



Original Article

TAMIS with partial excision of mesorectum and primary closure of rectal wound using vloc



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ABSTRACT

Background: Transanal Minimally Invasive Surgery has proven to be a viable alternative in the treatment of rectal tumors; however, rectal wound closure can be challenging. We describe our experience with this procedure using the vloc suture device.

Resume: Eight successful Transanal Minimally Invasive Surgery with primary wound closure using vloc were performed in 5 men, 62 years mean age; all cases had pre-operative diagnosis of adenoma with high-grade dysplasia. The surgical anatomic-pathologic results showed 6 adenomas with high-grade dysplasia and 2 well differentiated adenocarcinomas, limited to the upper third of the submucosa (pT1SM1) without lymphatic or vascular invasion. All lesions were resected with negative margins. No patient reported during follow-up rectal pain, fecal incontinence or bleeding.

Conclusion: The use of vloc in rectal wound closure during Transanal Minimally Invasive Surgery is secure and facilitates the procedure.

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TAMIS com excisão parcial do mesorreto e fechamento primário da ferida retal usando vloc

RESUMO

Tema: Cirurgia Minimamente Invasiva Transanal (TAMIS) tem provado ser uma alternativa viável para o tratamento de tumores do reto, porém o fechamento da ferida retal pode ser desafiante. Nós descrevemos nossa experiência com este procedimento utilizando o dispositivo de sutura vloc.

Resumo: Oito TAMIS foram realizados com sucesso com o fechamento primário da ferida usando vloc, cinco homens, com idade média de 62 anos, todos os casos tiveram diagnóstico pré-operatório de adenoma com displasia de alto grau. Os resultados anátomo-patológicos

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pós-operatório demonstraram: 6 adenomas com displasia de alto grau e 2 adenocarcinomas bem diferenciados, limitado ao terço superior da submucosa (pT1SM1), sem invasão linfática ou vascular. Todas as lesões foram ressecadas com margens negativas. Nenhum paciente relatou durante o seguimento dor rectal, incontinência fecal ou sangramento.

Conclusão: O uso de vloc no fechamento da ferida retal durante TAMIS é seguro e facilita o procedimento.

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Introduction

Transanal Endoscopic Surgery (TES) has been performed with traditional platforms such as TEM (Transanal Endoscopic Microsurgery) and TEO (Transanal Endoscopic Operation) and newer techniques like TAMIS (Transanal Minimally Invasive Surgery).^{1,2}

TAMIS procedure is the transanal use of disposable multiple channels laparoscopic ports, associated with the use of ordinary laparoscopic equipment and CO₂ insufflation (pneumorectum). It can be performed with various devices like SILSTM port (Covidien), SSLTM (Ethicon), Gelpoint (Applied Medical) or adaptations of anal dilator with surgical gloves.²

The risk of lymph node involvement in adenocarcinomas limited to submucosa (pT1) is 10–34%.³ Despite recent studies have shown that in the treatment of rectal adenocarcinoma, TES is associated with higher recurrence rates when compared to radical surgery (2.9–12% of the cases submitted to TES and 0.5% submitted to radical surgery),⁴ overall survival rates did not differ between the two groups. This is probably because patients undergoing TES follow rigorous surveillance protocols and when relapse occurs, they are referred to radical surgery or adjuvant treatment. Multicenter study concluded that TEM can be beneficial in very selected cases of rectal cancer, taking into account the degree of penetration into the submucosa (pT1SM1), tumor diameter (less 3 cm), absence of lymphatic or vascular invasion and well differentiated tumor,^{3,4} in this situation local recurrence rate of less than 5% was reported when treated by TES, which is similar to the results of radical surgery, but with a significant reduction in morbidity and mortality.

