

Overlapping Anal Sphincter Repair In The Patients With Obstetric And Non-Obstetric Trauma: Do The Improved Squeezing Pressures Indicate Better Anal Function?

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Citation

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Abstract

Background: Factors causing obstetric and non-obstetric traumatic sphincter damage are generally revealed in young individuals. The common treatment for such structural damage is overlapping sphincter repair. The aim of this study was to report the consequences of the surgical procedure in the patients with both obstetric and non-obstetric anal trauma.

Patients and method: Sixteen patients were enrolled in this study. Nine female were in the obstetric and 7 were in non-obstetric trauma group. They underwent to overlapping sphincter repair. Both groups were compared with hospital stay, need for painkiller, anal canal functions, complications and clarity of quality of life in about 15-9 months follow up.

Results: Most of the patients stayed in hospital less than 48 hours and needed painkiller for a short time. Means of the postoperative outcomes of the resting and squeezing pressures were moderately high in patients with non-obstetric sphincter injury while all had incontinent condition evaluated by fecal incontinence severity index (FISI) in preoperative period. Considering the quality of life of the patient in 8 months after surgery 75% of patient declared their own health condition was well. The failure of overlapping repair was obtained all in the obstetric trauma group.

Conclusion: In this limited series sphincter repair accomplished higher resting and squeezing pressures making the anal canal continent particularly in the patients with non-obstetric anal trauma in 15 months follow up.

INTRODUCTION

Fecal incontinence is a socially debilitating disorder particularly in women. In general, the prevalence of fecal incontinence ranges about from 2-8% in adult people. Merely one-half of individuals could detail their own complaints to the medical advisor. It is common in elderly people. In women aged over 65 years prevalence reaches 13% (1). Despite the fact that both an injury form and etiologic reasons are variable, anal incontinence resulting from anal sphincter rupture can be mostly encountered in women with vaginal delivery by using forceps and vacuum (2). This condition significantly influences patient's life quality in bad manner. However perineal damage occurred by non-obstetric traumatic factors such as previous perineal surgery and/or trauma. Anal sphincter reconstruction can re-establish continence and improve life quality in the mostly affected

patients. In the literature most studies are about the patients with a sphincter defect secondary to obstetric trauma which has been repaired by using overlapping technique. This technique was first described by Parks in 1971 (3). Slade et al. made a modification on that procedure in 1977 (4). That was leading procedure received by colon and rectal surgeon during the last decades. However recent reviews have stated that the conclusion of overlapping anal sphincter repair for obstetric trauma were rarely perfect (5). The aim of this study is to compare the outcomes of the anal manometric measurements in the patients with anal incontinence from both obstetric and non-obstetric traumatic reasons undergoing overlapping sphincter repair.

PATIENTS AND METHODS

Forty-four women with anal sphincter defect underwent to overlapping repair from January 1999 to January 2003.

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Thirty-one out of 44 patients had an anal obstetric trauma. The other patients selected from the group had anal sphincter damage caused by non-obstetric trauma. The factors causing sphincter damage were previous perineal surgery and trauma. One out of 17 patients had previous sphincter repair too. A median age was 28 (18-41) years for the patients with obstetric and 23.5 (20-31) years for the one with non-obstetric anal sphincter trauma (table 1). In the surgery clinic, physical and digital rectal and rectosigmoidoscopic examination was performed for each patient. Patients with different level incontinence were evaluated by pre and postoperative fecal incontinence severity index (FISI) and anal manometric measurement (table 2) after a consent form about anal manometry given. Unfortunately pudental nerve terminal motor latency (PNTML) could not be measured. However the patients with obstetric trauma were evaluated by using electromyography (EMG). Endoanal ultrasonography (EUS) was employed for each patient preoperatively yet performed for selected patients postoperatively. Some of whom had internal anal sphincter (IAS) defect too (Table 1).

Anal Canal functions: The continence function of the anal canal has been evaluated with the FISI scoring system reflecting both severity and frequency of the complaints (table 2). Pre/postoperative anal manometry with six-channel flexible, water-perfused catheter with six pressure transducers by a pull-through technique (Albynmedical, Mui Scientific, Mississauga, ON, Canada) was performed in all cases declaring any degree of soiling (FISI score more than 7-8). The functional anal canal length was defined as high pressure zone length where the pressures were revealed at least 20 mmHg more than the mean resting pressure on manometry.

