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on
Tobacco or Health: Make Better Choice
ABSTRACTS

TOBACCO: HISTORICAL BACKGROUND, PLANT INTRODUCTION & TOXICOLOGICAL OVERVIEW

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Tobacco belongs to the nightshade family of plants which contain high levels of alkaloids. In nature, these alkaloids work as a pesticide, and are a natural defense against being eaten. Nicotine in tobacco is an alkaloid. *Nicotiana tabacum* and *Nicotiana rustica* are the commercially cultivated plants for their tobacco. Indian tobacco refers to *Lobelia inflata*. Currently, tobacco is the most widely produced non-food crop in the world.

Tobacco is one of the major toxic agents in our civilization. Nicotine is one of the most potent, toxic and readily available drugs today. Tobacco smoke has strong biological and toxicological effects in vitro and in vivo. The main toxic compounds in tobacco are CO, nicotine and tars which have both local as well as remote effects on the human body. All organs and tissues can be damaged by the toxic compounds that are present in tobacco and, in particular, in tobacco smoke.

Tobacco was considered sacred to the ancient peoples that lived in both South and North America. Tobacco has also been used as a trade item that was readily accepted. It was also used by American Indian tribes in sacred and sociolegal events for smoking. Tobacco is considered a gift from the Creator, and tobacco smoke is seen as carrying one's thoughts and prayers to the spirits. Practical applications for tobacco have also been recorded; tobacco smoke and juice were used as insecticides on other plants and were also rubbed on the skin to keep bugs away, and a host of medicinal qualities were attributed to it by the native populace. In fact, tobacco was considered to be a master cure for all ailments from bad breath to cancer.

Although tobacco was smoked by ancient Native Americans, they also ingested it by mixing with liquids and drinking it, chewing, grinding and snorting it through the nose, and even by preparing and using enemas laced with it.

Modern use of tobacco is far away from its ancient roots. With the advent of cigarette machines, the public had fast, easy access to what was once considered a potent drug of the gods. Despite the well documented health concerns related to tobacco use, its popularity has yet to wane.

Over the years, more and more scientists began to understand the chemicals in tobacco, as well as the dangerous health effects smoking produces. In 1826, the pure form of nicotine was finally discovered followed soon by scientists concluding that nicotine is a dangerous poison that had the potential to kill a human being.

In 1964, the Surgeon General's report on "Smoking and Health" helped the US government to take a decision to regulate the advertisement and sales of cigarettes. The 1960's in general was a time when much of the health hazards of smoking were reported. In 1965, television cigarette ads were taken off the air in Great Britain. In 1966, health warnings on cigarette packs began to appear. Because of the negative press about tobacco, the major tobacco companies began to diversify their products giving rise to proxy advertising. In 1982, it was reported that second hand smoke may cause lung cancer. In 1985, lung cancer became the number one killer of women, beating breast cancer!

Despite the knowledge that cigarettes are harmful, tobacco industries continue to market and sell them. The fact that nicotine is addictive was probably also known and this very property has been exploited to get millions of people hooked on this dangerous habit!

Overview of Epidemiology of Tobacco use and its control

Prof. Anand Krishnan,

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Summary:

Tobacco use is the leading preventable cause of mortality and morbidity globally. Six million people are currently estimated to die annually from tobacco use, with over 600 000 deaths due to exposure to second-hand smoke. Tobacco use accounts for 7% of all female and 12% of all male deaths globally. WHO estimates that in 2012 there were some 1.1 billion smokers worldwide, with over 8 out of 10 tobacco smokers smoking daily. In India, 47.9% of men and 22% of women use tobacco with predominant form being smokeless tobacco use. This is especially true for women where only 2.9% consumed smoked tobacco compared to 18.4% who were using smokeless varieties. Nearly two in five (38%) adults in rural areas and one in four (25%) adults in urban areas use tobacco in some form. Khaini or tobacco-lime mixture (12%) is the most commonly used smokeless tobacco product, followed by gutkha (8%), betel quid with tobacco (6%) and applying tobacco as dentifrice (5%). The prevalence of each of the smokeless tobacco products, except dentifrice, is higher among males than females. Among smoking tobacco products, bidi (9%) is used most commonly followed by the cigarette (6%) and the hookah (1%). Some of the more recent concerns for tobacco control are the emergence of e-cigarettes and hooka bars as many of the control measures do not adequately cover them. Among the consequences of tobacco use heart disease and cancer are the leading killers. The four tobacco related diseases (CVDs, Cancers, Chronic respiratory diseases and tuberculosis) were together estimated to cause a loss of 104500 Crores in 2011.

