The effect of nicotine and caffeine on the salivary gland (Submandibular glands)

Hanaa H. Bastah
Master of Science
In major :Technical Anatomy & Histology
Royal Commission-Safety and Security-Industrial Yanbu

Introduction

- Submandibular glands are a pair of major salivary glands The secretion is a mixture of both serous fluid and mucus (Ito et al., 2001 and Bighetti et al., 2014).
- Approximately 70% of saliva in the oral cavity is produced by the submandibular glands. Granular convoluted tubules with their apical acidophilic granules are the most characteristic features (Kanno, 2004).
- Coffee and caffeine beside its stimulant effect on central nervous system were reported to have negative effects on body health (Hibino et al., 1997 and Corti et al., 2002). It was reported to be secreted in saliva and so used as an evaluation test for many drug pharmacokinetics.
- Literature on the effect of interaction between nicotine and caffeine on submandibular gland histology were few and unavailable. Hence the aim of this work was to study the effect of nicotine and caffeine interaction on histological and histochemical structure of female rat submandibular gland.

Materials & Methods

An experimental study based on scientific data was carried out; Four groups of animals each 8 adult female rats (200g-250gm) were sorted to:

G1- control (standard diet, injected with saline).
G2- Nicotine (received daily subcutaneous nicotine/saline (10mg/kg/body weight)).
G3- Caffeine (received daily intraperitoneal caffeine anhydrous (100mg/kg/body weight)).
G4- Caffeine + nicotine by same routes as G1 & G2.

After 4 weeks animals were sacrificed and Submandibular gland were taken, weighed, fixed in 10% neutral buffered formalin for paraffin processing. 5 micron thick sections were stained by haematoxylin and eosin, Masson trichrome and Periodic acid Schif (PAS), examined and photographed.

Results

Gross morphology and weight of dissected salivary glands of different groups were shown in Figs (1-2). Decrease was observed in nicotine group while increase in caffeine group and combination.

Discussion

Nicotine induced atrophy of salivary ducts and ascini may be due to toxic effect or overstimulation (Corti et al., 2002). Fibrous deposition was also reported by Takeuchi et al., 2010. Literature dealing with effect of caffeine on rat submandibular gland histology is unavailable. The increase vasculature (Corti et al., 2002 and Turner et al., 2009) may explain stimulating effect and protection of the gland against nicotine induced atrophy.

Conclusions & Recommendations

Nicotine produced marked degeneration in rat submandibular ascini and convoluted tubules. Decrease granule polysaccharides. Caffeine result in vascular dilation. Combination of caffeine with nicotine provide protection against nicotine induced histological changes.

References


Information

@ h.basta@hotmail.com