Anastomotic Compression Button: A New Mechanical Device for Sutureless Bowel Anastomosis

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The anastomotic compression button is a new mechanical device that uses three interlocking polypropylene buttons to produce a sutureless bowel anastomosis. The device is unique in that it allows application of the buttons via a device similar to the popular intraluminal stapler, but it leaves no staples or foreign body of any kind in the bowel wall. The authors compared the 25-mm anastomotic compression button with the 25-mm intraluminal stapler in the colon of dogs. After 28 days, the mucosal blood flow, burst pressure, and anastomotic indices were found to be identical between the anastomotic compression button and the stapler. The anastomotic compression button was easier to use, and microscopic examination showed less ulceration, fibrosis, and inflammation, and better re-epithelialization at the anastomotic compression button site. The anastomotic compression button appears to have the potential to be a superior method compared with stapled anastomoses in the colon. [Key words: Surgical staplers; Colorectal surgery; Suture techniques; Laser velocimetry; Surgical anastomosis; Dogs]

THE IDEAL METHOD for bowel anastomosis has yet to be developed. This method should produce a secure, well-healed, leak-proof closure without stenosis, and be safe and easy to perform. The importance of inverting anastomoses with serosa-to-serosa apposition has been stressed by Lembert since the early 1800s. Stapled enteric anastomoses are now considered to be the method of choice by many surgeons, however, they are not without problems. The persistence of metallic staples, acting as chronic foreign bodies, has been implicated in colonic stenosis and an increase in tumor recurrence.

Denans described the first compression device in 1826, and Murphy popularized his button around the turn of the century; however, they enjoyed only limited acceptance by the surgical community. In 1985, Hardy et al. described a biofragmentable ring of polyglycolic acid (Dexon, Davis and Geck, Wayne, NJ) for sutureless intestinal anastomosis that has been used in the United States. Like the Murphy button, however, its insertion requires extensive manipulation of the bowel, and is limited to proximal enteric anastomosis.

Recently, the Russian AKA-2 compression circular anastomoser has been developed and used in the Soviet Union with good clinical results. In Italy, Rosati et al. have devised their own mechanical compression device and have reported early success in both dogs and patients. This anastomotic compression button (ACB) is a new instrument that is being refined by Deknatel.

Supported by Deknatel, A Division of Pfizer Incorporated, Fall River, Massachusetts.

Address reprint requests to Dr. Harmon: Veterans Administration Medical Center, Department of Surgery # 112, 50 Irving St. N.W., Washington, D.C. 20042.
(Division of Pfizer Inc., Fall River, MA). The instrument produces a sutureless anastomosis with the aid of a mechanical introducer, that will allow it to be used in a low, colostomy-sparing, colorectal anastomosis. We report our experimental results of a comparison of the ACB with the popular intraluminal stapler in a large animal model.

**Materials**

The anastomotic apparatus of the ACB consists of three molded polypropylene buttons: an outer, an intermediate, and an inner button (Fig. 1). The buttons are introduced into the bowel on a mechanical device that is similar to that of the stapler (Fig. 2). After placing purse-string sutures around each of the transected colonic ends, the instrument is introduced into the bowel transanally until the outer button has exited from the distal stump. The central shaft, carrying the outer button, is then extended and the distal purse-string suture is tied around the intermediate button and shaft. The outer button is then inserted into the proximal stump, and its purse-string suture tied down over it. The buttons, along with the tissue, are then brought together by rotating the instrument’s handle to approximate the outer button, to the intermediate button at a fixed distance of 1.2 mm (Fig. 3).

The ACB is fired by closing the handles, which causes the inner button to enter, expand, and lock the intermediate button to the outer button. Simultaneously, a circular knife cuts through the purse-string tied colonic edges and the outer button, creating a water-tight, inverted serosa-to-serosa anastomosis (Fig. 4). The device is then easily removed, leaving the three interlocked buttons within the bowel.

As the anastomosis heals, the trapped and compressed