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ORIGINAL ARTICLE

TAILORED LATERAL INTERNAL SPHINCTEROTOMY IN MANAGEMENT OF CHRONIC ANAL FISSURE WITH HYPERTONIC INTERNAL ANAL SPHINCTER. A MODIFIED MINIMAL INVASIVE TECHNIQUE AND ITS CLINICAL AND MANOMETRIC OUTCOME

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Aim: *to do tailored lateral internal sphincterotomy extending up to upper end of fissure in patients having hypertonic internal sphincter (IAS) by technique has advantages of open and closed methods to keep continence. Clinical and anomanometric outcome will be assessed.*
Methods: *70 patients and 70 controls were subjected to anal manometric study. All patients had hypertonic IAS compared with controls.*
Sphincterotomy was done through 5-7mm perianal incision just lateral to lower edge of IAS. It extended up to upper end of fissure. Sentinel tags, anal polyps and fibrotic fissure were excised.
Results were assessed as persistence of symptoms, complications, healing, postoperative resting anal pressure (RAP) and recurrence.
Results: *Preoperative RAP significantly higher in patients (132.89 ± 6.61 cm H2o) than controls (79.64 ± 71, P >0.001). Sepsis of sphincterotomy wound occurred in 1.4%, bruising in 1.4%, transient minor soiling in 11.4% and no incontinence. In 97.2%, fissures healed within 6 weeks, postoperative RAP dropped significantly (78.09 ± 6.62 cm H2o, P >0.001). After 15.8 months mean follow up period, recurrence occurred in 4.3%.*
Conclusion: *tailored lateral internal sphincterotomy is effective treatment of CAF with anal hypertonia. Our technique is safe and does not affect continence.*

Keywords: *Anomanometry, healing, recurrence.*

INTRODUCTION

Chronic anal fissure (CAF) is a common benign anorectal problem that substantially impairs the patient's life. Consequently, a rapid and effective solution is required .[1] These patients have several anal pressure profiles,[2] but most of them have hypertonic internal anal sphincter (IAS) with raised resting anal pressure (RAP).[3] Surgical internal sphincterotomy is recommended as the first therapeutic approach in those with anal hypertonia.[1] It achieves permanent reduction of hypertonia with relief of symptoms and is very successful at healing CAF but requires an operation with associated small morbidity.[4]

Posterior sphincterotomy has largely been abandoned because of the resultant gutter deformity which may impair anal closure with consequent faecal leakage.[5] So, lateral internal sphincterotomy by either open[6] or closed[7] technique is the treatment of choice. In the open technique, after infiltration of local anesthetic in adrenaline into peri-anal skin, submucosa and inter-sphincteric plane, a longitudinal anal incision is done and the IAS was dissected out under vision up to the dentate line and divided.[8,9] In the closed method, unlike the open technique, the IAS is not dissected out nor visualized when it is cut.[8] There is a possibility of injury of the external anal sphincter (EAS) and the anal mucosa as well as the possibility of incomplete sphincterotomy because infiltration of local anesthetic in adrenaline masks its assessment. On the other hand, this technique has the advantages that it avoids an open intra-anal wound, the divided IAS is bridged by skin, there is minimal anal wound care, postoperative dilatation is unnecessary and relief from symptom is almost immediate, with the fissure becoming painless and healing within 3 weeks.[9]

Troublesome faecal incontinence after lateral internal sphincterotomy is often attributed to faulty surgical technique, division of excessive amount of IAS or inadvertent injury to EAS.[10] However, it was reported that incontinence rate is related to the extent of sphincterotomy with a high rate on division of the IAS up to the dentate line (total lateral sphincterotomy). Consequently this procedure should be done safely and reduced to the length of the fissure.[11,12]

In addition, the integrity of the IAS must be assessed preoperatively by anal manometry. If it is already compromised and the RAP is not raised, internal sphincterotomy is contraindicated.[3,13]

Aim of our study is to do lateral internal sphincterotomy extending up to the upper end of the fissure (but not to the dentate line) in patients having CAF with hypertonic IAS to keep continence. It is done by a technique has advantages of both open (safe and under vision) and closed (minimal invasive) methods. Clinical and anomanometric outcome will be assessed.

