

Transanal hemorrhoidal dearterialization versus Milligan-Morgan hemorrhoidectomy in grade III/IV hemorrhoids



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Transanal hemorrhoidal dearterialization versus Milligan-Morgan hemorrhoidectomy in grade III/IV hemorrhoids.

BACKGROUND: Grade III-IV hemorrhoids require surgical treatment. The Milligan Morgan hemorrhoidectomy (MM) - still considered the gold standard - is now flanked by less invasive surgical methods such as Procedure for Prolapse and Hemorrhoids (PPH) and Transanal Hemorrhoidal Dearterialization (THD). The authors wanted to compare in a prospective, randomized trial the MM hemorrhoidectomy and the THD in the treatment of grade III-IV hemorrhoids.

MATERIALS AND METHODS: Between January 2010 and March 2013 they were recruited 87 patients with grade III-IV hemorrhoids. All patients did not previously undergo surgical treatment. From the time of recruitment, for a period of six months the patients evaluated the extent of the symptoms of which were suffering expressing in simple and subjective questionnaire how hemorrhoidal disease accounted on their social life and wellness. After six months of the 52 patients with grade III hemorrhoids 27 were randomly treated with THD and 25 with Milligan Morgan; of 37 grade IV 18 they were treated with THD and 19 with MM. It was evaluated in particular the post-operative pain recovery, the reaching the feeling of wellness (evaluated with a modified VAS scale), the presence of bleeding and soiling. The patients then underwent follow-up to at three months, one year and three years.

RESULTS: Grade III-IV hemorrhoids treated with THD showed a more rapid achievement of the wellness with a lower incidence of post-operative pain and faster recovery and return to work activities and social life compared to MM cases. In grade IV hemorrhoids treated with THD or MM these objectives have been reached later compared to grade III. However in cases of grade IV hemorrhoids THD procedure resulted more difficult respect to cases of grade III and there has been an incidence of recurrence at 3 years equal to 15% of cases. In grade IV hemorrhoids treated with MM no recurrence occurred during the three-year follow-up.

CONCLUSIONS: For grade III hemorrhoids THD technique provides the same results of MM, while for grade IV hemorrhoids we believe that better result can be achieved with MM technique. However, we deem that in cases of grade IV hemorrhoids the choice between THD and MM can be more rationally made on the basis of objective examination with the patient in the operating position and already anesthetized and therefore in complete relaxation.

KEY WORDS: Transanal Hemorrhoidal Dearterialization THD, Milligan-Morgan Hemorrhoidectomy, Post-operative Pain, Hemorrhoids

Introduction

Hemorrhoids are one of the most prevalent diseases in Western countries. It is reported an incidence ranging

between 58 and 86% and a prevalence between 5 and 35%. The onset before 20 years of age is quite unusual, while the higher incidence peaks occur between 45 and 65 years of age ^{1,2}. Data from Società Unitaria di Coloproctologia (SIUCP) indicate that more than 3.7 million people suffer from hemorrhoids, with prevalence in the male population ³. As already described by Thomson in 1975, the term hemorrhoids refers to the disease of the anal cushions, whose vascular component is constituted by sinusoids that lack of well distinct muscular layer. These anal cushions play a fundamental role in the continence mechanism. The cause of symptomatic

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hemorrhoids is unknown ^{4,5}, but there are mainly three different theories:

- vascular hyperplasia;
- Dilation of anal cushion veins;
- Sliding of ano-rectal mucosa;

Some factors are associated to the protrusion of anal cushions:

- Prolonged standing position although statistically the data are controversial;
- Food intake scarce in fibers. Food abuses, both quantitatively and qualitatively (alcohol, spices), do not seem to be statistically supported, although this could be responsible in generating the “hemorrhoidal attack”;
- Constipation: hard stool but also to the loss of muscular coordination during the defecation ⁶;
- Diarrhea characterized by loose stools that with their acidic pH end up damaging the wall of the cushions with subsequent congestion;
- Other factors such as obesity, pregnancy, sedentary lifestyle, hypertension, cirrhosis and urinary retention lead to an increase in intra-abdominal pressure thus weakening connective structures and favoring the protrusion of anal cushions;

The more frequent symptom associated to hemorrhoids is rectal bleeding of bright red blood typically that follows the defecation. The bleeding stops spontaneously shortly, but usually alarms the patient conducting him to doctor ⁷.

