# 47 - PREVALENCE OF SMOKING AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN PERIPHERAL ARTERIAL DISEASE PATIENTS: PRELIMINARY RESULTS.

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## INTRODUCTION

The Peripheral Arterial Disease (PAD) results from the narrowing and hardening of the light of the lower limb arteries, as part of the systemic vascular atherosclerotic process. Intermittent claudication is the classic symptom, and is characterized by the occurrence of pain in the affected limb to the effort, which often restricts the daily activities of the patient 1.

Risk factors for PAD include advanced age, smoking, diabetes mellitus, dyslipidemia, obesity and hypertension2. Cigarette smoking, which is considered the main risk factor for preventable chronic diseases, including the PAD, it is also largely responsible for chronic obstructive pulmonary disease (COPD)3.

The change in lung mechanics presented in individuals with COPD is caused by bronchial obstruction that leads to the displacement of the point of equal pressure to the airways of smaller caliber, favoring air trapping4. The patients may have a significant reduction in physical performance due to several factors, such as dynamic hyperinflation and increased glycolytic muscle metabolism, accompanied by progressive deconditioning caused by inactivity, triggering physical and social limitations causing deterioration of their quality of life5.

Given that smoking is a common risk factor to both pathologies, it is important to assess lung function in arteriopathic patients since pulmonary involvement can also limit the exercise capacity of these individuals.

Therefore the objective of this study is to evaluate the smoking habit, lung function, the ankle-brachial index (ABI) and the ability to walk from individuals with PAD, and check if there are correlations between respiratory indices (spirometric and smoking) and peripheral (ITB and the distance walked).

## METHODOLOGY

Retrospective study based on clinical data of patients with PAD referred for physiotherapy service at the University Hospital of the West of Paraná. Were collected: 1) personal data: gender, age, body mass index (calculated as weight / height x height), 2) data related to smoking: duration of smoking, number of cigarettes per day and cigarette type (index years / pack = number of cigarettes smoked per day x number of years of smoking / 20), 3) data of lung function: the values described in the report of the first spirometry performed, these being: percentage of predicted value of forced expiratory volume in 1 second (FEV1) and Forced Vital Capacity (FVC) and FEV1/FVC ratio in percentage. All patients underwent spirometry (MicroLab, model MK8, USA), by the same technician who performed the tests according to the standards of the American Thoracic Society (2005)6; 4) ABI: data from the first collection, which was performed according to Johansson et al. (2010)7, using the Doppler Vascular device (MEDPEJ, model DV2001), with the patient in the supine position, at rest for at least five minutes. The sphygmomanometer was placed in a comfortable way, adjusted in the arms above the malleolus cubital on each side, for the determination of PA in the upper (UL). The highest systolic blood pressure (SBP) was elected for the upper limbs (UL). Then, for the determination of SBP for the lower limbs (LL), the cuff was positioned in the middle part of the leg and systolic blood pressure was collected both from dorsalis pedis and posterior tibial arteries. The lowest SBP was used for the calculation. The result was found by dividing the value of each LL PAS from PAS value on the UL. 5) Test claudication: data from the first test performed, on a treadmill (Embreex, Model 563R3), with constant speed (4.5 Km / h) and without inclination. The onset of pain, maximum pain and recovery time (TR) was timed. To obtain the initial distance (DPi), ie, until the onset of ischemic pain, and the maximum distance (DPm), or until the maximum pain, times were converted into measures of distance (in meters). The TR is shown in seconds for standardization.

For statistical analysis the data were tabulated in Microsoft Excel 2010 and later analyzed by GraphPad Prism 3.0 (San Diego, CA, USA). Quantitative data were analyzed for normality using the Kolmogorov-Smirnov and described as mean and standard deviation (normal distribution) or median and ranges (if not normally distributed). The correlation analysis was done using the Pearson test (normal distribution) or Spearman (if not normal). Statistical significance was set at 5%.