PATIENTS AND METHODS

This study was done in Assiut University Hospital during the period from May 2002 to January 2007 on 70 patients with CAF and 70 control subjects (age and sex matched) who had no anal complaint. All patients had hypertonic IAS compared with the control group and attend the follow up for at least one year. Both the patients and control group had the same sex ratio, 29 females, and 41 males and same age range from 18-67 years with mean age 32.1ys and 33.7ys respectively.

Inclusion and exclusion criteria: All patients had CAF with or without sentinel skin tag and/or anal polyp were included in the study. Some of them had had one or more anal procedures for CAF Table 1. All patients and control subjects were subjected to anal manometric study to measure RAP. All patients were selected to have increased RAP above the upper limit of the control group.

Patients who had RAP within the range of or less than the control group were excluded. Also, patients having complicated fissure with underlying abscess, fistula or anal stenosis were excluded (to avoid any procedure on the IAS other than our lateral sphincterotomy).

Ethical considerations and a written informed consent: The study protocol was approved by the local ethical committee and it was explained to each patient and a written informed consent was obtained.

On admission, clinical details and examination findings were recorded and physical fitness was assessed. RAP was measured preoperatively and 6 weeks postoperatively in all patients.

Anal manometric study: Manometric study was done with pneumohydrolic capillary perfusion manometry (Sandhill Smart Lab Motility System, Mfg by Sandhill Scientific Inc. Littleton Co. USA). ***Patient reparation:*** Patient was overnight fasting and received 2 enemas one hour before the study.

The procedure: With the patient lying on left lateral position (without sedation, Fig. 1a), Sandhill Vectorgram catheter (part number AG-108, reusable and sterilized by activated glutaraldehyde solution, Fig. 1b) was inserted into the anal canal up to 6cm. By employing a station pull out technique, the RAP (and also the maximum squeeze pressure) was recoded starting from 6cm from the anal verge down to the anal verge itself. The patient squeezes the catheter 3 times at each station and the computer selected the highest RAP (and squeeze pressure) and expressed as cm H2o (Fig. 1c). Patients having RAP above the upper limit of the control group were considered to have hypertonic IAS.

Surgical technique: Pri-operative preparation: Patients fasted 6 hours and received single enema one hour before operation. The perianal area was shaved. Each one received antibiotic prophylaxis in the form of metronidazole 500mg tds orally 24 hours (economic) before the operation and single dose of second generation cephalosporin (1.5 cefuroxime sodium, Zinnat) before induction of anesthesia. The procedure was done in lithotomy position (Fig. 2a) under general or spinal anesthesia according to patient preference and physical fitness. At first, examination under anesthesia was carried

out then a circumferential peri-anal skin landmark about 5mm length was done with the tip of the scalpel a long the intersphincteric groove in the left lateral position of the anal verge.

A bivalved rectal speculum was then introduced into the anal canal and opened in the sagittal plane to expose the left lateral wall of the canal and stretch the IAS. The lower edge of the IAS was palpated by the tip of the index finger, where its distal third is hypertrophied and presents a distinct, palpable band in patients with hypertonic IAS.[14] Tilting of the speculum slightly to the right side of patient draws the IAS downwards so that the lower edge becomes more prominent. While the speculum was opened and tilted to the right, a skin incision of about 5-7mm was done in the previous skin landmark along the intersphincteric groove just lateral to the lower edge of the IAS (Fig. 2b). The inner edge of the wound was grasped with a toothed dissecting forceps and the IAS was dissected out from anoderm using dissecting scissors. While the left index finger in anal canal, dissecting scissors introduced into intersphincteric plane dissecting the IAS from the EAS. Under vision, known by its white color or under palpation by the tip of left index finger, the lower edge of the IAS was grasped by a hemostat and the lower part of IAS was withdrawn out of the wound (Fig. 2c) and sphincterotomy was done safely using scissors. The extent of sphincterotomy was done to be more or less equal the length of the fissure that marked on the scissor. It was assessed by pressure with the tip of left index finger to palpate the groove produced in the IAS at the site of sphincterotomy while the speculum opened in place and the IAS was stretched. If the extent was found insufficient, further extension of sphincterotomy was done with scissor while the IAS in place unit it reached the upper end of the fissure. Some bleeding usually occurred after this step. This was easily controlled by compression with a gauze for 3-5 minutes. If there was a bleeding from the wound edges, it is controlled by diathermy coagulation. The wound was left open for drainage. However, there was usually, a slight ooze of blood from the small external wound, but this was soon arrested postoperatively by tamponade as the EAS recovers and contracts around the IAS,[9] so we apply T shaped bandage for a few hours. Sentinel tag, anal polyp and markedly fibrotic fissure were excised.

