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Abdominal pectopexy vs. abdominal sacral hysteropexy as conservative surgeries for genital prolapse: A randomized control trial

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SUMMARY

Background: Pectopexy is a new technique for apical repair in which lateral parts of the iliopectineal ligament are used for cuff or cervix suspension. This new method is considered a simple, safe procedure, especially in patients whose surgical exploration is difficult. Abdominal sacral hysteropexy remains a viable alternative for women undergoing pelvic reconstructive surgery who wish to retain their uteri, providing comparable rates of overall improvement and symptom change.

Aim of the work: The aim of the study is to compare between abdominal pectopexy and abdominal sacral hysteropexy in terms of operative time.

Methods: This prospective randomized control study was performed on total 80 patients who were diagnosed with pelvic organ prolapse in Ain Shams University hospital from May 2019 to May 2021 with women of any parity included in the study with stage 2 to 4 uterine prolapse, BMI from ≤ 35 kg\m^2 and age group from 20 to 40 years. Women with previous correction of apical prolapse and co-existing uterine pathology e.g. uterine fibroid were excluded from the study. The women involved in the study were divided into two groups: Group A: 40 women who underwent abdominal pectopexy and Group B: 40 women who underwent abdominal sacral hysteropexy.

Results: Operation duration was significantly shorter among Pectopexy group than among Hysteropexy group. Intraoperative blood loss was significantly lower among Pectopexy group than among Hysteropexy group. No significant difference between the studied groups regarding preoperative and postoperative hemoglobin. Postoperative hemoglobin drop was significantly lower among Pectopexy group than among Hysteropexy group. Postoperative pain at hour 24 was significantly lower among pectopexy group. Postoperative constipation was significantly recorded only in hysteropexy group. Postoperative blood transfusion was not recorded in both groups. Postoperative hospital stay was non-significantly shorter among Pectopexy group than among Hysteropexy group. Relapse was non-significantly more frequent in pextopexy group, while Stress urinary incontinence was non-significantly less frequent in pextopexy group. Sexual dysfunction was not recorded in the study groups.

Conclusion: As evident from the current study, Pectopexy is a safe, effective and feasible alternative approach in management of pelvic organ prolapse with significantly shorter operation time. Moreover, it is associated with minimal intraoperative and postoperative complications, so should be preferred over sacrohysteropexy in management of pelvic organ prolapse.

Keywords: Abdominal pectopexy; Abdominal sacral hysteropexy; Genital prolapse

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INTRODUCTION

Pelvic organ prolapse (POP), the herniation of the pelvic organs to or beyond the vaginal walls, is a common condition. Many women with prolapse experience symptoms that impact daily activities, sexual function, and exercise. The presence of POP can have a detrimental impact on body image and sexuality [1].

Pelvic organ prolapse (POP) is affecting women of all ages. Epidemiological studies suggest a lifetime risk of prolapse or incontinence surgery of between 7 and 19% [2].

Nulliparous prolapse is reported to account for 1.5% to 2% of all cases of genital prolapse [3]. The incidence rises to 5-8% for young women who have delivered one or two children. As this type of prolapse occurs at a younger age, the surgical technique should not only reduce the prolapse but also retain the reproductive function. Various conservative surgeries have been described in the past, each having their own merits and de-merits [4].

Pectopexy is a new technique for apical repair in which lateral parts of the iliopectineal ligament are used for cuff or cervix suspension. This new method is considered a simple, safe procedure, especially in patients whose surgical exploration is difficult [5].

Abdominal sacral hysteropexy remains a viable alternative for women undergoing pelvic reconstructive surgery who wish to retain their uteri, providing comparable rates of overall improvement and symptom change. Avoiding hysterectomy decreases the risk of mesh erosion but may increase the risk of subsequent recurrent prolapse, specifically in the anterior compartment [6].

Although sacrocolpopexy has been the most effective option over time, the procedure is still associated with some problems, and the most frequently reported complications include defecation disorders and stress urinary incontinence (SUI) [7].

AIM OF THE WORK

The aim of the study is to compare between abdominal pectopexy and abdominal sacral hysteropexy in terms of operative time.

PATIENTS AND METHODS

After ethical committee approval and informed

consent from the patients, this prospective randomized control study was performed on total 80 patients who were diagnosed with pelvic organ prolapse in Ain Shams University hospitals from May 2019 to May 2021.