Patients suffering from hemorrhoids complain with some frequency of functional disorders, such as:

- Foreign body sensation;
- Tenesmus and feeling of incomplete emptying;
- Oppressive pain, sometimes burning, sometimes intense;
- Soiling of feces;
- Prostatodynia.

Hemorrhoids if not appropriately treated may lead to complications such as thrombosis ⁸.

Diagnosis is established by a thorough clinical examination. It is mandatory to complete physical examination with ano-rectal exploration, through the use of an anoscope. Often it is necessary to complete the study with flexible colonoscopy.

The mere presence of hemorrhoids, in the absence of symptoms gives directions to conservative treatments ⁹ such as the increase of dietary fiber and fluids ¹⁰, probiotic supplementation ¹¹, anti-inflammatory drugs (NSAIDs), topical creams based of emollient and anti-edema, but avoiding anesthetic as ends up in sensitizing the rectal mucosa with proctitis and, the rest ¹².

Grade III-IV hemorrhoids require surgical treatment. Hemorrhoidectomy according to Milligan Morgan (MM) does not satisfy the elements that characterize the ideal intervention because of its morbidity, postoperative pain and possible outcomes such as stenosis and recurrence. Over the past two decades, the treatment of hemorrhoidal disease has seen the development and spread of different surgical procedures: the hemorrhoidopexy stapler tech-

nique according to Longo (SH), also known as technique for prolapsed hemorrhoids (PPH) ¹³⁻¹⁸ and the transanal hemorrhoidal dearterialization (THD) ¹⁹, also known as Doppler guided arterial ligation (DGHAL) instead, through the intraluminal ligation of superior hemorrhoidal artery branches, highlighted under Doppler guide, reduces the vascular flow ²⁰. The technique can be combined with the hemorrhoidopexy that at the same time reduces the prolapse. Both techniques are valid, but the first, albeit burdened by less postoperative pain and faster recovery compared to MM, is not free from serious complications and higher relapse rate. A recent Cochrane review of 23 randomized controlled trials ²¹, concluded that the technique of hemorrhoidopexy performed with SH-PPH technique is not superior to traditional hemorrhoidectomy. The THD technique, however, while allowing better results in terms of less postoperative pain and faster return to their activity seems to have worse long-term results. We compared THD an MM technique in a randomly selected population of grade III/IV patients.

Materials and Methods

Between January 2010 and March 2013 98 patients (25-76 years old) affected by third and fourth grade hemorrhoids were selected and deemed eligible for the study (37 women, 61 men). It was considered as grade IV those hemorrhoids constantly prolapsed, even if manually reducible. All patients were symptomatic, not previously treated, except with diet and symptomatic drugs. They were excluded patients with colonic inflammatory diseases, proctitis, anal fissures, fistulas or who had undergone previous rectal surgery.

An observation period of six months was observed, before the final indication for surgery, during which patients followed pharmacological and dietary advices and were requested to provide a weekly note of disorders related to their disease (Table I).

In particular, it was asked to take into consideration the presence or absence of bleeding, prolapse and the necessity to manual reduction, discomfort, anal pain, presence of soiling related to defecation and eventually if the symptoms burdened their working capacity, social relationships and wellbeing. To obtain a full cooperation from patients it has been delivered them a checklist of symptoms and elements to take into consideration, asking them to assign week to week, a score as reported in Table II. After a period of six months it was evaluated every single clinical history and surgery was planned only for those cases where the patient had suffered significantly for at least eight weeks. They underwent surgery even those patients who, despite having suffered for a number of weeks less than the preset limit, asked to undergo surgery because they felt it could not further endure the hardships of the disease.

