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## Research Article

### THE USE OF BAR IN COLORECTAL SURGERY IN THE ELDERLY

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#### ABSTRACT

**Introduction:** In the 1980s, the change of suture techniques from double-layered handwriting went to the mechanical sutures due to their rapid execution and anastomosis, although they did not substantial decrease in anastomotic dehiscence with mortality (1). In 1985, some authors attempting to reduce anastomotic complications introduced a biofragmentable anastomotic device consisting of absorbable polyglycolic acid and 12.5% barium sulphate. The goal of this study and document the results obtained after using the BAR at our institution in unregulated elderly patients needed for colon resection. **Materials and methods:** From January 2006 to Dicemdre 2016 consulted the database of the company Policlinico G Rodolico of the University of Catania were hospitalized n 40 colon resuscitated patients with entero-colic anastomosis by Valtrac / BAR. Of these, 45% (18 cases) were females, 55% (22cases) were male. The median age was 72 years (range 62-82 years). Colonic resection patients were affected by the following pathology of the colon in 22 cases (55%), in 10 cases of diverticular disease (25%) and in the remaining 8 cases (20%) from a colon polyposis. The BAR was used for the construction of various types of anastomosis, including all procedures involving the upper and lower gastrointestinal tract. **Results:** The results were encouraging for this type of suture implemented: IN 10 cases the colo-colon anastomoses were implemented (27%) cases of right colectomy (aneurysms of colic) and 7 (17.5%) were made of sigmoid resections (colo-colic anastomosis) finally in 12 cases (30%) of sinus colectomy (colonoscopy anastomosis). **Discussion :** The BAR is a device that is synthesized with PGA, acid characterized by hydrolytic instability. Its degradation process is erosive following two steps during which the polymer is converted to glycolic acid. In the first stage, water is creeping in the non-crystalline amorphous regions of the material, breaking down the foreign bonds present; the second phase begins when the amorphous region is eroded, leaving the crystalline portion of the polymer exposed to the action of water. When the crystalline structure collapses, the polymer chain dissolves. In relation to the results obtained, the BAR is a viable alternative to the mechanical suturing machines in a colic elective surgery in patients with clinical conditions that you say, and there is no picture of generalized generalized floggies. **Conclusions:** Based on our experience,. Simplicity of technique, versatility and rapid execution makes the BAR still a valid, safe and interesting alternative as well as accommodating many patients for surgery without leaving sutures.

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#### INTRODUCTION

In the 1980s, the change of the suture techniques from the double-layered manual to the mechanical sutures, thanks to their rapid execution and the holding of anastomosis, has not been witnessed a substantial decrease of anastomotic dehiscence with mortality (1), but indeed resulted in an insignificant increase in anastomotic stenoses, with a higher incidence in rectal colon anomalies. In 1985, some authors

attempting to reduce anastomotic complications introduced a biological fragmentable anastomotic device consisting of absorbable polyglycolic acid and 12.5% barium sulfate, making it radiopaque (Valtrac's Biological fragmentable Anastomosis Resobable [BAR]) composed of 2 identical segments connected together on a central frame. Intestinal anastomosis is created by binding the opening suture inserted at each end of the intestine around each BAR component. The device is then closed. Between 11 and 16 days after surgery the BAR is

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fragmented and is eliminated spontaneously. An inverted serous-serous anastomosis, therefore, can withstand an intraluminal pressure of 70 mmHg. In the 1990s, the device gained popularity, and a number of prospective studies confirmed that the results with the device were satisfactory, with reports of intraoperative problems Which: (1) incorrect estimate of colon luminal diameter; (2) Unlocking the appliance (3) Excessive pressure in the shutter breaks the friable device; (4) fragmentation delay; (5) postoperative tenesmus; (6) potential risk of relative obstruction due to the smaller inner diameter of the ring. For these reasons there have been several randomized (2,3,4,5,6) studies that have shown that BAR is a safe alternative to hand sewing techniques as well as mechanical stitchers in intestinal anastomosis. The aim of this study is to document the results obtained after using the BAR at our institution in unregulated elderly patients required for colon resection