Study population: Women who were diagnosed with pelvic organ prolapse were divided into two groups with the following inclusion criteria:

Inclusion criteria:

- Women with stage 2 to 4 uterine prolapse.
- BMI from ≤ 35 kg\m^2.
- Women of any parity including nulliparous were included.
- Age of female patients ranges from 20 to 40 years.

Exclusion criteria:

- Previous correction of apical prolapse.
- Co-existing uterine pathology e.g. uterine fibroid.

Study Procedures: The patients were divided into two groups as follows:

Group A: 40 women who underwent abdominal pectopexy.

Group B: 40 women who underwent abdominal sacral hysteropexy.

All the patients were subjected to

Preoperative Assessment including:

Detailed history taking including age, parity, medical, surgical history and history of blood transfusion.

Physical examination:

- General examination including the body mass index.
- Abdominal examination including presence of previous scars, uterine size, any tenderness and presence of palpable masses.
- Pelvic examination: including stage of uterine prolapse, any other pelvic floor defect, uterine size, any adnexal mass and tenderness.

Preoperative investigations:

- A preoperative trans-vaginal ultra- sonography to assess the volume of the uterus, gross uterine pathology and any adnexal pathology.
- The preoperative laboratory investigations: hemoglobin, percent and haematocrit value, blood grouping, liver and kidney function tests.

Availability of blood to be ensured for each patient before surgery.

Operative technique

Pectopexy: All patients were operated in the postmenstrual phase of the cycle, after taking detailed written informed consent. The pectopexy was performed under spinal anesthesia in low lithotomy position. Transverse incision was utilized and the abdomen was opened in layers. Wide exposure of the rectus abdominis muscle was done, maintaining perfect hemostasis. Dissection of the fascia Transversalis flush with the sacral bone and exposure of retropubic space took place. Then the bladder was dissected sharply, and the vesicouterine fold was identified. Dissection was carried forward to the right side using the round ligament as a landmark. The iliopectineal ligament was identified at the base of the triangle, which is bordered by the round ligament, external iliac vein, and obturator nerve. We used a non-absorbable polypropylene monofilament surgical mesh for fixation (three stitches to the cervix and one to each pectineal ligament. The mesh was stabilized tension free, and the peritoneal layer was closed with no.0 absorbable sutures.

Abdominal Sacral Hysteropexy: All patients were operated in the postmenstrual phase of the cycle, after taking detailed written informed consent. The abdominal sacral hysteropexy was performed under spinal anesthesia in low lithotomy position. Transverse incision was utilized and the abdomen was opened in layers. Wide exposure of the rectus abdominis muscle was done, maintaining perfect hemostasis. The bladder was mobilized off the cervix to expose 3 to 4 cm of the underlying pubocervical fascia. Windows were made in the broad ligament bilaterally at the level of the cervicouterine junction lateral to the uterine artery. Posteriorly, the rectovaginal space was entered at the level of the uterosacral ligaments and developed using blunt dissection to expose the rectovaginal fascia. Next, a 15 _ 15-cm piece of large-weave polypropylene mesh (Gynecare Gynemesh PS, Ethicon Inc, Somerville, NJ) was used to fashion two 4.5- to 5 cm wide strips of mesh; one was bisected for a distance of 5 cm to produce a Y-configuration for the anterior mesh. The anterior mesh arms were passed through the broad ligament windows and attached to the cervix and pubocervical fascia using interrupted 2-0 polydioxanone (PDS; Ethicon) sutures. The posterior mesh was attached to the distal rectovaginal fascia using transverse-interrupted 2-0 PDS sutures. The mesh was attached as far distally as possible to provide maximum support and elevation to the posterior wall and the apical compartment. A Halban culdoplasty was performed using 2-0 PDS sutures to obliterate the cul-de-sac and prevent entrapment of bowel under the mesh. Once the sacral dissection has exposed the anterior longitudinal ligament and middle sacral vessels, the proximal ends of the 2 mesh strips are attached to the sacral promontory using two 2-0 polyester (Ethibond: Ethicon) sutures to provide elevation of the uterus without tension. The peritoneum was closed over the mesh using a 3-0 vicryl (polyglactin 910, Ethicon) suture [8].

