Preservation of Anal Sphincter Function after Hemorrhoidectomy Under Local Anesthesia

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Key Words
anus; hemorrhoids; hemorrhoidectomy; incontinence; manometry

Background. This is a prospective study designed to confirm a simple, effective method of hemorrhoidectomy that can be accomplished by simple local anesthesia with good preservation of anal sphincter function both clinically and manometrically.

Methods. Eighty consecutive patients with prolapsed mixed hemorrhoids were operated with standard closed hemorrhoidectomy under local anesthesia. Pre- and post-operative assessments of anal continence and anorectal manometry were performed. Maximal basal pressure (MBP), maximal contraction pressure (MCP), squeeze pressure (SP), rectoanal inhibitory reflex (RAIR), functional length (FL), volumes at the first sensation of rectal fullness (V sense), urge of defecation (V urge), and intolerance (V max.) were measured. The pre- and post-operative data were compared with two-tailed paired Student t test. Statistical significance was considered as p-value less than 0.05.

Results. All 80 patients were completely followed up and studied. No patient had any degree of anal incontinence before and 6 months after hemorrhoidectomy. There was significant change in V sense and V urge after operation. How ever, MBP, MCP, SP, RAIR, and V max. remained unchanged.

Conclusions. Standard closed hemorrhoidectomy supplemented with appropriate submucosal dissection under adequate local anesthesia is simple and effective for the treatment of prolapsed hem orrhoids. The function of anal sphincter, both clinically and manometrically, can be well preserved. [Chin Med J (Taipei) 2001;64:519-524]

Received: March 14, 2001. Accepted: July 16, 2001.
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systemic sclerosis, inflammatory bowel disease, or patients who had comorbidity of other anorectal disease such as anal fissure, fistula, or who had previous anorectal operation were excluded from the study. The operation was performed with the patients in prone Jack-knife position. Local anesthesia was achieved by perianal and submucosal infiltration of 40 mL 0.5% bupivacaine mixed with 1:400000 epinephrine and 500 units of hyaluronidase. By doing this local infiltration, supplemented by intravenous injection of midazolam maleate 5 mg (Roche) for light sedation, satisfactory relaxation of anal sphincter and a clear surgical submucosal plane with good hemostasis were usually obtained. After complete relaxation of the anal sphincter, anal speculum (Hill-Ferguson retractor) was introduced into anal canal. The hemorrhoid tissues were meticulously dissected from the underlying subcutaneous external sphincter and internal sphincter muscles until the pedicle, which was transfixed and suture-ligated. The accessory hemorrhoid vessels among the main quadrants could be removed by submucosal dissection of the skin and mucosal bridges. The wound was closed with continuous suture and then lightly dressed. While three-quarters of excision is usually the standard procedure to remove all prolapsed hemorrhoids, sometimes it is necessary to require more than three. The wound was closed with continuous suture and then lightly dressed. This standard procedure of hemorrhoidectomy has been routinely practiced for more than 40 years in this hospital without major complications. No extra procedure such as sphincterotomy or anal dilatation was performed for any patient in this study. After the operation, warm sitz bath was encouraged and the patients were weekly followed until the wound healed. Anal dilatation was not necessary for any patient.

The clinical outcomes including bowel movement, anal continence function, postoperative bleeding, wound in fection, anal retraction, anal skin tag or mucosal ectropion were evaluated by a senior resident. The degrees of continence before and at least 6 months after hemorrhoidectomy were classified according to Browning and Parks. 3

Anorectal manometry was performed with the patients in left lateral position. Bowel preparation before examination was not necessary. The examining tube was a five lumens as semiby constricting of four channel mi cro-capillaries around a central catheter to which a low-compliance balloon was attached to which a low-compliance balloon was attached. The ports of the four mi cro-capillaries were set at 90 degrees in a radial manner at the same level. The micro-capillaries were continuously perfused with distilled water in a rate of 0.5 mL/min at 15 psi. Resting anal pressure was measured by the use of station pull-through technique from 6.0 to 0 cm proximal to anal verge. The mean of the highest pressures of 4 quadrants when the sphincter relaxed was selected as maximal basal pressure (MBP). The mean of the peaks in 4 quadrants of three consecutive voluntary contractions, while the sensor of the mi cro-capillaries located at the position of MBP was selected as maximal basal pressure (MCP). The squeeze pressure (SP) was the difference of MCP and MBP. The mean of the lengths of high-pressure zones of 4 quadrants was selected as sphincter functional length (FL). Recto-anal inhibitory reflex (RAIR) was tested by rapid inflation of the central balloon with 40 mL of air, with 10 mL increments, until at least 40% decrease of resting pressure appeared. The balloon was then continuously perfused with distilled water at a rate of 80 mL/min. Volume at which the patient first felt rectal fullness (V sense), urge of defecation (V urge), and intolerance (V max.) was recorded.

