Preserving round ligament of uterus in laparoscopic repair of female groin hernia: a prospective study

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Background
Preserving the round ligament during Trans Abdominal Pre Peritoneal laparoscopic hernia repair (TAPP) surgery may be unfeasible or prolong the duration of surgery because of the adhesions between the round ligament and hernial sac, so the benefit of preserving or cutting the round ligament during dissection and spreading the mesh is a matter of debate.
Patients and methods
A case series study was conducted on 20 adult female patients over 6 months, and the transabdominal (TAPP) approach was used for all patients. After identifying the round ligament and dissecting it carefully from the adherent peritoneum trying not to tear the peritoneum, the mesh was fashioned to cover the areas of weakness that can develop hernia and cover the round ligament without making a keyhole for it.
Results
Follow-up was done for at least 6 months with no evident recurrence. No complications were recorded except for residual swelling postoperatively in six cases, sometimes with skin ecchymosis. This situation was managed conservatively and resolved within 2 weeks. Overall, seven patients complained of mild pain (1–2) score, and only one patient was still complaining after 6 months; the pain was mild and well tolerated by the patient and generally did not affect patient satisfaction
Conclusion
TAPP laparoscopic repair of female inguinal hernia preserving the round ligament is feasible, although can be trickier and more difficult than scarifying it. The recurrence rate is low with good patient satisfaction. It seems there is no evident superiority of preserving the ligament, but we recommend more studies with longer follow-up and more cases to figure out the long-term effect of preserving the ligament.

Keywords:
female, laparoscopic hernia repair, round ligament, total extraperitoneal

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Introduction

Groin hernia repair in males is performed 8–10 folds higher than in females; that is why, there are not too many studies and reviews concerning female laparoscopic hernia surgery in particular [1].

Although anatomical groin differences are favoring decreased recurrence in females, but practically, presence of undiscovered femoral hernia in females may be a cause for higher recurrence after surgery in females [2].

Incidence of femoral hernia in females is 23–37% compared with 3% in males, and actually, we owe much to laparoscopy to get these accurate findings. We do not know too much about the function of the round ligament of the uterus; that is why, its transection during surgery is not uncommon and consequences are still obscure [3,4].

The nuclei of smooth muscle cells of round ligament contain steroid hormone receptors, suggesting that the round ligament has a role in pregnancy, and premenopausal and postmenopausal changes being the target organ affected by hormonal changes occurring during these periods [5].

Laparoscopic repair recently began to take the upper hand for the treatment of groin hernia. There are two main approaches: TAPP (laparoscopic transabdominal preperitoneal) and total extraperitoneal (TEP) laparoscopy [6,7].

Technically preserving the round ligament during TAPP surgery may be difficult or prolong the duration of surgery because of the adhesions between the round ligament and hernial sac, so the benefit of preserving or cutting the round ligament during dissection and spreading the mesh is a matter of debate [8,9].

Aim

The aim of this study was to evaluate the feasibility of preserving round ligament of uterus and not transecting it in the laparoscopic repair of female inguinal hernia and possible recurrence.

Patients and methods

This prospective study was conducted on 20 adult female patients admitted to the Surgery Department at Tanta University. The study was carried out over 6 months from June 2021 to December 2021. This study was approved by research ethical committee, Faculty of Medicine, Tanta University, Federalwide Assurance. The proposal include a clear statement that an written informed consent was obtained from all participants in this research

Inclusion criteria

Female patients 21–75 years with groin hernia (inguinal-femoral) were included.

Exclusion criteria

The following were the exclusion criteria:

(1) Contraindications to laparoscopy (cardiac-chest disease).
(2) Bleeding disorders.
(3) Strangulated hernia with high suspicion of bowel ischemia.

Operative technique

We used transabdominal (TAPP) approach for all patients. We used 10-mm umbilical port and two 5-mm paramedian ports. Peritoneum was incised from the level of anterior superior iliac spine to the median umbilical ligament followed by identification of the landmarks (pubic bone, inferior epigastric vessels, and round ligament of uterus). After identifying the ligament, we took care of dissecting it carefully from the adherent peritoneum trying not to tear the peritoneum (if the peritoneum was torn, it was carefully sutured at the end) (Fig. 1).

According to the cost coverage for the patient, we either used especially designed 3D max mesh @BARD 15–10 cm or we fashioned 15-15 Ethicon mesh to fit the area dissected, straightening the mesh was done to cover the areas of weakness that can develop hernia and covering the round ligament without making keyhole for it. We fixed the mesh with variable numbers of Tacs (5 mm ABSTACS @ BARD) or we use sutures and also for closure of the peritoneal flap.