Global Adult Tobacco Survey (GATS) India shows that 52 percent of adults were exposed to second-hand smoke (SHS) at home. In rural areas 58 percent and in urban areas 39 percent were exposed to SHS at home. Among those who visited different public places within 30 days prior to the survey, 29 percent were exposed to SHS in any of the public places; 18 percent on public transport, 11 percent in restaurants, 7 percent in Government buildings and 5 percent at the health care facility. The quit ratio for among ever daily smokers is 13 percent, while the quit ratio among ever daily users of smokeless tobacco is 5 percent. A little more than half (52%) of adults in India noticed anti-cigarette information on any media/location during the last 30 days prior to the survey. A relatively higher proportion of adults noticed anti-bidi information (61%) and anti-smokeless tobacco information (66%). About 15% to 18% of adolescents use tobacco.

Framework Convention on Tobacco Control (FCTC) is the first globally negotiated health treaty facilitated by WHO and lays down a framework on measures for tobacco control. The strategies include, making public places smokefree; starting tobacco cessation services, banning advertisement and sponsorship of tobacco companies in media and channels; inform people about dangers of tobacco through IEC activities including pictorial warnings on tobacco packets, increase taxes on tobacco products and finally establish tobacco surveillance systems.

Pathologic Effects of Tobacco Use

Dr Ravi Mehrotra

Tobacco, or the Big ‘T’, is the leading preventable cause of cancer is a little known fact in the public. The health risks with Tobacco usage (both smoking and non-smoking forms) are enormous. Assessing the global magnitude or severity of the health effects of tobacco use is complex because of the variability of product composition and the different ways in which these products are used around the world. The 2015 WHO estimate states that 6 million individuals die prematurely each year due to Tobacco related diseases. In India alone, tobacco use kills around 1 million individuals every year, which is expected to rise to 13% of total deaths of the entire nation by 2020. Tobacco is associated with an increased risk of multiple conditions including several types of cancer (including cancer of the lung, larynx, oral cavity, esophagus, throat, bladder, kidney, liver, stomach, pancreas, colon and rectum, and cervix, as well as acute myeloid leukemia), type 2 diabetes mellitus, heart diseases, chronic obstructive pulmonary disease, congenital defects, adverse reproductive effects (such as low birth rate and decreased fertility in women and erectile dysfunction in men), osteoporosis and hip/vertebral fractures, and overall diminished health, relating increased absenteeism from work and increased health care utilization and cost. Overall mortality among tobacco users increases three-fold as compared to non-users, with major culprits being cancer, respiratory and vascular disease. Tobacco kills more than AIDS, legal and illegal drugs, road accidents, murder and suicide combined. With this background, the current presentation aims to convey the global magnitude of its pathological effects and update on the current scenario of the problem.

Imaging of complications of tobacco consumption : Radiologist's perspective.

Dr. Deep Narayan Srivastava MD, MBA, FAMS, FICR
Professor, Department of Radio-diagnosis, AIIMS, New Delhi-29.

Abstract : Smoking can enormously harm the whole body as it's the leading cause in a number of gruesome diseases like lung cancer, coronary artery disease, strokes, growth retardation of fetus etc. Role of radiologist is to establish the correct diagnosis in time, to rule out close mimickers, play a role in deciding the management and to treat, wherever possible.

Lung cancer is the deadliest disease caused by smoking. A radiologist, besides diagnosing and staging the disease, can intervene by performing RFA and bronchial artery embolization (BAE) procedures also.

In coronary artery diseases the CT coronary angiography is used in coronary calcium scoring, plaque imaging and also to rule out other causes of chest pain as acute coronary syndrome, aortic dissection and pulmonary embolism.

The roles of imaging in stroke are accurate and rapid diagnosis and interventional treatment like thrombolysis and mechanical thrombectomy.

Sonography is frequently used in the diagnosis of intrauterine growth retardation and other congenital anomalies.

The radiological findings of some of the common diseases will be discussed.