Postoperative care:

- The patient received IV fluids in the first 24 hours (3litres).
- Oral clear fluid intake was started 8 hours after the operation.
- Another dose of antibiotics was received 12 hrs after the operation with the same regimen used in induction.
- Postoperative analgesia was received in the form of parental NSAIDs every 8 hrs for 24 hrs then on demand.
- The urinary catheter was removed 6 hrs after the operation.
- All patients were adviced to avoid vaginal intercourse for at least 2 months.
- All patients were adviced to avoid pregnancy for at least 1 year.

Follow Up:

- All patients were followed up after 10 days and then 3 months.
- All patients underwent abdominal examination and inspection & Palpation for their surgical wounds and pelvic examination for assessment of efficacy by POP-Q system.

Sample Size: Assuming the power= 0.80 and α=0.05, and by using PASS 11th release the minimal sample size for an equal size clinical trial is 32 women in each group. We recruited 40 women in each group for possible attrition.

Outcome measures

Primary outcome:

Operative time:

- Total operative time from skin incision till closure of the skin and excluding time of concomitant surgical procedures.
- Operative time was measured in minutes using stopwatch.

Secondary outcome:

Efficacy: After the procedure, there was follow up visits at 3 months to detect the efficacy of the procedure by using POP-Q system.

Intra operative blood loss was estimated via: Amount of blood in suction bottle. Estimation based on the number of soaked gauzes by weighing the gauzes used in the procedure before and after surgery (each 1 mg f corresponds to 1 ml of blood) [9]. Drop in postoperative hemoglobin and hematocrit when compared with preoperative values

Intra operative complications including: Need for blood transfusion. Bowel or bladder injury.

Postoperative hospital stay.

Postoperative pain: Postoperative pain was assessed using the linear 10cm visual analogue scale. Range is from 10(unbearable pain) to zero (no pain). This was assessed after 6 hours, 12 hours and 24 hours from the operation [10-13].

Postoperative complications: Need for post-operative blood transfusion. Postoperative bowel or urinary tract complications

Ethical Considerations: The patient data were anonymous. Data presentation were not be by the patient name but by diagnosis and patient confidentiality was protected

Conflict of interest: The candidate declared that there is no conflict of interest and the cost of the study was paid by the candidate.

Statistical analysis

The collected data were coded, tabulated, and statistically analyzed using IBM SPSS statistics (Statistical Package for Social Sciences) software version 22.0, IBM Corp., Chicago, USA, 2013. Quantitative normally distributed data described as mean ± SD (standard deviation) after testing for normality using Shapiro-Wilk test, then compared using independent t-test if normally distributed and Mann Whitney test if not normally distributed, while Pearson test was used for correlations. Qualitative data described as number and percentage and compared using Chi square test and Fisher's Exact test for variables with small expected numbers. A two-sided P value < 0.05 was considered statistically significant. Pearson's correlation coefficient (for metric variables) and Spearman's correlation coefficient (for rank variables) was used to estimate association between variables.

RESULTS

During this study, 112 patients were assessed for eligibility and 80 patients were included in the study (40 in each group). Of all eligible patients, 28 patients were excluded from the study based on the inclusion criteria and 4 patients refused to participate in of the study.

Ultimately, the analysis was based on the data of 40 patients in Pectopexy group and 40 in the Hysteropexy group.

Tab.1. showed that no significant difference between the studied groups regarding baseline demographic (age, BMI, parity and prolapse degree).

Tab. 2. showed that Operation duration was significantly shorter among Pectopexy group than among Hysteropexy group.

Tab. 3. showed that Intraoperative blood loss was significantly lower among Pectopexy group than among Hysteropexy group. Bowel injury was recorded only in

Tab. 1. Baseline demographic characteristics among the studied groups.

Variables		Pectopexy (N=40)	Hysteropexy (N=40)	P-value
Age (years)	Mean ± SD	31.0 ± 6.6	31.7 ± 6.3	^0.603
	Range	20.0–40.0	20.0–40.0	
BMI (kg/m²)	Mean ± SD	30.5 ± 2.8	30.8 ± 3.0	^0.703
	Range	25.0–35.0	25.0–35.0	
Parity (n, %)	Nulli	1 (2.5%)	2 (5.0%)	§0.999
	Parous	39 (97.5%)	38 (95.0%)	
Prolapse degree (n, %)	Second	24 (60.0%)	27 (67.5%)	#0.485
	Third	16 (40.0%)	13 (32.5%)	

BMI: Body mass index. ^Independent t-test. §Fisher's Exact test. #Chi square test

Tab. 2. Operation duration (minutes) among the studied groups.

