

Resection of mesothelial cyst of uterine round ligament by laparoscopic transabdominal preperitoneal procedure alone or combined with open surgery

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Abstract

Objective: Surgical treatment of a mesothelial cyst of the uterine round ligament (MCURL), an uncommon entity, has been rarely documented. In this article, we present our experience with excision of MCURLs.

Methods: The records of all female patients undergoing surgical removal of a groin mass in our department from March 2013 to November 2018 were retrospectively reviewed. Demographic information, clinical data, and follow-up outcomes were collected and analyzed.

Results: Among 298 women who underwent groin hernia repair, 17 (5.7%) had MCURLs. Of these 17 patients, 13 were aged 30 to 45 years and 15 had a normal body mass index (18.5–23.9 kg/m²). MCURLs occurred predominantly on the right side (11/17). Approximately half of the patients (9/17) were preoperatively misdiagnosed with inguinal hernias. Approximately 70% (12/17) of the lesions were localized medially to the inner ring of the inguinal canal and excised by a laparoscopic transabdominal preperitoneal (TAPP) procedure alone. Five patients required open surgery following the TAPP procedure because the cyst extended distally beyond the inner ring. No recurrence was noted during the entire follow-up period.

Conclusion: Most MCURLs were localized medially to the inner ring of the inguinal canal and could be excised by a TAPP procedure.

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Keywords

Mesothelial cyst of uterine round ligament, laparoscopic transabdominal preperitoneal procedure, open surgery, inner ring of inguinal canal, groin mass, excision

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Introduction

A mesothelial cyst of the uterine round ligament (MCURL) is a rare entity, and its prevalence is unknown.¹ The etiology of MCURLs remains unclear. Three theories regarding the pathogenesis of MCURLs have been proposed: the MCURL is formed by the de novo development of the mesothelium of the round ligament; the MCURL is formed by encompassing embryonic, mesenchymal, and mesothelial elements during round ligament development; and the MCURL is formed due to flawed obliteration of Nuck's canal, making the MCURL identical to a cyst of Nuck's canal.²⁻⁶ Similar histopathologic findings have been reported for MCURLs and cysts of Nuck's canal.^{2,4,7-9} Therefore, we believe that these two conditions are the same, and the terms "MCURL" and "cyst of Nuck's canal" were used interchangeably in this study.

Because the cyst usually presents as a groin mass, several case reports have described misdiagnosis of the cyst as a groin hernia, herniation of the ovary, or malignant metastasis.^{1-5,7-10} The largest series documented in the literature to date comprised nine patients identified during a 15-year period, with five of these patients being preoperatively diagnosed with a femoral or inguinal hernia.¹ MCURLs mostly occur in middle-aged women and show right-side dominance, the reason for which is unknown.¹ It is generally accepted that symptomatic or progressively enlarging cysts are treated by surgical excision.

However, most case reports have described open surgery for management of these cysts.^{2,3,6,8,9,11-15} Laparoscopic procedures have been increasingly gaining popularity since the 1990s because they are minimally invasive, resulting in fewer postoperative complications and faster recovery compared with open surgery.^{16,17} In the present study, we present our experience with the surgical resection of MCURLs in 17 patients using a laparoscopic transabdominal preperitoneal (TAPP) procedure alone or combined with open surgery. Specifically, we focused on the cyst conditions that determine suitability for a TAPP procedure or the need to combine a TAPP procedure with open surgery for cyst removal.

Methods

This study was approved by the Science Research Ethics Committee of Linyi People's Hospital (approval number: 30018) and performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. The need for informed consent was waived because this was a retrospective study.

Patients and data collection

The data of all patients in this study were retrieved from the Department of General Surgery, Linyi People's Hospital. The records of all female patients who underwent surgical removal of a groin mass from March 2013 to November 2018 were

retrospectively reviewed. Among these patients, those whose diagnosis of MCURL was confirmed by a postoperative histopathologic examination were included in this study. All operations were performed by two of the authors (C.D. and Z.Z.), both of whom had more than 5 years of experience performing open and laparoscopic procedures. The patients' demographic information, symptoms, preoperative examination results, operative and postoperative data, histopathology reports, and follow-up outcomes were collected and analyzed.