The type of intervention was established by randomiza-

TABLE I - Symptoms six months before surgery

Prolapse	100%
Constipation	70%
Soiling	52%
Tenesmus	49%
Bleeding	25%
Itching	15%
Feeling occasional foreign body in the anal canal	8%
Thrombosis of hemorrhoidal nodules	4%

TABLE II -

Score	Impact on daily activities
0	no impact in the planning of working life and report and in perception of the feeling of wellness
1	Minimal
2	likely to limit normal activities, resolves with intermittent medication
3	limits significantly the work and relational activities, increased use of medicines
4	severe impairment of working capacity, relationships, severe malaise

tion; 9 patients refused randomization and therefore were not included in the study. They were thus recruited 89 patients, 52 with grade III and 37 with grade IV hemorrhoids. All patients were previously subjected to colonoscopy, in order to exclude concomitant diseases. Before surgery an enema was performed (the evening before surgery). Patients were placed in lithotomic position and under general anesthesia and evaluated again after complete muscular relaxation. In all patients, in the 12 hours post-surgery, it was administered, through an elastomeric pump, an analgesic therapy, (Ketorolac 90 mg plus betamethasone 4 mg or Ketorolac 90 mg plus morphine 10-30 mg). Patients were discharged one day after the intervention. After the surgery, it was considered the perception of pain at rest, during and after defecation, the presence of bleeding, tenesmus, soiling, itching, difficulties to evacuate, the time necessary to return to normal work and social life. All patients took weekly note (for a period of three months) of any presence of pain and perception of wellness thought to use a VAS scale (Visual Analogue Scale). In practice, each patient attributed a "0" score, the total lack of symptoms and a "10" rating, when patients felt very bad with severe pain limiting their daily activity (Table II). One week after surgery an interview was made and at one month, in addition, it was performed a proctologic visit with rectoscopy. The follow-up included a visit to three months after surgery and then at 1 and 3 years.

SURGICAL PROCEDURE AND TECHNIQUE

All patients were treated by two surgeons to the same experience in the use of the two techniques. For THD it was used the THD Kit (THD SpA Correggio (RE) Italy): high ligation of superior hemorrhoidal artery branches, mucopexy, exeresis by anorectal junction, and consequently, low ligation of vessels. The incision on the anocutaneous side and liberation of hemorrhoid up to the apex of its vascular pedicle was performed with Ultracision Harmonic FOCUS® Shears to obtain a rapid haemostasis and safer and less traumatic dissection. Reached the pinnacle of the stalk, it was first coagulated and dissected, then a full-thickness 2.0 Vicril stitch was close to the peduncle. A spongostan haemostatic™ Absorbable Gelatin Sponge was placed at the end of both procedures. At discharge it was prescribed daily Psyllium fibers and 2 liters of water daily to avoid constipation and encourage the production of softer stools.

Results

27 of 52 III-grade hemorrhoid patients and 18 of 37 IV grade, were treated with THD technique while 25 grade III and 19 grade IV were treated with MM hemorrhoidectomy.

Operative times

The operation times in grade III hemorrhoids ranged between 40 and 55 minutes for THD and 38-58 minutes for M-M. In grade IV 45-68 minutes for THD and 40-60 minutes for M-M. (Fig. 1)

