

Oral Presentation II

not induce any secretion. And SP may have positive relation with the inflammation of the human dental pulp cells.

<ORAL PRESENTATION II>

Chairman : Gi-Woon Choi (Professor, Kyung Hee University)

10:20-11:10 (Room 401)

Influence of NK1 receptor antagonists applied iontophoretically on pulpal blood flow in the cat

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I. Objectives

Pulpal inflammation is a kind of neurogenic inflammation and it shows vascular changes such as vasodilation and changes in vascular leakage. Various kinds of neuropeptides including substance P (SP) are known to be involved in the pulpal inflammation. The purpose of this study was to investigate the influence of NK1 receptor antagonists on the pulpal blood flow (PBF) when applied iontophoretically through the dentinal cavity of the teeth in order to understand whether iontophoretically applied NK1 receptor antagonists can control the pulpal inflammation.

II. Material and Methods

Experiments were performed on 11 cats generally anesthetized with intra-muscularly administered ketamine (75 mg/kg) and acepromazine (2.5 mg/kg), and intra-venously administered alpha-chloralose (40 mg/kg) and urethane (500 mg/kg). Air way was maintained through the intubation of a tracheal tube and systemic blood pressure was monitored through the femoral artery.

SP (Sigma-aldrich Co., St. Louis, Missouri, USA) was administered to the dental pulp through the catheterized lingual artery in doses that caused PBF change without the influence of systemic blood pressure. NK1 receptor antagonists, [D-Pro²,D-Trp^{7,9}]-SP (Sigma-aldrich Co., St. Louis, Missouri, USA) and [D-Pro²,D-Phe⁷,D-Trp⁹]-SP (Sigma-aldrich Co., St. Louis, Missouri, USA) were applied iontophoretically (0.02 mA, 1 min) (PerIont Micropharmacology System, Perimed Co., Stockholm, Sweden) to the prepared class V dentinal cavity of ipsilateral canine teeth of the drug administration. The probe of laser Doppler flowmeter (Periflux 4001, Perimed Co., Stockholm, Sweden) was placed on the distal surface of ipsilateral canine teeth to the drug administration and PBF was monitored. Data were analyzed statistically with paired t-test.

III. Results

1. Intra-arterially administered SP (0.8~20.0 ng/kg) resulted in the significant increase of PBF ($p < 0.05$).
2. Iontophoretically applied drugs induced significant increase of PBF compared to the simple application of drugs to the dentinal cavity ($p < 0.05$).
3. PBF increase after iontophoretic application of the NK1 receptor antagonists (0.2~3.4 mM) followed by the intra-arterial administration of SP was significantly less than PBF increase after iontophoretic application of the 0.9% saline followed by the intra-arterial administration of SP as a control ($p < 0.05$).
4. Iontophoretic application of the NK1 receptor antagonists (0.2~3.4 mM) following the intra-arterial administration of SP resulted in less increase of PBF than the iontophoretic application of the 0.9% saline following the intra-arterial administration of SP as a control ($p < 0.05$).

IV. Conclusions

The results of the present study provide evidences that the iontophoretic application is an effective method to deliver drugs to the dental pulp, and that iontophoretically applied NK1 receptor antagonists block SP-induced vasodilation effectively. The above results