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Research Article

Evaluation of Overlap Anal Sphincter Repair (OASR) in Patients with Post-Traumatic Fecal Incontinence

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Abstract

Background: Fecal incontinence (FI) that develops after traumatic injury to the anal sphincters is a challenging problem, although many operations have been devised for its treatment, yet no ideal procedure has been yet described.

Patients and Methods: 116 patients (90; 78% males) with post traumatic FI, with a mean age of 34.84, were admitted to the colorectal surgery unit of Mansoura University. Patients underwent clinical examination and assessment via Wexner continence scale, anorectal manometry, endoanal ultrasound before undergoing surgical repair with overlap anal sphincter repair in all patients. Patients were followed up for one year after surgery.

Results: Among the 116 patients, 108 (93%) patients had developed FI that after anal surgery, 46 patients of them were after hemorrhoidectomy. 65 (56%) patients were incontinent to solid stool, 42 (36%) patients to liquid stool, and 9 (7.75%) patients to gas. Postoperatively, 91(78%) patients regained completely normal continence, 15 (13%) patients had partial return of function and ten (9%) patients were still incontinent. The Wexner score dropped from 13.1± 9.58 preoperatively to 1.73 ± 8.2 one year postoperatively with a significant p value of 0.0001. The mean operative time was 1.4 ± .31 hours with a mean hospital stay of 7.8 ± 1.75 days. Postoperative complications occurred in 18 (16%) patients and there was no mortality in this study.

Conclusion: Although overlapping sphincter repair is still probably the first choice for patients with FI and a documented external sphincter defect, long-term improvement of FI after OASR may be less optimistic than previously realized.

Keywords: OASR; Direct repair; Traumatic; Fecal incontinence

Introduction

Fecal incontinence is a distressing condition which can be defined as any incontinence of flatus, liquid stool or solid stool that affects quality of life of patients [1]. FI is more common in males, with an increasing incidence with age [2].

FI is often secondary to disruption of the anal sphincter muscles, which can be due to traumatic, surgical [3] or obstetric causes which are the commonest cause [4]. Obstetric injuries include perineal tears or episiotomies associated with previous vaginal deliveries, pudendal neuropathy or both [5].

Numerous methods have been described in treatment of FI due to sphincter disruption. Primary repair is usually successful in case of anterior midline obstetric tears, but not usually successful in traumatic or operative injury at the lateral sides of the sphincter ring [6]. Other options include: conservative management, biofeedback therapy and surgery [1] with sphincteroplasty is considered the most logical treatment option [7].

Direct end-to-end sphincteroplasty usually has disappointing results due to sutures break down and retraction of the muscle ends and high failure rates reaching 40% [5]. OASR is an alternative method to direct repair with better functional results which makes it considered to be the first line surgical therapy [1]. The short-term outcome of OASR is very good with an early success rate between 69 to 97 % [3,8].

Patients and Methods

From April 2010 to October 2013, 116 patients with post traumatic FI were admitted to the colorectal surgery unit of Mansoura University after obtaining ethical approval from the local ethical committee and underwent OASR. Patients were 26 (22%) females and 90 (78%) males with a mean age of 34.84 (range 6–72) years.

All patients included in this study had incontinence to liquid and/or solid stool and had failed conservative treatment as bulking agents and biofeed back therapy previously. All patients had a defect that included less than one-half of the circumferences of the external anal sphincter (EAS) on endoanal ultrasonography. Patients who had previous surgeries for FI or had other anorectal pathology were excluded from the study.

Methods

All patients included in the study were personally interviewed, and asked to apply for the Wexner continence grading scale [9]. Quality of life was assessed by the Fecal Incontinence Quality of Life Scale (FIQL) [10]. In patients with a colostomy (2 patients), it was impossible to calculate the score preoperatively.

The sphincter defect was diagnosed by anorectal digital examination and endoanal ultrasonography. Criteria to define a sphincter defect were hyperechoic breaks in the normally hypoechoic ring of the internal anal sphincter (IAS) and a mixed hyperechoic break in the circumferential integrity of the EAS.

Physiologic assessment was made by anorectal manometry with measuring of the maximum resting pressure, maximum squeeze pressure in the left lateral position. The normal references for our unit are 40-80 and 80-140 cm H_2O for mean resting and squeeze pressures, respectively.