Figure 1

Table 1: patient's demographics and follow up

		Obstetric trauma (n: 31) [mean (SEM) (Min-Max)]	Non-obstetric trauma (n: 13) [mean (SEM) (Min-Max)]
Median Age (year)		28 (3.8) (24-43)	23.5 (1.6) (20-37)
Mean operation time (min-SEM/min-max)		74 (11.7) (45-110)	60 (5.0) (45-75)
		(t=0.911) p=0.414	
No. of birth		1.6 (0.2)	1.2 (0.2)
Previous sphincter repair		0	1
EAS defect	Key-hole	2	5
	Lateral	25	7
IAS defect		17	11
Follow up (months)		15.2 (3.3) (7-27)	9.6 (1.1) (7-13)

IAS: Internal anal sphincter.
EAS: External anal sphincter.

Figure 2

Table 2: Fecal Incontinence Severity Index (FISI) matrix and the question asked for the patients. In the patients presenting anal incontinence, the question asked is "How often did you experience any amount of leakage at last month?" please indicate on the matrix. Scores on the matrix has been represented scores reverse coded. Lower score indicates least severity. (Adapted from Dis Colon Rectum, 1999; 42: 1527).

	2 or more a day	Once a day	2 or more a week	Once a week	1 to 3 a month	Never
Gas	12	11	8	6	4	0
Mucus	12	10	7	5	3	0
Liquid	19	17	13	10	8	0
Stool	18	16	13	10	8	0

Endorectal Ultrasonography was performed with 360 degree rotating handheld ultrasonic probe, built-in 10 MHz (B&K Medical, Denmark) and vaginal probe built-in 10 MHz by independent radiologist. IAS and external anal sphincters (EAS) and the defective area were carefully imaged. Care was given to try to mark both ruptured margins of the EAS.

Quality of general health: The postoperative general health conditions of patients were evaluated by using the quality of life questionnaire (QoL-FI) for colorectal disorders just before and 8th week - 8th months after surgery.

Operative technique, Mechanical bowel cleansing a day before operation, prophylactic antibiotic (Ornidazole , Roche, Istanbul, Turkiye) 0.8 g/day was given 2 hours before surgery and continued 5 days. On the operation table, patients were placed in jack-knife position. Spinal anesthesia by using spinal 22 g needle filled with 8-10 ml prilocaine %2 (Citanest, Astra-Zeneca, Luleburgaz, Turkiye) was performed for each patient. The rectum was irrigated with 500 ml 0, 9% warm saline with povidon iodine 10%. About 10 milliliters epinephrine 1/100000 was injected into sub-mucosa which made the dissection easy and almost without bleeding. A curvilinear incision located about 1 cm from the anodermal junction was made around the anal orifice. The anoderm was mobilized from the underlying sphincter muscles and scar. Both ends of EAS were determined and mobilized enough to do overlap. Scar was not removed. Because of the lack of the plan of dissection sometimes both external and internal anal sphincters were included in the repair. More care was given to identify the inferior rectal branches of the pudental nerve traversing to the external sphincter posterolaterally. Overlap repair with good bulk of both ends of the external sphincter was performed by using 2/0 nylon (Ethicon Endo-Surgery, Inc., Cincinnati OH) sutures. Puborectalis was not narrowed for all.

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Pain management: After the surgery, the standardized scheme for analgesia was utilized. Pethidine HCL, 1mg/kg/dose (Aldolan flc. 100mg/2ml, Liba, Turkiye) was injected intramuscularly (IM) in postoperative first two hours. A non-steroidal anti-inflammatory drug (ibuprofen - IBU-600, Yeni Ilac, Istanbul, Turkiye) 600 mg/two times a day, was prescribed from POD 1 per orally. The severity of postoperative pain was assessed at 2, 4, 8, 16, 36 hours by using visual analogue scale (VAS).

Statistical analysis, Wilcoxon sign rank test was employed for nonparametric variables and paired sample t-test for parametric variables during the data analyzes. Statistical significance was assigned to any p value less than 0.05.

RESULTS

All patients were operated under spinal anesthesia. Mean operation time was 74 (SD.26.3) (45-110) for obstetric and 60 (11.2) (45-75) min. for non-obstetric trauma group (p=0.414). Pain management was evaluated by using VAS scoring system. Even the early postoperative time period the highest VAS score was 3. Most patients had almost no need of painkiller after postoperative day 2 (POD 2). A mean of VAS score was appeared as 0.7 after POD2. Except two, the other patients were discharged in 36 hour after surgery. The mean hospital stay was 1.5 (0.3) days (table 3). Considering the early complications were bleeding in the operation site in 1 patient, urine retention due to spinal anesthesia in 1 patient. No nerve injury was experienced. Perianal fistula occurred in 1 patient 2 weeks after surgery. Thus total complication ratio was seen up to 6.8 % (table 3).

