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Original Research Article

Overlap repair of isolated internal anal sphincter injury: success and failure

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ABSTRACT

Background: Internal anal sphincter (IAS) injury may manifest after other anal surgeries. The pattern of incontinence due to its injury is unique with passage of flatus and/or faecal matter during both day time and sleep. Its repair is extremely challengeable due to its delicate modified smooth muscles. The aim of this study is to evaluate our limited modifications in overlap repair of IAS injury, hoping to reach satisfactory success rates that could encourage the return again to this type of repair.
Methods: This is a prospective controlled study on 17 patients with isolated IAS injury that were operated upon by a modified overlap repair. Endoanal ultrasonography and anorectal manommetric studies were done preoperatively for all cases. Wexner continence score was estimated preoperatively and at the end of 2nd, 6th and 12th months postoperatively. Our definition of failure was having postoperative Wexner score of > 8 or a drop to < 50% of the preoperative score (if it was preoperatively <16).
Results: Failure rate was greatly affected by the size of defect. Age and preoperative resting anal pressure were not prognostic factors for failure. After 12 months follow-up, we reached 70.6% success rate.
Conclusions: IAS repair under certain circumstances (size of defect not more than half of the circumference of IAS, single injury to the sphincter, and with well experienced surgeons) worth the trial of repair with hopeful results.

Keywords: IAS repair, Anal sphincter repair, Anal sphincter surgery, Iatrogenic IAS injury repair, Overlap IAS repair, Surgical management of faecal incontinence

INTRODUCTION

The internal anal sphincter (IAS) is the continuation of the circular smooth muscle of the rectum, which is in a state of continuous maximum contraction, thus providing a barrier to the involuntary loss of stool and contributing to 50%-85% of the anal resting tone.[1] IAS injury is a problem that may manifest after anal sphinctrotomy, sphincterectomy and hemorrhoidectomy surgeries.[2]

The pattern of incontinence due to IAS injury is unique with passage of flatus and/or faecal matter during both day time and sleep. However, patients can keep continence during urge due to the intact external sphincter which can sustain squeeze for few minutes.[3]

The repair of IAS is extremely challengeable due to the unique nature of the internal sphincter muscle fibers which are delicate modified smooth muscles.[4,5] For many years, IAS repair was deemed inappropriate technique due to a belief of sure recurrence though perfection of the technique, this is due to this unique nature of the internal sphincter muscle fibers added to the inappropriate detection of the site and extent of the defect in the internal sphincter depending on clinical examination as the only available tool.[6]

Moreover, the use of bulking agents for internal sphincter defect augmentation did not show any significant rise in the resting or squeeze anal pressure; also it is contraindicated in flatus incontinence in addition to the possible migration and sepsis.[2]

Recently, with the advance of endoanal ultrasound technology, few surgeons regained the interest to repair the internal sphincter defects using non absorbable stitches with respectable results.[7,8]

The aim of this study is to evaluate the results of the overlap repair of IAS injury depending on few limited modifications and precautions, which could encourage again this simple and easy procedure.

METHODS

This is a prospective controlled study, which was conducted on 17 patients recruited from Ain Shams University hospitals, Cairo, Egypt from August 2013 till February 2015.

The study was designed to include patients with isolated IAS injury, excluding combined internal-external sphincter injuries, multiple internal sphincter injuries (patchy internal sphincter) and internal sphincter injury with other anorectal pathology (e.g. fistula, piles, ulcerative colitis and rectal prolapse). Also patients with a single internal sphincter injury exceeding 50% of the circumference of the anal canal were excluded from the study. For the clarity of our study, any patient with squeeze pressure less than 90 mmHg was excluded, regardless of any endoanal ultrasound findings.

This study was approved by the ethical committee of general surgery department, Ain Shams University.

Detailed history was taken from all patients included in the study focusing on continence prior to the claimed surgery, presence of chronic illness, type and timing of anal surgery, the postoperative sequence and the degree of incontinence following the surgery using Wexner Continence score.

In our study, we performed overlap internal sphincter repair for 21 patients over 19 months with follow-up for 12 months. Only 17 of them completed the study as we lost contact of 3 patients and one patient died.

Both general and PR examinations were done, in the outpatient clinic, for patients included in the study.

All patients were subjected to endoanal ultrasonography for detecting site, size and number of injuries, and also to exclude the presence of external anal sphincter defect. According to the size of defect (by endoanal ultrasound), we classified the patients into 3 groups; group A: size of defect less than or equal to 1/4 of the internal sphincter circumference, group B: size of defect less than or equal to 1/3 but more than 1/4 of the circumference, and group C: size of defect less than or equal to 1/2 but more than 1/3 of the circumference.