## RESULTS

Among the fourteen patients, only one was excluded for not meeting criteria for acceptability of spirometry. All quantitative data were normally distributed, so are described as mean and standard deviation (SD) and are shown in Table 1. Qualitative data are reported as total number (n) and percentage relative to the total (%).

Table 1. Characteristics of participants included in the study

| variables | | Group (n=13) |
|---|---|---|
| **General data** | | |
| Age (years) (Mean ± SD) | | 67 ± 9 |
| Gender | | |
| | (n/% masculin) | 9/69 |
| | (n/% feminin) | 4/31 |
| BMI (Kg/m$^2$) | | 25 ± 4 |
| Sedentarism (n/%) | | 13/100 |
| Smoking data | | |
| | Current smoking (n/%) | 9/69 |
| | Ex-smoker (n/%) | 4/31 |
| | Never smoked (n/%) | 0/0 |
| Years / pack (Mean ± SD) | | 60 ± 21 |

| | |
|---|---|
| **Pulmonary function data** | |
| Distúrbio ventilatório restritivo e/ou misto (n/%) | 0/0 |
| Ausência de distúrbio ventilatório (n/%) | 4/31 |
| Distúrbio ventilatório obstrutivo (n/%) | 9/69 |
| Leve (n/%) | 4/44 |
| Moderado (n/%) | 3/33 |
| Grave (n/%) | 2/22 |
| CVF (% predito) | 90 ± 17 |
| VEF1 (% predito) | 76 ± 24 |
| VEF1/CVF (%) | 64± 12 |
| **Dados vasculares** | |
| ABI (Mean ± SD) | |
| Left limb | 0,68 ± 0,29 |
| Right limb | 0,69 ± 0,14 |
| Claudication data (Mean ± SD) | |
| DPi in meters | 151 ± 93 |
| DPm in meters | 379 ± 306 |
| TR in seconds | 221± 122 |

Regarding the correlation analysis, we found that BMI and age did not correlate significantly with any of the other measured parameters (respiratory and vascular). Among the respiratory parameters, there were no statistically significant correlations between the index of years-pack and spirometric or vascular data. Spirometric data correlated significantly with each other, as expected (FVC versus FEV1 = r: 0.85, p: 0.0005; FEV1 versus FEV1/FVC = r: 0.80, p: 0.0006), but showed no statistically significant correlation with the vascular data (ITB and the distance walked).

**DISCUSSION**

As shown in the results, all arteriopathic patients included in the study were sedentary, mostly men, overweight and seniors. Regarding the respiratory aspect, we highlight the fact that all are or were smokers and most developed COPD in different levels of severity. For the vascular aspect it was observed that the level of obstruction demonstrated by ABI was moderate and the functional impairment was important, as evidenced in the treadmill test.

About age and gender, the data from this study are in agreement with the literature. Yoshida et al. (2008) 8 state that the prevalence of PAD increases with age, predominantly in the age group of 50 to 70 years (50-85 years in this study), which predominates in males (61% versus 64% in this study).

Most individuals of this study were overweight, based on BMI of 25 kg/m². The relationship between overweight and arteriopathy, has been widely documented in the literature, as in the study of Silva, Giribela and Wolosker et al. (2012)9 patients were also overweight with an average BMI of 27 kg/m².

Regarding the inactivity, Gardner, Scott and Montgomery et al. (2007) found that individuals with intermittent claudication with less ability to walk were those who had lower levels of physical activity. The authors believe that the walking ability of these individuals and physical inactivity, are the result of an attempt to minimize the claudication symptom, but therefore, in the long term, there is further deterioration in the ability to walk10. Individuals with COPD are also characterized by physical deconditioning. Skeletal muscle dysfunction, one of the extrapulmonary characteristics of this disease, is linked to decreased exercise capacity, that, when associated with dyspnea, leads to more physical inactivity11. The sample consisted of arteriopathy sedentary individuals, in which most of them had COPD. Thus most of these patients had two possible causes for physical inactivity (PAD and COPD), but we cannot say that the inactivity is due to one factor or another, or even due to another factor not presented here, since that this was not a goal of this study.

