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Cigarette Smoking: The Most Widespread and Insidious Weapon of Mass Destruction

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Abstract

Today, lung cancer is the leading cause of cancer-related death, and it is estimated that, annually, the lung cancer mortality is higher than colon cancer, breast cancer and prostate cancer combined. Tobacco smoking is certainly the main indicted for lung cancer.

The European history of tobacco begun thanks to Christopher Columbus but it was between the two world wars that it passed from a habitude for a few people to a social evil. The association between lung cancer and tobacco smoking is today a statistical certainty. Although the question for further tobacco control and improved cessation strategies is powerful, the utopian goal of a smoke-free society is still distant and lung cancer will remain among the top killers for decades unless radical reductions in smoking prevalence will be achieved.

Key Words: Tobacco; Smoking; Cigarette; Lung cancer

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Today, lung cancer is the leading cause of cancer-related death and it is estimated that, annually, the lung cancer mortality is higher than those for colon cancer, breast cancer and prostate cancer combined. At 5 years after diagnosis, the average survival is only 15%. The average survival at 5 years is much higher if the diagnosis is made in the early stages of the disease (stage I). For this reason, to know the epidemiology and risk factors is an important weapon that we can use for "prevention" and consequently the reduction of incidence and mortality. Tobacco smoking is certainly the main indicted for lung cancer. The European history of tobacco begun thanks to Christopher Columbus who, when arrived in San Salvador on October 12, 1492, was considered as a divine being sent by the gods and received many gifts (wooden spears, wild fruits and dried leaves) [1, 2]. The first information on the tobacco smoke is found in the General History of the Indies of Bartholomew De La Casas, who wrote, "The Indians mix their breath away with the smoke of an herb called "petum "and blowing like hell." The petum, also called "tabago", was sniffed, chewed or smoked in pipes of reddish stone. All evidences received are in agreement that, for the Indians, "swallow smoke take more time to work". Burning the tobacco had a religious value. At the Mayans and Aztecs, as early as at 500-1000 B.C. the priests, at the beginning of the religious ceremonies, used to blow the smoke toward the sun and the cardinal points from a pipe or directly from rolled tobacco. For the Mayans and American Indians, the meaning was to pay homage to the god Balan, the god of the four winds that lit up the sky with lightning and clouds [2]. Later, the smoke began to stop being blown, but aspirated and its use was no longer limited to the priestly caste, but extended to the people. But we must not think that the history of tobacco coincides with that of smoking. In fact, even tobacco as other substances that over the centuries have been considered the drugs can be taken in various ways, while conversely the habit of smoking is well before the discovery of tobacco. For example, we have found ancient metal pipe that date back to the Bronze Age. Evidently, before the discovery of tobacco people smoked other herbs, including cannabis [2]. Tobacco smoking spread through diplomatic channels across the continent when the Portuguese ambassador Jean Nicot paid tribute to Catherine De Medici not only for the leaves but also the seeds of the plants that were called by the name of Nicot "Herba Nicotine". The first European man to smoke tobacco was probably a friend of Christopher Columbus, Rodrigo de Jerez. The use of smoking, sniffing and chewing tobacco was introduced in the various countries by sailors and soldiers from Spain, Portugal , Naples, Sicily , Lombardy, expecially for the reputed medicinal properties or as extravagant fashion reserved for a few people but it did not represent a true mass phenomenon until the period