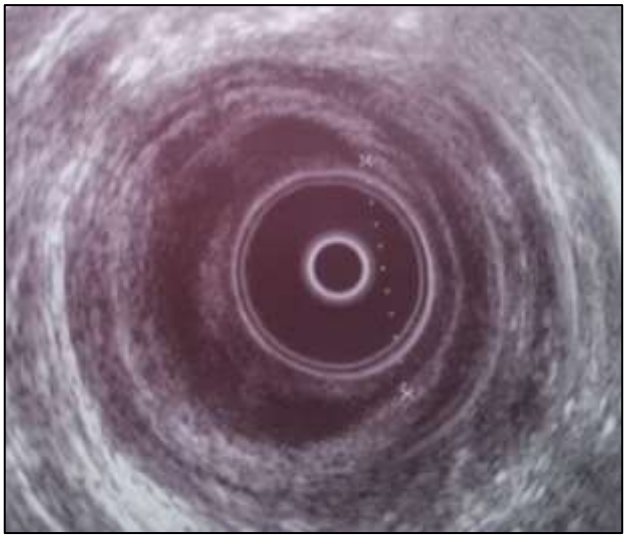

Figure 1: Endoanal ultrasound finding consistent with defect < 50% (group C) of the internal sphincter circumference.

Anal manometric study was also performed for all patients in the outpatient clinic, stressing on the resting anal pressure (RAP) and the squeeze pressure.

Patients were informed about the details of surgery, postoperative care, follow-up and complications, and they were consented via a written previously prepared consent form.

Preoperative work up was done, patients were instructed to have fluid diet 2 days prior to our repair, and at the night prior to the surgery an evacuating regular enema was done.

Intra-operatively, one gram 3rd generation cephalosporin and 500 mg metronidazole IV were given to all patients after sensitivity tests and were continued for the next 4 days. Post-operatively, patients continued nil per mouth for 3 days then began soft diet. Care of the wound by twice daily dressing using saline/ garamycin solution was done followed by application of topical garamycin creams and covering the wound by a sterile piece of gauze. Patients were instructed to sit in a warm water bath after defecation for not more than 5 minutes then to dry the wound with a clean kerchief, put garamycin cream and cover the wound by sterile gauze.

Patients were discharged home on the morning of the 5th postoperative day, except if there was a wound infection; patients' discharge was postponed until complete recovery. Outpatient medications were prescribed in the form of oral ciprofloxacin 500 mg twice daily, metronidazole 500 mg three times per day for 7 days and

bulk laxative granules once daily for 2 months with the usual wound care till complete healing of the wound.

Postoperative follow-up at the outpatient clinic began after 2 weeks of patient discharge then every 2 weeks till the end of the 2nd month postoperatively. Patients were instructed to come to the outpatient clinic if any abnormality occurred, such as incontinence, abnormal discharge or pain.

Postoperative follow-up items were focusing on patients' satisfaction, Wexner Continence score and presence of any wound discharge, in addition to observing the wound and removal of any residual skin stitches. The first per rectal (PR) examination was delayed till the 4th visit, aiming not to interrupt the process of natural healing.

Delayed follow-up data (at the end of the 6th and 12th postoperative months) was accepted either by contacting patients over the phone or at the outpatient clinic asking about their continence satisfaction and their Wexner score. Our definition of failure was having a postoperative Wexner score of greater than 8 or a drop to less than 50% of the preoperative score (if the preoperative score was <16).

Postoperative manometry was performed for only 4 patients (3 patients that developed delayed postoperative re-incontinence and for another patient who did not show any improvement postoperatively). One patient with re-incontinence refused any further management.

Operative technique

In our study, all cases with IAS injury were repaired by the same technique and the same surgical team.

Either spinal or general anesthesia was used but we preferred general anesthesia if there was no contraindication for it. Patients were positioned in extended lithotomy position, PR examination and reviewing the endoanal ultrasound results were done. Saline adrenaline solution 1:200.000 was injected at the subcutaneous space over the sphincter defect, proximal and distal to the defect by about one to one and half cm, continuing the injection at the healthy felt intersphincteric plane, both proximal and distal to the site of injury, to facilitate the dissection through this plane. Then a small amount of the solution was injected at the sub mucosal plane to facilitate dissection of the sphincter from the overlying mucosa.

Skin incision using sharp scalpel was done that extended from the healthy intersphincteric plane, proximal to the site of injury by 2 cm, to the distal healthy plane by the same distance. By using low voltage cautery force, we deepened the incision between both external and internal sphincters till complete exposure of the outer surface of the injured sphincter and the healthy proximal and distal segments on both sides of the defect separating the full length of the internal sphincter from the external sphincter, followed by careful dissection of this segment from the anoderm and anal canal mucosa. Overlapping of both healthy ends (transverse mattress sutures) without tension was done using prolene 4/0. We used about 3-4 stitches (5 mm distance each) keeping the knot opposite the intersphincteric plane.

