A SURGICAL COUPLER FOR IMPERMEABLE ANASTOMOSES

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Technology description

SUMMARY

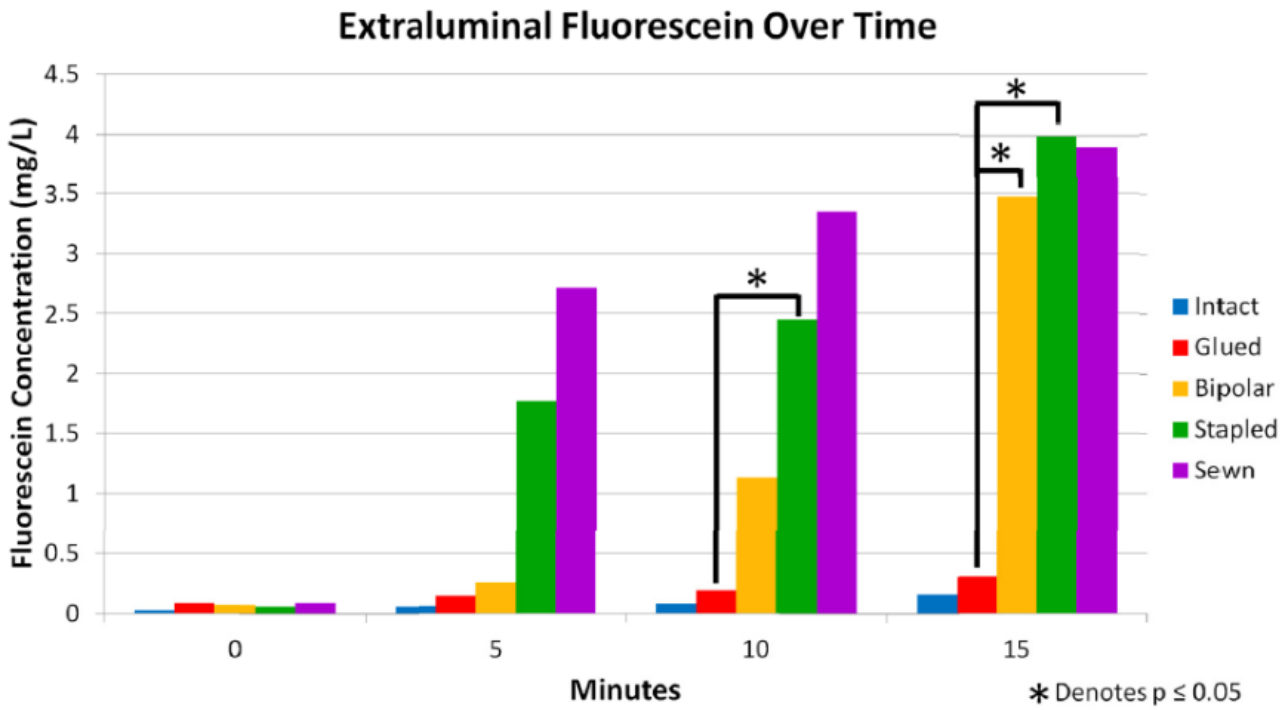
•Anastomotic leak is a serious complication of gastrointestinal surgery, with consequences ranging from benign to life threatening. Treatment is costly and exposes patients to additional pain and risk. Current common anastomotic approaches include hand suturing and stapling, but there is a potential to reduce leak rates with a next-generation surgical approach.

•It is known that certain gut microbes can disrupt anastomotic healing by adhering to collagen left exposed by sutured and stapled anastomoses. The inventor developed a novel anastomotic technique that both mechanically minimizes collagen exposure and pharmacologically inhibits microbial action, theoretically eliminating anastomotic leak.

•The invention is a biodegradable anastomosis coupling composed of a mucoadhesive polymer that aligns the cut bowl edges while surgical adhesive is applied externally. The coupling degrades in a matter of hours, releasing antimicrobial agents and growth factors, and leaving behind a healed inner mucosal layer with no exposed collagen.

•The inventor validated the prototype coupling/adhesive technique using an ex vivo swine model and compared fluid and microbial permeability to that of stapled and sewn anastomoses. The invention resulted in dramatically lower permeability of anastomoses.

FIGURE



Fluorescein was perfused through anastomosed swine internal intestinal lumen and external luminal fluorescein concentration was quantified. Red bars represent lumen glued using the invention surgical device.

Application area

•Surgery (human and veterinary):
•Acute care/Trauma
•Colorectal•Esophageal
•Hepatobiliary

Advantages

•Designed to reduce anastomotic leaks and postoperative infections
•Lower anastomosis permeability than established anastomotic techniques
•Minimizes intraluminal collagen exposure
•Maintains good blood supply to healing bowel edges
•Allows local delivery antimicrobials and growth factors to the wound

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