All of the manometric sure ments were performed by a senior, well-trained resident. The study was approved from the Ethics Committee of the hospital and National Council of Science in Taiwan, and all patients signed an informed consent before participation. All 80 patients were completely followed by manometric study both before and after surgery. Data were expressed as mean ± SD. Statistical analysis was performed using two-tailed paired t test, and significance was considered as p value less than 0.05.

Results

From Dec. 1998 to July 1999, there were 80 pa-
tients with prolapsed mixed hem or rhoids, who re-
ceived hemorrhoidectomy by one surgeon (au-
thor). The dis tri bu tion of age, gen der and in di ca tions of op-
er a tion are shown in Ta ble 1. There were six (7.5%) pa-
tients who had symp to ms of con sti pa tion but none had any de gree of stool in con ti nence be fore op er a-
tion. The av er age age of pos tive a tive stay was 3.1 ± 1.9
days (range 1-8), and av er age of stool be fore op er a-
tion was 11.5 ± 3.2 months (range 6-17) (Ta ble 1). The early and late
com pli ca tions are shown in Table 2. No pa ti ent had pos tive a tive anal ab scess, fis tula or anal stric ture in need of di la ta tion. All pa ti ents were con ti nent to gas, liq uid and solid stool at the day of fi nal fol low up (Table 2).

The pre operative and post operative man om et ric pa ram e ters are shown in Table 3. There was no sig nif i cant change in MBP, MCP, SP, FL, or V max af ter hem or rhoidectomy. All pa ti ents had pos itive recto-
tal inhib i tory re flex, and were able to dif fer en ti ate gas from fla tus both be fore and af ter hem or rhoidectomy. How ever, there was sig nif i cant change in the V sense and V urge af ter the op er a tion (Table 3).

Discussion

Hem or rhoids, as de scribed by Thomp son, are the con se quence of dis tal dis place ment of the anal cush-
ions, which are nor mal struc ture of anal ca nal and have impor tant con trib u tion to the con ti nence of anus.5 As shown by Gib bons and Lestar, the in ter nal sphincter on its own can not com pletely close the anal ca nal. The ad di tion of mucosal folds with fill ing of the ve nous spaces is also nec es sary as act to as a com pli ant and com for table plug.6,7 Anoderm, in clud ing that cov-
ers the tran si tional zone, is highly sen si tive as well as im por tant for anal con ti nence by the sam pling func-
tion.8 For main te nance of a sat is fac tory con ti nent anus, one must pre serve not only the sphincter mech a nism, but also a sub stan tial amount of vas cu lar cush ions and bridges of anoderm. Com plete re mo val of vas cu lar cush ions of anal ca nal may cre ate a tight and thin layer of anoderm, and may sub se quently cause a lot of com-
pli ca tions, such as pain and bleed ing dur ing de fe ca tion, anal stenos is, mucosal ectropion, mu cus dis-
charge, and/or in con ti nence.9

Quad rant hem orhoidectomy, ei ther open or close the wound, ful fills all the re quire ments of the pres er-
vation of anal cush ions.10,11 In our opin ion, al most any de gree of prolapsed hem or rhoids can be man aged by mul ti ple quad rant ex ci sions. Even in cir cumfer ential ro sette type of hem or rhoids in which ac ces sory hem-
orrhoid tis sue ap pears among the con ve n tional three

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<th>Table 1. Indications for hemorrhoidectomy</th>
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<td>Age: Year ( mean ± SD)</td>
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<td>Gender: n (male:female)</td>
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<td>Indications n (%)</td>
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<td>n = case number.</td>
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<th>Table 2. Complications of hemorrhoidectomy</th>
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<td>Complications</td>
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<td>Stool impaction</td>
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<td>Urine retention</td>
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<td>Secondary bleeding</td>
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<td>Minor skin tag</td>
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<td>Small fissure</td>
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aStool impaction which needs enema; 
bUrine retention which needs catheterization; 
cBleeding which needs readmission;