## MATERIALS AND METHODS

From January 2006 to Dicemdre 2016 consulted the database of the company Policlinico G Rodolico of the University of Catania were hospitalized n 40 patients undergoing colon resection with colic entero anastomosis by Valtrac / BAR. Of these, 45% (18 cases) were females, 55% (22cases) were male. The median age was 72 years (range 62-82 years). Colonic resection patients were affected by the following pathology of the colon in 22 cases (55%), in 10 cases of diverticular disease (25%) and in the remaining 8 cases (20%) from a colon polyposis. Symptomatology was characterized by weight loss, anemia, and rectal rays episodes, for the polyps apart from the periodontal rectum episode.. accompanied by rectal tenesmus the diagnostic route included a staging of the disease through imaging diagnostics (TAC , RMN, PET, ECO, Sector arteriography), with biopsy examination and with anatomopathological examination in addition to laboratory diagnostics. In addition, the following pathologies were associated with the treated patients: Diabetes in 51% of cases, cardiovascular disease in 49%. our experience was motivated because in patients with metallic suture in the colon and rectum, both for post-neoplastic anastomosis and for proctologic and non-neoplastic surgery, performed in the previous interventions, after surgery and in the first 24 months there was a clinical symptom characterized by bleeding

quality of life and to meet the demands of a possible colon surgery with anastomoses without metal sutures. This requirement has therefore determined the use of the Valtrac <sup>TM</sup> BAR fig 1, 2 device consisting of two segments containing absorbable polyglycolic acid (87.5%) and barium sulphate (12.5%). It comes in a range of sizes (25, 28, 31 and 34 mm). The two components interdigitate on a central frame; a distance of 6 mm is observed between the protruding edges of the BAR in open position and a distance of 1.5 mm, 2 mm or 2.5 mm is made in a fully closed position to accommodate the different thicknesses of the intestinal wall. This also limits the amount of tissue necrosis [45]. Each ring is securely positioned at the ends of the intestine cut with the aid of a tobacco bag suture, fig. 3. Between two and three weeks after the intervention, the BAR determines the production of intestinal anastomosis, fig. 4 [ 46]. The BAR has been used for the construction of various types of anastomosis, including all procedures involving the upper and lower gastrointestinal tract. The indication of colon resection was related

In cancer: 1) histologic confirmation of primary malignant neoplasia of the colon. 2) the degree of tumor differentiation 3) the tumor penetration depth (T) 4) the number of evaluated lymph nodes and the number of positive lymph nodes 5) the state of the proximal, distal and radial margins 6) the lympho-vascular invasion 7 ) to perineural invasion 8) To extra-lymph node tumor deposits. in diverticular disease, colic resection was performed in the presence of precarious clinical conditions with > 70 years of age and with sub-occlusion occurring > 2, finally in the colonic polyposis the resective surgical indication was given by polyposis > of 50 of which some are in histological modification. In the 24 hours prior to surgery, the colon was prepared with osseous hydrolytolytic solutions. Antibiotic prophylaxis that has been prolonged for 48 h. , the surgery was performed in the open with the median incision. The diameter of the BAR has been established according to the sizing tool. A BAR ring was placed at the end of the intestine cut and secured with the bag suture and the second BAR ring was introduced to another end of the intestine cut and secured with another bag suture. Confirmed the absence of tension, both rings were then clicked to complete the anastomosis. (Fig. 2), with some suture points re-absorbed them. The patients were left with NPT until the complete fragmentation of the BAR was confirmed based on the abdominal X-ray, carried out 2 weeks



Fig 1 Valtrac / BAR

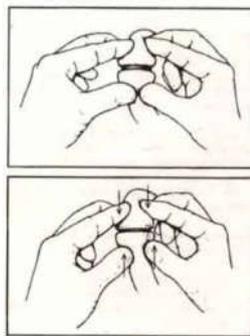


Fig 2 closing the flaps



Fig 3 tobacco bag



Fig. 4 endoscopic result BAR

occasionally, rectal tenesmus, evacuative pain in over 30% of cases treated with mechanical sutures. All this required greater attention to a research whose purpose was to achieve a better

after surgery and was repeated if necessary. With an average ejection of the ring of 13 days;

## RESULTS

The results were encouraging for this type of suture: IN 10 cases colo-colon anastomosis (rectal anastomosis) (25%) was performed, in 7 cases (17.5%) were made of sigmoid resections (anastomosis colic colic), in 11 (27.5%) cases of right colectomy (ileo colic anastomosis) and in 12 cases (30%) of sinus colectomy (colonoscopy anastomosis). Postoperative surgical complications were absent: surgical site infection, wound dehiscence, intra-abdominal abscess, anastomotic loss occurred only in n 2 cases (5%), anastomotic dehiscence was subclinical, and were treated conservatively with total parenteral nutrition (NPT) for 15 days, healing without reliquates. Perioperative mortality was (2.5%) determined by acute myocardial infarction in only one patient in the first 24 hours. We did not have any major haemorrhage cases from the bones. No anastomotic stenosis was observed in follow-up, ranging from 2 to 24 months involving 70% of cases treated. Average postoperative hospitalization was 15 days. For the success of anastomosis with the Valtrac BAR, the absence of tension on the anastomotic site decreases as a consequence the risk of dehiscence and the overall incidence of surgical site infection after surgery [20-22]. During application of the device A Valtrac / BAR was required to be larger than the thickness indication set by the sizing tool. the overall clinical condition of the patient and the metabolic state were essential to avoid early defragmentation of the device. Moreover, we did not notice any late intestinal restriction. In this study, medical data was collected at the time of clinical cure, and we used BAR anastomosis only in elective surgery