After sterilization with povidone iodine 10%, the wound was covered with a flat dressing and secured with a T-bandage.

Postoperative treatment: All patients received prophylactic antibiotic in the form of oral metronidazole and a second generation cephalosporin for one week. A single dose of nonsteroidal anti-inflammatory (Keterolac tromethamine 30mg) was injected i.m on recovery. I.m nalbuphine hydrochloride 20mg was injected if needed. Oral analgesia was used according to the need. Patients resumed normal oral feeding after recovery starting by fluids and semisolid in the same day. Normal diet was resumed on the second day. Normal bowel habit was initiated by laxative on the 3rd postoperative day and the patient was kept on stool softeners for 2-3 weeks.

After 8-12 hours of the operation, the wound and peri-anal area were inspected for bruising or hematoma before patient discharge.

Patients were reviewed every week for 2 visits, every 2 weeks for 3 visits and monthly by telephone questionnaire or by examination for at least one year. If there was any anal complaint the patient was examined and assessed.

Results were assessed as:

1. Persistence of symptoms.
2. Local complications (bruising, sepsis, soiling and incontinence).
3. Healing of fissure (anoderm became intact) assessed by examination of the patient in both left lateral and knee chest positions during straining while the buttock were separated. If it was found healed, complete healing was assessed by proctoscopic examination.
4. RAP after 6 weeks.
5. Recurrence after complete healing.

Statistical study: It was done by SPSS ver 11 using paired t test to compare the same variable in the same group (paired quantitative data).

RESULTS

All patients had hypertonic IAS compared with the control group and attended the follow up for at least one year. The clinical data details are shown in Table 1.

Table 1. Clinical data of 70 patients.

Patients characteristics	Number	Percentage
Sex		
Males	41	58.6%
Females	29	41.4%
Main symptom		
Pain	67	95.7%
Bleeding	3	4.3%
Site of fissure		
Anterior	6	8.6%
Posterior	51	72.9%
Anterior and posterior	9	12.9%
Multiple	4	5.7%
Previous anal procedures		
One	8	11.4
Two	2	2.9

Sentinel tag was found in 33 patients (47.1%), anal polyp in 4 patients (5.7%) and both in 13 patients (18.6%). Fissures were excised in 18 patients

All patients had significant increase of preoperative RAP (mean = 130.89 ± 6.61cmH2O) compared with that of controls (mean 79.64 ±7.10cmH2O) with P. value <0.001 Table 2.

Table 2. Preoperative RAP of patients and controls.

RAP	Range in cmH2O	Mean ± SD cmH2O	P. value
Patient group	120-151	132.89 ± 6.61	<0.001
Control group	68-91	79.64± 7.10	

Postoperative progress of patients is outlined in Table 3. Within the first postoperative 24hs, 20 patients (28.6%) who underwent sphincterotomy only responded to a single i.m dose of ketorolac tromethamine 30mg (Ketolac, Amriya Pharmceutical). The remaining patients, 31 patients (44.3%) needed additional dose of nalbuphine 20mg i.m and 19 patients (27.1%) needed further dose of i.m ketorolac tromethamine. Within the first week, pain responded to oral diclofenac 50mg twice daily in 63 patients (90%) with 7 patients (10%) needed oral analgesia and topical anesthetic for additional week. One patient (1.4%) with unhealed fissure needed application of topical anesthetic (lidocaine hydrochloride jelly 2%, Xylocaine by Astra Zeneca) after defecation for additional 4 weeks. Sixty three patients (90%) were comfortable enough to open their bowels normally with laxative (2 tablets each consisted of 5mg bisacodyl and 100mg dioctyl sodium sulphosuccinate at bed time) after 48 hours of operation. Sepsis of sphincterotomy wound (edges were swollen, red, painful and tender without pus discharge) occurred in one patient (1.4%) and of sites of excised fissures and sentinel tags (there was pain and tenderness with pus discharge from the raw surface) in 12 patients (17%). All infections were minor sepsis and controlled by topical antibiotic (Fusidinic acid 2% cream) except in one patient. In this latter patient, pus discharge continued for 4 weeks and by P/R examination a foreign body (a seed of grape) was found implanted in the site of excised fissure. Improvement occurred after its extraction. No incontinence to flatus or solid stool occurred. Minor soiling (minimal discharge containing some stool particles found on the dressing) occurred in 8 patients (11.4%) and improved completely after 2 weeks in 6 patients and after 4 weeks in two.

