Smoking and Alcoholism, Risk Factors for Papillitis?

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Abstract.
Introduction. The inflammation of the optic nerve at the level of the optic papilla or optic disc is known as papillitis. We couldn’t find enough published studies to back up smoking and alcoholism as absolute risk factors for papillitis, but the possibility has been raised, so we decided to conduct this study to see if we could find a statistically significant causal association between these factors and papillitis in our hospital.

Methodology. In patients with papillitis treated at the Ophthalmology Center of Santiago de Cuba, an analytical investigation of cases and controls was conducted (2017–2019). 42 patients in Group 1 (Cases). Group 2 (Controls): 84 patients’ partners who visited at the same time as the patients but did not have any ophthalmological issues.

Results. We found an OR = 1.60, with a CI of [0.74; 3.48], in the smoking-papillitis connection, but p > 0.05. Alcoholism was linked to papillitis with an OR of 1.19, a CI of [0.53; 2.68], and a p value of 0.05.

Conclusions. Smoking and drunkenness had no statistically significant causal relationship with papillitis in our investigation.

Keywords: Alcoholism, smoking, papillitis, optic nerve, optic neuropathy.

INTRODUCTION

In young adults, optic neuritis is the most prevalent cause of optic nerve injury [1]. It can be anterior (also called papillitis) or posterior (retrobulbar). Papillitis is defined by the American Academy of Ophthalmology (AAO) as inflammation of the optic nerve at the papilla or optic disc level [2]. In this research, we will focus our attention on this ophthalmological entity, as it is a frequent reason for consultation in neuro-ophthalmology, and its sequelae can significantly affect vision. Many studies have been carried out over the last decade with the aim of clarifying its main causes [3–5].

Papillitis is due to different aetiologies, from common causes such as infections to less reported ones such as lightning strikes [6]. Other associations include papillitis with intraocular disease; in the course of systemic, connective tissue or autoimmune diseases [7]; secondary to insect bites or stings [8]; among others. The risk factors for papillitis are closely related to its aetiology, with some studies [7, 9] mentioning infections, autoimmune diseases, alcohol consumption and smoking as risk factors.

We will focus our attention on the latter two. Tobacco usage is well-known as one of the primary causes of death worldwide, with an estimated five to six million fatalities per year. According to current consumption patterns, around 1 billion people will die from smoking in the twenty-first century, compared to only 100 million fatalities from the same cause in the twentieth century [10].

In 2017, 34.3 million persons aged 18 and older (14 percent of US adults) were expected to be smokers in the United States, with men smoking at a higher rate than women (15.8 percent vs. 12.2 percent) [11]. In the same year, 7.4 million adults in the UK (15.1% of the population) were reported to be smokers (17 percent of men and 13.3 percent of women) [12]. In Russia, the prevalence of smoking is considered by WHO to be one of the highest in the world, and has been estimated at 60% [13]. Cuba is reported to have one of the highest smoking rates in the world.
In Cuba, smoking prevalence has been considered high for as long as information has been available. The first data on national smoking prevalence in Cuba dates back to 1978, from a survey conducted by the Ministry of Internal Trade, in which 68.9% of the population aged 17 years and older smoked [14, 15]. Among 78 WHO member countries, Cuba ranks 28th in smoking prevalence, which is currently 38.2% [15].

Tobacco smoke contains up to 4,000 active chemicals, the majority of which are harmful when inhaled or inhaled in large quantities [16]. Smoking has been linked to systemic diseases such as lung cancer, cerebrovascular and cardiovascular diseases, gastrointestinal disorders, and others [10], as well as a variety of ocular diseases, the most common of which is age-related macular degeneration (AMD) in people over 50 in developed countries. In the United Kingdom, Canada, the United States of America, and Australia, it is caused by smoking [17]. Both the development of cataracts and AMD are directly accelerated by smoking [18].

There are other diseases where well-documented studies have demonstrated the influence of smoking, including: polypoidal choroidal vasculopathy [19], diabetic retinopathy [20], ocular inflammations (uveitis, scleritis, episcleritis) [21], dysthyroid orbitopathy [22], as well as toxic-nutritional optic neuropathy, formerly called tobacco-alcoholic ambyopia [20], and Cuban epidemic optic neuropathy. (Fuentes Pelier D. Epidemiological and clinical evolution of patients with Cuban epidemic optic neuropathy in Santiago de Cuba. Doctoral thesis, 2019).

When it comes to alcohol, keep in mind that it is a psychoactive chemical with addictive tendencies that has been widely utilised in many cultures for ages [23]. According to the World Health Organization, alcohol causes 24 million fatalities globally each year, accounting for 5.3 percent of all deaths; it is a cause of more than 200 diseases; and it accounts for 5.1 percent of the global burden of disease and injury.

There are currently 20 million alcoholics in the United States of America, which has a population of 300 million people, and 13.7 percent of those born today are expected to develop alcoholism. The situation in Latin America, which has a population twice that of North America, is likewise in risk, with an estimated 40 million alcoholics [25].

In Cuba, it is considered that 45.2% of the population over 15 years of age consumes alcoholic beverages, mainly in the 15–44 age range, and the majority of alcohol dependents are between 25–42 years of age. In the last 15 years, there has been an increasing trend in consumption on a societal scale [23].

