

## **Endoscopic Treatment of Large Polyps with Adrenaline Injection Volume Reduction Technique in Patients with Peutz-Jeghers Syndrome Complicated with Intestinal Obstruction**

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### **Abstract**

**Introduction:** Peutz-Jeghers syndrome (PJS) is characterized by hamartomatous polyps mainly in the small bowel. These polyps may cause intussusceptions and bowel obstruction, which leads to multiple surgeries. Endoscopic removal is a technical challenge because they are difficult polyps.

**Objective:** Describe and evaluate the feasibility, safety and efficacy of the adrenaline injection volume reduction technique (AIVR) for the removal of large and obstructive polyps in PJS.

**Patients and Method:** Case-series study (from march 2008 to august 2017). We included 24 patients with clinically diagnosed bowel obstruction (42 polyps); 15 patients had previous surgeries due to obstruction. A single balloon enteroscope (SBE) Olympus SIFQ180 was used. AIVR technique injection of 4 to 8 mL of 1:20.000 adrenaline solution into the head of the polyp at 2 to 4 sites. Pre- and post-AIVR size was determined by measuring the open snare against the polyp. Polyp volume and % volume reduction was calculated determined by standardized equation found in the literature.

**Results:** 42 polypectomies were performed. Size and volume of pre-AIVR polyps were: 3 cms/14 cc (26 polyps), 4 cms/34 cc (10 polyps), 5 cms/65 cc (6 polyps) and post-AIVR: 1.5 cms/1.8 cc (26 polyps), 2.0 cms/4 cc (10 polyps), 3.0 cms/14 cc (6 polyps). Volume reduction: 87%, 88% and 78% respectively. 10 polyps (24%) were multilobed-confluent. In all lesions, volume reduction was successful. Polypectomy in bloc was technically possible in all lesions. All polyps were hamartomatous. 7 patients (29%) presented abdominal pain that resolved spontaneously.

**Conclusion:** Our results shows that AIVR technique is simple, feasible, safe and effective technique for the removal of large polyps in patients with PJS complicated with bowel obstruction. Also, many polyps can be removed, fewer endoscopic sessions.

**Keywords:** Peutz Jeghers Syndrome (PJS); Adrenaline Injection Volume Reduction (AIVR) Technique; Intestinal Obstruction; Single Balloon Enteroscopy (SBE)

### **Introduction**

Peutz-Jeghers syndrome (PJS) is an autosomic dominant hereditary polypoid syndrome caused by a germinal mutation on the gen that codifies the STK11 serine/threonine kinase (LKB1) on the 19p13.3 chromosome [1]. Its incidence has been estimated between 1 in 50000 to 1 in 200000 born alive; it's associated with mucocutaneous pigmentation, mainly around the lips, and hamartomatous polyps in the gastrointestinal (GI) tract [2,3]. These polyps may appear all along the GI tract, but mainly in the small bowel (SB) specially the jejunum (60 - 90%), followed by the stomach and the colon [4]. They may cause abdominal pain and there's a high risk for GI bleeding, malignant transformation or bowel obstruction due to an intussusception of a segment of the SB caused by a large polyp [5,6]. Intussusception is more often during the first decade of life and may lead to multiple laparotomy and enterotomy, resulting in a higher risk for a short intestine syndrome [7-9].

Although minimal invasive endoscopic therapy has been recently reported, its use has been limited due to many reasons: the presence of multiple polyps, with different sizes (sometimes as big as 3 cms), when they are bigger than 1/3 of the intestinal lumen, that may have a large stalk (with an artery in it) with a serous retraction, when tend to be confluent and that may cross over two or more conjoining valves, the thin wall of the SB, the presence of intestinal adhesions due to previous surgeries, the length of the procedure and, when the polyp is larger than 3 cms, the higher probability of an incomplete resection and the complications derived from the procedure.

