The Investigation of the Effect of Nasal Packing Materials on the Healing of the Nasal Mucosa of Sheep after Full Thickness Injury.

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Abstract

Rhinosinusitis is a common condition that is chronic in up to 18% of the general population. If intensive medical treatment fails, then surgery may be required. Currently the accepted form of surgery is endoscopic sinus surgery. This technique involves opening the natural ostia of the sinuses to restore aeration and mucociliary drainage.

The most frequent complication of this surgery is the development of postoperative adhesions. Their formation represents a failure of the healing process. To prevent the formation of adhesions, nasal packing is often used. To date the effect of nasal packing on the healing process has not been studied with rigorous scientific control.

The sheep has been chosen as the most suitable animal model to investigate the healing process. The sheep is suitable in terms of size, histology, physiology, and pathology. The sheep's nasal cavity is also suitable for nasal endoscopy and surgery. Research conducted previously in the sheep model has demonstrated that unpacked full-thickness wounds take longer than three months to heal. The research in this thesis sought to determine if the use of different packing materials influenced healing.

This thesis has compared the healing process that follows the use of three different nasal packing materials. These are a polyvinyl acetate based pack, a hyaluronic acid-based pack, and the hyaluronic acid-based pack with Insulin-like growth

factor-I incorporated into it. Assessment was made using light microscopy, immunofluorescence, and electron microscopy.

The results demonstrate that the use of a polyvinyl acetate sponge and a dissolvable hyaluronic acid based pack confers no significant benefit to the healing process when compared to controls. However, the incorporation of insulin-like growth factor-I into the hyaluronic acid based pack resulted in a statistically significant ($p<0.05$) improvement in re-epithelialisation at day 28 (89% for Insulin-like growth factor-I versus 44% for controls).

Attempts to assess the effect of this pack on the rate of adhesion formation was unsuccessful due to the inability to produce a replicable animal model of adhesion formation.

It is concluded that the use of Insulin-like growth factor-I in the hyaluronic acid based packs confers an important benefit to the healing process after full-thickness injury.