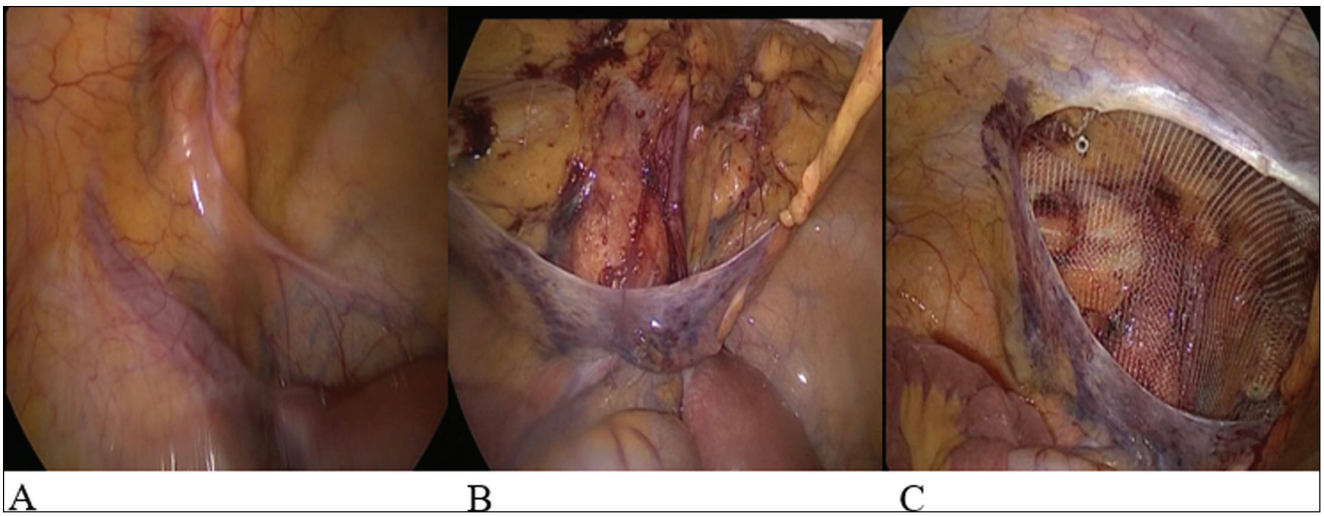
Postoperative care

Patients were assessed directly postoperatively, 1 month, and 6 months after operation regarding pain according to analog score, any residual swellings or complication and general patient satisfaction, and follow-up for possible recurrence for at least 6 months.

Statistical analysis of the results

Data were fed to the computer and analyzed using IBM SPSS software package, version 20.0. (IBM Corp., Armonk, New York, USA). Categorical data were represented as numbers and percentages. For continuous data, they were tested for normality by the Shapiro–Wilk test. Quantitative data were expressed as a range (minimum and maximum), mean, SD, and median for not normally distributed quantitative variables. Friedman test was used to compare between

Figure 1



(a) The laparoscopic view of left indirect inguinal hernia and appearing the round ligament of uterus. (b) Dissecting the space with meticulous dissection of the round ligament. (c) Spreading the mesh and fixation with tacs.

more than two periods and followed by post-hoc test (Dunn's) for pairwise comparisons. The significance of the obtained results was judged at the 5% level.

Results

During the period of study, 20 cases of female groin hernia were performed by the laparoscopic approach. The mean age was 42.3 ± 13.8 years (minimum-22, maximum-77), and the BMI was 31 ± 4.9 kg/m^2 (minimum-23, maximum-40).

A total of 14 cases had right side swelling, four cases had left side, and two cases had bilateral, so we had 22 hernias to operate. Of them, 15 (68.1%) were found to be indirect inguinal hernia (one of them was irreducible), one case was femoral hernia only, three cases were both inguinal and femoral hernias, and three cases were direct and indirect hernias. Of the 22 cases, two had chronic irreducibility, and the content was omentum that was easily reduced intraoperatively. Moreover, one case was recurrent after previous open surgery, and one case had previous open appendicectomy and the operation was on the same side.

We used different methods for fixing the mesh according to the surgeon's choice and also the type of mesh according to mesh availability, so the extra cost was much variable (1925 LE±1079.4). In only one case, the mesh was not fixed.

Follow-up was done for at least 6 months (8.8 ± 1.8 months) with no evident recurrence. No complications were recorded except for residual swelling in the groin postoperatively in six cases sometimes with skin ecchymosis in the groin and labial skin. This situation was managed conservatively and an ultrasound was done, and it was just edema in the inguinal canal and tissues around the round ligament that responded to medical treatment and resolved within 2 weeks.

These data are illustrated in Tables 1 and 2.