With respect to smoking, its presence was detected in all participants, with 69% remaining smokers and 31% former smokers. The patients had a smoking history of approximately 60 years/pack, which may have collaborated with the accelerated development of atherosclerotic disease and the pulmonary function changes in some of them. It is described in the literature that this habit increases the risk of PAD, lowers the success rate of vascular restoration and increases the incidence of amputation in patients with intermittent claudication12.

According to Meirelles (2009) smoking is the most important cause of COPD, with approximately 80-90% of COPD deaths are caused by smoking. According to the author, the chance of a smoker dying from COPD is 12-13 times greater than of a non smoker and 25% of smokers of a pack of cigarettes for 10 years or more develop COPD13. Based on tobacco intake of patients studied, the chance that these individuals had to develop COPD was high, which was confirmed by spirometry. The fact that some patients do not have lung disease, despite being smokers, confirms the data from the literature, that the relationship between smoking and lung function is common, but not mandatory. We emphasize that, despite smoking being a major risk factor for PAD, were not found in the literature, to date, studies correlating COPD and PAD, which is a new data presented in our study.

Spirometry performed showed that, among patients with COPD, 22% had severe obstruction. According to the literature, individuals with COPD have reduced exercise tolerance, associated with dyspnea and fatigue, which leads to decreased functional capacity, including the walk, with the progression of the disease14. This correlation (greater severity of COPD versus major limitation for walking) could not be observed in this study, possibly due to the small number of subjects with severe COPD (2).

According to Filho, Pereira and Carvalho et al. (2007) the combined use of ITB with walking tests have been employed to better understand the level of commitment of the patient with PAD, because it links a measure of integrity of blood flow with a measure of functional capacity15. In this study ABI showed that there were arterial obstruction in both lower limbs, since it was below 0.9 on average, and this can be classified as moderate second Maffei (2002)16. ABI values in the present study (0.68 and 0.69) coincide with Silva et al. (2012) who also identified moderate obstruction among the patients studied (average 0.59)9.

In our study, the onset of claudication occurred at 151 meters on average and maximum pain at 379 meters. These data give us subsidies to say that this sample have moderate/severe claudication patients in relation to functional capacity, according to Fontaine (1954)16. In the study cited earlier the onset of claudication occurred before 200 meters and maximum distance walked was 265 meters and were also classified as moderate/severe9. A direct correlation between ABI and distance traveled was expected, but this was not observed in this study, probably for the same aforementioned limitation (small sample).

Considering the high prevalence of COPD in the present study, it is believed that this is an important clinical data, which must be taken into account in the daily care of these patients. Furthermore, it is considered necessary to increase the sample to clarify whether there is correlation between respiratory variables (years-pack and spirometric data) and vascular variables (ABI and walking test).

**CONCLUSION**

In this sample of patients with moderate PAD, the smoking habit and COPD have a high prevalence. Although there was no correlation between vascular and respiratory data, it is believed that the pulmonary function should be investigated in PAD smokers patients, for optimization of their treatment.

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**PREVALENCE OF SMOKING AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN PERIPHERAL ARTERIAL DISEASE PATIENTS: PRELIMINARY RESULTS.**