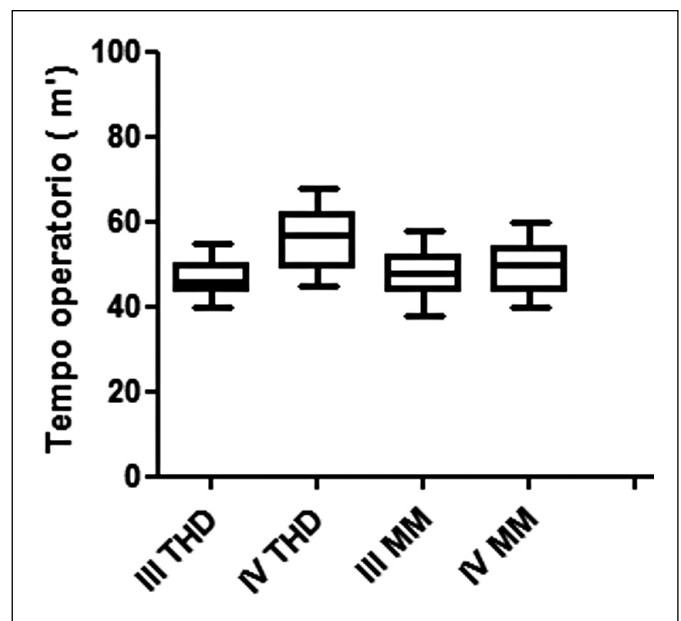


Fig. 1

The Operative time was lower in the third grade compared to IV. THD required longer times compared to Milligan Morgan ($p < 0.05$)

PAIN IN FIRST POSTOPERATIVE WEEK

Grade III hemorrhoids: 1 patient (3.7%) among the 27 treated with THD had pain at rest and 3 (12%) of the 25 treated with MM; 2 patients (7.4%) among those treated with THD and 12 (48%) among patients treated with MM had pain after evacuation (Fig. 2).

Two patients treated with Milligan-Morgan, due to the onset of intense pain at the end of the administration of analgesic therapy were discharged at second postoperative day.

Grade IV: 2 patients felt pain at rest (14%) among patients treated with THD and 4 (21%) among those treated with MM; the pain after evacuation was reported in 3 (16.6%) and 4 (21.5%) respectively; bleeding 0 between the first and second (10.5%) among the second (Table I).

Among patients treated with THD only 15 (33.3%) used analgesics; among those treated with MM used analgesics 30 patients (68.2%) the first week, 13 (29.5%) in the second week and 7 (15.9%) in the third week.

Rest pain at 1 week and after 3 weeks

Lower in the third grade. The Grade IV presents more pain. Anyway THD gave less pain than the MM but there is little statistical significance ($p = 0.049$)

The loss of blood, which occurred after MM in 2 cases of grade IV hemorrhoids, occurred by the third postoperative day; did not require any treatment having

stopped spontaneously and was due to mild bleeding from surgical wounds.

The resumption of the evacuation took place from 2 to 6 days after THD and between 3 and 9 days after MM. In four of the cases treated with THD there was the presence of soiling, stopped between 2-10 days; in 9 cases treated with MM, there was the presence of soiling, stopped between 10-35 days.

Patients undergoing THD returned to their work after 2-5 days; those undergoing Milligan-Morgan after 3-18 days.

FEELING OF WELLBEING

Evaluating the feeling of well being reported by the patients between those treated with THD the first week, 12 of those in grade III reported feeling full of wellness and only one among those with grade IV hemorrhoids. At the second week the patients were respectively 23 and 8. At the third week 27 and 16; at fourth week 27 and 18.

Among those undergone MM the feeling of well being was reported in the first week from 4 patients with grade III hemorrhoids and none with grade IV; at second week 13 with grade III and none with grade IV; at third week 21 with grade III and grade IV with 4; the fourth week 0 and 13, respectively; the fifth week 25 and 17.

Post-discharge pain

The post-evacuation pain was greater with MM compared to THD technique. Increased in the fourth grade compared to III ($p < 0.001$)

THREE MONTHS FOLLOW UP

At 3-months follow up none of the grade III hemorrhoids 52 patients reported pain at rest or after evacuation; none reported of bleeding; none of 37 grade IV hemorrhoid patients reported pain at rest, 1 patient (4%) among those treated with MM reported pain after evacuation; no case of blood losses.