Measures	Pectopexy (N=40)	Hysteropexy (N=40)	^P-value	Effect size Mean ± SE 95% CI
Mean ± SD	69.4 ± 12.6	102.8 ± 9.9	<0.001*	-33.4 ± 2.5
Range	50.0–120.0	85.0–120.0		-38.4–-28.3

^Independent t-test. CI: Confidence interval. *Significant. Effect size: Value of Pectopexy over Hysteropexy

Tab. 3. Intraoperative blood loss, visceral injuries, hemoglobin (gm/dL) & Hematocrit (%) among the studied groups.

Findings	Pectopexy (N=40)	Hysteropexy (N=40)	^P-value	Effect size Mean ± SE 95% CI
Intraoperative blood loss (mL)	325.0 ± 45.5	361.0 ± 53.5	0.002*	-36.0 ± 11.1
Bowel Injuries	0 (0.0%)	1 (2.5%)	0.999	Not applicable
Bladder injuries	1 (2.5%)	0 (0.0%)	0.999	Not applicable
Preoperative				
Hemoglobin	11.4 ± 0.7	11.5 ± 0.7	0.549	-0.1 ± 0.2
Hematocrit	32.8 ± 2.0	33.3 ± 2.3	0.325	-0.5 ± 0.5
Postoperative				
Hemoglobin	10.7 ± 0.7	10.7 ± 0.8	0.913	0.0 ± 0.2
Hematocrit	30.8 ± 1.9	31.1 ± 2.3	0.587	-0.3 ± 0.5
Drop				
Hemoglobin	0.7 ± 0.1	0.8 ± 0.1	0.004*	-0.1 ± 0.0
Hematocrit	2.0 ± 0.3	2.2 ± 0.4	0.008*	-0.2 ± 0.1

^Independent t-test. CI: Confidence interval. *Significant. Effect size: Value of Pectopexy over Hysteropexy

Hysteropexy group, while Bladder injury was recorded only in Pectopexy group. The differences were statistically non-significant. No significant difference between the studied groups regarding preoperative and postoperative hemoglobin & hematocrit. Postoperative hemoglobin and hematocrit drop was significantly lower among Pectopexy group than among Hysteropexy group.

Tab. 4. showed that no significant differences between the studied groups regarding postoperative pain at hours 6 and 12. Postoperative pain at hour 24 was significantly lower among pectopexy group.

Tab. 5. showed that there is a significant difference between the two groups as regards the occurrence of constipation but no significant differences between the studied groups regarding hospital stay, preoperative, postoperative and reduction in POP-Q score. No blood transfusion in both groups.

Tab. 6. showed that Relapse was non-significantly more frequent in pextopexy group, while Stress urinary incontinence was non-significantly less frequent in pextopexy group. Sexual dysfunction was not recorded in the study groups.

DISCUSSION

The current study revealed that there was no significant difference between the studied groups regarding baseline demographic (age, BMI, parity and prolapse degree) (p values = 0.603, 0.703, 0.999, 0.485) respectively.

The current research study revealed that the operative time was significantly shorter in Pectopexy group than Hysteropexy group.

These findings are in agreement with previous studies, although in all the previous studies the pectopexy was done laparoscopically.

Alper Biler et al. [14] did a study to compare perioperative complications and short term outcomes of abdominal sacrocolpopexy, laparoscopic sacrocolpopexy and laparoscopic pectopexy for apical prolapse. A total of 68 abdominal surgeries (44 abdominal sacrocolpopexy and 24 sacrohysteropexy), 14 laparoscopic surgeries (10 laparoscopic sacrocolpopexy, 4 laparoscopic hysteropexy) and 28 laparoscopic pectopexy were done. The mean operating time was found significantly shorter in pectopexy group.

Banerjee C et al., [5] described pectopexy as a new

Tab. 4. Postoperative pain perception (VAS-10) among the studied groups.