Variable rates of complications are reported with TES, especially related to suture dehiscence. This is more prevalent in patients undergoing neoadjuvant therapy therapy.⁵

TES has three steps. First step: initial transanal installation of the device, when performing TEM and TEO the introduction of a rigid surgical proctoscopy and hold it to the operating table; the patient will be positioned according to the location of the lesion; in TAMIS no attachment to the operating table is necessary and the device can be sutured to the perianal skin; usually it is possible to perform most procedures in the lithotomy position. Second step: excision, where in cases of partial thickness resection is not necessary to close the wound; we can easily identify the submucosa plane dissection with visualization of the circular orientation of the muscle fibers. In cases of Partial Mesorectal Excision (PME) with full thickness resection of rectal wall, the perirectal fat is also easily identified.¹

Third step: in cases of PME, usually primary wound closure is indicated, although the possibility to leave it open without major complications is described. The realization of suture in a narrow operating field, where the conflict of tools frequently occurs, is tough and it is not always possible. Several techniques have been described: continuous sutures anchored with conventional laparoscopic or silver clips; automatic continuous sutures (endostich), separated stitches with extracorporeal knot, anchored stitches and closure using traditional anal retractors. The difficulty or impossibility of wound closure and the inadvertent opening of the abdominal cavity have been described for cases of conversion to traditional transanal surgery or laparotomy or laparoscopy.⁶

The objective of this study is to report the use of vloc device (Fig. 1) to close the rectal wound in TAMIS procedure.

Methods

Surgical technique installation of TAMIS

The patient underwent previous mechanical bowel preparation, and the procedure is performed under general anesthesia in the lithotomy position. The patient's position usually is

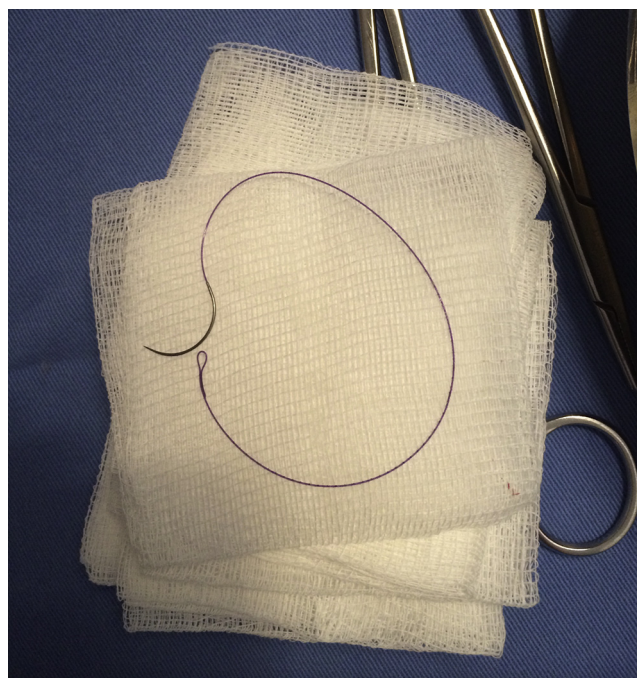


Fig. 1 – Vloc device.