Figure 3

Table 3: Complications experienced in early postoperative period

Complications	Obstetric sphincter defect (n:31)	Non-obstetric sphincter defect (n:13)	
Bleeding	1	0	
Urine retention	0	1	
Postoperative Perianal fistula	0	1	
Inferior rectal nerve injury	0	0	
Total complication rate	3.2%	15.3%	6.8%

In preoperative evaluation all patients had anal incontinence with a mean FISI score of 18. Eight weeks after surgery 3 patients (6.8%) in obstetric trauma and 2 patients (4.5%) in non-obstetric trauma group still had incontinence with mean FISI score of 19. At 8th month 8 patients (18%) in both groups remained incontinent with mean of FISI scores of 18

and 16 (table 4).

Figure 4

Table 4: Manometric and functional results of overlap sphincter repair

		Obstetric sphincter defect (n:9)	Non-obstetric sphincter defect (n:7)	p value
MRP (mean-SEM-min-max) mmHg	Preop.	21.2 (3.4) (12-33)	26.8 (3.5) (17-41)	0.043
	PO 8 th wk	35.2 (2.2) (27-39)	45 (1.8) (39-51)	
MSP (mean-SEM-min-max) mmHg	Preop.	44 (3.1) (33-50)	51.6 (3.6) (40-62)	0.044
	PO 8 th wk	59.8 (3.1) (53-71)	77 (4.7) (55-90)	
Anal canal length (cm)	Preop.	1.18 (0.7)	2.1 (0.6)	0.042
	PO	3 (0.3)	3.4 (0.7)	
VAS	POD 1	3.1 (1-6)		0.007
	POD2-5	0.7 (0-2)		
Hospital stay (day) (mean-SEM) (range)		1.5 (0.3) (1-6)		
Difficulty with evacuation	Preop.	0	1	
	PO	0	0	
Use of anti-laxative	Preop.	7	6	
	PO	1	0	
				Satisfaction
Mean FISI Score	Preop.	18	18	
	PO 8 th wk	19 (n=3) (6.8%)	19 (n=2) (4.5%)	88.6 %
	PO 8 th mo.	18 (n=5) (11.4%)	16 (n=3) (6.8%)	82 %

FISI: Fecal incontinence severity index
 PO: Postoperative
 POD: Postoperative day
 SEM: Standard Error of Mean
 MRP: Minimal resting pressure
 MSP: Maximal squeezing pressure
 VAS: Visual Analog Scale

Considering the pre-postoperative anal functional outcomes in the patients with obstetric and non-obstetric sphincter injury, maximal resting pressure (MRP) was 21.2(3.4) and 35.2 (2.2) mmHg and 26.8 (3.5) and 45 (1.8) mmHg, minimal squeezing pressure (MSP) was 44 (3.1) and 59.8 (3.1) mmHg and 51.6 (3.6) and 77 (4.7) mm Hg respectively. Means of postoperative MRP and MSP outcomes were moderately high in the patients with non-obstetric sphincter injury (p=0.043, p=0.044). Anal canal length was measured 3 and 3.4 cm in postoperative period while the outcomes were 1.2-2 cm before the surgery (table 4).

Whole patients were evaluated with QoL-FI at 8th months in follow up. Eight patients defined poor health condition. But remaining 36 patients defined their health condition was good (82%) (Moderate to perfect). (table5).

Figure 5

Table 5: Patients' quality of life survey performed PO 8th week and months.

Quality of general health	No. of Pts	Patient's satisfaction
PO 8 th month	Perfect	82%
	Good	
	Moderate	
	Poor	18%

