Cyclooxygenase Inhibition of LTC Stenosis in the Mouse Model

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ABSTRACT

Objective: Laryngotracheal stenosis is a narrowing of the airway secondary to activation of the inflammatory cascade from different types of injury. It is closely linked with inflammatory markers such as IL-1 or TGF-beta. We have previously described a murine model of laryngotracheal stenosis that mimics physiologic injury such as laryngotracheal reflux or intubation. In this experiment, we aim to test the effects of inhibition of cyclooxygenase on granulation formation in this murine model of laryngotracheal stenosis and on inflammatory cytokines.

RESULTS

Methods: Laryngotracheal complexes (LTC) were implanted into a previously described recipient mouse model. Treatment group (n=4) received COX inhibitor chow for three weeks. Control group (n=4) did not. After three weeks, LTCs were harvested and assayed microscopically for comparison. Relative levels of IL-1, COX2, and TGF beta were compared using RT-PCR.

Procedure
Laryngotracheal complexes (LTC) from C57BL6 mice were harvested by exposing the airway from the thyroid cartilage to approximately the third tracheal ring. (Figure 1A). A total of thirty two mice were used. Chemical or acid injury was performed on eight LTCs by injecting HCI acid (pH 3-4) within the lumen of the airway for five minutes prior to irrigation with saline. (Figure 1B) Traumatic or wire injury was performed on eight separate LTCs by inserting and removing a wire brush (2 mm in diameter) through the lumen twenty times. (Figure 1C) Eight separate LTCs were harvested without injury. One set of LTCs consisted of one uninjured LTC, one acid injured LTC and one wire injured LTC. Each set of three LTCs were placed into a recipient mouse’s dorsum. (Figure 1D) After three weeks, the LTCs were harvested.

Statistical analysis
Student t-test was used for all statistical analysis. Statistical significance was determined using Student t-test with significance set at p < 0.05.

DISCUSSION

In this study, no significant difference in granulation formation, measured by lamina propria thickness was found between control and treatment laryngotracheal complexes. In addition, no significant change was noted in inflammatory markers such as IL-1 and TGF-beta in control versus treatment laryngotracheal complexes. This may be due to the limited sample size or may be secondary to inadequate inhibition.

CONCLUSIONS

In this study, possible therapies to decrease or prevent subglottic stenosis. We aim to study the effects of cyclooxygenase (COX) inhibition on laryngotracheal granulation and stenosis in a previously described murine model.

REFERENCES