The endoscopic management of the giant polyps (> 3 cms) of the SB may be a challenge for the therapeutic endoscopist, mainly because the risk of bleeding and intestinal perforation [10]. Also there's the need to resect as many polyps as possible, in order to reduce the number of endoscopies by extending the time between procedures [11].

It's a clinically proven fact the effect of adrenaline injection in reducing the amount of bleeding and the size of lesions. Hogan, *et al.* [12] proved that adrenaline injection helped the assessment and removal of giant polyps from the colon, avoiding piecemeal resection. Walker, *et al.* [13] reported the removal of a giant inflammatory polyp using a combined technique with adrenaline injection and placing a gastric endoloop on the stalk.

There are only case report in the medical literature regarding the use of adrenaline injection on the polyps, previous to its removal, in the SB of patients with PJS. Laskaratos, *et al.* [14] published a case report where they resected a fibroid inflammatory giant polyp from the ileum after injected a 1:10000 adrenaline solution to reduce the size of the polyp and the bleeding risk, which allowed a complete removal.

### **Objective of the Study**

To describe the adrenaline injection volume reduction (AIVR) technique for the endoscopic treatment of giant polyps in patients with PJS complicated with intestinal obstruction, assessing its feasibility, safety and efficacy.

### **Patients and Methods**

Case series study, from March 2008 to August 2017. There were 24 patients, all with clinically proven bowel obstruction, with 42 lesions. 15 patients had previous surgery due to bowel obstruction.

All patients had upper and lower endoscopies and an endoscopic capsule (Mirocam, Korea) or a CAT scan previous to the procedure. Location of the polyps was estimated analyzing the time of intestinal transit (time between the first image of the duodenum and the ileocecal valve) from the endoscopic capsule.

A Single Balloon Endoscope (Olympus SIF Q180 Olympus Optical Co, Japan) was used in all the patients, with an Olympus Balloon Control Unit with a pressure range between -6,0 kPa and +5,4 kPa, and a silicone disposable overtube. A CO<sub>2</sub> pump was used for insufflation (Olympus Optical Co). An electrosurgical unit ERBE vio 300D (EndoCutmode. Effect 3, 120 W, COAG Forced 40 W) was used. Injector and polypectomy snare were also used (Cook Medical).

An informed consent was obtained from each patient, from itself or its legal guardian. Anterograde approach was performed in 21 patients and retrograde approach in 3; for the first a 12 hours fasting was enough and for the other a standard PEG preparation was ordered. All procedures were performed by the same expert endoscopist, 20 in the endoscopy suite and 4 in the OR under anesthesiology surveillance (< 12 YO).

Once located the polyp its size was assessed measuring it against the open polypectomy snare; then began the AIVR technique: injection of 4 to 10 ml of 1:20000 adrenaline solution in 2 to 4 places of the polyp head until a bleached is observed. Then another 2 to 6 ml of adrenaline solution is injected in 2 or 4 places of the stalk. After 3 to 5 minutes a significant reduction in size was appreciated and the polypectomy was performed. Once retrieved the polyp it was measured before send it to pathology. Volume of the polyp and percentage of reduction was calculated using the standard formula ( $\text{Sphere volume } Z \left[ \frac{4}{3} \right] \pi r^3$ ). All patients received prophylactic antibiotics before the procedure.

### **Statistical analysis**

Frequency, percentages and mean values were calculated for our observations.

**Results**

24 patients were included (8 female, 16 male) mean age 29.4 years (8 - 55). 15 of them had previous abdominal surgery. 7 patients had an endoscopic capsule study and 17 had a CAT scan. 42 polyps were found: 26 in proximal jejunum, 10 in medial jejunum and 6 in distal ileum.

The values for size/volume prior to AIVR, after AIVR and percentage of reduction are shown on table 1.

