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ORIGINAL ARTICLE

Influence of waterpipe smoking on hematological parameters and cognitive function before and after supramaximal exercise

Influence du tabagisme par fumée de Narguilé sur la formule sanguine et la réponse cognitive à un exercice supramaximal

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KEYWORDS

Shisha;
Wingate test;
Number-recall-test;
Complete blood
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Summary

Objectives. – Tobacco use contributes to 5 million deaths per year worldwide with half of the people who smoke today likely to die prematurely. The aim of the current study was to examine the influence of waterpipe (WP) smoking on cognitive function and hematological parameters prior to and following supramaximal exercise.

Methods. – A total of 20 sedentary males were assigned into two groups: WP smoker (WPS, $n = 10$, with more than 10 years smoking experience), and non-smoker (NS, $n = 10$). Participants performed a 30 s Wingate supramaximal exercise test. Blood samples and cognitive test were obtained before and immediately after the exercise test.

Results. – No significant difference was observed between groups for cognitive function at both pre- (54.0 ± 9.9 vs. $58.3 \pm 11.8\%$, $P = 0.428$) and post-exercise (62.5 ± 6.3 vs. $61.1 \pm 5.9\%$, $P = 0.645$). All hematological indices increased significantly at post-exercise with white blood

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cell, neutrophil, haematocrit and lymphocyte values significantly greater for WPS compared to NS.

Conclusion. – Long-term WP smoking resulted in significantly greater hematological indices potentially reflective of greater inflammation. Despite these hematological differences, similar group responses were observed during stress (i.e. supramaximal exercise) indicating that long-term WP smoking may have limited impact on cognitive function via hematological changes. Future studies may elucidate the impact of long-term WP smoking on cardiovascular and cognitive function.

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MOTS CLÉS

Narguilé ;
Chicha ;
Test de Wingate ;
Test de mémorisation
numérique ;
Numération formule
sanguine ;
Paramètres
hématologiques

Résumé

Objectif. – Le tabagisme est responsable de 5 millions de décès par an dans le monde, la moitié des fumeurs étant susceptibles de mourir prématurément. Les effets de l'utilisation du narguilé ou chicha, très répandue dans le monde, sont probablement comparables mais restent moins connus. Le but de cette étude était d'examiner l'influence d'une séance de narguilé sur les fonctions cognitives et les paramètres hématologiques, avant et après un exercice supramaximal.

Méthodes. – Vingt hommes sédentaires ont été répartis en deux groupes : WP 15 fumeur (WPS, $n = 10$ depuis plus de 10 ans), et non-fumeur (NS, $n = 10$). Les participants ont effectué un test de Wingate de 30 s. Des échantillons sanguins et un test des fonctions cognitives ont été obtenus avant et immédiatement après cet exercice.

Résultats. – Aucune différence significative n'a été observée entre les groupes pour la fonction cognitive tant avant ($54,0 \pm 9,9$ vs $58,3 \pm 11,8$ %, $p = 0,428$) qu'après l'exercice ($62,5 \pm 6,3$ vs $61,1 \pm 5,9$ %, $p = 0,645$). Tous les paramètres hématologiques ont significativement augmenté après exercice (leucocytes, neutrophiles, hématocrite, lymphocytes), et cette augmentation était significativement plus grande chez les WPS que chez les NS.

Conclusion. – Les WP, qui ont un passé d'utilisation prolongée du narguilé, présentent une augmentation plus marquée à l'exercice des paramètres hématologiques, reflétant probablement une inflammation plus importante. Cependant, les réponses aux tests de fonction cognitives lors d'un test supramaximal sont analogues, ce qui semble indiquer que ces modifications hématologiques liées au tabagisme prolongé n'ont qu'un impact limité sur les fonctions cognitives.

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1. Introduction

Tobacco use contributes to 5 million deaths per year worldwide with half of the people who smoke today likely to die prematurely [1]. Tobacco use is the 2nd major leading cause of death and is currently responsible for 10% of all adult deaths across the world [2]. The use of waterpipes (WP) for smoking tobacco has contributed to the large-scale smoking incidence and dates back to at least 400 years ago [3]. The global trend for WP smoking continues to rise with the following factors contributing to this growth:

- the introduction of flavoured WP tobacco with reduced harshness, pleasant flavour and aroma;
- the misperception that WP is 'healthier' than cigarette smoking;
- social acceptance and WP being an essential part of gatherings, and cafe and restaurant culture;
- influence of internet, mass and social media;
- low cost;
- lack of WP-specific policy and regulations towards its use [4].

These factors contribute to increases in smoking rate and the subsequent impact on health. Recently, cigarette smoking was reported to alter cardiovascular function such as increasing daytime and average 24-hour blood pressure (BP) and heart rate (HR), and ultimately the development of atherosclerosis and cardiovascular disease [5,6]. Additionally, cigarette smoking was reported to attenuate working memory [7], further highlighting the significant and multidimensional impact of smoking on health. Smokers were reported to exhibit poorer cognitive functions such as working memory, attention, executive function, and information-processing speed in comparison with non-smokers [8–10]. Moreover, several studies reported that smoking undermines grey matter densities in brain regions that are crucial for cognitive function [11,12]. The main pathophysiological pathways responsible for this reduced cognition with smoking are still unclear, but may be related to alterations in vascular and/or cardiovascular function given that smoking is an important risk factor for cardiovascular diseases [13]. An important component of the human cardiovascular system is the blood and its individual components (i.e. hematological indices).

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