The Health Effects of Electronic Cigarettes

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Electronic cigarettes (e-cigarettes or EC), also known as electronic nicotine-delivery systems, are devices that produce an aerosol by heating a liquid that contains a solvent (vegetable glycerine, propylene glycol, or a mixture of these), one or more flavourings, and nicotine, although the nicotine can be omitted. EC were introduced to the market nearly a decade ago as an alternative to tobacco smoking and aimed to provide an additional opportunity for tobacco smokers to quit smoking. There is a striking diversity in the flavourings in e-cigarette liquids and the effects on health of the aerosol constituents produced by these flavourings are unknown. To make more appealing to youth, the vapour is often flavoured with various attractions. The content of EC cartridges have found varying nicotine levels (0 to 150% of that in cigarettes) as well as other unlisted and dangerous ingredients. Due to the addictive nature of the Nicotine, there are concerns that EC use will lead young non-smokers to take up nicotine through EC, gradually from a low to a very high level. The safety of EC has not yet been scientifically proven, and outcomes of the available studies are against the ECs as a smoking cessation aids. In the absence of clear regulations, the manufacturers are free to promote these devices in various social media, including Internet, TV, YouTube by sexy advertisements, who urge the youth to 'take their freedom back'. Due to lack of regulations, big tobacco companies started selling tobacco products as EC. Different countries regulate ECs differently, resulting in legal complexity, possible uncertainty and a big regulatory gap.

In India, ECs are currently marketed mostly online, including a link through social networking sites. They are also becoming more visible in shopping malls and kiosks near universities and educational areas. Allowing unproven claims about its ability to help smokers quit may also prove 'equally dangerous'. So far only a few countries have banned the EC.

EC have become very popular among younger age groups even in India, seeming to be efficacious and are relatively safer as compared to conventional smoking, but issues of continued dependence and possible harm remain as a great concern. The health effects of vaping include the potential negative impact of nicotine on adolescent brain development, risk for nicotine addiction and initiation of the use of conventional cigarettes. It is impossible to reach a consensus on the safety of EC except perhaps to say that they may be safer than conventional cigarettes but are also likely to pose risks to health that are not present when neither product is used. Certainly it will not be an acceptable and effective public health practice in India to promote EC.

Tobacco and Bone Health

Prof. Dr. Alok Chandra Agrawal

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Tobacco has been implicated in the development of nonunion and delayed union. Smoking has been found to decrease oxygen levels in the cutaneous and subcutaneous tissues leading to poor wound healing. Nicotine has been found to decrease vascularization at fracture sites, increasing the chances for the development of osteomyelitis.

Smoking has been shown to adversely affect bone mineral density, lumbar disc disease, the rate of hip fracture, and the dynamics of bone and wound healing. A review of multiple studies into the adverse effects of tobacco use on fracture repair revealed that there are several hypotheses as to the mode of action: a reduced blood supply, high levels of reactive oxygen intermediates, low concentrations of antioxidant vitamins and the effects of nicotine on arteriole endothelial receptors bringing vasoconstriction. Nicotine in high doses is directly toxic to proliferating osteoblasts.

Experimental studies have shown that tobacco has negative effects on fracture healing in diaphyseal fractures. Nicotine seems to affect the early revascularization of the fractured bone, probably through down-regulated gene transcription of fibroblast growth factor, vascular endothelial growth factor, and bone morphogenetic protein cytokines known to be important to angiogenesis and osteoblast function. Smoking is believed to affect bone healing in diaphyseal fractures of Femur, Tibia and Humerus. Other diaphyseal fractures may be affected too but this has not been formally demonstrated yet, except for the negative effect of tobacco in healing of scaphoid nonunion and of lumbar arthrodesis .

Although approximately 50% of smokers return to their habit, it is best for healing of bone and soft tissue if they can abstain while being treated for their injury.

“Health hazards of tobacco chewing requiring surgical intervention”

Prof. (Dr.) Nitin M Nagarkar,

Director, AIIMS Raipur.

Abstract:

This would include discussion about the various methods in which tobacco is been used in daily life. The resulting health hazards of tobacco including the most prevalent head and neck cancer (HNC) will also be discussed in detail. Carcinoma of oral cavity is the most common HNC for which tobacco chewing has got a major role to play. Presently, surgical treatment plays a major role in management of these cancers.

The surgical intervention for oral cavity or head and neck carcinoma is very complicated as, oral cavity has a vital role to play in deglutition, phonation as well as respiration. Any surgical intervention would require to consider all these vital functions. Along with this such cancers have high possibility of metastasis to cervical lymph nodes. This makes it mandatory to manage the neck in majority of the cases and hence increasing the chances of complications and making the surgical intervention more challenging.

