

# **Lessons learned from laser tissue soldering and fibrin glue pyeloplasty in an in vivo porcine model.**

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## **Abstract:**

**PURPOSE:** We compared sutured pyeloplasty to 2 newer techniques of tissue anastomosis, including laser soldered pyeloplasty using a diode laser with 50% albumin solder mixed with indocyanine green and fibrin glue.

**MATERIALS AND METHODS:** We performed 53 pyeloplasties in 50 pigs using suture, laser or fibrin glue. In the immediate group anastomotic leak pressure was measured immediately postoperatively, and then animals were euthanized. At 1, 3 and 4 weeks postoperatively a pressure flow study at 10 cc per minute in cm. H<sub>2</sub>O was performed, and tissue was sent for histological and collagen content analysis.

**RESULTS:** In the immediate studies laser soldering achieved a significantly higher mean anastomotic leak pressure (50.5 +/- 15.1 cm. H<sub>2</sub>O) than sutured (17.3 +/- 5.4) or fibrin glued (3.5 +/- 1.5) repairs. In the 1, 2 and 4-week studies animals in the sutured pyeloplasty group had no complications, and all pressure flow studies except 1 were normal. However, in the laser soldered groups we observed 8 urinomas in 19 animals, and most occurred during the first part of our study. This complication was prevented by stopping urine flow at the anastomotic site at laser irradiation and by improving application of the solder. Of the 11 animals in which pressure flow studies were performed only 2 were obstructed. Of the 7 chronic fibrin glue group 4 animals had urinomas and 2

had unobstructed pressure flow studies. Histological studies and immunohistochemical staining for collagen showed no differences in collagen distribution among the 3 procedures.

CONCLUSIONS: Laser soldering and fibrin glue pyeloplasties are not superior in the long-term compared to sutured pyeloplasty. Fibrin glue in our animal model had the highest failure rate. Further improvements in the technical aspect of laser tissue welding need to be made to benefit from its theoretical advantages in minimally invasive surgery.