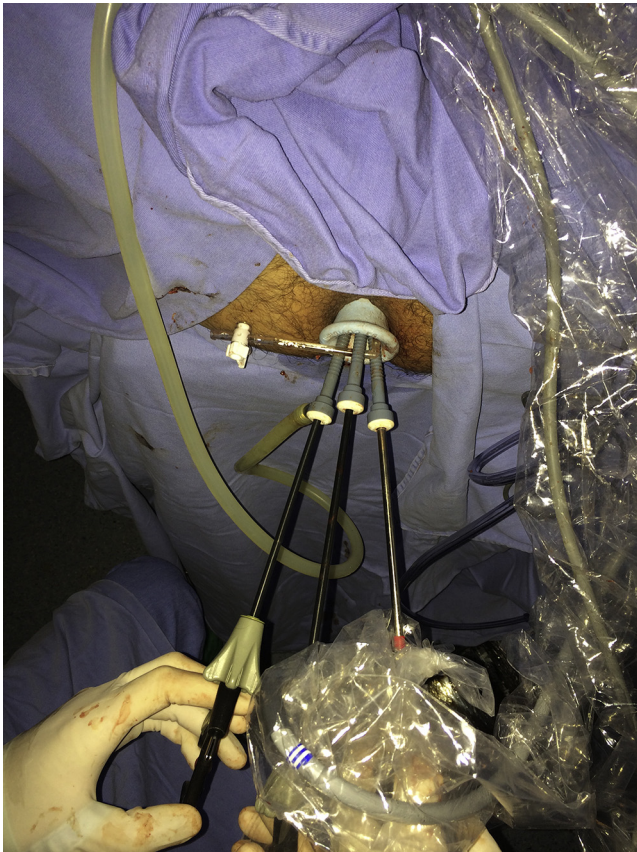


Fig. 2 – SILSTM port device.



Fig. 3 – SSLTM port device.

independent of the location of the lesions (but in our previous experience, in one anterior bulky lesion we have opted to the prone position).¹ Next is introduction of SILSTM port (Covidien, USA) (Fig. 2) or SSLTM (Ethicon, USA) (Fig. 3) and one 5 mm or 12 mm optic and 2 clamps through device holes and fixation to the perianal skin, if necessary and CO₂ insufflation to maintain a satisfactory level of rectal distension (usually 12–15 mmHg).

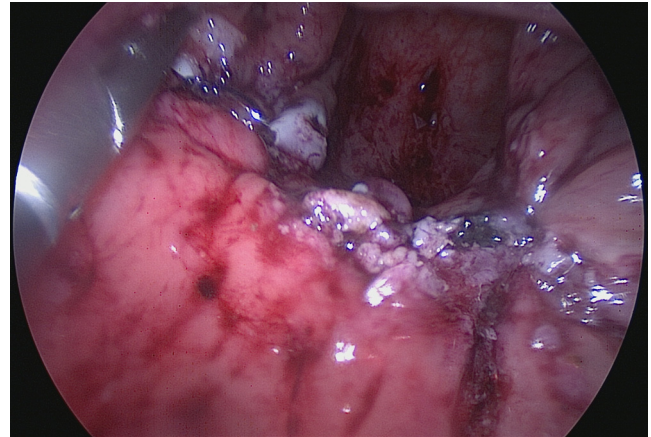


Fig. 4 – Final aspect of the rectal wound closure.

Dissection of the lesion

Radial demarcation of the tumor; excision of the lesion, including the full thickness of the rectal wall and adjacent perirectal fat; this step can be performed either with conventional electric scalpel or other energy sources like bipolar or ultrasonic scalpel. In cases that used SILS, we took the specimen out together with the device. Reintroduction of SILS with new insufflation.

Closure of wound

In these cases where the perirectal fat was exposed, closure of rectal wall was performed using vloc device; after the transfixation of the edges of the wound, the needle is passed through the loop located at its end starting a continuous suture, taking into account that the suture automatically anchors in the wound; thanks to micro-spicules, it is not possible to loosen the suture or return the last passage. When the defect is too large we used more than one suture. When the suture is finished it is not necessary to perform knot or anchor with clip, just cut it (Fig. 4). After reviewing hemostasis and the suture, withdraw the device.

Eight PME procedures with primary wound closure using vloc were performed and compared by gender, age, indication and surgical complications, operative time, number of sutures, positive margins and mortality.^a

Results

Eight procedures were performed in 5 men, 62 years mean age, and all cases had pre-operative diagnosis of adenoma with high-grade dysplasia. Four had undergone previous colonoscopic polypectomy (piece meal resection) with positive margins.

Colonoscopy with biopsy was performed in all patients and Magnetic Resonance Imaging (MRI) of abdomen and pelvis

^a To watch the video of this procedure access: <https://www.youtube.com/watch?v=lLE0OkV4URU>.