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<th>Table 3. Anorectal manometry before and after hemorrhoidectomy</th>
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<td>Parameter</td>
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<td>MBP (mmHg)</td>
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<td>MCP (mmHg)</td>
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<td>V max (mL)</td>
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All data are mean ± standard deviation.
aStatistically significant, two tailed paired t test. MBP = Maxi-
mal basal pressure; MCP = Maximal contraction pressure; SP = Squeeze pressure; FL = Functional anal length; V sense = Volume of first sensation of rectal fullness; V urge = Volume of first sensation of urge to de feca te; V max = Maxi-
mal tolerable rectal capacity.
major locations, suitable submucosal dissection of the dermornocusal bridges can be easily performed. In very rare cases, circumferential hemorrhoidectomy such as Whitehead operation is necessary.

The internal sphincter muscle contributes about 80% of the resting anal tone. It is easily jured during hemorrhoidectomy for two reasons. The branches of conjoined longitudinal muscle traverse through the smooth muscle bundles of internal sphincter, spread among the hemorrhoid tissues, and then connect to the subepithelial smooth muscle. The internal sphincter muscle fibers are usually adhered to and easily dragged with the hemorrhoid tissues during hemorrhoidectomy. The introduction of a large anal retractor into an incompletely relaxed anal canal is important to avoid injuring the sphincters. In this series, we used prone Jackknife position with adequate local infiltration of anesthetic and epinephrine. By doing this, complete relaxation of sphincter and satisfactory haemostasis could be achieved. There seem to be no adverse effect on continence with adequate relaxation of sphincter, meticulous dissection to avoid injury of sphincter fibers, and preservation of some normal vascular plexus or by subclinical injury of intermuscular smooth muscle bundles of internal sphincter, meticulous dissection to avoid injuring the sphincter fibers.

Many investigators have demonstrated increased anal basal pressure in hemorrhoid patients (especially in younger and male patients), which can turn nor mal with hemorrhoidectomy but not with rubber band ligation or cryotherapy. It is not clear why the sensitivity of the rectum was decreased after hemorrhoidectomy in this group of patients. All of the patients who received surgical treatment in this series had big prolapsed hemorrhoids. We are not sure whether the bulky hem or rhoids in the rec tum have any effect on the irritable rectal wall before operation. With the removal of the bulky hem or rhoids, the irritable rectal wall may return to normal.

In conclusion, we prove that there is no adverse effect of hemorrhoidectomy on the anal continence function, both clinically and manometrically. Some important principles should be followed during hemorrhoidectomy; namely adequate relaxation of sphincter, meticulous dissection to avoid injury of sphincter fibers, and preservation of some normal vascular cushions and bridges of highly sensitive anoderm. These principles can be well preserved and followed by the use of local anesthesia.

### References


局部麻醉藥注射下施行而能完全保留肛門功能之痔切除手術

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背景　痔切除手術造成肛門括約肌之傷害，文獻上有時提及。許多病人亦深有疑慮而裹足不前，乃轉而尋求偏方。許多不適當之偏方治療往往造成無法彌補之結果。本文乃做一前瞻性之研究，從臨床上及肛門之壓力測試上對肛門括約肌功能是否造成不利的影響。

方法　選擇 80 例嚴重脫垂性痔瘡必須接受手術之病人。術前及術後 6 個月分別詢問並記錄其肛門控制能力，並測其肛門括約肌之壓力、收縮力及各種參數。手術採俯臥，局部注射麻藥下實施。比較術前術後肛門括約肌之控制功能及其壓力變化。

結果　八十個病人手術均無重大之併發症，沒有一個病人有術後任何程度之失禁。手術前後肛門括約肌之靜態壓、收縮壓，括約肌寬度、反射功能等均無改變。

結論　局部麻藥注射作痔切除手術為一良好之方法。此手術不會對肛門括約肌功能有任何不良影響。

關鍵詞　肛門、痔、痔切除術、失禁、壓力測試。