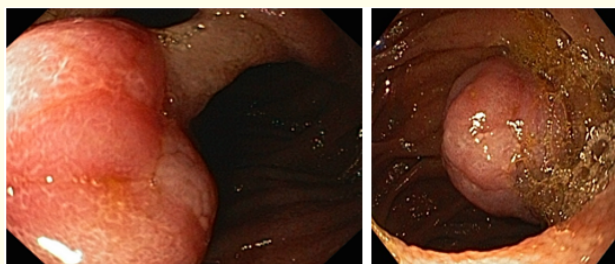
	Pre AIVR	Post AIVR	Volume reduction
26 polyps	3cms/14cc	1.5cms/1.8cc	87%
10 polyps	4cms/34cc	2.0cms/4cc	88%
6 polyps	5cms/65cc	3.0cms/14cc	78%

**Table 1:** Size and volume of polyps pre and post AIVR technique.

In all patients a significant reduction in the volume of the polyp was achieved, and a complete polypectomy was performed. All 42 polyps were hamartomatous (100%) (Figure 1-3).



**Figure 1a:** Pre-injection adrenaline.



**Figure 1b and 1c:** Post-injection adrenaline.

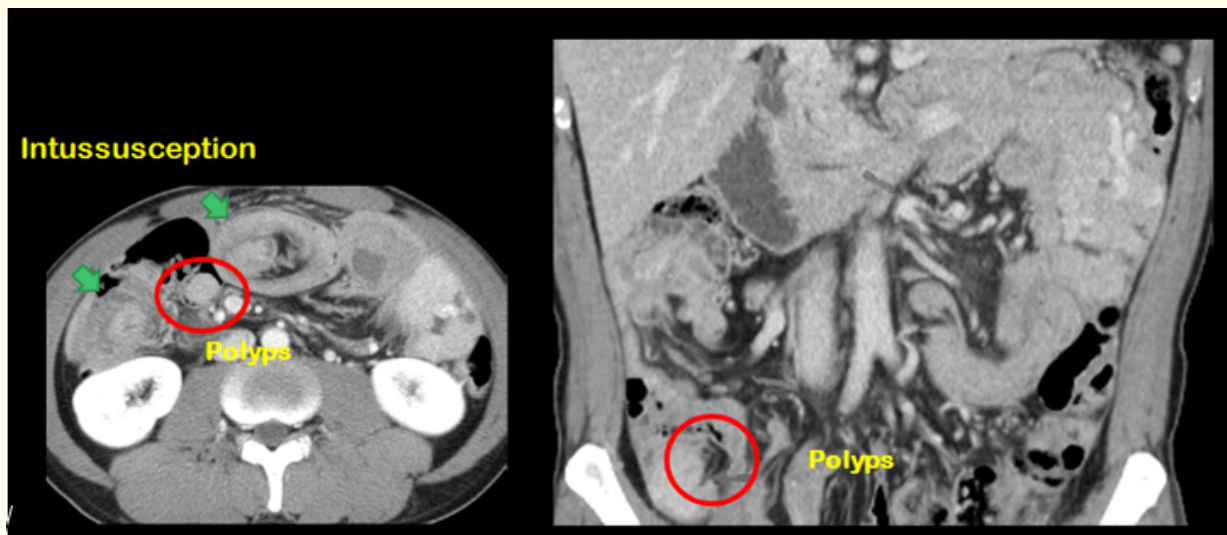
**Figure 1:** Adrenaline injection volume reduction technique (AIVR) for the removal of large and obstructive polyps in PJS.

In 7 patients (29%) a mild abdominal pain post procedure was reported, but was spontaneously resolved. No mortality was declared in our study.