## DISCUSSION

In 1887, Halsted demonstrated that the submucosal is the tissue lamina which secures most of the tension force in the gastrointestinal tract. The largest amount of collagen is contained in this lamina, along with blood vessels, lymphatic vessels and nerve fibers. The serous is a thin connective tissue covering its own muscular. (7, 8, 9, 10, 11) And in the healing process of intestinal anastomoses, an acute inflammatory phase, a proliferative phase and, finally, a remodeling phase are distinguished. (12,13,14,15) Collagen is the only and most important molecule to determine the strength of the intestinal wall, and its metabolism plays a primary role in the healing of anastomoses. (16,17,18,19,20) After the intervention, mature collagen degradation, already begun in the first 24 hours, dominates the next 4 days, for an over-production of protein-protein matrix, an important class of enzymes involved in collagen metabolism. From day 7 post surgery, collagen synthesis resumes, especially near anastomosis. After 5 to 6 weeks, there is no further increase in the presence of collagen in a healing wound or anastomosis, although the replacement, with summary, is still evident. The strength of the scar continues to increase progressively over time (21,22,23,24,25) The orientation and cross-links between the collagen fibers determine the strength of the tissue. Burst pressure used as a quantitative measure of the degree of resistance of anastomosis for living, increases rapidly in the first postoperative period, reaching 60% of the surrounding colon resistance from the third to the fourth day and 100% on the seventh day. (26,27,28,29,30) In relation to the illustrated features that a The ideal suture device is to have strong resistance (sealing) and rapid reabsorption (in order not to create tissue reactions), just

like the BAR device that is synthesized with PGA, acid characterized by hydrolytic instability. Degradation process is erosive follows two steps during which the polymer is converted to glycolic acid. In the first stage, water is creeping in the non-crystalline amorphous regions of the material, breaking down the foreign bonds present; the second phase begins when the amorphous region is eroded, leaving the crystalline portion of the polymer exposed to the action of water. When the crystalline structure collapses, the polymer chain dissolves. (31,32,33,24,35,36) At physiological conditions, polyglycolic acid degrades by random hydrolysis processes, but also by some classes of enzymes, particularly belonging to the esterase family. The degradation product, glycolic acid, is non-toxic and can enter the Krebs cycle, after which it is secreted in the form of water and carbon dioxide. Part of the glycolic acid is also eliminated in the form of urine. (37.38.39.40) Studies conducted on polyglycolic acid sutures showed that the material lost half its resistance in about two weeks and 100% in a month. The polymer is then completely absorbed by the body in a 4-6 month window. with minimal tissue response (41,42,43,44,45) It is because of its features that it is understood that PGA is used as a BAR (a biological fragmentable anastomotic device) as it has a longer life span for scar formation wounds in the various tissues .. (46,47,48) In a randomized control pathway that compares BAR with mechanical extraction of anastomosis suture to extraperitoneal rectal anastomosis () The time needed to create anastomosis with BAR was slightly shorter than the time necessary for anastomosis with mechanical sutures, although this was not statistically significant. Total operating time, intraoperative blood loss and postoperative complication rates were similar to both anastomotic techniques [48]. On the contrary, there was no statistical difference in the complication rates between BAR and a mechanically sutured anastomosis in elective and emergency procedures [48]. In relation to the results obtained, the BAR is a viable alternative to the mechanical suturing machines in a colic elective surgery in patients with clinical conditions that you say, and there is no picture of generalized generalized floggies. (49)

## CONCLUSIONS

In the age of imaging diagnostics, the absence of intestinal metal clips improves the quality of life as it allows patients to follow-up to be able to undergo MRN and other examinations at full freedom. The absorbable sutures also allow the disappearance of the painful symptomatology found after the packaging of the metal suture. The safety and efficacy of anastomosis with BAR depend on the proper preparation and placement of anastomotic intestinal extremities, with no tension and the attachment of the submucosal. Based on our experience, Simplicity of technique, versatility and rapid execution makes the BAR still a valid, safe and interesting alternative as well as accommodating many patients for surgery without leaving suture

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