Time	Findings	Pectopexy (N=40)	Hysteropexy (N=40)	¤P-value
Hour-6	Median (1st–3rd IQ)	5.0 (5.0–6.0)	5.0 (5.0–6.0)	0.768
	Range	4.0–6.0	4.0–6.0	
Hour-12	Median (1st–3rd IQ)	4.0 (3.0–4.0)	4.0 (3.0–4.0)	0.816
	Range	2.0–5.0	2.0–5.0	
Hour-24	Median (1st–3rd IQ)	1.0 (1.0–2.0)	2.0 (1.0–2.0)	0.008*
	Range	1.0–2.0	1.0–3.0	

IQ: Innterquartiles. €Mann Whitney test. *Significant

Tab. 5. Postoperative complications, hospital stay and POP-Q score at point C among the studied groups.

	Measures	Pectopext (N=40)	Hysteropexy (N=40)	¤P-value
Constipation	Number of cases	0 (0.0%)	7 (17.5%)	0.012*
Blood transfusion	Number of cases	0 (0.0%)	0 (0.0%)	0
Hospital stay (hours)	Mean ± SD	25.8 ± 8.4	27.0 ± 12.4	0.613
POP Q Pre-operative	Median (1st–3rd IQ)	1.0 (0.3–2.0)	1.0 (0.3–2.0)	0.741
	Range	-1.0–3.0	0.0–5.0	
POP Q Post-operative	Median (1st–3rd IQ)	-3.0 (-3.0–-2.0)	-3.0 (-3.0–-2.0)	0.999
	Range	-3.0–-2.0	-3.0–-2.0	
POP Q Reduction	Median (1st–3rd IQ)	4.0 (3.0–5.0)	4.0 (3.0–4.0)	0.642
	Range	2.0–5.0	2.0–7.0	

IQ: Innterquartiles. €Mann Whitney test

Tab. 6. Follow up findings (relapse, incontinence and sexual outcomes) among the studied groups.

Variables	Pectopexy (N=40)	Hysteropexy (N=40)	§P-value	Effect size Relative risk 95% CI
Relapse	2 (5.0%)	1 (2.5%)	0.999	1.35 (0.59–3.10)
Stress urinary incontinence	1 (2.5%)	2 (5.0%)	0.999	0.66 (0.13–3.31)
Sexual dysfunction	0 (0.0%)	0 (0.0%)	Not applicable	

IQ: Innterquartiles. €Mann Whitney test

technique for prolapse surgery in obese patients. They successfully performed the procedure in 12 patients without any complications. Lesser morbidity and lesser operative time were found during pectopexy.

Regarding operative complications, bowel injury was recorded only in Hysteropexy group, while bladder injury was recorded only in Pectopexy group. These differences were statistically non-significant with (p value=0.999, 0.999) respectively. Intraoperative blood loss was significantly lower in Pectopexy group than in Hysteropexy group (p value=0.002).

Consequently, Postoperative hemoglobin and hematocrit drop were significantly lower in Pectopexy group than in Hysteropexy group with (p value=0.004, 0.008) respectively. These findings are in agreement with previous studies.

Banerjee C et al., [5] reported bowel injury in 1.2% of patients in sacropexy group, which was statistically non-significant.

Barranger et al. [15] did a study, which carried over a period of one year. Twelve women with uterovaginal prolapse wishing to retain their uterus underwent Sacrohysteropexy with Prolene Mesh to see outcome of Abdominal Sacrohysteropexy in Young Women with Uterovaginal Prolapse and reported that there was no women developed significant intra and postoperative complications [7].

The most worrying intra-operative complication of sacrohysteropexy is hemorrhage from the pre sacral vessels, which may have life-threatening consequences [16].

Noé et al. [17] compared short-term operative outcomes of pectopexy and sacrocolpopexy procedures in a randomized comparative study of 83 patients with symptomatic primary vaginal prolapse. They showed that the mean operating time and blood loss were significantly lower in the pectopexy group with no major complications occurred in either group.

Our results revealed that there was no significant differences between the studied groups regarding postoperative pain at hours 6 and 12 while Postoperative pain at hour 24 was significantly lower among pectopexy group (p value=0.008).

Kale et al. [18] reported that pectopecxy minimized bowel manipulation, potentially leading to less postoperative pain especially if laparoscopic and robot-assisted approaches.