No cases of stenosis or fissure were detected three months after surgery. All patients were subjected to rectoscopy. All patients undergoing MM showed a complete recover. Only in one case among those with grade IV hemorrhoids, it was observed in the anal canal a fibrous nodule, outcome of submucosal coagulation of hemorrhoidal nodule accessory. In 42 of the patients treated with THD it is highlighted a number of thin scars of the mucosa, drawing a line continues to "Z", a result of mucopexy. At three months it was made an assessment of the presence of tenesmus, soiling, constipation and itching. Among patients with grade III hemorrhoids, both among those treated with THD and with MM, there were none presence of these symptoms. Among those operated for grade IV hemorrhoids, there was a single case of tenes-

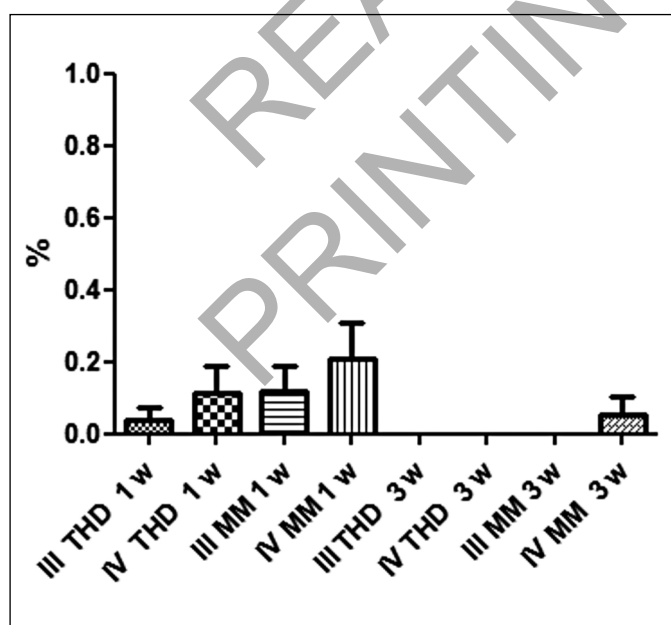


Fig. 2

mus after MM, 1 case of soiling after THD and 1 after MM, no cases of constipation or itching.

The one-year follow up was essentially unchanged except for the disappearance in 30% of cases of linear scars highlighted after THD.

No cases of stenosis were detected in all patients till the end of three-years observation.

It was reported two cases of recurrence in patients with initial grade IV hemorrhoids. In both cases they were classified as grade II and treated with MM.

Discussion

THD technique offers best results when provides, in addition to high ligation of superior hemorrhoidal artery branches, exeresis of mucosa in continuity with prolapsed hemorrhoids up the the dentate line and its subsequent repositioning. Using this technique, it is possible to make simultaneously the high and low ligation of arterial branches. The course of superior hemorrhoidal arterial branches along the rectal wall is very variable, such as it was considered that relapse after THD could be attributed, in some cases, to a non-complete ligation of some branches which penetrate into muscularis propria too distally²².

In grade IV hemorrhoids, to find distal branches may be difficult, albeit with the Doppler probe, and this justified, in our view, the choice to extend the exeresis between 10mm and 5 mm (average 8 mm) from the anorectal line, in order to have more chances of making a low ligation.

Although the detection of distal arterial branches is not always possible after high ligation, the adoption of THD, which involves the exeresis of the mucosa close to the dentate line, allows to carry out a low vascular ligation, while saving the sensitive mucosa of the anal canal.

The reduced postoperative pain for THD cases compared to Milligan-Morgan, is partly due to the absence (for THD) of wound in anodermal.

In our study, patients treated with THD, compared to MM, in a 36-months follow up, presented two cases of recurrence although of a lesser grade compared to pre-treatment, whereas among those undergoing MM hemorrhoidectomy it was only noted a case of asymptomatic fibrotic nodule, already detected at follow-up at 1 year. The two cases were reported among patients with IV grade hemorrhoids (11%). We believe that this finding reinforces the evidence that the choice of technique to adopt should be decided from surgeon. The case of recurrence detected among patients undergoing MM hemorrhoidectomy was attributable to an initial case of grade IV and in any case could not be considered a relapse, but a fibrotic nodule subsequent to surgery. The two cases of relapse after THD may be related to the advanced grade of hemorrhoids. Although the technique adopted is the one that should ensure greater success,

in cases of grade IV hemorrhoids THD may lack it is unable to perform an ideal mucopexy. In fact, while bringing the suture for exeresis up close to the dentate line, as often happens in the event of large prolapsed hemorrhoids as in the grade IV, it may determine an uneffective mucopexy.

