

Pitfalls of Double Stapling Technique

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Abstract

Background: Recently, surgical staple devices are widely used in gastroenterological surgery around the world. Therefore, performance of surgery such as surgical time and perioperative complication rate are improved. But anastomotic leakage occurs at 1-22%. The reasons of anastomotic leakage are known as impeded blood flow, tension of anastomosis, careful operative procedures and factors of patients, but weak points and pitfalls of surgical stapler are unknown. The aim of this study is to reveal weak points and pitfalls of circular stapler.

Method: We used colon of pig without blood flow, because of investing pressure capacity of only staple, and made 5 anastomoses models by double stapling technique (DST) used EEA31™. We measured pressure capacity by water column and evaluated shape of staple after dissolving tissue. The anastomoses models are normal type (Model 1), staple on staple type (Model 2), staple on cutter type (Model 3), thickness gap type (Model 4), circumferential thickness type (Model 5).

Result: The only Model 4 occurred leakage by low pressure. We measured pressure capacity of Model 1 was 2 times and Model 4 was 4 times. The median pressure capacity was 30cmH₂O in Model 1 and 9.125cmH₂O in Model 4. The staple formation was failure in thickness gap type only.

Conclusion: The pitfalls of circular stapler were thickness gap of anastomotic surface occurs staple failure and decrease anastomotic capacity to resist pressure.

Key words: Double Stapling Technique, Leakage, Staple, Circular Stapler, Pressure Capacity