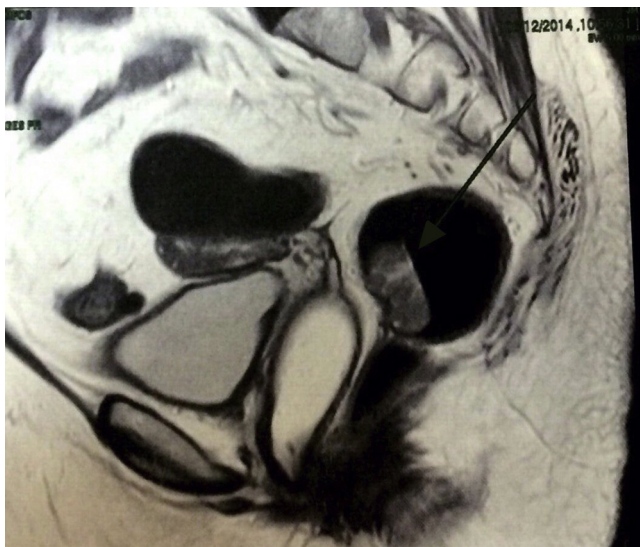


Fig. 5 – MRI of pelvis showing rectal tumor.

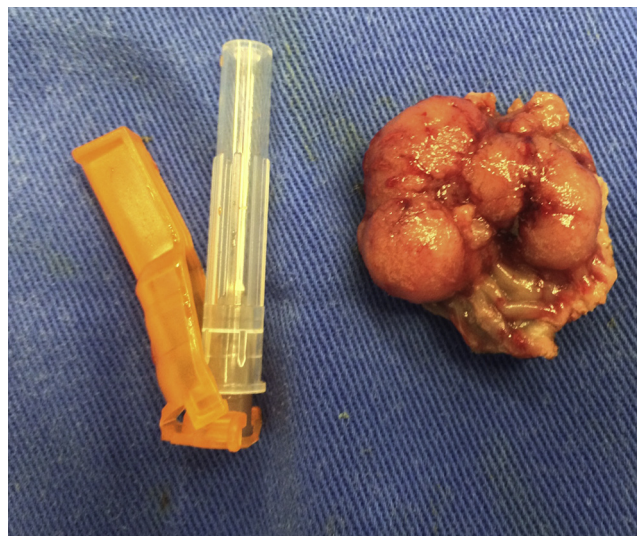


Fig. 6 – Surgical specimen.

with a specific protocol for staging of rectal tumors (Fig. 5); there were no suspicion of invasion of muscle layer of the rectum or suspect lymph nodes.

In 7 cases SILSTM port device (Covidien, USA) was used, and in one case SSLTM (Ethicon, USA). The average lesion size was 2.5 cm. The average distance from the anal verge was 6.2 cm.

The mean duration of the procedures was 95 min; it was possible to perform the primary closure of the rectal defect in all cases using the vloc suture device (Covidien, USA). An average of 1.5 suture per procedure was used; the average hospital stay was 2.3 days.

The anatomic-pathologic results showed 6 adenomas with high-grade dysplasia and 2 well differentiated adenocarcinomas, limited to the upper third of the submucosa (pT1SM1) without lymphatic or vascular invasion and negative lymph nodes; in these 2 cases the option of radical surgery was offered, but they refused this alternative. All lesions were resected with negative margins (Fig. 6).

No patient reported during follow-up rectal pain, fecal incontinence or bleeding. One patient had a hemorrhoidal thrombosis treated with medications. All patients underwent flexible sigmoidoscopy 30 days after the procedure (Fig. 7); no dehiscence wound was diagnosed. There were no deaths. The mean follow-up is 11 months, without recurrence. No adjuvant treatment was necessary.

Discussion

When we compare these results with our previous experience (first series in South America), performing a total of 12 TAMIS procedures, the wound closure using vloc device seems to decrease surgical time and avoid the use of anal retractors to facilitate the closure of the rectal wall defect. The wound closure in TES is generally the most laborious part of the procedure and responsible for conversion. Vloc avoids the necessity of intracorporeal knot and facilitates further closure of the wound by the continuous anchoring as the suture continues.