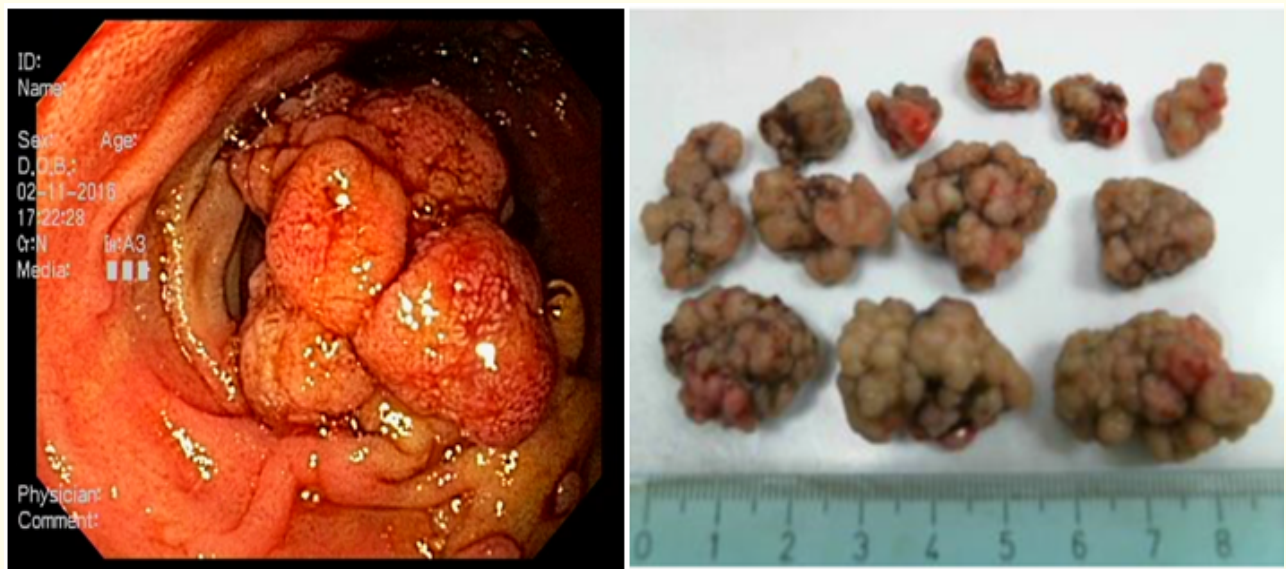
**Discussion**

The small bowel tropism of Peutz-Jeghers polyps makes their detection and treatment a challenging issue. Current guidelines recommend scheduled small bowel surveillance with capsule endoscopy and endoscopic clearance of significant polyps given their potential for development of cancer and intestinal obstruction. There are few data to support the use of balloon assisted enteroscopy for small bowel surveillance, but the technique expands the therapeutic options for the management of small bowel lesions found on other gastrointes-

tinal exams. In particular, balloon-assisted enteroscopy permits endoscopic treatment of small bowel bleeding lesions or polyps. In the context of Peutz-Jeghers syndrome, small bowel enteroscopy allows removal of proximal or distal small bowel polyps detected by other means and offers the possibility of preventing polyp-related complications, in particular intussusceptions, thus avoiding, reducing, or postponing the need for elective or emergency surgery. Altered anatomy or adhesions due to prior surgical intervention might theoretically limit the successful completion of balloon-assisted enteroscopy by preventing progression of the enteroscope. Successful and safe enteroscopic polypectomy of small bowel polyps by balloon-assisted enteroscopy in patients with Peutz-Jeghers syndrome, even with prior laparotomies, has been reported in the literature [16].