of the two world wars [2]. In '600, mainly sailors and soldiers of every rank smokes, but also intellectuals, writers and poets start smoking. It is the beginning of the '700 that writers and poets begin to enter their works tobacco as the main protagonist. In painting, many artists began to choose as the subject of tobacco. The widespread use of tobacco on a global scale, therefore, led to the controversy and the birth of the first bitter opponents. Some doctors began to consider tobacco as a plant harmful and far from curative. Thus were born the first heavy penalties and the first prohibitions, motivated by various pretexts but this wave of prohibition did not produce practical results and, in 1700, the war of repression against tobacco and smoking was lost. The imposition of tax on the tobacco cultivation was replaced with the ingenious invention of the "monopoly of state". In practice, only the state had the power to cultivate and distribute tobacco. The operation proved one of the most skilled tax inventions of modernity and earned him immense revenue to the coffers of the states. From the East, arrived in 1832, a revolutionary innovation. The Muslim soldiers of Ibrahim Pasha at the siege of St. John of Acre began to slip a bit 'of tobacco into the paper cylinders in which they kept their gunpowder and to turn them on. Thus they invented the cigarette. For a long time the cigarette was not about the cigar and pipe smokers who thought it was too cloying and insipid. Then began the transition from the pipe, by chewing and sniffing tobacco, to the cigarette, more practice and adhering to the fashion changed. The American Civil War (1861-1865) introduces a type of American cigarettes made of tobacco, light in color, more aromatic and sweeter. Once again the war put the economic cigarette in the hands of the soldiers. After they tried a few cigarettes with this unusual tobacco, the new smokers felt the urgent need to smoke again. Therefore the cigarette industry had created a new and powerful vice. The consumption of cigarettes soared with the First World War: the American production went from 18 billion cigarettes in 1914 to 1947 billion in 1918. This helped a crusade to provide free cigarettes to soldiers because their narcotic effect was considered useful to combat loneliness at the front. Between the two world wars, it was just a habit for a few people that became a social evil. Cigarettes were a 19th century innovation that grew up during World War II, among the soldiers first. The development of advertisement further influenced the customs of the mass. Since that time, the habit of smoking had its maximum spread: myth was born of man and woman in hard career, both smoking unrepentant. From television to movies, heroes or assumed, between a cigarette and the other, discovered enemy spies or were saving the world. Colossal sums were allocated for the promotion of cigarettes as an aid to stay lean. Film extolling dive smokers, such as Marlene Dietrich, helped to create a sophisticated image that struck the women. In 1939, close to of another world war, American women joined men in consuming 180 billion cigarettes. When World War II broke out, the soldiers took the free cigarettes again. In Europe post-war at some point the cartons of cigarettes replaced the currency in the black market. Cigarettes smoking became the predominant cause of lung cancer and the leading worldwide cause of cancer death [3]. Before the 20th century nothing was known about the etiology of cancer. There was just the clever remarks that some types of tumors developed in particular groups of people; in 1713 Ramazzini of Padua noticed that breast cancer was more common among nuns; in 1716 John Hill wrote about the relationship between snuff and nose cancer; in 1795 Percivall Pott described the high incidence of scrotum cancer among chimney sweeps etc. Satisfactory statistical results, epidemiological and interpretative studies appeared several decades later [4]. In the beginning of the twentieth century, lung cancer was an uncommon disease. Previously, in 1859, R. Virchow, on the analysis of autopsy records, reported an incidence of 0.03% (one case on 3390 autopsies) but W. Kikuth noticed, in 1924, an increase up to 0.4% about the period 1900-1911 and up to 0,7% about the period 1912-1913. The lung cancer was classified as a rare cancer but Kikuht was right when he argued that the concept of "rarity of lung cancer" could no longer be maintained. During the following decades there was a significant increase in the incidence of this kind of tumor and the increase was disproportionate to the incidence of tumors in general. In 1947 the incidence increased up to 5% and autopsy studies showed that the frequency of lung cancer was age and male related. The first hypothesis concerning the possible causes mentioned for example, some forms of influenza, tuberculosis, exposure to irritant gases and other chronic irritative factors. However, only at the beginning of the 1940s the abnormal increase in the incidence of lung cancer was to be associated with the massive increase of smoking tobacco. Statistical studies by Potter and Tully reported a higher proportion of smokers in patients with cancer of the buccal cavity and respiratory tract, among males over the age of 40 [5, 6]. Some large statistical studies were carried out in 1950 and gave such striking results. In the report of Levine of 1950 we can read: "excessive and prolonged use of tobacco, especially cigarettes, seems to be an important factor in the induction of bronchogenic carcinoma; the occurrence of carcinoma of the lung in a male nonsmoker or minimal smoker is a rare phenomenon (2%). Ninety-six and one-tenth per cent of patients with cancer of the lungs who had a history of smoking had smoked for over twenty years. Few women have smoked for such a length of time, and this is believed to be one of the reasons for the greater incidence of the disease among men; the greater practice of inhalation among cigarette smokers is believed to be a factor in the increased incidence of the disease [5]. Schrek et al in 1950, in a case-control study concluded as following: "A relatively high percentage of cigarette smokers were found among the patients with cancer of the respiratory tract, as compared to the control. This positive correlation between the incidence of cigarette smoking and the incidence of cancer of the respiratory tract appeared to be both statistically and biologically significant. There is strong circumstantial evidence that cigarette smoking was an etiologic factor in cancer of the respiratory tract [7]. Doll and Bradford, always in 1950, concluded that "among the smokers a relatively high proportion of the patients with carcinoma of the lung fell in the heavier smoking categories; Cigarette smoking was more closely related to carcinoma of the lung than pipe smoking; the lung carcinoma patients had begun to smoke earlier and had continued for longer than controls [8]. The association between lung cancer and tobacco smoking was no longer a suspicion, but a statistical certainty, and indisputable. Even in the 60's there was who was wary still. Rupert Willis argued that a "greater surgical interest in the disease and greater competence of pathologists in

