The Effect of Fibrin Glue on Wound Healing with Unilateral Neck Dissections

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Abstract

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the use of fibrin glue in head and neck surgery and discuss an evidence based cost-benefit analysis of its use in unilateral neck dissections.

Objectives: To demonstrate decreased post-operative drain output for patients who had intraoperative application of fibrin glue (FG) for unilateral neck dissections.

Study Design: Retrospective chart review.

Methods: Records were reviewed for 75 patients from a single institution with a focus of unilateral neck dissection. Bilateral neck dissections and laryngectomies were excluded from the study due to increased variability of the post-operative course. A total of 33 patients met the inclusion criteria, of these patients, 15 had application of fibrin glue and 18 did not (FG=15, non-FG=18). T-test was used to compare mean drain output.

Results: Mean drain output observed for the first 24 hours was 110.1 ± 36.8 mL versus 63.2 ± 66.7 mL for the FG and non-FG groups with a p-value of 0.0166. The total drain output was not statistically significant based on use of fibrin glue, 106.4 ± 78.7 mL (FG) versus 104 ± 78.1 mL (non-FG), mean difference 1.6mL (p=0.953). Prior radiation was noted to be associated with decreased drain output; pre-radiated group (XRT) with 45.3 ± 20.9mL compared to non-radiated group (non-XRT) with 100.5 ± 61.1mL (p=0.0006) in first 24 hours. The total output for radiation was significant with 63.4 ± 32.8mL (XRT) versus 116.4 ± 82.6mL (non-XRT), mean difference 53.0mL (p=0.0141).

Conclusions: Confirmed less drain output with fibrin glue within the first 24 hours, but no difference in total drain output. The use of fibrin glue did not decrease risk of complications or result in shorter hospital stay.

Background

Fibrin glue/gel/sealant/adhesive is a two component biological material, sometimes referred to a biological system or biological reaction. The two agents mimic the final stage of the coagulation cascade (where thrombin in the presence of calcium, activates the conversion of the fibrinogen monomer into a fibrin polymer). The components: (1) a protein solution of human fibrinogen and a synthetic fibrinolysis inhibitor (Aprotinin, which prevents fibrin clot degradation) and (2) a solution of human thrombin with calcium chloride. The product is adhesive and full adsorption is expected to occur over the days to weeks following application depending on proteolytic activity of the recipient site.

Clinical uses of nonautologous fibrin/fibrinogen has been discussed and tried in the literature for over a century. In recent years, technology including improvements in concentration/purification of human fibrinogen has allowed for the development of the current products. Since then, there have been multiple studies demonstrating the use of Fibrin Glue for various clinical applications across surgical specialties. This study aims to evaluate a single institution’s use of the fibrin glue in neck dissections.

Unilateral neck dissections were evaluated specifically during this study because the placement of a closed suction drain at the time of surgery provided an objective means for evaluation of wound healing. The hypothesis was that there would be demonstrable benefits from use of fibrin glue during unilateral neck dissections due to the hemostatic and adhesive properties. A secondary objective was to evaluate for evidence of unwanted increase in inflammation, foreign body reaction, tissue necrosis, or fibrosis. Fibrin Glue was expected to improve wound healing in a way that could be demonstrated by a decrease in drain output from closed suction Jackson Pratt drains. This observation is of particular use because drain output is associated with length of hospital stay and overall cost of medical care. Increased drain output may also be an early sign of complication such as chyle leak or pharynocutaneous fistula.

Discussion

The study confirmed less drain output in early post-operative course with fibrin glue but showed no significance difference in total drain output. There was no difference in complications or length of hospital stay. From this study, there appears to be a lack of additional benefit or harm with the use of the fibrin glue prior to wound closure for unilateral neck dissections.

The authors of this study can neither recommend for or against the use of fibrin glue application to the wound bed prior to closure in unilateral neck dissections. There may be additional studies in the future that may find additional applications of fibrin glue but at this time there is no demonstrable benefit from the use of fibrin glue in unilateral neck dissections.

References


