least 1 hour daily, BMI 21–25 kg/m2, alcohol

consumption of less than 46 g/day, non-smoking, and sleep duration of 5.5–7.5 hours/day they reduce cardiovascular risk and positively influence the process of diagnosis and treatment of Anton Babinski syndrome.

Authors contribution

Conceptualization: Piotr Pierzchała
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All authors have read and agreed with the final, published version of the manuscript.

Ethical approval

Not applicable.

Informed consent

Not applicable.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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