Excess skin (if present) was trimmed and the residual skin was sutured using an absorbable stitch (3/0) in a tri-star manner (Figure 4), leaving a space of about one cm between stitches.

Figure 2: Deformed internal sphincter from 12 o'clock to 4 o'clock (1/3 of the sphincter circumference).

Figure 3: Overlapping of both healthy ends of the internal sphincter.

Figure 4: After closure of the wound (Tri-Star appearance of the skin closure).

Figure 5: Complete wound healing after 6 months.

RESULTS

In the whole study we reported failure in 5 patients (29.4%) in which the postoperative Wexner score was greater than 8 or dropped to less than 50% of the preoperative score. However, the rest of the patients (70.6%) showed improvement in their Wexner scores to reach a mean of 7.24 after a one year follow-up.

The size of the defect was found to be an important determining factor for success of the repair, whereas the preoperative RAP and age were not reported to be predictive factors for success or failure (Tables 2, 3 and 4).

Table 1: Mean Wexner score preoperatively and at the end of the 2nd, 6th and 12th months postoperatively.

	Preoperative	2nd month	6th month	12th month
Mean Wexner score	15.12	5.88	7.12	7.24

Table 2: Size of the defect and the failure rate.

Size of the defect	Total number of patients (%)	Number of failed cases (%)
≤1/3 of internal sphincter circumference	9 (52.9%)	1 (11%)
>1/3 - ≤1/2 of internal sphincter circumference	8 (47%)	4 (50%)

Table 3: The preoperative resting anal pressure (RAP) and the failure rate.

Preoperative RAP	Total number of patients (%)	Number of failed cases (%)
<25 mmhg	11 (64.7%)	3 (27%)
>25 mmhg	6 (35.3%)	2 (33%)

Table 4: Age of patients and failure rate.

Age	Total number of patients (%)	Number of failed cases (%)
≤40 years	10 (58.8%)	3 (30%)
>40 years	7 (41.1%)	2 (28.6%)

Among different causes of isolated IAS injuries, hemorrhoidectomy was reported to be the most important cause of sphincter injury, where an overall 59% of our patients were documented to have previous hemorroidectomy, whilst other causes contributed to a smaller share.

Table 5: Causes of isolated internal sphincter injuries.

Cause of isolated IAS injury	Number of patients (%)
Hemorrhoidectomy	8 (47%)
Fistula lay open	2 (12%)
Complex anal surgery*	2 (12%)
Unknown anal surgery	5 (29%)

*Complex anal surgery: anal surgery for hemorrhoids accompanied with fissure and/or fistula surgeries.

Postoperative wound infection occurred in 4 cases (23.5%) that were presented by wound discharge. One patient (5.8%) had severe wound dehiscence and disruption of the repair, while the other 3 cases passed with no failure and were managed by regular dressing and antibiotics.

DISCUSSION

After one year follow-up of 17 patients with attempted IAS repair following an iatrogenic IAS injury, we noticed that the failure rate was affected by the size of the defect in the internal sphincter (an endoanal ultrasound finding). The size of the defect was an important determining factor for success of the repair as we reported that with a defect less than or equal to 1/3 of the sphincter circumference, we had only 11% failure which rose to 50% with a defect size between 1/3 and ½ of the sphincter circumference.

In our study, the preoperative RAP was not a predictive factor for success or failure. However, we believe that if more cases were included in the study, the results could be different and the RAP could be a prognostic value. Similarly, age was found not to be of value for prediction of the outcome for IAS repair with almost no difference in failure rates between patients under and over 40 years (Table 4).

The same opinion was mentioned by El-Gazzaz and co-workers in 2012, where they reported that age is not a predictor of outcome for overlapping sphincter repair and their recommendation was to offer this procedure for both young and old patients.[9]

In our study, hemorrhoidectomy was reported to be the most important cause of IAS injury among our patients, where 47% of them had a previous history of at least one hemorrhoidectomy and 12% had a history of complex anal surgeries, including hemorroidectomy. Thus, overall 59% of our patients had performed previous hemorroidectomy. This in consistent with our belief regarding the mode of injury to the IAS following incorrect haemorroidectomy, as with the excessive traction over the hemorrhoids and attempted excision, surgeons excise a wedge of the internal sphincter rather than doing false sphinctrotomy, thus the defect size is larger than other procedures, such as sphincterotomy and fistulotomy. Abbasakoor and co-workers in 1998 reported that internal sphincter injury should be suspected in patients with incontinence after hemorroidectomy.[10]

It was believed for many years that one of the reasons of failure is the unpreventable postoperative contamination and infection (sitzler and thomson).[11] Nevertheless, in our study, we could not offer faecal diversion for those patients as their culture would not permit them to accept having a colostomy bag, and because of the fact that colostomy is not a continent way of defecation that could be offered for those patients with mild to moderate incontinence symptoms. However, we faced only one case (5.8%) out of the 17 that had severe wound infection which contributed to its failure. Therefore, we think that with proper preoperative preparation and postoperative care including nil per mouth for 3 days, proper intravenous antibiotics and wound dressing followed by strict commitment of the patient to our instructions in his/her home, wound infection could be prevented or, even if occurred, it could be managed without affecting the repair. Moreover, we believe that the way of repair itself without marked dissection of the sphincter would prevent sphincter devitalisation and ischemia which could contribute to the progression of infection. We also found that with adequate mobilization of the internal sphincter without leaving both sphincter edges under tension will minimize the incidence of wound dehiscence.