We think that in grade III hemorrhoids THD and MM, are equivalent in terms of results, although the less post-operative pain, the more rapid recovery of activity and the more rapid achievement of a condition of being they are more favorable to THD. Similar results can be achieved even in the case of grade IV in the short and medium term hemorrhoids, but the long-term results seem to be more favorable to MM although more numerous samples of patients would provide more consistent data. The lower incidence of postoperative pain in the cases treated with the THD is consistent with data reported in other trials. Authors^{23,24} reported fewer cases of post-operative pain in cases treated with THD compared to those treated with SH or than those treated with hemorrhoidectomy²⁵.

The technique we used to make the mucopexy, penetrating the rectal wall for not more than 6 mm, has avoided penetrating the wall of the rectum to the entire thickness and this could explain the absence of perirectal sepsis although no antibiotic prophylaxis was performed but only a good topical antiseptis.

The Harmonic Scalpel allowed a less-traumatic isolation of hemorrhoidal nodules reducing the rate of bleeding at 4.5% consistent with the findings of others authors. We believe the choice to use a full thickness stitch at apex of hemorrhoid before the resection of the nodule, is a choice of prudence that should always be implemented.

Conclusion

A rigorous selection of patients is always at the base of therapeutic successes. In the treatment of hemorrhoidal disease, this imperative becomes even more pressing. The THD technique is more conservative and presents fewer complications than other surgical techniques and deserves a role of first choice in grade III hemorrhoids. The technique, however, must necessarily include a high ligation, a low ligation and construction of mucopexy. In this way, in addition to reducing hyperafflux of blood to hemorrhoidal structures, it can be obtained an upward repositioning with the elimination of the prolapse. Even Milligan-Morgan hemorrhoidectomy in grade III hemorrhoids produces good results, although with higher perioperative morbidity than the THD and slower reacquisition of wellness.

In grade IV hemorrhoids, the postoperative course seemed to be more favorable for THD than MM, but not significantly, and to a lesser extent than in cases of grade III hemorrhoids, while the long-term results were more favorable to MM hemorrhoidectomy.

Performing mucopexy with THD in grade IV hemorrhoids involves the adoption of a more marked resection which, while smooth in its realization, may imply immediate consequences in the static of the anorectal region and on the dynamics of defecation resulting therefore in temporary tenesmus, pelvic pain, urinary retention, defecatory difficulties lasting few days. Even today, therefore, in the case of grade IV hemorrhoids MM hemorrhoidectomy can be considered the best treatment. In these cases THD continues to have indication but this choice must be confirmed, from time to time, after that the operator has examined the patient in full relaxation in operating position.

Riassunto

La terapia delle emorroidi di III e IV si basa sul trattamento chirurgico. All'emorroidectomia secondo Milligan Morgan (MM), da molti chirurghi considerata il gold standard, si affiancano attualmente metodi chirurgici considerati meno invasivi come la Procedura per Prolasso ed Emorroidi (PPH) e la dearterializzazione emorroidaria transanale (THD). Gli Autori hanno voluto confrontare in un trial prospettico e randomizzato la emorroidectomia secondo MM e la THD nel trattamento di emorroidi di III e IV grado valutandone i risultati a breve e medio termine.