**Figure 2a:** CAT scan.



**Figure 2b:** Large and obstructive polyps.

**Figure 2:** Peutz-Jeghers syndrome.



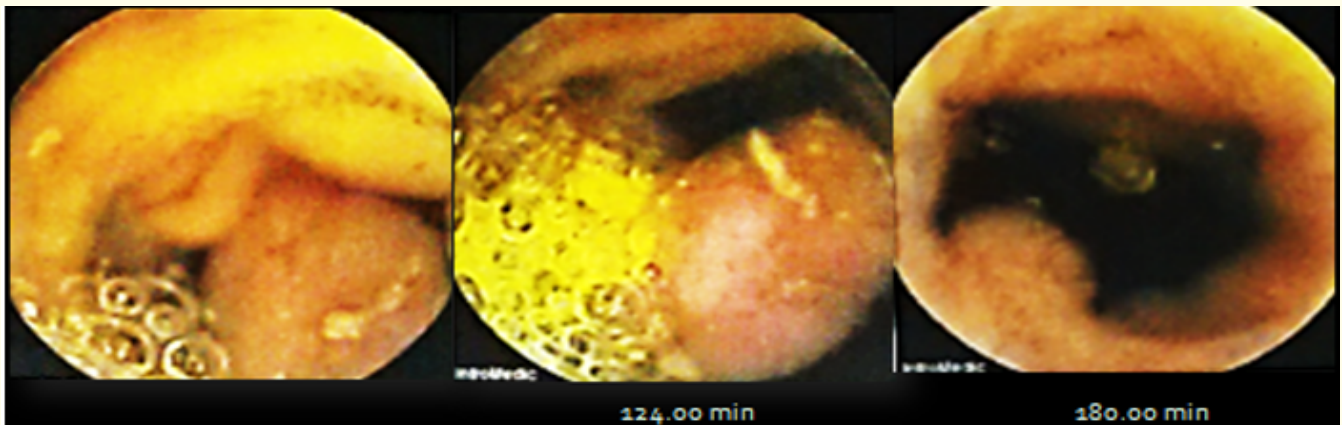


Figure 3a: Endoscopic capsule (Mirocam, Korea).

