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Evaluation of Tensile Strength of Hand Sewn Anastomoses after Gastric Resections - An Experimental Ex Vivo Study

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Abstract
Introduction: This study aimed to evaluate the resistance of anastomoses to mechanical traction in an ex vivo biomechanical experiment, to determine the most resistant manual suture for restoring digestive tract continuity after various types of gastric resection for cancer.
Materials and methods: The tensile strength of different types of anastomoses was compared ex vivo using porcine esophagus, stomach, and small intestine. The test setup included a tensile testing device, which applied a controlled force on the anastomoses until they broke, which was recorded for each type of anastomosis and was expressed in N. Data processing and statistical analysis were performed in the GraphPad Prism program, using a paired T-test and ANOVA test. We considered the p-value <0.05 to be statistically significant.
Results: Double-layer gastrojejunal (Roux-en-Y) and end-to-end esophagojejunal anastomosis presented the highest tensile strength. Double-layer anastomoses showed significantly higher tensile strength compared to monoplane ones. The results suggest that the double-layer suture technique offers better mechanical stability, which may reduce the risk of postoperative complications.
Conclusions: Biplane anastomoses after gastric resections may reduce postoperative complications and improve patient outcomes.
Keywords: anastomosis, tensile strength, experimental