Assessment of the pain according to visual analog score was done directly postoperative and reassessed after 3 and 6 months. Overall, seven of the patients after 3 months complained of mild vague pain in the groin region (1–2) score, and only one patient was still complaining after 6 months. Pain was mild and well tolerated by the patient and generally did not affect patient satisfaction. Table 3 and Fig. 2 demonstrate the progress of pain after 1 week, 3 months, and 6 months, which improved significantly (P<0.001).

Table 1 Distribution of the studied cases according to demographic data and clinical data (*N*=20)

	n (%)
Age (years)	
Mean±SD	42.3 ± 13.8
Median (minimum–maximum)	40.5 (22–77)
BMI (kg/m^2)	
Mean±SD	31 ± 4.9
Median (minimum–maximum)	30.5 (23–40)
Side	
Right	14 (70)
Left	4 (20)
Bilateral	2 (10)
Medical history	
None	17 (85)
DM	2 (10)
Hypertensive	1 (5)
Extra cost	
Mean±SD	1925 ± 1079.4
Median (minimum–maximum)	1500 (0–5000)
Follow up (month)	
Mean±SD	8.8 ± 1.8
Median (minimum–maximum)	8.5 (6–12)
Hospital stay	
0	2 (10)
1	17 (85)
2	1 (5)
Mean±SD	0.95 ± 0.39
Median (minimum–maximum)	1 (0–2)

Table 2 Distribution of the studied cases according to different parameters (*N*=22)

	n (%)
Presence of femoral	4 (18.2)
Operative time	
Mean±SD	84.6 ± 17.3
Median (minimum–maximum)	80 (55–120)
Direct postoperative complications	
Nothing	15 (75)
Edema caused residual swelling and ecchymosis resolved within 2 weeks	5 (25)
Operative findings	
Direct and indirect	3 (13.6)
Indirect hernia	14 (63.6)
Femoral hernia	1 (4.5)
Irreducible indirect hernia	1 (4.5)
Femoral + indirect hernia	2 (9.1)
Femoral + irreducible indirect hernia	1 (4.5)
Previous surgery	
No	19 (86.4)
Appendicectomy open (same side)	1 (4.5)
Recurrent	1 (4.5)
Open repair other side	1 (4.5)

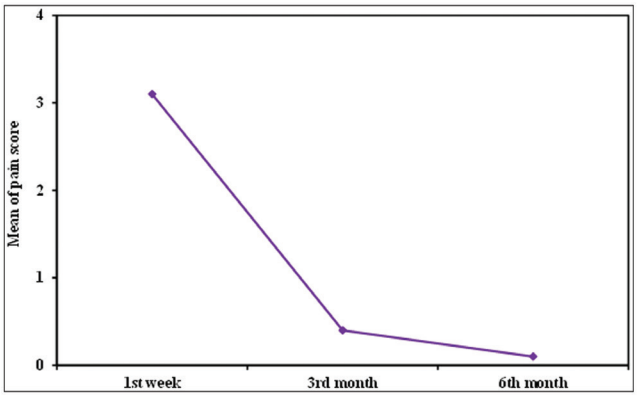
Table 4 shows there was no significant relation between side of the hernia or presence of associated femoral hernia and the development of postoperative edema or pain.

Table 3 Comparison between the three studied periods according to pain visual analog score (*N*=22)

	Pain score			*F*	*P*
	1st week	3rd month	6th month		
Mean±SD.	3.1±0.7	0.4±0.7	0.1±0.2	41.33	<0.001*
Median (minimum–maximum)	3 (2–4)	0 (0–2)	0 (0–1)		
Sig. bet. periods	P_1<0.001*, P_2<0.001*, P_3=0.336				

F, Friedman test, significance between periods was done using post-hoc test (Dunn's). *P*: *P* value for comparing between the studied periods. P_1: *P* value for comparing between 1st week and 3rd month. P_2: *P* value for comparing between 1st week and 6th month. P_3: *P* value for comparing between 3rd month and 6th month. *Statistically significant at *P* value less than or equal to 0.05.

Figure 2



Comparison among the three studied periods according to pain score (*n*=22).

Table 4 Relation between direct postoperative complications with side and presence of femoral (*N*=22)

	Direct postoperative complications		χ^2	FE*P*
	Absent (*N*=16)	Present (*N*=6)		
Side				
Right	11 (68.8)	5 (83.3)	0.468	0.634
Left	5 (31.3)	1 (16.7)		
Presence of femoral	3 (18.8)	1 (16.7)	0.013	1.000

χ^2, χ^2 test; FE, Fisher exact. *P*: *P* value for comparing between absent and present.

Discussion

TAPP surgery is a well-known approach for laparoscopic management of groin hernia. As it is essential to make good parietalization of the peritoneal sac from extraperitoneal structures (the spermatic cord in male and the round ligament of the uterus in females) for proper mesh positioning, it is expected to be more difficult in females owing to many adhesions between round ligament and peritoneum [8].