Topic: Radiotherapy in Tobacco Related Lesions

Dr. Siddarth Nanda

Abstract:

Global tobacco menace has reached pandemic proportions. Tobacco has significant impact on public health and global health care systems. It is the single most important cause of preventable mortality. As many as 2,500 persons die every day due to tobacco-related diseases in India & smoking accounts for 1 in 5 deaths among males as compared to 1 in 20 among females, accounting for an estimated 9,30,000 deaths in 2010. India is the second largest consumer and third largest producer of tobacco in the world. The prevalence of overall tobacco use among males is 48% and among females is 20%.

More than 400,000 Indians die each year as a direct result of cigarette smoking, making it the nation's leading preventable cause of premature mortality. Worldwide, the picture is even bleaker; with current smoking patterns, about 500 million people alive today will eventually be killed by tobacco use. By 2030, tobacco is expected to be the single biggest cause of death worldwide, accounting for about 10 million deaths per year. One-half of these deaths will occur among people 35 to 69 years of age, losing an average of 20 to 25 years of life.

All types of tobacco both smoking and smokeless have been established as causal agents for oral and pharyngeal cancer and are responsible for several other cancers like lung, liver, colon and acute myeloid leukemia. Tobacco habits are practiced in various different forms and many of them are specific to certain areas of India. The reasons for the initiation of tobacco use are many.

Tobacco is extremely addictive, and its use is harmful in many ways. Both smoked and smokeless tobacco contains the alkaloid, nicotine, which is the main addictive agent. Smoked as well as unburnt tobacco contains thousands of chemical compounds. Many of these compounds are not only irritants and toxins, but they are also carcinogens. The most potent carcinogens in tobacco are the tobacco-specific nitrosamines, polycyclic aromatic hydrocarbons, and many others.

Current management of cancer is multidisciplinary and it involves several clinical and other supportive departments. Surgery, radiotherapy and chemotherapy remain the major modality for management of cancer. Radiotherapy has a definite role to play in management of tobacco related cancers both in curative as well as palliative setting.

Pharmacotherapy of Tobacco Dependence

Dr. S.P. Dhaneria

M.D., D.M., D.N.B., MNAMS, M.Sc., LL.B.(Hons)

Acting Dean (Academics)

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Long term use of Tobacco is a leading cause of preventable diseases and premature deaths. Tobacco related diseases impose substantial financial burden of healthcare providers. Nicotine present in Tobacco is a ganglionic cholinergic agonist and its repetitive exposure leads to neuroadaptation and dependence.

Tobacco cessation programme is very effective when psychotherapy (Counselling and behaviour therapy) is coupled with Pharmacotherapy. Pharmacotherapy is indicated when a person is ready to quit tobacco in any form. Discontinuation of Tobacco leads to unpleasant manifestation of withdrawal syndrome and that can be managed by Nicotine Replacement Therapy (NRT) Nicotine is administered as chewing gum, Nasal Spray, Transdermal patch, Sublingual tablet and Lozenges. The dose of nicotine in the formulation is gradually reduced. Besides NRT other first line drugs are Bupropion and Varenicline. These Non-Nicotine options relieve the withdrawal symptoms and decrease the craving for tobacco. Bupropion inhibits reuptake of Dopamine and Noradrenaline while Varenicline is a partial agonist of Nicotine receptors. Second line drugs like Clonidine and Nortriptyline are used when First line drugs are ineffective. Clonidine is a α_2 agonist reducing sympathetic discharge from locus Ceruleus. Nortriptyline inhibits reuptake of Noradrenaline.

Mecamylamine (a non-competitive nicotinic receptor antagonist) and Naltrexone (Opioid receptor antagonist) have also been tried in management of nicotine dependence with significant outcome. Role of Buspirone, Baclofen, Cystisine, Selegiline, Silver acetate and Acupuncture is still uncertain. Vaccine for prevention of smoking relapse is also under trial.

Tobacco dependence treatment are both clinically effective and cost-effective relative to other medical and disease preventive interventions. Good political commitment, awareness and participation of population and proper implementation of health programmes are necessary for success of tobacco cessation programme.

Abstract

Dr. Lokesh Singh

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Smoking or chewing tobacco is one of the most prevalent substances used in India and worldwide. Various healths related hazards have been identified and efforts are made for tobacco cessation to reduce the morbidity and mortality related to tobacco use. Both pharmacotherapy and other non-pharmacological strategies can be used effectively for tobacco cessation. Medications including varenicline, bupropion, and nicotine replacement therapies like patches or gum help people quit tobacco. Medical health professionals have to take responsibility to cut down the use of tobacco in our society.