Table 3. Clinical results of sphincterotomy.

Postoperative course	No.	Percentage
Pain control within 24hs with injectable analgesia		
Single dose	20	28.6%
2 doses	31	44.3%
3 doses	19	27.1%
Response of pain to oral analgesia/local anesthetic		
Within 1st week	63	90%
For 2 weeks	6	8.6%
For 6 weeks	1	1.4%
Return of bowel function after 48hs.	63	90%
Postoperative complications		
Perianal bruising	1	1.4%
Sepsis of sphincterotomy wound	1	1.4%
Sepsis at site of excised sentinel tag & fissure	12	17.2%
Incontinence to solid stool/flatus	0	
Soiling	8	11.4%
Healing of fissures within 6ws		
Healed	68	97.2%
Unhealed	2	2.8%
Recurrence	3	4.3%

Fissures healed completely (intact anoderm with complete disappearance of preoperative symptoms) in 59 patients (84.3%) within 4 weeks and by the end of 6th week fissures healed in 68 patients (97.2%). In one patient (1.4%) who had foreign body implanted, fissure healed after 9 weeks. The other patient (1.4%) with unhealed fissure had had 3 inflamed fissures with edematous anus and sphincterotomy was difficult to be done properly and assessed. Postoperative RAP was 108cmH2O indicating insufficient sphincterotomy which was repeated on the right side of the anus and fissures healed within additional 7 weeks.

Postoperative manometric study after 6 weeks of the operation (after getting complete healing) showed that the mean postoperative RAP dropped significantly in 69 patients (mean = 78.09 ± 6.62cmH2O) compared with preoperative mean values with P value is <0.001 Table 4. The postoperative RAP of patients was within the range of control group but its mean value was significantly lower (P value=0.003).

Table 4. Pre-and postoperative RAP of patients.

RAP	Preop. RAP cmH2O	Postop. RAP cmH2O	P. value
Range	120-151	66-89	<0.001
Mean	132.89±6.61	78.09 ±6.62	

After a follow up period of 12 to 24 months (mean 15.8 months), recurrence occurred in 3 patients (4.3%). Recurrences occurred between the fifth and seventh months. The cause of recurrence was repeated forcible passage of flatus while sitting in one patient (taxi driver), and passage of hard bulky stool after repeated transient attacks of constipation in the other 2 patients. All fissures healed under medical treatment.

Fig 1a. Patient lies on left lateral position with Sandhill vectorgram catheter in the anal canal and connected with water perfusion pump.

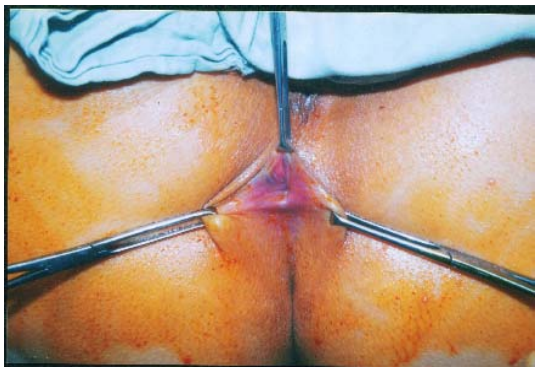

Fig 2a. Patient lies in lithotomy position and has anterior fissure.

