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[The protection of hydrogen-rich saline on a rat dry eye model induced by scopolamine hydrobromide]

[Article in Chinese]

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Abstract in English, [Chinese](#)

Objective: To evaluate the effect of hydrogen-rich saline (HRS) on dry eye rats induced by subcutaneous injection of scopolamine hydrobromide. **Methods:** Experiment research. Thirty female Wistar rats at about six weeks old were randomly divided into the normal group, dry eye group, HRS eyedrops group, normal saline eyedrops group (NS), HRS intraperitoneal injection group and NS intraperitoneal injection group, with 5 rats in each group. The dry eye was induced by subcutaneous injection of scopolamine hydrobromide in the latter five groups. The clinical signs of dry eye such as tear volume (SI_t), tear break-up time (BUT) and corneal epithelial fluorescein staining scores were evaluated on day 7, 14, 21 and 28. On the 28th day, ten eyes in each group were enucleated and processed for paraffin sections for HE, PAS and immunohistochemistry stainings. Analysis of variance was used to test the data, and independent samples *t*-test was used for comparison between the two groups. Two-way repeated measure ANOVA was used to compare the difference among groups at different time points, one-way ANOVA was used to test the comparisons of the clinical signs at one time, and *LSD* was used to for comparison between two groups. **Results:** Before and after the experiment of the day 7, 14, 21, 28, the values of SI_t in HRS eyedrops group and HRS intraperitoneal injection group were respectively:(3.625±1.157),(3.313±0.704),(3.250±0.535),(3.313±0.372), (3.375±0.582)mm and (3.500±1.019), (2.893±0.656), (3.321±0.668), (3.179±0.575), (3.214±0.871)mm. The values of BUT were respectively: (2.750±0.707), (2.688±0.594), (2.813±0.753), (3.000±0.756), (2.750±0.707)s and (3.000±0.679), (2.321±0.464), (2.750±0.753), (3.214±0.699), (2.679±0.608)s. The values of fluorescein staining score were respectively: (6.250±0.707), (8.875±0.641), (8.750±0.707), (9.250±0.463), (8.250±1.282) and (6.000±0.679), (9.143±1.027), (8.857±0.770), (9.143±0.949), (8.500±0.760). The difference of SI_t, BUT and fluorescein staining score between the groups was statistically significant on the 14th day($F=5.194, 3.894, 16.487, P<0.05$), the values of SI_t, BUT and fluorescein staining score of HRS eyedrops group showed significantly better than NS eyedrops group($P<0.05$), HRS intraperitoneal injection group showed significantly better than NS intraperitoneal injection group($P<0.05$), and there was no significant difference between HRS eyedrops group and HRS intraperitoneal injection group($P>0.05$), which remained stable until the day 28. On the 28(th) day, HE, PAS and immunohistochemistry stainings showed the corneal and conjunctival epithelia became smooth and regular, the cell layer number decreased, the tissue hyperplasia and edema were lightened, and the size of goblet cells tended to be normal, and the squamous metaplasia and inflammation were relieved. In HRS eyedrops group and HRS intraperitoneal injection group. **Conclusions:** HRS eyedrops group and HRS intraperitoneal injection group can relieve the signs of dry eye, improve the pathological damage of cornea and conjunctiva, and protect the ocular surface of a rat dry eye model, which is better than NS groups from the 14(th) day. (*Chin J Ophthalmol*, 2017, 53: 363-372).

Keywords: Disease models, animal; Dry eye syndromes; Hydrogen; Scopolamine hydrobromide; Sodium chloride.

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