Stapled haemorrhoidopexy: correlation among histology, intraoperative morphology and interindividual anatomic variability in muco-haemorrhoidal prolapse

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PURPOUSE: *The Authors correlated intraoperative mucohaemorrhoidal prolapse morphology, specimen histology, anal canal length and purse-string height.*
METHODS: *Between September-November 2010, 18 patients (9 grade III; 9 grade IV haemorrhoids) underwent stapled haemorrhoidopexy. Mean age was 54 years (range 38-78).Proctoscopic prolapse morphology, anal canal length, purse-string height and external component were evaluated intraoperatively and specimens sent for histology.*
RESULTS: *Intraoperative findings were as follows: 2/18 patients showed no procidentia, 2/18 'haemorrhoid type' prolapse, 14/18 'rectal type' prolapse. Mean anal canal lenght was 3.5cm (range 2.5-4.5); mean purse-string height was 4.5cm from the dentate line (range 3.5-5.5); 10/18 patients carried external component. Histology showed mucosa/submucosa in 4/18 cases, muscolaris propria in 9/18, perivisceral fat in 5/18. No procidentia/'haemorrhoid type' prolapse showed only mucosa/submucosa at histolgy; a 'rectal type' morphology showed at least the muscolaris propria. An anal canal > 3.5cm related to 'haemorrhoid type' prolapse, a pursestring ≤ 4cm and mucosa/submucosa at histology. An anal canal ≤ 3.5cm related to 'rectal type' prolapse, a purse string > 4cm from dentate line and at least the muscolaris propria. One patient required analgesics for >7 days. At three months, 1/18 patient presented urgency, 2/18 stool clustering. In 1/18 patient a moderate grade of external component persisted.*
DISCUSSION: *A possible correlation among anoscopic phenotype, specimen histology, pursestring height, might exist and influence clinical outcomes.*
CONCLUSIONS: *A positive correlation between specimen thickness, purse-string height and 'rectal type' morphology was found. Patients with higher anal canal showed haemorrhoidal pattern of prolapse, a lower purse-string and mucosa/submucosa at histology.Intraoperative prolapsing tissue morphology could represent a further criteria for surgical decision.*

KEY WORDS: Haemorrhoids, Haemorrhoidopexy, Prolapse

Introduction

The novel technique of stapled haemorrhoidopexy in the surgical treatment of mucohaemorrhoidal prolapse was first introduced by Longo [1] in 1998. The operation has gained wide consent and rapid propagation among colorectal surgeons [2,3], showing good results in terms of symptom relief, postoperative pain and return to work [4]. A randomized clinical trial by Ortiz et al. [5] showed how stapled haemorrhoidopexy gives significant advantage in terms of postoperative pain compared with traditional haemorrhodectomy. Indications, contraindications and technical details have recently been codified [6], though some points are still a concern. The lack of a long-term follow-up, the presence of associated anorectal benign conditions and external component, purse-string suture

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height [7-9] and the histopathological features of the resected specimen represent the current debating issues. Aim of the study was to evaluate the correlation between muco-haemorrhoidal prolapse severity at intraoperative proctoscopy and histological features of excised doughnuts in terms of wall thickness and layers.
Histopathological results were related to anal canal and purse-string height and to the external component as well. In addition, short term results are reported in terms of continence, postoperative pain and sepsis, haemorrhage and symptom relief.