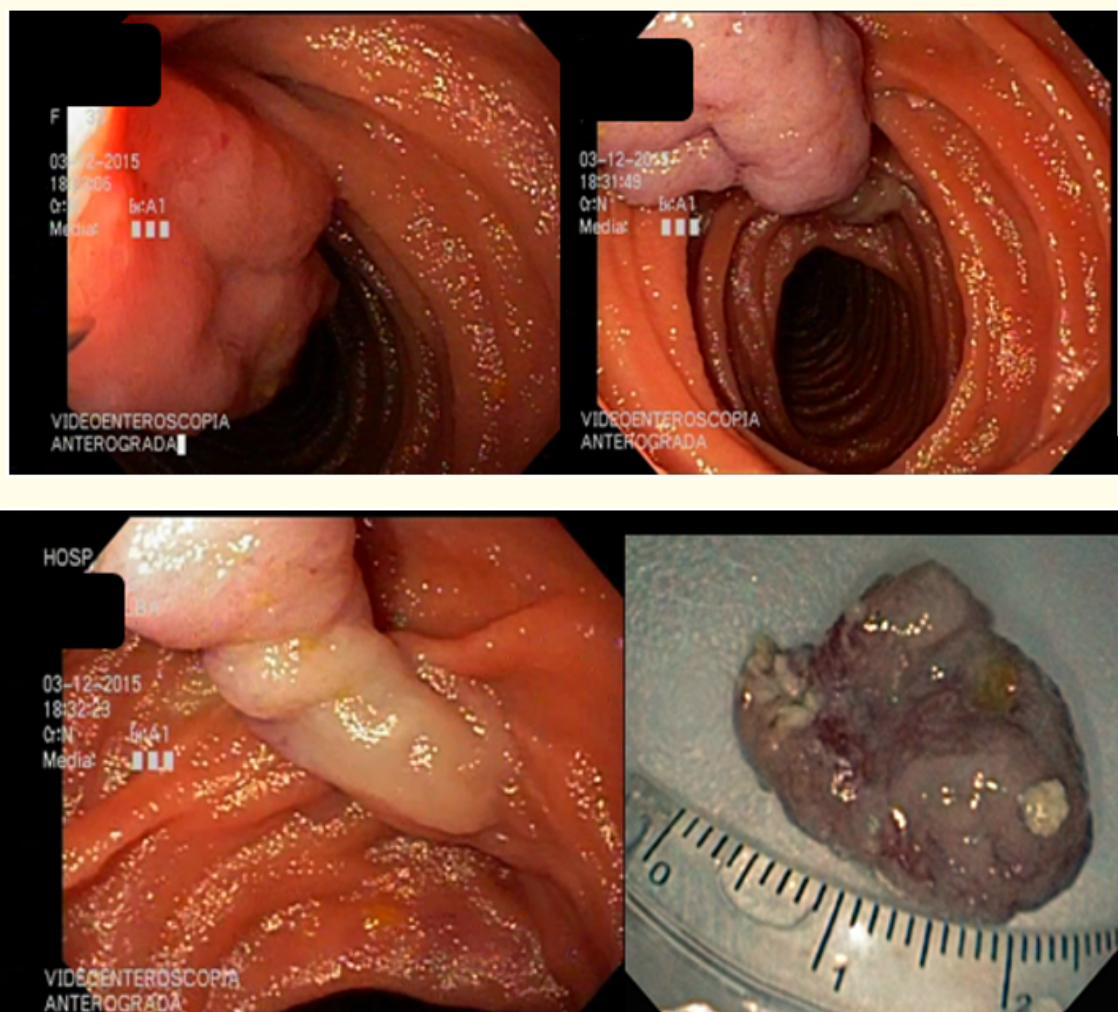


Figure 3b: Adrenaline injection volume reduction technique (AIVR) for the removal of large and obstructive polyps in PJS.

Figure 3: Peutz-Jeghers syndrome.

Many patients with PJS undergo abdominal surgery due to intussusception of the SM, mainly because of large polyps. Surgical risk is above 50% for patients with polyps bigger than 15 mm. SBE is a minimally invasive technique with low morbidity-mortality and a short hospital stay, avoiding the need for surgery after the endoscopic capsule diagnosis is made. Besides, a repeated surgery with extended resection of the SB may lead to a short intestine syndrome, which is a real problem in patients with PJS [15].

With the giant polyps, sometimes the head and the stalk are big enough as to obstruct the whole lumen of the SB, making it difficult to evaluate the safety of the polypectomy. The AIVR technique allows a single piece resection, resulting in a shorter time of the procedure and a lower bleeding or perforation risks. Torroni, *et al.* [15] suggests that a polypectomy is feasible when the polyp is smaller than 15 mm but for polyps bigger than 5 cms a laparoscopy is in order. We demonstrated that our technique makes possible the polypectomy even when there's a complete obstruction of the bowel lumen.

Hogan, *et al.* [12] showed that the epinephrine volume reduction (EVR) is dramatic and frequently results in volume reduction of greater than 80%. This reduction sounds almost impossible until one realizes that a 25% reduction in the diameter of a sphere results in a 58% reduction in volume, and a 50% reduction in the diameter results in an 87% reduction. EVR also reduces the added risks of bleeding and prolonged procedure time by avoiding piecemeal resection.

Estimation of polyp size can be difficult because endoscopists frequently overestimate *in vivo* size [17-19]. Estimation of size with open forceps has not been shown to improve measurements. Difficulty of measurement has been demonstrated in studies comparing visual estimation, open biopsy forceps methods, linear probe, and ruler measurement immediately after excision with fixation in formalin. The gold standard is measurement outside the body immediately after excision [20]. It has been suggested that a trained pathologist's measurements should be used in clinical trials [21]. The marked potential for observer bias in a report of this nature is understood as a result of being unable to make true objective *in vivo* measurements.

Our results are similar to those reported by Hogan, *et al.* [12] in colonic polypectomy, with reduction in the size and volume of the polyps around 80%, became evident the use of the technique. Even it's a little difficult to measure the size of the polyp, a well-trained endoscopist can achieve that skill.

## **Conclusion**

Our results show that AIVR technique is a simple, feasible, safe and effective way to remove large polyps from the SB of patients with PJS. It's a lower cost technique and helps avoid abdominal surgery. Nonetheless further prospective controlled studies are needed.