the recognition of less obvious lung cancers could be an explanation for the increased incidence [4]. Moreover, modern statistical studies show that the incidence of lung cancer goes hand in hand (with a normal latency period) with the progress of the social habit of smoking tobacco. Once the "lethal combination" was established, massive cessation programs were put in place, that initially had a positive effect or caused a significant reduction in the number of smokers, and this was reflected in a statistically significant reduction in the incidence of lung cancer in later years. Another important statistic is the difference between the two sexes, in fact in women, the increase in incidence of lung cancer occurred since the early 50's when the habit was widely adopted by them! Today the curve of incidence of lung cancer among men has reached a stage of stability associated with the stability in recent years of the number of male smokers while the curve of incidence of the disease in women is increasing in association with the continuing increase of smoking among women. Lung cancer continues to be the leading cause of cancer-related deaths worldwide. Despite improvements in survival for many types of cancer in recent years, 5-year survival for lung cancer has remained poor, because by the time a diagnosis is made, lung cancer is often well advanced and treatment options are limited. There are many risk factors for lung cancer (exposure to indoor radon, family history of lung cancer, air pollution, pre-existing lung diseases, exposure to industrial or chemical carcinogens) but the most important risk behavior for lung cancer is tobacco smoking [9]. The relationship between smoking and lung cancer is one of the most thoroughly investigated issues in biomedical research and compelling evidence has built up since the middle of the twentieth century to indicate that smoking is the predominant causal factor for lung cancer [10]. A large number of studies have found that smokers have a 15 to 30 fold increased risk of developing lung cancer compared with nonsmokers [9]. There is also sufficient evidence to conclude that exposure to second-hand smoke can cause lung cancer. A Japan Study by Hirayama [11], in 1981, concluded that wives of heavy smokers were found to have a higher risk of developing lung cancer than wives of non-smokers and a statistically significant dose-response relationship was observed with a double mortality. Today, the causal association that has been well established between second-hand tobacco smoking and lung cancer can explain 1, 6% of lung cancers [12]. Results from different studies [13, 14] showed a relative risk between 1,14 to 5,20 in people who had never smoke but they lived with a smoker. In addition, passive smoking during childhood increases lung cancer risk in adulthood by 3, 6 times [15]. Cigarette smoke is a complex aerosol consisting of gaseous components and particulates. The main constituent responsible for the "addiction" is nicotine. Remaining particulate components are responsible for the development of lung cancer. At least 50 different carcinogens in cigarette smoke have been identified, and the most important include the following: polycyclic aromatic hydrocarbons, aromatic amines, nitrosamines and various organic and inorganic compounds such as benzene, arsenic and chromium. Other substances are radioactive elements such as radon's by-products from decay: bismuth and polonium. Some of these compounds need to be metabolically activated to become carcinogenic and must confront the body's normal mechanisms of detoxification. Many of these substances act locally following inhalation, while others act systematically; they are absorbed into the bloodstream and can be transported in the lungs and in other locations in the body. For example, cigarette smoke can also become responsible for urinary bladder tumors. The mechanism of action of these substances is variable, but they can act on some metabolism phases favoring enzymatic activities or can block or bind at various DNS sites to cause a major damage. Such damage may or may not be repaired and the cell may undergo death (apoptosis), or it may undergo neoplastic transformation [16]. Over the past 20 years, a lot of studies in molecular biology and genetics have been published. Today we can say that there is a genetic component predisposing individuals to an increased risk of developing lung cancer. This risk increases exponentially in individuals possessing this genetic predisposition who are also smokers. This predisposition may occur with a more efficient and more rapid metabolization and activation of carcinogens or with simpler conjugation of some substances to the DNA [16]. The dramatic increase (over 600%) in lung cancer mortality in women is mainly attributed to increasing rates of smoking since the end of the 40s. However, it seems that women have a greater genetic susceptibility linked to a simpler association of carcinogens with their DNA. This would also justify the higher incidence of the disease among nonsmoking women than among their male counterparts. It is difficult to assess differences in incidence and mortality among various ethnic groups. It could be attributed to genetic differences, to social differences or to the type of cigarette smoked, such as the presence or absence of a filter. In conclusion, lung cancer has become the number one killer among cancers worldwide and there is no doubt that the main preventable risk factor for lung cancer is cigarette smoking. It is estimated that at least 20% of all cancer deaths could be prevented with the elimination of this dangerous risk factor. Definitively, although the argument for further tobacco control and improved cessation strategies is powerful, the utopian goal of a smoke-free society is still distant and lung cancer will remain among the top killers for decades unless radical reductions in smoking prevalence will be achieved.