Fig. 7 – Surgical postoperative view of scar on rectal wall.

The use of more than one suture facilitates the closure of larger wounds because it prevents the narrowing of the rectal lumen as the suture is performed.

Complications occur in about 4% of cases of TES^{6,7} and include bleeding, perforation, wound dehiscence, abscesses, incontinence, stenosis and subcutaneous emphysema. Among all the complications, bleeding and wound dehiscence are the most common surgical complications (27.4% and 13.7%, respectively), and urinary tract infection is the most common overall complication (21.1%). Most surgical complications are treated conservatively and only 2% require additional procedures.⁷⁻⁹

Complications and wound dehiscence occur more frequently in irradiated patients than non-irradiated (33 and

25.6% vs 5.3 vs 0%, respectively)⁵; small dehiscence are more prevalent (21%), large dehiscence are uncommon (4.7%). Marks¹⁰ also reported that 91% of dehiscence was treated conservatively, with a diagnosis mean time of 3.8 weeks.

The learning curve influences on conversion rates, postoperative complications and the height and size of the resected lesions.⁹

High complication rates after radiotherapy 10 (57%) have been reported with TES; rectal pain is the most frequent manifestation (34%) and was classified as grade II and III in over 70% of patients.⁹ Perez et al.¹¹ showed high index of dehiscence and rectal pain after radiotherapy compared to non-irradiated group (61% vs 23%); the median time from diagnosis was one week and a eight weeks healing time, 8% developed late complications, all after diagnosis of suture dehiscence. Rectal stenosis has been described in 5% in both groups after wound complications. The majority (93%) of the patients were managed conservatively.

Saclarides¹² draws attention to the care of the wound closure after full excision of the rectal wall in TES, as transverse wound closure with absorbable sutures. Multiple sutures are preferable for closure of large wounds; in these cases the revision of the permeability of the rectal lumen after the end of the suture is always mandatory, in order to avoid stenosis.

A question that remains unclear is whether the TES techniques are comparable. Prospective studies have not been performed yet, comparing the former platforms and TAMIS. One author¹³ in an experimental study reported that TAMIS is related to high failure rates (30%) when compared to TEM, in contrast with reports by other authors who have shown high success rates with TAMIS.² Strangely, it was described too that the time for the installation of TAMIS device is greater than TEM or TEO. In relation to costs, contrasting results have also been described in relation to the different methods of TES, with these reports: TEO €1920, TEM €2310 and TAMIS €2220.¹⁴

A recent review² found that 390 procedures had been described using TAMIS, the average lesion size was 3.1 cm, the average distance from the anal margin was 7.6 cm, positive margins occurred in 4.3%, and fragmentation of surgical specimens in 4.1%. Conversion was reported in 2.3% of cases. Complications occurred in 7.4%, the most common being bleeding, pneumo-scrotum, subcutaneous emphysema, fever, suture dehiscence and peritoneal perforation.

TAMIS have been most commonly performed under general anesthesia, although the use of spinal anesthesia¹⁵ with good results was described. Wright¹⁶ reports safety release of the patient after 48 h and might be possible to conduct TES in day hospital system.

New TAMIS applications as transanally proctectomy with Total Mesorectum Excision (TME)^{2,17} seem to be promising and may indicate that the method is suitable for the treatment of advanced rectal tumors and perhaps superior to other techniques of TES in specific situations. Improvement of devices used in TAMIS may allow treatment of lesions located in upper rectum,¹⁸ correcting the most important limitation of the method when compared with TEM and TEO.

Like the other techniques of TES, the careful selection of patients with rectal tumor to undergo PME by TAMIS is critical to achieve good results.

Conclusion

We conclude that the use of vloc in wound closure during TAMIS is secure and facilitates the procedure.

Conflicts of interest

The authors declare no conflicts of interest.

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