Operative technique

Preparations: Patients underwent bowel preparation by rectal enemas and clear liquid diet the day before surgery. Also, adequate thromboembolic prophylaxis was given the day prior to surgery. A

single dose of Cefotaxime 1 gm and Metronidazole 250 mg was given at the induction of anesthesia. An informed written consent was obtained from all patients prior to the surgery

Operative steps: Patient was placed in the lithotomy position. A curvilinear anal incision encompassing at least half the anal circumference was performed. The fibrotic ends of the sphincter on both sides of the defect were dissected till adequate length was available for overlap without tension. Scar tissue was left in place to provide additional support. Overlapping sphincter repair was done with interrupted 2-0 polyprolene sutures. The skin was closed in a longitudinal fashion with 3-0 interrupted absorbable sutures on a drain. At end of surgery, the anal canal should admit the little finger of the surgeon.

Postoperative care

Patients were on NPO for 3 days postoperatively then started clear liquid diet till discharge. Lactulose was added after starting oral feeding. 1 gm of cefotaxime and 500 mg of metronidazole were administered intravenously on a daily basis for one week. Sitz baths were not used. Analgesics were prescribed for approximately 5 to 7 days. Patients were usually discharged at 8-10 days postoperatively.

Follow up

Three months after sphincter repair, clinical examination, anoretal manometry, and endoanal ultrasound were performed and if the results were satisfactory the stoma - if present -was closed. The continence score was then calculated 1 month after stoma closure. The same evaluation is repeated at one year postoperatively.

Patients were asked to select one of four categories relating to symptom improvement after surgery; improved, initially improved then deteriorated, same or worse. Patients' functional results were assessed by a four point Likert scale with outcomes of worse, same, improved, or completely continent.

Statistical Analysis

Data were statistically analyzed using SPSS 10.0 (Chicago, IL, USA) on Microsoft windows. Questionnaire responses were analyzed using the paired T test, Fisher's exact test and Mann-Whitney U test. Categorical data was analyzed using the Chi Squared test. Relationships and differences were considered statistically significant when the associated P values were ≤ 0.05.

Results

This prospective study included 116 patients with FI with a mean age of 34.84 (range 6–72) years. 26 (22%) patients were females and 90 (78%) patients were males (Table 1). The cause of FI is demonstrated in Table 2. Table 3 displays the iatrogenic causes of FI in the studied group.

Age groups	Males (No/%)	Females (No/%)
Less than 20 years	14 (12%)	2 (1.7%)
20 – 40 years	34 (29%)	17 (14.6%)
40 - 60 years	33 (28%)	7 (6%)
More than 60 years	9 (7.75%)	-
Total number	90 (78%)	26 (22%)
Mean age	38.45	31.23

Table 1: Demographic data of the studied group

Cause	Males	Females	Total
Anal surgery	88	20	108 (93%)
Obstetric	0	6	6 (5%)
Sexual abuse	2	0	2 (1.7%)

Table 2: Cause of incontinence

Type of surgery	Males	Females	Total
Haemorrhoidectomy	41	5	46 (40%)
Fistulectomy	27	9	36 (31%)
Unknown anal surgery	10	2	12 (10%)
Fissure	5	3	8 (7%)
Perianal abscesses	4	0	4 (3%)
Rectal prolapse	1	1	2 (1.7%)

Table 3: Cause of incontinence in anal surgery group

Preoperatively, 65 (56%) patients were incontinent to solid stool, 42 (36%) patients to liquid stool (33 percent), and 9 (7.75%) patients to gas. 60 (51.7%) patients had passive FI, and 56 (48.3%) patients had mixed (passive & urge) incontinence. The mean duration of incontinence was 4.2 years (range, 3 months - 22 years).

Postoperatively 91 (78%) patients regained completely normal continence; none of these had fecal leakage but 14 patients of them had minor flatus incontinence only during the first month of follow up, which resolved spontaneously as reported by the patients at 3 months of follow up. 15 (13%) patients had partial return of function with generally acceptable continence for solid stool but poor control over liquid stool and flatus; these patients reported intermittent fecal leakage. In the remaining ten (9%) patients the repair was judged to have failed. The Wexner score dropped from 13.1 ± 9.58 preoperatively to 1.73 ± 8.2 postoperatively to with a significant p value of 0.0001 (Table 4).

