

Extraction Force of Endoscopic Tissue Specimen Retrieval Bags

CORTNEY HENDERSON, DVM, MS, DACVS, ETHICON, INC. CINCINNATI, OH

Evaluation of three 10mm endoscopic tissue specimen retrieval bags in a preclinical model shows the Ethicon ENDOPOUCH Retriever® to have the lowest peak force of extraction for a tissue specimen through an abdominal wall trocar insertion site.

Background

A low extraction force is a desirable feature of a specimen retrieval device. Risk of bag rupture, mechanical failure, and increased surgical time and frustration may be attributed to a large extraction force. Endoscopic tissue specimen retrieval devices have unique bag designs and constructions that influence peak force of extraction through an abdominal wall incision.

This study was performed to measure and compare the peak extraction force among leading endoscopic specimen retrieval devices for a tissue specimen through an abdominal wall incision.

Methods

Evaluation of device extraction force was conducted in porcine carcasses. The location of each device was randomized to minimize effects of tissue variability. Incision size and tissue specimen volume were controlled to ensure consistency.

Twelve retrieval devices of each type were evaluated. A 12mm Bladeless XCEL™ Trocar was placed through the abdominal wall and removed. The retrieval bag, containing a 25ml tissue specimen, was withdrawn through the incision and the peak extraction force was recorded. Device failure was also noted if applicable.

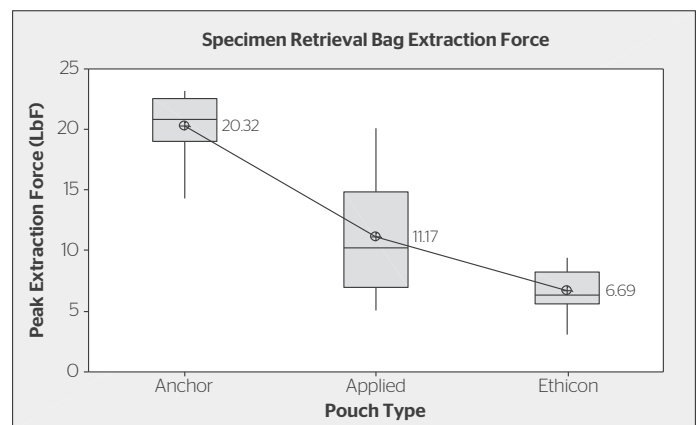
Two-Sample t-tests were used to detect differences in peak extraction force between the control device, the Ethicon ENDOPOUCH Retriever® (product code: POUCH), and the two test devices, the Applied Medical Inzii™ Retrieval System (product code: CD001) and the Anchor Tissue Retrieval System (product code: TRS100SB2). A significance level of 0.05 was set to determine statistical significance.

Results

The Ethicon ENDOPOUCH Retriever® was found to have a statistically significant ($p < 0.05$) lower mean peak extraction force than both the Anchor Tissue Retrieval System and the Applied Medical Inzii™ Retrieval System. The Ethicon ENDOPOUCH Retriever® had a 40% lower peak extraction force than the Applied bag, and a 67% lower peak extraction force than the Anchor bag.

In this study, the Anchor Tissue Retrieval System had 75% device failure rate at the cord. As extraction force was applied, the cord device ruptured near the bag before the specimen was extracted. The Ethicon ENDOPOUCH Retriever® and the Applied Medical Inzii™ Retrieval System did not experience device failure during the testing procedure.

Table 1: Peak extraction force by pouch type. Mean force represented as symbols and numbers, median and quartiles as thick bars, range by thin lines.



Discussion

The specimen bag of the Ethicon ENDOPOUCH Retriever® had the lowest peak extraction force to pull the bag and tissue specimen through a trocar insertion site among bags studied.

The unique tapered bag of the Ethicon ENDOPOUCH Retriever® had a tendency to “stack” the tissue specimen into a column during extraction, potentially requiring less force to extract the bag and specimen.