References

1 Britton J, Bogdanovica I (2013) Tobacco control efforts in Europe. Lancet 381:1588-1595

2 Gately I. A cultural history of how an exotic plant seducted civilization. New York, NY: Grove Press.

3 Alberg AJ, Brock MV, Ford JG, Samet JM, Spivack SD (2013) Epidemiology of Lung Cancer: Diagnosis and managemente of Lung Cancer. (3rd ed), American College of Chest Physicians Evidence-Based Clinical Practice Guidelines *Chest.* 143(5 Suppl):e1S-29S

4 Gerry H, Wayne M, James C (2003) The Great Debate: smoking, lung cancer and cancer epidemiology. CBMH/BCMH, 20: 367-386

5 Levin ML, Goldstein H, Gerhardt PR (1950) Cancer and tobacco smoking. A.M.A. 143.

6 Potter EA, Tully MR (1945) The statistical approach to the cancer problem in Massachussets. Am J Pub Health 35: 485-490

7 Schrek R, Baker L, Ballard GP, Dolgoff S (1950) Tobacco smoking as an etiologic factor in disease. I. Cancer. Cancer Res 10: 49-58

8 Doll R, Hill B (1950) Smoking and carcinoma of the lung. Preliminary report. British Medical Journal 2: 740-748

9 International Agency for Research on Cancer (2002) Tobacco Smoke and Involuntary Smoking. Lyon, France.

10 Sasco AJ, Secretan MB, Straif K (2004) Tobacco Smoking and cancer: a brief review of recent epidemiological evidence. Lung Cancer 45: S3-S9

11 Takeshi H (1981) Non-smoking wives of heavy smokers have a higher risk of lung cancer: a study from Japan. British medical Journal Vol 282

12 Molina JR, Yang P, Cassivi SD, Schild SE, Adjei AA (2008) Non-small Cell Lung Cancer: Epidemiology, risk factors, treatment and survivorship. Majo Clin proc 83: 584-594

13 Kackshaw AK, Law MR, Wald NJ (1997) The accumulated evidence on lung cancer and environmental tobacco smoke. BMJ 315: 980-988

14 Whitrow MJ, Smith BJ, Pilotto LS, Pisaniello D, Nitschke M (2003) Environmental exposure to carcinogens causing lung cancer: epidemiological evidence fromt he medical literature. Respirology 8: 513-521

15 Vineis P, Airoldi L, Veglia P (2005) Environmental tobacco smoke and risk of respiratory cancer and chronic obstructive pulmonary disease in former smokers and never smokers in the EPIC prospective study. BMJ 330:277

16 Hecht SS (1999) Tobacco Smoke Carcinogens and Lung Cancer. Journal of the National Cancer Institute 91.