Material and Methods

Between September and November 2010, 18 patients admitted for surgical treatment of haemorrhoids were studied. Mean age was 54 years (range 38-78); 9 patients suffered from grade III haemorrhoids (50%) and 9 grade IV (50%). In this latter group patients with uncomplicated haemorrhoids, irreducible by the patient but reducible at surgery were included, according to the consensus position paper by Corman et al.[6]. Preoperative assessment included full colonoscopy, anorectal manometry, defecography and endoanal ultrasound (EAUS). Inclusion criteria were: a 'clean colon' at colonoscopy, normal rest and squeeze anal pressures at manometry, normal anal sphincter anatomy at EAUS. A modest mucous prolapse was present in 12/18 patients (66%). All patients were symptomatic for anal bleeding, wet anus, history of haemorrhoidal thrombosis, presence of external tags. Patients reporting symptoms potentially related to an obstructed defecatory syndrome were not included in the study. Written informed consent was obtained; all patients underwent a stapled haemorrhoidopexy under subarachnoid anaesthesia using the KYGZ-33.5 single-use circular stapler [Changzhou Kangdi Medical Stapler Co., Ltd] and Purse Device kit KHQ-33.5 (including a circular anal dilator, anal obturator, observation device, hook) [Changzhou Kangdi Medical Stapler Co., Ltd]. At the time of operation the following parameters were evaluated: protruding tissue into the observation device, intraoperative proctoscopic prolapse morphology, anal canal length, purse-string height and the presence of external component. Anal canal length and purse-string suture height were measured with a little narrow rigid ruler. The excised tissue was sent for histology to evaluate the resected layers of rectal wall. Grossly, the specimens were composed of fragments of rectal wall from 2 to 5 cm in maximum diameter. Tissues were formalin-fixed, paraffin-embedded and stained with haematoxylin and eosin. Morphologically, the presence of mucosa, submucosa, muscularis propria, serosa and perivisceral adipose tissue was evaluated. Where muscularis propria was present, it was measured by a micrometric eyepiece. A final correlation among intraoperative and histological parameters was performed. Immediate postoperative complications were evaluated in terms of haemorrhage, pain, sepsis and mortality. At three months after surgery, patients were clinically reviewed, assessing symptom relief, incontinence, pain, stool clustering.

Results

In 2/18 patients (11%) procidentia was not present through the anal dilator; in 2/18 patients (11%) the prolapsing tissue was defined as 'haemorrhoid type' with the classic proctoscopic morphology, characterized by the three typical cushions; in 14/18 cases (78%) a 'rectal type' prolapse morphology was identified, characterized by typical circumferential rectal folds. Mean anal canal height was 3.5 cm (range 2.5-4.5 cm); mean purse-string height was 4.5 cm (range 3.5-5.5 cm); in 10/18 patients (55.5%) an external component was present. Microscopic evaluation of resected doughnuts showed the following results: mucosa and submucosa were present in 4/18 patients (22.5%) with the anal transitional zone in 1; in 9/18 cases (50%) mucosa, submucosa and muscularis propria were identified; in 5/18 cases (27.5%) the whole rectal wall with its perivisceral fat tissue was present, though extremely thin in three. A correlation was found between the intraoperative morphology through the observation device and histological results. More specif-

Table I - *Correlation between intraoperative morphology, anal canal legth, purse-string suture height and specimen wall layers*

Patient N°	Intraoperative Morphology	Anal canal length (cm)	Purse-string suture height (cm)	Histological reports
1	NP	3.6	4	MS
2	NP	3.8	3.8	MS
3	HT	4.5	3.5	MS
4	HT	4.1	3.7	MS
5	RT	3.5	4.3	MP
6	RT	3.2	4.9	MP
7	RT	3.5	4.2	MP
8	RT	2.9	5.3	MP
9	RT	2.5	5.0	MP
10	RT	2.9	4.7	MP
11	RT	3.1	4.6	MP
12	RT	3.3	5.5	MP
13	RT	2.8	5.2	MP
14	RT	2.5	4.6	FPT
15	RT	3.2	4.5	FPT
16	RT	3.5	4.4	FPT
17	RT	2.7	5.3	FPT
18	RT	3.3	4.5	FPT

NP = No procidentia; HT = Haemorrhoidal Type prolapse
RT = Rectal Type prolapse; MS = Mucosa and Submucosa
MP = Muscolaris propria; FPT = Fat perirectal tissue

ically, in patients carrying either no procidentia or a 'haemorrhoid type' prolapse, histology showed the presence of only mucosa and submucosa; in patients with a 'rectal type' prolapsing tissue, histological reports demonstrated also the muscolaris propria or perirectal fat tissue. As shown in table I, a positive correlation between specimen wall layers, purse-string suture height and intraoperative morphology was found: patients with an anal canal > 3.5 cm in length showed a haemorrhoidal pattern of prolapse, a low pursestring suture (≤ 4 cm from the dentate line) and only mucosa and submucosa at histology; patients with an anal canal ≤ 3.5 cm in length showed a rectal type prolapse with a higher purse string suture (> 4 cm from the dentate line) and at least the muscolaris propria of the rectum in the histological report. One patient (5.5%), with the anal transitional zone at histology, required analgesics for more than 7 days for postoperative pain; no other short term complication was observed in the study group. Modest bleeding during the first postoperative 30 days was considered normal. Perioperative mortality was null. At three months after surgery, one patient (5.5%) complained of urgency, 2/18 cases presented stool clustering, neither incontinence nor chronic pain were reported. Symptom relief and high patient-perceived satisfaction were encountered in 17/18 cases (94.5%); in one patient a moderate grade of external component persisted.