Regarding Postoperative complications, constipation was significantly recorded only in hysteropexy group (p value=0.012) while Postoperative blood transfusion was not recorded in both groups.

Noé et al. [17] reported that a clear difference was found regarding defecation disorders as the occurrence of *de novo* constipation was significantly higher in the sacropexy group than pectopexy group which was 0% in pectopexy and 19.5% in sacropexy (p value=0.002).

Also, Biler et al. [14] revealed that defecation problems ranging from 17-37%, are the most frequently reported complications associated with sacrocolpopexy. Constipation was not observed in the pectopexy group explained by that the placement of the mesh between the sacrum and vagina (cervix) always narrows the pelvis, and the cause of defecation problems may be the reduced space in the pelvis or trauma to the hypogastric nerves [19].

Kale et al. [18] revealed that one important problem that is observed following sacrocolpopexy is that of gastrointestinal complications; defecation problems, particularly constipation, are most common.

Biler et al. [14] reported that no postoperative blood transfusions needed in both groups.

Our results revealed that there was no statistically significant difference between the two groups regarding the postoperative hospital stay (p value=0.613).

Noé et al. [17] results were agreed with our results in that there was no significant difference in the hospital stay among the studied groups.

Also, Szymczak et al. [20] who assessed perioperative complications for pectopexy in comparison to the sacropexy, revealed that despite the difference in operative time, no difference in hospital stay (p value=0.81).

Regarding long-term complications and follow-up, Relapse was non-significantly more frequent in pextopexy group, while Stress urinary incontinence was non-significantly less frequent in pextopexy group. Sexual dysfunction was not recorded in the study groups.

Barranger et al. [15] revealed that recurrent prolapse was recorded in 2 (16.7%) women who underwent Abdominal Sacrohysteropexy in young women with uterovaginal Prolapse and was symptomatic and required repeat surgical treatment with success rate was 83.3%.

Nygaard et al. [21] conducted a study to summarize published data on abdominal sacrocolpopexy. It was found that the success rate, defined as lack of prolapse postoperatively, ranged from 58% - 100% and success rate in terms of lack of apical prolapse was 78% to 100%. The median reoperation rate for pelvic organ prolapse was 4.4% and for stress urinary incontinence were 4.9%.

Biler et al. [14] reported that *de-novo* stress urinary incontinence, urgency, and defecation problems, as well as perioperative complication rates, were not statistically significantly different between the groups.

Our results revealed that abdominal hysteropexy and pectopexy are equally effective in repair of POP, as there were no significant differences regarding preoperative, postoperative and reduction in POP-Q score between the studied groups.

These results are in agreement with results of previous studies done by Nidhi et al., [7] who reported that sacrohysteropexy are an effective method of managing the pelvic organ prolapse but it is associated with several Intraoperative and postoperative complications. To overcome these complications, Banerjee C et al. [5] & Noé et al. [17] had described pectopexy procedure for repair of apical prolapse, in which bilateral ileopectineal ligaments are used for mesh fixation [7].

The strength points of this study is that it is prospective study design, the inclusion and evaluation of two different surgical routes and having no patients lost to follow-up in three months. It is the first study to compare between abdominal pectopexy and abdominal sacral hysteropexy as all the previous studies were done laparoscopically.

The limitations of the study are worthy of mention including relatively smaller sample size relative to the previous studies, not being a multicentric study as Biler et al. [14] involved a total of 110 patients with apical prolapse and this represents a significant risk of publication bias. Another limitation is the relatively short-term follow-up of patients postoperatively as Biler et al. [14] tracked outcomes for six months postoperatively, which may underestimate the incidence of recurrence of POP, *de novo* SUI, or mesh erosion.

CONCLUSION

Pectopexy is a novel promising method for POP correction that offers some practical advantages, such as shorter operative time, less morbidity, blood loss and postoperative complications.

Pectopexy is a safe, effective and feasible alternative approach in management of pelvic organ prolapse. Moreover, it is associated with minimal intraoperative and postoperative complications, so should be preferred over sacrohysteropexy in management of pelvic organ prolapse.

The present study can burden the knowledge and shed some light on future prospective studies with longer follow up period demonstrating the long-term outcomes of abdominal pectopexy.

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