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Histological Features of Parotid Gland of Albino Rats Exposed to Smokeless Tobacco

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Abstract: Smokeless tobacco is very common personal habit of people living in various areas of Asia which is an alarming sign for the development of different oral diseases in such people. The aim of present study was to investigate effects of smokeless tobacco on parotid glands of the Aalbano rats by using various percentages of the smokeless tobacco. The rats were divided into three different groups, control group (A) no smokeless tobacco, experimental group (B) 5% smokeless tobacco and experimental group (C) 10% of smokeless tobacco with different feeds required according parameters. Weekly weight gain and partid gland were analyzed through student *P* test and histological structures were recorded through HE stain and Retculin stain. The results showed that as compared to control group body, weight of the rats was decreased in groups B and C having smokeless tobacco percentage in the diet. Weight of parotid gland as compared to control group was decreased in groups B and C with diet of smokeless tobacco. Further, histological observation under HE stain showed that parotid gland of group B showed mild narrowing of ductal lumen, collapse of vessels and stromal was also increased, in group C parenchymal tissues with loss of acini found damaged and glandular dystrop and lymphatic infiltration were determined moderate to severe. Meanwhile, reticulin stain showed that vascular collapses were shown because of increasing in stromal glandular atrophy in group C as compared to control group. In conclusion, this study showed that smokeless tobacco caused serious injuries in the tissue level in parotid gland with high percentage of smokeless tobacco which highlight health hazards on its consumption.

Key words: smokeless tobacco, histological observation, parotid gland, Albino rat

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Introduction

In Pakistan, tobacco consumption is increasing day by day. 31% Pakistani population consume tobacco in various forms. About thousands of peoples lose their lives because of tobacco induced diseases annually. It is most common preventable etiology of premature deaths. Tobacco is one of the important causes of neonatal morbidity (2004). Tobacco associated pathologies result in four million morbidities every year globally (Mathers and Loncar, 2006).

There are different ways of tobacco consumption which includes Bede, tobacco chew gums, cigar, cigarettes, creamy snuffs, dipping tobacco, gutka, hookah, pipe smoking, snuff, topical tobacco paste and tobacco water (Proctor, 2012). Use of smokeless tobacco is common in rural parts of the countries.

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Many people know that tobacco use results in the development of malignant tumors, but they do not know the relationship of tobacco use with ischemic heart diseases, infertility and poor pregnancy outcomes (Warren *et al.*, 2008). Majority of the female population consume smokeless tobacco because of the easy access and lacking of literacy (Backinger *et al.*, 2003; Shrestha *et al.*, 2010). Smokeless tobacco contains more nicotine as compared to one cigarette. Use of 11 dips smokeless tobacco daily become equivalent to the same amount of nicotine a smoker gets in 30-40 cigarettes a day. Although the nicotine uptake in the body is much slower with the smokeless tobacco as compared to cigarettes, still it usually lasts longer in the blood stream than with the cigarettes (Shrestha *et al*., 2010). Smokeless tobacco ends up in high mortality rate, because it results in many heart diseases and vasculopathies (Peto *et al.*, 1992). It also results in oral leukoplakia among young people as well as in adolescence. This oral leukoplakia is the alarming condition for the development of oral cancers (Payne *et al*., 1998). Smokeless tobacco remain on high risk of diseases (Humans, 2007), there is increase chance of oral cavity diseases include smokless tobacco keratois, gingival inflammation, periodontal inflammation, alveolar bone damages, dental caries, tooth abrasion, dysplasia and oral squamous cell carcinoma (Greer, 2011). Smokeless tobacco and cigarettes both contain nicotine which is neuro-depressant as well as neuro-stimulant. Nicotine effects of smokeless tobacco are not faster as compared to cigarettes, but their serum levels are equal. Nicotine caused suppression of antibody cells and block the proliferation and differentiation of lymphocytes and it also decreases T-cell signaling, further causes injuries in cells due to increased of pro-inflammatory cytokines with use of smokeless tobacco (Yanagita *et al.*, 2012). Many research studies have been conducted both human beings as well as animals which reported many abnormalities like oral mucosal hyperkeratinization, vasculopathies, cancer of lungs, hepatic diseases and nervous weakness. It has also been reported that the levels of calcium are high in the smokeless form of tobacco which results in oral mucosal hyperkeratinization (Richter and Spierto, 2003; Payne *et al.*, 1998). Smokeless tobacco use results in the development of cancers of many tissues like parotid gland, submandibular glands, sublingual glands, pancreas, nasal cavities, esophagus, pharynx, larynx, intestine, stomach and urinary system. It also results in peptic ulcer and teratogenesis (Roy *et al.*, 1998).

In Pakistani, society due to low socioeconomic status smokeless tobacco is used more as compared to cigarette. The hazardous effects of smokeless tobacco are less compared to cigarette is a misconception. Many studies report that cigarette smoke leads to deleterious effects on salivary glands and oral tissues of humans and rats. Little work has been done on the effects of smokeless tobacco on the parotid gland. Our study was conducted to elaborate the effects of smokeless tobacco on parotid glands. Present results showed that smokeless tobacco caused weight loss and damaged the parotid gland which might lead salivary glands diseases upon continuous use.

Materials and Methods

The authority of animal care and use approved this experiment. A total of 30 healthy (200-230 g in weight) female Albino rats were harvested into three different groups, the groups were named as control, experimental group A (5%) and experimental group B (10%) (10 rats in each group). The rats were confirmed for adulthood by vaginal swab test (Shrestha *et al*., 2010). Sexing of the rats was done (Liu *et al*., 2008). The experiment lasted for 40 days. The animals were housed as three rats per cage under hygienic conditions. The floor of the cages was laden with saw dust which was changed on alternate days during the study. The animals were placed in standard stainless steel cages (18"×12×6" high). A sipper with the quantity of 200 mL of distilled water was placed in each cage. Animals were left for acclimatization for three days. They were provided with laboratory