Discussion

Stapled haemorrhoidopexy has received a big enthusiasm among colorectal surgeons in the surgical treatment of haemorrhoids. The novel interest not only regards patient satisfaction and symptom relief, but also technical, histological and functional details. Long-term efficacy of this surgical approach has also been demonstrated by a multicenter randomized trial by Ganio, Altomare et al., which show that there is not significant difference in terms of recurrence rate, compared with traditional haemorrhoidectomy. According to the original technique described by Longo in 1998[1], a submucosal purse-string suture should be placed at ~4 cm above the dentate line: in this way the circular staple line should be evident at ~2 cm proximal to the mucocutaneous junction.

Following the correct procedure, the microscopic evaluation of resected specimens should show only mucosa and submucosa. Nevertheless, in up to 97% of cases, a variable amount of smooth rectal muscle is evident at histology[11] without, however, any significant modification of continence or quality of life parameters[12]. Other studies emphasize how mucosal resection is only theoretical and a deeper resection is the more usual outcome, with muscle tissue present in 100% of the specimens in a series reported by Behboo et al. [13] Our experience is not far from these latter results, showing muscularis propria in 50% of patients and perirectal fat tissue in 27.5% of cases. The presence of fat tissue in the surgical specimen may be considered an original finding of the present study. Actually most of the studies simply do not report on the presence of perirectal fat tissue in the resected specimen, as they only focus on the presence or absence of muscle tissue. Thus, we also point out the possibility to get fat tissue in the operative specimen in a significant amount of cases; this finding might also correlate with the tendency of our group to perform a pursestring suture as high as possible and deep enough to get a satisfactory lifting effect on the prolapsing mucohaemorrhoidal tissue.

A possible drawback of this approach might be to get an increased complication rate, particularly with regard to recto-vaginal fistula, which is a well-known described but uncommon complication as reported by Pescatori and Gagliardi [14]. Actually we did not see this complication in our institutional experience: obviously, care must be taken in avoiding the stapling of the vaginal wall, which can be easily achieved putting a finger in the vagina and lifting the posterior wall while tightening the stapler; also the use of a vaginal dilator can be very useful in these cases; a final finger-check is always recommended before firing.

On the other hand the finding of a thick rectal specimen did not negatively correlate with functional results; moreover, in the group of patients receiving a pure anopexy (only mucosa and submucosa at histology) one case of urgency and one case of abnormal pain requiring higher doses of analgesics were found. In the group with muscularis propria at histology, two patients complained of stool clustering. The physiopathology of these results was interpreted as follows. The two patients with postoperative pain and urgency carried a staple line very close to the dentate line, one of them showing transitional epithelium at histology. The involvement of the anal transitional zone and the sensitive component in the suture can easily explain the symptom 'pain', as reported by Correa-Rovelo *et al* [15]; the only oedema next to the dentate line probably justifies the 'urgency' symptom. Patients complaining of stool clustering, instead, carried a staple line inside the rectum, showing smooth muscle or fat perirectal tissue at histology: a reduced compliance could give reasons for a lower threshold of the rectal first sensation and rectoanal inhibitory reflex (RAIR), not unlike the 'anterior resection syndrome'[16-18].