This is consistent with the results of a randomized trial done by Hasegawa and colleagues which indicated that faecal diversion in sphincter repair was unnecessary, because it has no benefit in terms of wound healing or functional outcome, and it is a source of morbidity.[12]

Using nonabsorbable monofilament (prolene 4/0) and keeping the knots facing the intersphincteric plane not the mucosa, in our opinion, decreased the incidence of infection and protrusion of the stitch into the anal canal. Moreover, proper spacing between stitches prevented the occurrence of sphincter ischemia and dehiscence.

In 2012, Farag published his book (Integrated coloproctology a new theory of anorectal physiology) where he reported that the anal canal resistance equation explains that the anal canal resistance is directly proportional to the anal canal length and is inversely proportional to the anal canal diameter.[13] From this equation we had the whole idea of our technique which is to regain a long tube of sphincter around the anal canal with accepted narrowing of the internal diameter of this tube to leave a continuous average high pressure inside this tube and permit an adequate sampling (proper sensation of the stools by mucosa of the upper anal canal) via the narrowing, elongation and overlap flap of the internal sphincter.

The limitations of this study were the limited number of patients studied and the scarcity of recent publications discussing isolated IAS repair. We believe that deficiency of articles handling this issue is due to the still believed idea about the insignificance of this maneuver.

CONCLUSION

Internal sphincter repair under certain circumstances (isolated defect, size of defect less than 1/2 of the circumference and with well experienced surgeons) worth the trial of repair with hopeful results and this could be attributed to our idea of repair.

However, we recommend further multicenteric studies to be done on this topic including larger number of patients to get more solid results before standardizing this technique to be used by other surgeons.

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Conflict of interest: None declared
Ethical approval: This study was approved by the Ethical Committee of General Surgery Department, Ain Shams University, Cairo, Egypt

REFERENCES

1. Oberwalder M, Dinnewitzer A, Baig MK, Nogueras JJ, Weiss EG, Efron J, et al. Do internal anal sphincter defects decrease the success rate of anal sphincter repair? Tech Coloproctol. 2006;10:94-7.
2. Fernando DP. Internal anal sphincter augmentation and substitution. Gastroenterology report. 2014;2:106-11.
3. Lazarescu A, Turnbull GK, Vanner S. Investigating and treating fecal incontinence: when and how. Can J gastroenterol. 2008;23(4):301-8.
4. Briel JW, de Boer LM, Hop WC, Schouten WR. Clinical outcome of anterior overlapping external anal sphincter repair with internal anal sphincter imbrication. Dis Colon Rectum. 1998;41:209-14.
5. Wexner SD. Anal sphincter repair: what's in a name? Dis Colon Rectum. 1999;42:688-9.
6. Leroi AM, Kamm MA, Weber J, Denis P, Hawley PR. Internal anal sphincter repair. Int J Colorectal Dis. 1997;12:243-5.
7. Abou-Zeid AA. Preliminary experience in management of fecal incontinence caused by internal anal sphincter injury. Dis Colon Rectum. 2000;43(2):198-202.
8. Demirbas S, Atay V, Akin L, Çelenk T. Overlapping anal sphincter repair in the patients with obstetric and non-obstetric trauma: Do the improved squeesing pressures indicate better anal function? Internet J Gynaecol Obstet. 2003;3(1):1-6.
9. El-Gazzaz G, Zutshi M, Hannaway C, Gurland B, Hull T. Overlapping sphincter repair: does age matter? Diseases of the colon and rectum. 2012;55(3):256-61.
10. Abbasakoor F, Nelson M, Beynon J, Patel B, Carr ND. Anal endosonography in patients with anorectal symptoms after haemorrhoidectomy. British J Surg. 1998;85(11):1522-4.
11. Sitzler P, Thomson JP. Overlap repair of damaged anal sphincter: a single surgeon's series. Dis Col Rect. 1996;39(12):1356-60.
12. Hasegawa H, Yoshioka K, Keighley MR. Randomized trial of fecal diversion for sphincter repair. Dis Col Rect. 2000;43(7):961.
13. Farag A. Integrated coloproctology a new theory of anorectal physiology. Resist Flow Equat Funct Coloproctol. 2012;5-17.

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