DISCUSSION

Before 1940's end-to-end sphincter repair was a common

procedure. When the high failure outcomes of the end-to-end sphincter repair were experienced surgeons had a tendency to perform an overlapping sphincter repair for the patients with anal trauma with success rates ranging from 45% to 100% (6). Overlapping repair has considered the better because the surface area in contact is thick. The deteriorating outcomes of overlapping repair in follow up were reported. Tjandra et al. stated that after 5 years overlapping repair performed, no patient was continent to flatus and less than 10% of patients was fully continent to solid and liquid (6). Sitzler et al. reported in his particular series that successful outcomes were achieved in about 75% of patients (7). Malouf et al. declared in their series that after 77 months follow up 71 % of patient had a significant improvement in their bowel control. But they experienced the decreasing in the improvement of patient's function in time from 15 to 77 months (8). Ha et al. stated the increase in squeezing pressure and sphincter length in their series. It was also declared that after overlapping sphincter repair the increased squeezing pressure relating the improving in continence condition was the only parameter revealed by manometry (9). Fleshman et al. declared that patients with obstetric anal sphincter injury showed 96% of anal functional improvements with 54% complete control of continence in 6 months follow up (10). Londono-Schimmer et al. found significant improvements in squeezing pressures. But they stated that manometry gave unclear outcomes due to the differences in technical characteristics (11). Otherwise Wexner et al. showed that an increase in both resting and squeezing pressures and sphincter length correlated well with anal functional restoration (12,13). The improvement of anal functions in the patients over 50 years old has not clear. Although some reports (13, 14) stated no correlation between age and postoperative function, the other concluded that failure rates are higher with increasing age (7). Pudental nerve terminal motor latency time period (PNTML) was considered as an important factor to determine the poor outcome of overlapping sphincter repair which was stated by Tjandra et al. in their series (6,15,16). But some reports (7,8) noticed that PNTML may not be sensitive enough to detect nerve damage. Even the surgery itself may be a reason causing to the long-term deterioration which was no or little effect on functional outcomes of the anal canal (9). Pudental nerve may be damaged in most during the vaginal delivery. Cumulative hazardous effect of multiparity makes pudental nerve damaged. Thirtytwo-35 % of women has changed anal function after first vaginal delivery. This ratio increases to

45% after second vaginal delivery (17,18). Fyness et al. showed that PNTML time lengthened for each woman after even first vaginal delivery anal sphincter defect was encountered in a few women undergoing second vaginal delivery (19). However Bussen et al. report that reliability of PNTML depended on several factors such as the measurement performed which parts of a day and quantified which side of nerve (20). Thus it is difficult to conclude that the delayed PNTML is the main factor causing anal incontinence in multiparous individuals (9).

Halverson et al. evaluated the quality of life of patient undergoing overlapping sphincter repair in long follow up period by using ASCRS-validated FISCI and QOL scale. They stated a close correlation between a low FISCI score and high quality of life of the patients (1,21). Malouf et al. stated that after surgery the patients were satisfied by even slight anal functional improvement (8).

In this study two groups of patients with both obstetric and non-obstetric traumatic sphincter injury were compared. Less than considerable follow up period was a problem of the study. The continence function of the anal canal has been evaluated with FISCI scoring reflecting both severity and frequency of the complaints (21). FISCI scale valuing from 1 to 20 assigned to the frequency of each symptom. In our experience the patient's definition about their continence condition according to the FISCI scale improved up to 88.6 % of patient's continence status in early postoperative follow up. At the end of 8th months 36 patients (82%) were near fully continent and 8 patients with high ranked FISCI score in both groups had failure (18%) in repair. ERUS performed for 4 patients revealed sphincter repair disruption in two involving obstetric trauma. Considering pre-postoperative means of MRP, MSP and anal canal length in both groups the outcomes of non-obstetric trauma patients were significant higher than that revealed in the obstetric trauma group (p=0.043, p=0.044, and p=0.042 respectively) (table 4). Regarding the patients with no defective nerve function in non-obstetric trauma group, a sharp-cut defect of external and/or internal sphincter with dense scar tissue underwent to a repair rather late after trauma occurred. But each patient in the obstetric injury group had repair performed by gynecologist after delivery. In the operation the bulky sphincter muscles with scar tissue gave an opportunity to make a clear dissection and thicker overlap repair without bleeding. But in the patients with obstetric trauma sphincter muscles which were deficient without dense scar tissue

brought about the needy overlap repair. These factors should be the reason why high resting and squeezing pressures and good continence condition in postoperative time period were significant in the patients with non-obstetric trauma group. Furthermore anal canal was significantly longer in postoperative period.

In those patients pain management was mostly achieved in first 24 hours. After POD 2 the mean of the patient's VAS score indicated almost no pain. Hospital stay was 1.5 days. No major complication except perianal fistula happened in postoperative 2 weeks was assessed.

In this series overlapping sphincter repair achieved higher resting and squeezing pressures particularly in the patients with smooth sphincter injury with dense scar tissue in which condition the overlapping repair was performed well. Both higher squeezing pressures and broad anal canal should be the reason why the patients with non-obstetric trauma had more success in anal functions than those with obstetric trauma in a short follow up time period.