An unusual report of our research was the correlation between specimen thickness and intraoperative morphology of the prolapsing tissue. More specifically, we were able to identify two characteristic aspects: in one case there was a rectal type prolapsing tissue with the concentric mucosal rings peculiar to rectal prolapse; in the other there was a typical haemorrhoidal protruding tissue with its classic radial folds and cushions. The presence of rectal prolapsing tissue was not due to a preoperatively underestimated rectal prolapse; we would rather relate this finding to pelvic muscle relaxation following subarachnoid anaesthesia, underlining a sub-clinical rectal prolapse. A mucosal prolapse is, in any case, to be considered a paraphysiologic report, as was actually preoperatively diagnosed in 66% of cases. Patients with a typically haemorrhoidal prolapsing tissue showed a high anal canal (>3.5 cm): they were all males and were the same patients who reported postoperative pain and urgency. In our experience, the lack of a protruding mucosa and the characteristic intraoperative haemorrhoidal radial folds through the anal dilator positively correlate with a higher anal canal, a lower purse-string and a narrower specimen in terms of width and thickness, all leading to worse postoperative results. Our data are at variance with other authors. Lloyd et al.[19] suggest a modified technique for grade III/IV haemorrhoids, even with large external component. The placement of a lower purse-string suture (2-3 cm above the dentate line) did not show such bad postoperative results allowing an adequate reduction of the external portion of haemorrhoidal prolapse as well. Not surprisingly, also in our experience, a purse string closer to the dentate line does lead to a better reduction of external haemorrhoids, nevertheless, only intraoperative manual setting of the exteriorised component was sufficient to perform a satisfactory anopexy. Furthermore, performing a lower purse string in the case of abnormal haemorrhoidal prolapsing tissue may lead to a higher risk of bleeding, with potential creation of submucosal haematomas and subsequent distortion of the normal anatomic planes. The convenience of a higher purse-string suture was already evident in previous reports[8, 9], some of them suggesting a target height of ~6 cm proximally to the dentate line[8], even though the correlation was in these cases with functional results regarding postoperative pain and continence. In the case of residual prolapsing tissue, our attitude is to lift the redundant component up above the dentate line, combining haemostatic stitches through the circular suture with ischemizing pinches of the protruding mucosa. It is, moreover, possible to perform accessory procedures as necessary either before or after stapling, such as the excision of external component in accordance with the surgeon's personal preference[6, 20]. Nonetheless, we must emphasise that any procedure (e.g. diathermy, stitches, etc.) on perianal skin or sensitive anal epithelium leads to increased postoperative pain. With this in mind, our guidance is to consider the possibility of performing a conventional haemorrhoidectomy, choosing the technique with which the surgeon is more familiar. The intraoperative morphologic patterns through the anal dilator could be a further element of therapeutic behaviour in the operative room, to decide on a stapled anopexy alone or with a concomitant excision of external conditions or for a conventional haemorrhoidectomy.

The major limitation of this study lies in the small sample size which probably does not allow to get significant results; however, our aim was to report this interesting findings, so that the present study is to be considered as a pilot study and results probably need to be completed and confirmed by larger, multicentre investigations.

Conclusions

Despite the small sample size and its limitations, this pilot study showed a positive correlation between specimen wall thickness, purse-string suture height and rectal type morphology and severity of prolapse at operation. Patients with a higher anal canal showed a haemorrhoidal pattern of prolapse, a subsequent lower pursestring suture and only mucosa and submucosa at histology. The placement of a purse-string more than 4 cm above the dentate line led to better functional three-month results in terms of pain, urgency and patient satisfaction. According to our results, intraoperative identification of prolapsing tissue morphology could represent a further criteria for surgical decision.

Riassunto

Scopo di questo lavoro è stato quello di approfondire alcuni aspetti tecnici ed istologici di una tecnica diffusamente utilizzata negli ultimi anni per il trattamento della malattia emorroidaria, che è l'emorroidopessi con stapler. Sebbene il decorso clinico di questa metodica sia caratterizzato da scarso dolore postoperatorio e rapida ripresa funzionale, ancora c'è dibattito sulle corrette indicazioni, eventuali modifiche tecniche e risultati funzionali. Nella nostra coorte di 18 pazienti (9 con emorroidi di III grado e 9 di IV grado) abbiamo analizzato e correlato i seguenti dati: morfologia del prolasso mucoemorroidario intraoperatorio; altezza del canale anale; altezza del posizionamento della borsa di tabacco dalla linea dentata; istologia dell'anello di parete rettale resecato dalla suturatrice. Sono state identificate alla proctoscopia due tipi morfologici: una morfologia "tipo emorroidale", caratterizzata da pliche radiali e dai tipici noduli/cuscinetti emorrodari, ed una morfologia "tipo prolasso rettale", con pliche circonferenziali. Si è concluso che quando la morfologia è del "tipo prolasso", quindi con una quota più consistente di prolasso mucoso associata, spesso c'è associazione con un canale anale più corto, con una borsa di tabacco che si realizza più in alto rispetto alla linea dentata ed un esame istologico che mostra un campione più "spesso" in cui spesso è rappresentata anche la tonaca muscolare e/o il grasso perirettale. In questi pazienti la metodica potrebbe essere particolarmente indicata, essendosi riscontrato minor dolore postoperatoria, minore urgenza defecatoria postoperatoria e maggiore soddisfazione globale.

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