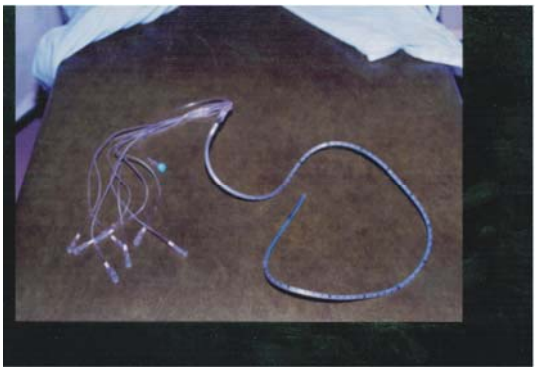

Fig 1b. Sandlill vectorgram 8 channels catheter.

Fig 2b. Perianal incision.

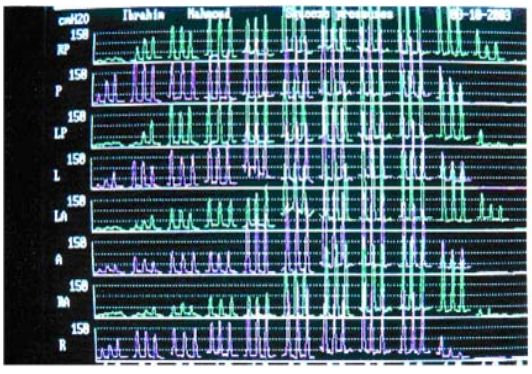

Fig 1c. Pressure tracing starting 6cm from anal verge down to anal verge with 8 channels oriented from above downwards: RP=right posterior, P= posterior, LP= left posterior, L= left, LA= left anterior, A= anterior, RA=right anterior, R= right.

Fig 2c. Lower edge of IAS is grasped by hemostat and withdrawn outside the wound.

DISCUSSION

Our technique was proposed to do tailored lateral internal sphincterotomy that is more or less equal the length of the fissure and never reaches dentate line. In addition, it is done safely under vision without any danger to the anoderm or EAS through a small extra-anal incision. So, it has advantages of both open and closed techniques at the same time. This technique is actually a modification of that described by Boulos and Araujo (1984).[8] They described sphincterotomy through a larger circumferential perianal incision where the IAS is dissected and divided up to the dentate line, bleeding is controlled by diathermy electro-coagulation and the wound is closed with chromic cat gut sutures and the anal canal is packed. They reported incontinence to flatus in 14.3%, bruising in 7.1% and infection in 7.1% with no incontinence to faeces. They also reported significant reduction of postoperative median RAP (by 50%) with healing of all fissures. Our technique is minimal invasive and sphincterotomy is partial (incision done was small and dissection was minimal and no postoperative complaint related to that incision). Bruising occurred in 1.4% (one patient) and minor sepsis of sphincterotomy wound in 1.4% (one patient) which was easily controlled by topical antibiotics. These low incidences can be attributed to leaving sphincterotomy wound open for drainage. No incontinence was reported but only soiling occurred in 11.4% which improved completely on the second visit after 2 weeks in 6 of them and in the other 2 patients after 4 weeks. The temporary soiling that occurred in the early postoperative period can be explained by the finding of Gunal et al., (2007)[15] that the RAP dropped markedly at day 2 postoperatively and improved at day 20.

In our study, sphincterotomy was done successfully in 69 out of 70 patients. In the remaining one, she had 3 inflamed fissures with edematous anus so that sphincterotomy and its assessment were difficult. After 6 weeks, fissures unhealed and sphincterotomy was found insufficient. It was repeated on the right side and fissures healed within 7 weeks.

In our study, 90% of patients were comfortable enough to open their bowels normally after 48 hours of the operation with laxative. Local complications related to sphincterotomy incision were minimal. Within the 1st week pain responded to oral analgesia in 90% of patients with 10% needed oral analgesia and topical anesthetic for additional week. Garcea et al,(2003)[11] reported persistence of symptoms after conservative sphincterotomy in 11.9% with only 9.2% needed topical analgesia.