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References

1. Halverson AL, Hull TL, Long-term outcome of overlapping anal sphincter repair, *Dis Colon Rectum*; 2001; 45:345-8
2. Cook TA, M.C.M.N., Management of fecal incontinence following obstetric injury. *Br J Surg*, 1998. 85: p. 293-299.
3. Parks AG, McPartlin JF, Late repair of injuries of the anal sphincter, *Proc R Soc Med* 1971;74:1187-9
4. Slade MS, Goldberg SM, Schottler JL, Balcos EG, Christenson SE, Sphincteroplasty for acquired anal incontinence, *Dis Colon Rectum* 1977;20:33-5
5. Fang DT, N.S., Vermeulen FD, Herman FN, Goldberg SM, Rothenberger DA., Overlapping sphincteroplasty for acquired anal incontinence. *Dis colon rectum*, 1984. 27: p. 720-2.
6. Tjandra JJ, H.W., Goh J, Carey M, Dwyer P., Direct repair vs. Overlapping sphincter repair. *Dis colon rectum*, 2002. 46(7): p. 937-43
7. Sitzler PJ, Thompson JP, Overlap repair of damaged anal sphincter. A single surgeon's series, *Dis Colon Rectum* 1996;39:1356-60
8. Malouf AJ, Norton CS, Engel AF, Nichols RJ, Kamm MA, Long-term results of overlapping anterior anal sphincter repair for obstetric trauma, *Lancet*, 2000;355:260-65
9. Ha HT, Fleshman J., Smith M, Read TE, Kodner IJ, Birnbaum EH., Manometric squeeze pressure difference parallels functional outcome after overlapping sphincter reconstruction. *Dis Colon Rectum*, 2001. 44(5): p. 655-660
10. Fleshman JW, Dreznik Z, Fry RD, Kodner IJ, Anal sphincter repair for obstetric injury: manometric evaluation of unclonal results. *Dis Colon Rectum* 1991;34:1061-7
11. Londoo-Schimmer EE, Garcia-Duperly R, Nichols RJ, Ritchie JK, Hawley PR, Thompson JP, Overlapping anal sphincter repair for fecal incontinence due to sphincter trauma: five year follow up functional results. *Int J Colorect Dis* 1994;9:110-3
12. Wexner SD, Marchetti F, Jagelman DG, The role of sphincteroplasty for fecal incontinence reevaluated: a prospective physiologic and functional review. *Dis Colon Rectum* 1991;34:22-30
13. Olivera L, Pfeifer J, Wexner SD. Physiological and clinical outcome of anterior sphincteroplasty. *Br J Surg* 1996;83:502-5
14. Young CJ, Mathur MN, Evers AA, Solomon MJ, successful overlapping anal sphincter repair: relationship to patient age, neuropathy, and colostomy formation. *Dis Colon Rectum* 1998;41:344-9
15. Sangwan YP, Collier JA, Barrett RC, Roberts PL, Murray JJ, Rusin L, Schoetz DJ Jr, Unilateral pudental neuropathy. Impact on outcome of anal sphincter repair, *Dis Colon Rectum* 1996;39:686-89
16. Ctercteko GC, Fazio VW, Jagelman DG, Lavery IC, Weakley FL, Melia M, Anal sphincter repair: a report of 60 cases and review of the literature, *Aust N Zeland J Surg* 1988,58:703-10
17. Leroi AM, Kamm MA, eber J, Denis P, Hawley PR, Internal anal sphincter repair, *Int J Colorect Dis* 1997;12:243-5
18. Gilliland R, A.D., Moreira H, Oliveira L, Gilliland JE, Wexner SD., Pudental neuropathy is predictive of failure following anterior overlapping sphincteroplasty. *Dis colon rectum*, 1998. 41: p. 1516-22
19. Fynes M, Donnelly V, Behan M, O'Connell PR, O'Herlihy C, Effect of second vaginal delivery on anorectal physiology and faecal continence: a prospective study, *Lancet* 1999;354:983-6
20. Bussen D, Sailr M, Fuchs KH, Thiede A, Reliability of pudental nerve terminal motor latency. *Coloproctology* 2003;25:261-5
21. Rockwood TH, Church JM, Fleshman JW, et al. Patients and surgeon ranking of the severity of symptoms associated with fecal incontinence: the fecal incontinence severity index. *Dis Colon Rectum* 1999;42:1525-32

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