Parameter	Preoperative	Postoperative	P value
Patients with FI	116	49	< 0.0001
Mean resting anal pressure	57.5 ± 20.24	64.7 ± 18.24	0.0048
Mean squeeze anal pressure	90.3 ±27.24	124.56 ± 29.14	< 0.0001
Mean Wexner Score	13.1± 9.58	1.73 ± 8.2	< 0.0001

Table 4: Postoperative improvement at one year

While evaluation of patients at three months after surgery showed that 91 (78%) patients were fully continent, this number declined to 67 (57.7%) patients at one year of follow up (Table 5) indicating worsening results with longer follow up period. FIQIL showed significant postoperative improvement in all of its parameters with a p value less than 0.0001 (Table 6).

Status of Continence	At 3 months	At one year	P value
Full continence	91	67	0.0011
Minor Incontinence	15	20	0.463
Major Incontinence	10	29	0.0013

Table 5: Patients' outcomes at 3 months and one year of follow up

Scale	Preoperative	Postoperative	P value
Life style	2.04 ± 1.12	3.83 ± 0.88	< 0.0001
Coping	2.16 ± 1.42	3.78 ± 1.25	< 0.0001
Depression	2.54 ± 0.82	3.82 ± 0.92	< 0.0001
Embarrassment	2.39 ± 1.76	3.36 ± 1.2	< 0.0001

Table 6: FIQIL at one year postoperative

The postoperative changes in the mean resting anal pressure and the mean squeeze anal pressure are shown in Table 4. Preoperative endoanal ultrasound demonstrated a single sphincter defect in all cases before repair, being placed anteriorly in 111 (96%) patients and laterally in 5 (4%) patients. Also endoanal ultrasound demonstrated combined internal and external sphincter defects in 96 (87%) patients and 20 (17%) to have only external sphincter defects. Interestingly, 46 out of 96 patients (48%) with combined sphincter defects were still incontinent at one year after repair, which is almost three times the percentage of patients who had an isolated EAS defect preoperatively and remained incontinent after repair (15%). For the 46 patients who had FI after hemorroidectomy, lateral defect was noted in 5 patients & anterior defect in 41 patients. Also, combined sphincter defect was observed in 13 patients & isolated EAS defect in 33 patients.

The mean operative time was 1.4 ± 0.31 hours with a mean hospital stay of 7.8 ± 1.75 days (range 8–15 days), there was no mortality in this study. Postoperative complications occurred in 18 (16%) patients which included: urinary retention (8; 7%), wound infection (4; 3%), wound disruption (3; 2.5%), anal stenosis (2; 1.7%), and fecal impaction (1.8%) (Table 7).

Complication	Male	Female	Total
Urinary retention	6	2	8
Wound infection	3	1	4
Wound disruption	2	1	3
Anal stenosis	2	0	2
Fecal impaction	01	1	1

Table 7: Postoperative complications

The mean follow-up of 34.1 ± 4.35 months (range, 12-53). Follow-up data were available for all patients (patients who missed follow-up were excluded) for a period of 12 months.

Patient outcomes were classified as excellent in 26 (22%) patients, good in 45 (39%) patients, fair in 31 (27%) patients, and poor in 14 (12%) patients. Thus, although 82% reported sustained improvement, only 61% had a good to excellent result. The patients' perception of continence compared to preoperative status revealed that 90 (78%) patients felt that FI had improved, 16 (16%) patients felt there was no change and six (6%) patients felt it got worse.

Discussion

Methods of restoring continence after sphincter division include construction of accessory sphincteric mechanisms such as circumanal slings of gluteus maximus and gracilis and procedures to augment existing function of the damaged sphincter itself which include reefing procedures designed to shorten the arc of action of the remaining EAS and the use of pedicled and free muscle grafts to supplement external sphincter contractile activity [6].

The results of direct end-to-end repair of the divided sphincter are unpredictable with failure rates reaching 40% based on the collective results of the American Proctological society [11]. The technique must overcome the inherent tone in the external sphincter which tends to cause retraction of the muscle ends and disruption of the suture line. A cohort study evaluated patients at 3 months and at an average of 40 months after direct sphincter repair. At initial evaluation, 49% of patients were continent to gas and stool. At subsequent follow-up, only 28% of patients were totally continent [12].

In 1991, Wexner and colleagues performed overlapping sphincteroplasty with internal anal sphincter imbrication in 16 female patients with an isolated anterior EAS defect. After ten months of follow-up, 76% of patients had an excellent or good result. It is questionable whether addition of internal anal sphincter imbrication is worthwhile, because similar results have been reported after conventional overlapping sphincter repair [13].