## **Bibliography**

1. Beggs AD, *et al.* "Peutz-Jeghers Syndrome: a systematic review and recommendations for management". *Gut* 59.7 (2010): 975-986.
2. Giardiello FM and Trimbath JD. "Peutz-Jeghers syndrome and management recommendations". *Clinical Gastroenterology and Hepatology* 4.4 (2006): 408-415.
3. Kopacova M, *et al.* "Peutz-Jeghers syndrome: diagnostic and therapeutic approach". *World Journal of Gastroenterology* 15.43 (2009): 5397-5408.
4. Utsunomiya J, *et al.* "Peutze Jeghers syndrome: its natural course and management". *Johns Hopkins Medical Journal* 136.2 (1975): 71-82.
5. Gammon A, *et al.* "Hamartomatous polyposis syndromes". *Best Practice and Research: Clinical Gastroenterology* 23.2 (2009): 219-231.
6. Zbuk KM and Eng C. "Hamartomatous polyposis syndromes". *Nature clinical practice. Gastroenterology and Hepatology* 4.9 (2007): 492-502.
7. Hinds R, *et al.* "Complications of child hood Peutz-Jeghers syndrome: implications for pediatric screening". *Journal of Pediatric Gastroenterology and Nutrition* 39.2 (2004): 219-220.

8. Gao H., *et al.* "Endoscopic therapy of small-bowel polyps by double-balloon enteroscopy in patients with Peutz-Jeghers syndrome". *Gastrointestinal Endoscopy* 71 (2010): 768-773.
9. VanLier MG., *et al.* "High cumulative risk of intussusception in patients with Peutz-Jeghers syndrome: time to update surveillance guidelines?" *American Journal of Gastroenterology* 106.5 (2011): 940-945.
10. Plum N., *et al.* "Peutz-Jeghers syndrome: endoscopic detection and treatment of small bowel polyps by double-balloon enteroscopy". *Zeitschrift für Gastroenterologie* 45.10 (2007): 1049-1055.
11. Burt RW and Jacoby RF. "Polyposis syndromes". In: Yamada T. eds. *Textbook of Gastroenterology*. Volume 1. Oxford, UK: Wiley-Blackwell (2009): 1653-1655.
12. Reed B Hogan and Reed B Hogan III. "Epinephrine volume reduction of giant colon polyps facilitates endoscopic assessment and removal". *Gastrointestinal Endoscopy* 66.5 (2007): 1018-1022.
13. Walker J., *et al.* "Combined volume reduction with the loop-and-leave technique permits safe endoscopic management of high-risk giant gastric polyps". *Gastrointestinal Endoscopy* 83.3 (2016): 655-656.
14. Laskaratos F-M., *et al.* "Endoscopic resection of a giant ileal inflammatory fibroid polyp by retrograde double-balloon enteroscopy". *Endoscopy* 48.1 (2016): E14-E15.
15. Torroni F., *et al.* "Conservative approach in Peutz-Jeghers syndrome: Single-balloon enteroscopy and small bowel polypectomy". *World Journal of Gastrointestinal Endoscopy* 6.7 (2014): 318-323.
16. A Bizzotto., *et al.* "Balloon-Assisted Enteroscopy: A Window to Small Bowel Polypectomies in Peutz-Jeghers Syndrome". *Video Journal and Encyclopedia of GI Endoscopy* 1.1 (2013): 212-214.
17. Catalano MF., *et al.* "Preliminary evaluation of the prototype stereoscopic endoscope: precise three-dimensional measurement system". *Gastrointestinal Endoscopy* 39.1 (1993): 23-28.
18. Fennerty MB., *et al.* "Are endoscopic measurements of colonic polyps reliable?" *American Journal of Gastroenterology* 88.4 (1993): 496-500.
19. Morales TG., *et al.* "The difference in colon polyp size before and after removal". *Gastrointestinal Endoscopy* 43.1 (1996): 25-28.
20. Gopalswamy N., *et al.* "Is in vivo measurement of size of polyps during colonoscopy accurate?" *Gastrointestinal Endoscopy* 46.6 (1997): 497-502.
21. Schoen RE., *et al.* "The pathologic measurement of polyp size is preferable to the endoscopic estimate". *Gastrointestinal Endoscopy* 46.6 (1997): 492-496.

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