Complete healing of fissures occurred in 84.3% within 4 weeks and by the end of 6 weeks fissures healed in 97.2% (68 patients). The cause of unhealing of fissures in one patient was insufficient sphincterotomy which was less than the length of the fissures and in the other one was implantation of a foreign body in the site of excised fissure. A healing rate of 97% after conservative sphincterotomy was reported by Garcea et al., (2003)[11] within a mean period of 6.9 weeks. A healing rates of 95.1% by 7 weeks and 97.5% at 3 months were reported by Liratzopoulos et al.,(2006).[4] On the other hand, 96% healing rate was reported by Nyam and Pamberton (1999)[16] after 3 weeks and 100% healing rate at one month by Boulos and Araujo (1984).[8]

In our study, no incontinence was reported but minor soiling occurred in 11.4% which completely improved within 4 weeks. Garcea et al. (2003)[11] reported incontinence to fluid stool and flatus in 1.7% and to flatus only in 1.7% after partial lateral sphincterotomy. Nyam and Pemberton (1999)[16] surveyed patients treated by total sphincterotomy up to dentate line during the period between 1984 and 1996 (585 patients) and reported that some degree of faecal incontinence occurred in 45% of patients at some time in the postoperative period. They also found after a mean period of follow up 5 years that, 6% of patients had incontinence to flatus, 8% minor soiling and 1% loss of solid stool. Also, Liratzopoulos et al., (2006)[4]surveyed patients underwent total subcutaneous lateral sphincterotomy between 1981 to 2004 (246 patients) and found minor incontinence in 7.02% at 48 weeks follow up. Moreover, Hashmat and Ishfaq (2007)[17] reported incontinence of flatus/ faeces in 64.3 at 1st week after total lateral internal sphincterotomy but resolved by the 8th week. On the other hand, Tocchi et al., (2003),[18] selected patients with hypertonic IAS by anal manometric study for subcutaneous total lateral sphincterotomy. They reported transient incontinence rate of 9.1% and persistent incontinence to flatus and soiling in 3%. However, it was reported that incontinence rate is related to the extent of sphincterotomy with a high rate when division of IAS extends up to dentate line so it must be reduced to the length of fissure.[11,12]

Moreover, Shelygin et al., (2005)[19]followed up patients after fissure excision in combination with lateral subcutaneous sphincterotomy for a mean period of 4.3 years. The follow up included clinical examination, anorectal manometry endorectal ultrasonography and defecography in patients having symptoms. They found different grades of incontinence in 19.7% with excessive division of IAS was the cause in only 3.4%. Other causes were perineal descent syndrome in 13.7% and advanced age in 2.6%. They concluded that it is necessary to examine patients carefully before surgery and the surgical technique must be modified according to anorectal manometric study. However, it was reported that, after 6 years follow up lateral internal sphincterotomy is a good treatment for CAF and does not compromise long term faecal continence.[20]

In our study, recurrence of fissure occurred in 3patients (4.3%). Recurrent transient attacks of constipation and passage of hard bulky stool were the cause in 2 patients and repeated forcible passage of flatus while sitting in the third one. In the 3 patients, fissures healed under medical treatment. Garcia et al., (2003)[11] reported that no patient required reoperation for recurrence after conservative sphincterotomy. However, 1-3% recurrence rate after partial sphincterotomy was reported.[21] In addition, after total closed sphincterotomy a recurrence rate of 10.2% was reported after a mean period of follow up 4.3 years and the cause was incomplete sphincterotomy.[19]

In our study, patients had significantly high RAP (mean 132.89±6.61 cmH2O) compared with control subjects (mean 79.64±7.1cmH2O). Compared with preoperative values, there was a marked significant reduction in postoperative RAP (mean 78.09±6.62cmH2O, P<0.001) which was close to those of control group (P=0.003). This RAP is within the range of normal as reported by Kenefick et al., (2002)[13] that normal RAP is more than 60cmH2O. After total sphincterotomy, Boulos and Araujo (1984)[8] reported a reduction of RAP from a mean 97cmH2O to 47.5cmH2O and from 107.4 to 52cmH2O after open and closed sphincterotomy respectively. Gunal et al.(2007),[15] found that RAP preoperatively was significantly higher in patients with CAF (83.4±1mmHg) than in normal control subjects (52±1.2mmHg). They found significant drop in RAP postoperatively, marked at day 2 (29±1mmHg) than at day 20 (47±1mmHg) which was close to those of normal volunteers.

On conclusion, tailored lateral internal is effective treatment of chronic anal fissure with anal hypertonia. Our technique of sphincterotomy is safe and does not affect continence but not done in edematous anus.

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