Abstract

Objective: To test the feasibility of Laser Tissue Welding (LTW) in creating an endoscopic transluminal repair of esophageal perforation.

Study Design: IACUC approved animal model.

Subjects and Methods: A diode laser was used to create an endoluminal rabbit esophageal perforation repair. Burst pressures were compared to open incision, external suture, and external laser augmented suture closure. Comparisons were performed 5 times and analyzed using Kruskal-Wallis ANOVA and a post-hoc Dunn’s Method.

Results: The burst threshold of the endoluminal weld (64.76±6.84mmHg) was significantly higher than the open incision (6.5±1.94mmHg) and not significantly different than the external suture (37.18±1.97mmHg) or the laser incision (71.60±5.84mmHg) and not the laser weld group and the external laser augmented suture group. There was no significant difference between the endoluminal weld group and the external suture group (P<0.05). There was no significant difference between the endoluminal weld group and the external laser augmented suture group.

Conclusion: This is the first study to attempt and successfully demonstrate the feasibility of utilizing laser tissue welding to create a water tight endoluminal repair of an esophageal injury without the need for foreign body implantation. This technology has the potential to reduce the percentage of patients requiring open surgical repair in the setting of iatrogenic perforation. Appropriate patient selection and close observation remain the keys to successfully performing this procedure.

References