In females, improper parietalization of round ligament can lead to undesirable dislocation of the mesh that can be an important cause of recurrence; that is why, some surgeons may sacrifice the round ligament in favor of good positioning of the mesh, whereas others prefer ligament-preserving techniques. One of these techniques is incising the peritoneum on the two sides of the round ligament to avoid dissecting the adhesion, and after placement of the mesh in place, suturing the peritoneal defect is done [9].

Another ligament-preserving technique is to make a transverse slit in the mesh and place the lower sleeve under the ligament so make a hole in the mesh for the ligament, and then close this gap taking the ligament as an anchor [10]. On the contrary, our choice was to save the continuity of the mesh and make more effort in dissecting the round ligament from the peritoneum and placement of the mesh on the round ligament without making a hole that may disturb its strength.

He and colleagues performed both techniques (keyhole technique and open and suture peritoneum technique) on 152 patients (162 hernias) to preserve round ligament out of 257 female patients who performed TAPP procedure for groin hernias. They used the keyhole technique for 120 patients; in 28 hernias, they succeeded to dissect the cord without damaging the peritoneum, and in 14 hernias, they opened the peritoneum on the two sides of round ligament and then sutured it. Operation time in the preservation group (30.6–11.1 min) was significantly longer than that in the transection group (24.9–8.2 min) [9].

The relationship between round ligament and peritoneum was described by Sun [11]. He described three groups: loose adhesions, small-gap, and no-gap. Fortunately, 10 (12 hernias) of our 20 patients (22 hernias) were loose adhesions and were dissected easily without tearing the peritoneum, whereas in the rest of the cases, we managed the peritoneal tears by suturing. However, in the study by He and colleagues, only 8.5% of cases fit in the loose group.

In a retrospective study by Abolmasov and Bashankaev, 58 TAPP surgeries were done for 48 female patients by keyhole technique. The mean operative time was 56 min. They found no strong correlation between operative time and BMI or side of the hernia. The mean follow-up period was 43 months (minimum-12, maximum-122 months). They had no postoperative complications except for trocar site hernia in one patient and recurrence in only one patient after 1 year from the operation. TAPP reoperation was done. They

discovered a defect between the two sleeves of the mesh because of ruptured sutures, and they used an extra mesh for repair [10].

This study done in Tanta University was a prospective study with short-term follow-up. The mean±SD follow-up was 8.8 ± 1.8 months. We did not report any recurrence of hernia in our follow-up period. The mean±SD operative time was 84.6 ± 17.3 min. Overall, six of our cases had residual swelling directly postoperatively (sometimes with skin ecchymosis). We were concerned about recurrence, so an ultrasound was done and discovered only edema, which was resolved within less than 2 weeks with anti- inflammatory medications. Moreover, seven patients complained of mild well-tolerated groin pain after 3 months, and only one patient continued to complain of mild vague pain after 6 months; this mild pain did not affect patient's satisfaction from the operation (we claim that using absorbable tacs in this patient for fixing the mesh may be the cause of this mild pain and its disappearance within 6 months). There was no significant relation between the appearance of this edema or pain and the side of the hernia or associated femoral hernia.

Another retrospective study by Luk and colleagues on 77 hernias in 68 patients used the TEP approach aiming to compare the effect of preservation or division of the uterine round ligament in the studied group [12]. In a mean±SD follow-up of 42.9 ± 37.3 months, only one case had recurrence of the hernia (in the division group). The round ligament was divided in 67.5% of the cases and preserved in rest of cases. They did not find significant differences in the multivariate analysis between the two groups regarding outcomes (chronic pain, paresthesia, and genital prolapse). Surprisingly, four cases had genital prolapse, and three of them were in the preservation group. They suggested that division of the round ligament does not affect the outcome.

We did not have recurrent cases in our study, may be owing to short-term follow-up and less number of case than other studies used the laparoscopic approach (TEP or TAPP), which showed nearly similar rates ranging from 1.3 to 1.8% [12–14]. Our study and other studies found that the laparoscopic approach is feasible with low complication rate. Although some studies suggested female sex as a risk factor for pain sensitivity after laparoscopic hernia repair [15], our results were encouraging regarding development of chronic pain and patient overall satisfaction.

Conclusion

TAPP laparoscopic repair of female inguinal hernia preserving the round ligament is feasible, although can be trickier and more difficult than scarifying it. The recurrence rate is low with good patient satisfaction. It seems there is no evident superiority of preserving the ligament, but we recommend more studies with longer follow-up and more number of cases to figure out the long-term effect of preserving the ligament.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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