Alcohol use causes death and disability at a relatively young age. It’s linked to mental health issues, severe non-communicable diseases like cirrhosis of the liver, certain types of cancer, and cardiovascular diseases, as well as injuries from violence and vehicle accidents [24].

As for ophthalmological conditions, the most recognised is toxic-nutritional optic neuropathy, of multifactorial aetiology [26]. It is the most frequent cause of bilateral optic neuropathies, especially in adults [27]. Toxic optic neuropathy has also been described in cases of ingestion of 600–700 ml of methanol [28]. The clinical picture is characterised by acute central visual loss. The toxin is often present in alcoholic beverages made at home, and the patient unwittingly ingests it. Methanol poisoning can also be caused by ingesting paint solvents, gasoline additives, antifreeze, or windshield fluid [29].

Regarding the latter two, we were prompted to perform this study since we couldn’t find enough published papers to support them as absolute risk factors for papillitis. Our goal was to discover statistically significant causal correlations between smoking and drunkenness and the development of papillitis.

**METHODS**

Analytical case-control study of papillitis patients seen at Santiago de Cuba’s Ophthalmology Center (2017–2019). 42 patients in Group 1 (Cases). Group 2 (Controls): 84 patients’ companions who visited at the same time as the patients and did not have any ophthalmological issues. Due to the number of cases, it was decided to select 2 controls for each case. To calculate the sample size, we used an expected proportion of 45% of exposed cases and 20% of unexposed cases, an expected Odds Ratio (OR) of 2, two controls for each case, and a confidence interval (CI) of 95%. The Declaration of Helsinki was taken into account during the research, as well as the ethical principles and regulations established by the Ethics Committee of our institution.

A literature search was conducted in PubMed, ClinicalKey, ClinicalTrials.gov, Lilacs, EBSCO, Hinari and Scielo; Index Medicus and Cuban Medical Journals. In order to identify possible associations between variables, contingency tables were designed, whose analysis made it possible to estimate the OR, its confidence interval (CI), as well as the level of statistical significance of the difference between the groups.

**RESULTS AND DISCUSSION**

As indicated in Table 1, we observed an OR = 1.60 for the causal association of smoking with papillitis, although its CI: [0.74; 3.48] and \( p > 0.05 \) indicate that it is not a direct risk factor for developing the illness. Ciesielski et al. [30] found similar results when they looked at the immediate effect of smoking on optic nerve and macular perfusion in healthy regular smokers. Their findings reveal that cigarette smoking has no immediate effect on vascular density in the central retina and optic disc region in healthy regular smokers. This is in agreement with Holló [31],
who suggests that acute cigarette smoking has no effect on macular and peripapillary vascular density in healthy middle-aged smokers.

Nevertheless, it is important to consider smoking in the toxic history and habits when evaluating patients with papillitis, as these aforementioned researchers did not evaluate the long-term effect of smoking. Furthermore, in our study there was a higher frequency of smoking (40.5%) in the case group than in the controls (29.8%), although it was not statistically proven to be a risk factor.

In this NOInA case report, as we have mentioned, no causal association of smoking with the disease was demonstrated, since smoking is not frequently described in studies on papillitis, as it generates another specific type of neuropathy, the toxic-nutritional one. A progressive, symmetrical, and bilateral decline in visual acuity, scotomas, and pallor of the optic disc are common symptoms of this clinical entity [32].

As for the pathological mechanism, it is presumed that free radicals in tobacco impair the mitochondrial DNA respiratory chain, resulting in changes in mitochondrial morphology leading to demyelination [33]. Toxic optic neuropathy caused by smoking (particularly cigar or pipe smoking) is a diagnosis of exclusion, and alternative causes, such as mitochondrial optic neuropathies, such as Leber hereditary optic neuropathy, should be investigated [29].

We have found, as an interesting fact, the use of electronic cigarettes, which in several developed countries is applied as a smoking cessation mechanism [34]. However, it is controversial, as some studies have reported that their use has become very common among young people, and induces them to start smoking real cigarettes [35]. This is to draw attention to disease prevention; not starting or stopping smoking are the best ways to prevent and avoid the development of smoking-related neuropathies.

As for alcoholism and papillitis, as can be seen in Table 2, there was no causal association, as we obtained OR = 1.19, with CI: [0.53; 2.68] and p > 0.05. This means that it does not constitute a direct risk factor for suffering from the disease, similar to what occurs with smoking, as both toxic habits generate a specific type of neuropathy, which is not the previous inflammatory type, as we have explained.

Some authors [29] even suggest that while alcohol is no longer thought to be a direct cause of toxic optic neuropathy, it is linked to a higher incidence of nutritional deficiencies, some of which may cause optic neuropathy. In the group of cases in this study, those exposed were 31.0%, higher than the controls, where those exposed represented 27.4%, so this issue remains controversial and we consider it important to evaluate this history carefully in each patient.

**CONCLUSIONS**

Smoking and drunkenness were not shown to be statistically significant risk factors for papillitis in our investigation.

**AUTHOR CONTRIBUTIONS**

Information research (DHF, MVM, DFP); data collection (DHF, MVM, DFP), article writing (DHF, MVM, DFP, EZA), proofreading and editing (DHF, MVM, DFP).

**CONFICT OF INTEREST**

There are no conflicts of interest declared by the authors.

**REFERENCES**