**ABSTRACT**

Cigarette smoking is the main risk factor for preventable chronic diseases, including peripheral arterial disease (PAD) and chronic obstructive pulmonary disease (COPD). It is considered important to assess lung function in arteriopathic patients, since the association with lung disease can also limit the exercise capacity of these individuals. OBJECTIVE: To evaluate the smoking habit, lung function, the ankle-brachial index (ABI) and walking capacity from individuals with PAD, and check if there are correlations between respiratory and peripherals indices. METHODOLOGY: Analysis of data from medical records of patients with PAD. Data: 1) personal characteristics; 2) data related to smoking; 3) pulmonary function data; 4) ABI; 5) claudication test. RESULTS: BMI and age did not correlate significantly with any other parameters. There were no statistically significant correlations between the index of smoking and vascular or respiratory parameters. Spirometric data were significantly correlated between them, but not with other parameters. The relationship indicated by the literature that the greater the intensity of smoking, the greater the tendency to impairment of lung function is true, but not mandatory, since all individuals in the study were smokers, but not all are COPD. The continuity of this research may indicate greater statistical power, whether there is correlation between the peripheral and respiratory variables in individuals with PAD, as it has not yet found in the literature. CONCLUSION: In this sample of patients with moderate PAD smoking and COPD have a high prevalence. Although there was no correlation between vascular and respiratory data, it is believed that the pulmonary function should be investigated in patients with PAD smokers to optimize their treatment.

**KEYWORDS:** Peripheral arterial disease, obstructive lung disease, physical therapy.

**PREVALENCE DU TABAGISME ET MALADIE PULMONAIRE OBSTRUCTIVE CHRONIQUE DANS LES PATIENTS AVEC MALADIE ARTERIELLE PERIPHERIQUE: RESULTATS PRELIMINAIRES.**

**RÉSUMÉ**

Le tabagisme est le principal facteur de risque pour les maladies chroniques évitables y compris la maladie artérielle périphérique (MAP) et la maladie pulmonaire obstructive chronique (MPOC). Est considéré comme important pour évaluer la fonction pulmonaire arteriopathic, depuis l'engagement poumon peut également limiter la capacité d'exercice de ces individus. Objectif: évaluer l'habitude de fumer, la fonction pulmonaire, l'indice de pression systolique (IPS) et la capacité de marcher des

individus atteints de la MAP, et vérifier s'il ya des corrélations entre les indices respiratoires et périphériques. Méthodologie: Analyse des données des dossiers médicaux de patients atteints de la MAP appelé pour le service de physiothérapie. Parameters: 1) les caractéristiques personnelles, 2) les données liées au tabagisme, 3) les données de la fonction pulmonaire; 4) IPS; 5) claudication. Résultats: IMC, l'âge et l'indice de paquets-années ne sont pas corrélés de manière significative avec l'un des autres paramètres. Données spirométriques ont été présentés de manière significative entre eux, mais pas de corrélation avec l'indice des données sur le tabagisme ou vasculaire. Corréler les données présentées, la relation indiquée par la littérature que plus l'intensité du tabagisme, plus la tendance à la dégradation de la fonction pulmonaire est vrai, mais pas obligatoire, puisque toutes les personnes participant à l'étude étaient des fumeurs, mais tous ne sont pas MPOC. La continuité de cette recherche pourrait indiquer une plus grande puissance statistique, s'il ya corrélation entre les variables périphériques et respiratoires chez les personnes souffrant de MAP, car il n'a pas encore trouvé dans la littérature. Conclusion: Dans cet échantillon de patients atteints de fumer PAD modérée et la MPOC ont une prévalence élevée. Bien qu'il n'y ait pas de corrélation entre les données vasculaires et respiratoires, on croit que la fonction pulmonaire devrait être étudiée chez les patients avec des fumeurs de la PAD.

**MOTS-CLÉS:** maladie artérielle périphérique, maladie pulmonaire obstructive, physiothérapie.

**PREVALENCIA DE TABAQUISMO Y ENFERMEDAD PULMONAR OBSTRUCTIVA CRÓNICA EN LOS PACIENTES CON ENFERMEDAD ARTERIAL PERIFÉRICA: RESULTADOS PRELIMINARES.**

