Effects of Diphenhydramine Hydrochloride and Lidocaine Hydrochloride Injection on Oral Mucosa

(Histological, Histochemical and Ultrastructural Comparative Study on Rabbits)

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Abstract

Introduction

Allergic reaction to local anaesthetics is one of the adverse drug reactions which may be noticed in dental practice. Clinically diphenhydramine hydrochloride has been suggested as a good alternative for patients' claiming allergy to ordinarily used anaesthetic agents like lidocaine.

The present study attempted to evaluate the tissue response to diphenhydramine injection and compare it with the tissue response to lidocaine injection the usually used anesthetic agent.

Materials and methods

The study was conducted using 144 locally available rabbits that were equally divided into 2 experimental groups and 1 control group. The experimental groups received 0.05ml of either 1.25% diphenhydramine hydrochloride or 2% lidocaine hydrochloride injection in their lower lips; the control group received an equal amount of 0.9% sodium chloride at the same site. Lip biopsies including site of injection were taken in different time intervals (1hour, 1day, 4days, 7days, and 14 days) following the injection. In addition, lip biopsies were collected from 13 rabbits used as a normal baseline data. These biopsies used for routine histological, ultrastructural, and alpha naphthyl acetate of esterase and peanut agglutinin (PNA), soybean agglutinin (SBA), and ulexeuropaeus 1 (UEA-I) lectine histochemical evaluations.

Results

The diphenhydramine hydrochloride injection caused severe inflammatory reaction in the oral mucosa with the development of clinical

and microscopical ulcer after 7 days that resolved within 14 days. On the other hand, lidocaine hydrochloride injection caused moderate inflammatory reaction after 1 hour that reduced gradually with time.

Ultrastructural changes were detected 1 hour after injection. The diphenhydramine hydrochloride caused destruction in the connective tissue with degenerative changes of the fibroblast cells. Degenerative changes of epithelial cells were also noticed with cytoplasmic vacuolizations and reduction in the cytoplasmic projections. The lidocaine hydrochloride injection caused more numerous cytoplasmic vacuolization of smaller size than diphenhydramine group with reduction in the cytoplasmic projections.

The injection of both lidocaine and diphenhydramine hydrochloride showed alteration in the distribution and intensity of the non-specific esterase after 1 hour and the alteration increased progressively with time and return to normal pattern within 7 days in lidocaine hydrochloride group. The reactive cells were distributed in all epithelial layers with significantly higher intensity in diphenhydramine hydrochloride group that remained throughout time intervals.

On the other hand, the distribution of peanut agglutinin (PNA), soybean agglutinin (SBA), and ulexeuropaeus 1 (UEA-I) was not altered 14 days following lidocaine and diphenhydramine injections.

Conclusion

From these results we conclude that 2% lidocaine hydrochloride injection caused mild reversible inflammatory reaction in the oral mucosa, its use should be limited to the least effective dose, while diphenhydramine hydrochloride was highly irritant, its use as a dental anesthetic is reaffirmed cautiously in instance in which the usual anesthetic agents are precluded