In a randomized study that compares direct end-to-end repair with OASR, the outcome after both procedures was comparable both clinically and by anorectal physiologic testing. After a median follow-up of 18 months, approximately three-quarters of patients reported a persistently improved continence and continence score was substantially improved after either technique of sphincter repair, suggesting no obvious benefit of OASR over end to end repair [5].

There is conflicting evidence regarding the effect of a patient's age upon the outcome of surgery. Some studies [14,15] found that increasing age resulted in poorer results may because the etiology in elderly has a neurogenic or myogenic component as well as structural sphincter deficit. In contrast, other studies [16,17] found no such correlation, which is the same as our study reported.

The site of injury in the sphincter ring showed an interesting sex distribution. Anterior injury sufficient to cause incontinence was three times more common in women than men, which is attributed to smaller perineal body and attenuation of the supporting tissues following stretching of the perineum during childbirth [18].

The best results were obtained in young patients with traumatic division of previously healthy normal sphincters, while in the obstetric group the most likely cause of failure is pelvic floor neuropathy which

may be the result of unrecognized traction injuries to the pudendal nerves. The greatest difficulty in achieving a successful result was in the operative injury group due to multiple previous anal operations, preexisting Crohn's disease, and refusal to have a temporary colostomy at the time of the repair [19].

The most serious complications of repair are ischemic necrosis and fistula, which we have not encountered in our study. Every effort is made to preserve the blood supply during mobilization of the muscle ends and avoid strangulation when tying the sutures. Minor complications were relatively frequent in our study; however, all were easily treated and none affected the eventual clinical outcome.

Our study shows that at an average of 12 months after OASR, 42% of patients were still incontinent to flatus or feces. These results are similar to those reported in larger studies or after a longer follow up. The surgical procedure used the overlapping anal sphincter repair without colostomy, which is the most common technique at present, because colostomy does not modify functional results of surgery [12].

We used the Wexner score system to evaluate the severity of incontinence and changes in continence function because it is simple and widely used, and unlike the quality of life scales, the result is not influenced by comorbid diseases. Changes in the Wexner score one year postoperatively had a strong statistical significance (p value < 0.0001), which copes with the reduction of number of incontinence patients to only 49 (42%).

As shown by our study, the functional improvement of continence after sphincter repair was accompanied by an improvement of maximum squeeze anal canal pressure. By contrast, the mean resting anal canal pressure remained largely unchanged and did not correlate with functional improvement of FI after sphincter repair.

It has been suggested that the discrepancies between self-evaluation by patients and the objective criteria of incontinence may be explained by the presence of an irritable bowel syndrome, however, this study indicates a good agreement between self-evaluation by patients in this study and the presence or absence of FI, whatever its frequency. Thus, 36 of the 40 patients who said that they were improved only slightly or not at all were still incontinent, and only 18 reported at least one episode of fecal incontinence per week.

Preoperative pudendal neuropathy is a predictive factor for the failure of sphincteroplasty, yet we could not confirm this conclusion in our study because none of our patients underwent pudendal nerve terminal motor latency study. However, we have found that a defect in the IAS was a predictive factor for failure as 48% of patients with an IAS defect before surgery were incontinent at final evaluation. Some authors have shown a correlation between functional results and those of postoperative anal endosonography, whether a sphincter defects was still present or not [12] yet to our knowledge, no study has shown the role of an IAS defect as a prognostic factor after sphincteroplasty.

In our study all patients with FI at three months were still incontinent at final evaluation, but 27% of the patients who were either continent or incontinent to gas at three months claimed to be incontinent to feces at the final evaluation. This suggests that the results of sphincteroplasty worsen across time which what is similar to what Chase et al., reported in their study that success rates of sphincteroplasty were as low as 50–60% after 5 years. Explanations for this may be weakening of the muscle because of normal muscle aging, repair breakdown, or a combination of these factors [4].

Conclusion

OASR can acceptably improve fecal incontinence when singular anal sphincter defects are detected, as interpreted by patients and by improvements in continence scores. Long-term improvement of FI after OASR may be less optimistic than previously realized. Although overlapping sphincter repair is still probably the best first choice of operations in patients with FI and a documented external sphincter defect, one should recognize the limitations of this procedure and set realistic expectations regarding expected outcome for patients.

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