Materiali e metodi: Tra gennaio 2010 e marzo 2013 sono stati reclutati 87 pazienti con emorroidi di III e IV grado secondo la classificazione di Goligher. Tutti i pazienti non avevano subito in precedenza alcun trattamento ma per tutti vi era indicazione al trattamento chirurgico. Dal momento del reclutamento, i pazienti, per un periodo di sei mesi, hanno valutato l'entità dei sintomi dei quali soffrivano esprimendo in modo semplice e soggettivo quanto incidere la patologia emorroidaria sulla loro vita di relazione e sulla sensazione di benessere. Dopo sei mesi dal reclutamento sono stati avviati all'intervento chirurgico in maniera randomizzata: dei 52 pazienti con emorroidi di III grado 27 sono stati trattati con THD e 25 con MM; dei 37 di IV grado, 18 sono stati trattati con THD e 19 con MM. Sono stati quindi valutati i tempi di ripresa post-intervento tenendo conto in particolare del dolore post-operatorio, del raggiungimento della sensazione di benessere dai pazienti valutata con una scala VAS modificata, dalla presenza di sanguinamento e soiling. I pazienti sono poi stati sottoposti a follow-up a tre mesi, un anno e tre anni. Risultati: I casi di emorroidi di III e IV grado trattati con THD hanno mostrato un più rapido raggiungimento della condizione di benessere con una minore incidenza di dolore post-operatorio e più rapida ripresa delle attività lavorative e di relazione rispetto ai casi trattati con MM. Nel caso di emorroidi di IV grado trattate con THD tuttavia, questi obiettivi sono stati raggiunti più tardivamente rispetto ai casi di emorroidi di III grado.

Anche con l'emorroidectomia secondo MM i risultati rispetto ai casi di III grado trattati con lo stesso metodo sono stati più tardivi. Tuttavia nei casi di emorroidi di IV grado è risultata più indaginosa la realizzazione del trattamento con THD rispetto ai casi di III grado e vi è stata una incidenza di recidive a 3 anni pari al 15% dei casi. Nelle emorroidi di IV grado trattate con MM non si è evidenziata a 3 anni alcuna recidiva.

Conclusioni: per le emorroidi di III grado la tecnica THD può essere considerata un metodo al pari della MM, mentre nel caso di emorroidi di IV grado si ritiene che migliori risultati possono essere ottenuti con la MM. Gli Autori tuttavia traggono il convincimento che in casi di emorroidi di IV grado la scelta tra THD e MM possa comunque essere più razionalmente fatta sulla base del riscontro obiettivo con il paziente in posizione operatoria e già anestetizzato e pertanto in completo rilasciamento sfinteriale.

References

1. Aigner F, Bodner G, Gruber H: *The vascular nature of hemorrhoids*. J Gastrointest Surg, 2006; 10:1044-50.
2. Faccini M, Zuccon W, Caputo P, Gavezzoli D, Manelli A, Bonandrini L: *Hemorrhoidal disease: Epidemiology and correlation with chronic constipation*. Ann Ital Chir, 2001; 72(3):337-40.
3. Faucheron JL, Gangner Y: *Doppler-guided hemorrhoidal artery ligation for the treatment of symptomatic hemorrhoids: Early and three-year follow-up results in 100 consecutive patients*. Dis Colon Rectum, 2008; 51:945-49.
4. Kjaer S, Lund HH, Schulze S, Bisgaard T: *Limited success in patients treated with transanal haemorrhoidal dearterialisation*. Dan Med J, 2014; 61(12), A4971.
5. Kousten J, Baeten CG: *Hemorrhoidectomy vs Lord's method: 17 year follow-up of a prospective randomized trial*. Dis Colon Rectum, 2000; 43:503-06.
6. Lunniss PJ, Gladman MA, Hetzer FH, Williams NS, Scott SM: *Risk factors in acquired faecal incontinence*. J R Soc Med, 2004; 97:111-16.
7. Giordano P, Gravante G, Sorge R, Ovens L, Nastro P: *Long-term outcomes of stapled hemorrhoidopexy vs conventional hemorrhoidectomy: A meta-analysis of randomized controlled trials*. Arch Surg, 2009; 144:266-72.
8. Buyukasik O, Hasdemir OA: *Rectal lumen obliteration from stapled hemorrhoidopexy: Can it be prevented?* Tech Coloproctol, 2009; 13, 33-335.
9. Serventi A, Rasso C, Giaminardi E, Massobrio A, Vitali GC, Stabilini L: *Haemorrhoidal disease: Role of conservative outpatient treatments*. Ann Ital Chir, 2011; 82:341-47.
10. Altomare R, Cacciabudo F, Damiano G, et al.: *The Mediterranean Diet: A History of Health*. Iranian J Publ Health, 2013; 42(5):449-57.
11. Sinagra E, Tomasello G, Cappello F, et al.: *Probiotics, prebiotics and symbiotics: State-of-the-art and new insight*. Journal of Biological Regulators and Homeostatic Agents, 2013; 27(4):919-33.