**RESUMEN**

El tabaquismo es el principal factor de riesgo para las enfermedades crónicas prevenibles, como la enfermedad arterial periférica (PAD) y la enfermedad pulmonar obstructiva crónica (EPOC) se considera importante evaluar la función pulmonar arteriopathic, ya que el compromiso pulmón también puede limitar la capacidad de ejercicio de estos individuos. Objetivo: Evaluar el hábito de fumar, la función pulmonar, el índice tobillo-brazo (ITB) y la capacidad de caminar de las personas con enfermedad arterial periférica, y comprobar si hay correlación entre los índices respiratoria (espirometría y el tabaquismo) y periféricos. Metodología: Análisis de los datos de las historias clínicas de los pacientes con PAD que se refiere al servicio de fisioterapia, se recogieron: 1) características personales, 2) los datos relativos al consumo de tabaco, 3) datos de la función pulmonar; 4) ITB, 5 ) claudicación. Resultados: El índice de masa corporal, la edad y el índice de paquetes-año no se correlacionan significativamente con cualquiera de los. Datos espirométricos se presentaron significativamente entre ellos, pero no hay correlación con otros parâmetros. La relación indicada por la literatura que cuanto mayor es la intensidad del consumo de tabaco, mayor es la tendencia al deterioro de la función pulmonar es cierto, pero no es obligatorio, ya que todas las personas en el estudio eran fumadores, pero no todos están EPOC. La continuidad de esta investigación podría indicar una mayor potencia estadística, si existe correlación entre las variables periféricas y respiratorias en las personas con enfermedad arterial periférica, ya que aún no se encuentran en la literatura . Conclusión: En esta muestra de pacientes con PAD moderado fumador y EPOC tienen una alta prevalencia. Aunque no hubo una correlación entre los datos vasculares y respiratorios, se cree que la función pulmonar debe ser investigado en pacientes con PAD fumadores.

**PALABRAS CLAVE:** Enfermedad arterial periférica, enfermedad pulmonar obstructiva, fisioterapia.

**PREVALÊNCIA DE TABAGISMO E DOENÇA PULMONAR OBSTRUTIVA CRÔNICA EM DOENTES ARTERIAIS PERIFÉRICOS: RESULTADOS PRELIMINARES.**

**RESUMO**

Introdução: O tabagismo é considerado o principal fator de risco passível de prevenção para várias doenças crônicas, entre elas a doença arterial obstrutiva periférica (DAOP) e a doença pulmonar obstrutiva crônica (DPOC). Considera-se importante avaliar a função pulmonar de arteriopatas, já que o comprometimento pulmonar também pode limitar a capacidade ao exercício destes indivíduos (SILVA G. A. et al., 2006) Objetivo: Avaliar o hábito tabágico, a função pulmonar, o índice tornozelo-braquial (ITB) e a capacidade de caminhada de indivíduos com DAOP, e verificar se há correlações entre os aspectos respiratórios e periféricos. Metodologia: Análise de dados em prontuários de pacientes com DAOP encaminhados para serviço de fisioterapia. Foram coletados: 1) características pessoais; 2) dados relacionados ao tabagismo; 3) dados da função pulmonar; 4) ITB; 5) parâmetros do teste de claudicação. Resultados: O IMC e a idade não se correlacionaram de forma significante com nenhum dos outros parâmetros. Não houve correlações estatisticamente significantes entre o índice de anos-maço e os parâmetros respiratórios ou vasculares. Os dados espirométricos correlacionaram-se de forma significante entre eles, porém não demonstraram correlação com nenhum outro parâmetro. A relação indicada pela literatura de que quanto maior a intensidade do tabagismo, maior a tendência ao comprometimento da função pulmonar é verdadeira, porém não obrigatória, já que todos os indivíduos do estudo são tabagistas, porém nem todos são DPOC. A continuidade desta pesquisa poderá indicar, com maior poder estatístico, se há ou não correlações entre as variáveis respiratórias e periféricas nos indivíduos com DAOP, dado este ainda não encontrado na literatura. Conclusão: Nesta amostra de pacientes com DAOP moderado o tabagismo e a DPOC tiveram alta prevalência. Apesar de não ter havido correlação entre os dados respiratórios e vasculares, acredita-se que a função pulmonar deva ser investigada em pacientes DAOP tabagistas.

**PALAVRAS-CHAVE:** Doença arterial periférica, doença pulmonar obstrutiva, fisioterapia.