12. Arnold S, Antonjietti E, Rollinger G, Scheyer M.: *Dopplersonographisch unterstützte Hamorrhoiden-arterienligatur: eine neue Therapie bei symptomatischen haemorrhoiden.* Chirurg, 2002; 73, 269-73.
13. Gentile M, Cricrì AM, D'Antonio D, Bucci L: *Stapling anopexy vs. traditional haemorrhoidectomy: Comparative outcome of two groups of patients.* Ann Ital Chir, 2002; 73(2):181-86.
14. Zanghì G, Catalano F, Zanghì A, et al.: *Surgical treatment of mucosal hemorrhoidal prolapse using a circular stapler.* Ann Ital Chir, 2003; 74(1): 63.
15. Conzo G, Buffardi R, Brancaccio U, et al.: *Stapled hemorrhoidopexy in the treatment of hemorrhoidal prolapse.* Ann Ital Chir, 2004; 75(6): 655-60.
16. Pescatori M, Orsini G, Tegon G, Vasapollo L: *Stapled hemorrhoidopexy: critical observation on state of art.* Ann Ital Chir, 2005; 76(1).
17. Sammarco G, Ferrari F, Carpino A: *PPH vs Milligan-Morgan: Early and late complications in the treatment in the hemorrhoidal disease with circumferential prolapse.* Ann Ital Chir, 2014; 85: 464-69.
18. Bove A, Bongarzone G, Palone G, Chiarini S, Calisesi EM, Corbellini L: *Effective treatment of haemorrhoids: early complication and late results after 150 consecutive stapled haemorrhoidectomies.* Ann Ital Chir, 2009; 80:299-303.
19. Tirone A, Vuolo V, Gaggelli I, Francioli N, D'Onofrio P, Quarta S, Verre L: *Transanal Haemorrhoidal Dearterialisation: Personal experience.* Ann Ital Chir, 2010; 81:311-13.
20. Sammartano A, Palumbo VD, Damiano G, et al.: *Colour Doppler-guided haemorrhoidal artery ligation: An adjunct in identification of haemorrhoidal vessels.* Tech Coloproctol, DOI 10.1007/s10151-012-0926-2
21. Lumb KJ, Colquhoun PH, Malthaner R, Jayaraman S: *Stapled versus conventional surgery for hemorrhoids.* Cochrane Database of Systematic Reviews 2006, Issue 4. Art. No.: CD005393. DOI: 10.1002/14651858.CD005393.pub2.
22. Ratto C, Parello A, Donisi L, Litta F, Zaccone G, Doglietto GB: *Assessment of haemorrhoidal artery network using colour duplex imaging and clinical implications.* Br J Surg, 012; 99:112-18.
23. Festen S, Van Hoogstraten MJ, Van Geloven AA, Gerhards MF: *Treatment of grade III and IV haemorrhoidal disease with PPH or THD. A randomized trial on postoperative complications and short-term results.* Int J Colorectal Dis, 2009; 24:1401-05.
24. Sajid MS, Parampalli U, Whitehouse P, Sains P, McFall MR, Baig MK: *A systematic review comparing transanal haemorrhoidal dearterialisation to stapled haemorrhoidopexy in the management of haemorrhoidal disease.* Tech Coloproctol, 2012; 16:1-8.
25. Denoya PI, Fakhoury M, Chang K, Fakhoury J, Bergamaschi R: *Dearterialization with mucopexy vs haemorrhoidectomy for grade III or IV haemorrhoids: Short-term results of a double-blind randomized controlled trial.* Colorectal Dis, 2013; 15: 1281-288.

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