Surgical procedures

Surgical resection of MCURLs was accomplished by a TAPP procedure alone or combined with open surgery. The TAPP procedure was performed as follows. Under general anesthesia, a small incision was made superior to the upper umbilicus rim; this was followed by the establishment of pneumoperitoneum with carbon dioxide under an insufflation pressure of 13 mmHg. A 10-mm optical trocar was then placed through the supraumbilical incision, and a 30° telescope attached to the camera was introduced. A 5-mm operating trocar was inserted 0.5 cm inferior to the umbilicus at the lateral edge of the rectus abdominis on each side of the abdomen. The peritoneum was incised approximately 2 cm proximal to the inner ring of the femoral canal, and dissection proceeded laterally to the anterior superior iliac spine and medially to the medial umbilical ligament. After dissection and separation of the Retzius and Bogros (retroinguinal) spaces, the round ligament was exposed and the cyst adherent to the ligament was identified. The cyst was then dissected and excised. After cyst excision, the abdominal wall was fixed as follows. A space between the inner ring of the inguinal canal and the triangle of doom was created by dissection, and a 10- × 15-cm polypropylene hernia patch covering the

entire myopectineal orifice was placed and fixed in this space as described elsewhere.¹⁸ When the distal end of the cyst extended beyond the inner ring and was difficult to resect with the TAPP procedure, the residual lesion was further excised by open surgery as described previously.² Briefly, an incision starting from the external ring and extending toward the inner ring of the inguinal canal was made to open the skin, subcutaneous tissue, and external oblique aponeurosis. The inguinal canal was then dissected and the round ligament was explored for identification of the cystic lesion. Finally, the lesion was resected. Postoperative follow-up was performed once every 6 months.

Results

Among 298 women who underwent groin hernia repair, 17 (5.7%) were diagnosed with MCURLs. As presented in Table 1, the patients' age ranged from 19 to 46 years with a mean ± standard deviation of 35.9 ± 8.2 years. The mean body mass index was 21.6 ± 2.9 kg/m². The chief complaints were an inguinal mass with intermittent pain, a mass with recent pain, or progressive enlargement of a mass. Eleven women had a mass on the right side. All patients underwent ultrasound examinations, and some also underwent computed tomography examinations (Table 1). Prior to the operation, eight patients were diagnosed with an MCURL while nine were diagnosed with an inguinal hernia (Table 1). Sixteen patients had no history of surgery, while one (Patient 4) had undergone an operation to remove a right ovarian teratoma 15 years prior to the current visit.

The TAPP procedure was performed in all patients. The cyst was identified during the procedure, leading to intraoperative diagnosis of MCURL in all cases. Coexisting inguinal hernias were found in seven patients (Table 2). After excision of

Table 1. Demographic information, chief complaints, and preoperative diagnosis of all patients.

Patient	Age (years)	BMI (kg/m ²)	Chief complaint	CT examination	Preoperative diagnosis
1	45	17.2	RIM for 18 years, pain in recent 2 weeks	Yes	IH
2	19	20.1	RIM for 6 weeks with intermittent pain	No	IH
3	22	23.3	RIM for 8 weeks with intermittent pain	No	CRL
4	46	24.5	RIM for 7 years, pain in recent 1 month	No	IH
5	45	24.8	LIM for 7 years, PE in recent 1 year	Yes	CRL
6	27	21.1	RIM for 8 months, PE in recent 1 month	No	IH
7	33	22.7	LIM for 6 years, PE in recent 1 month	Yes	IH
8	39	24.9	RIM for 1 year with intermittent pain	Yes	CRL
9	34	21.5	LIM for 5 months with sensation of heaviness and bulging	Yes	CRL
10	44	18.4	LIM for 4 years, pain in recent 1 week	No	IH
11	41	19.2	RIM for 1 year, pain in recent 1 month	Yes	IH
12	35	25.8	RIM for 5 months, pain in recent 2 weeks	Yes	CRL
13	43	19.3	RIM for 1 year, PE in recent 3 weeks	Yes	IH
14	30	18.9	LIM for 3 months with intermittent pain	No	CRL
15	38	17.9	RIM for 10 months, pain in recent 1 week	No	CRL
16	39	22.1	RIM for 9 months, pain in recent 1 month	No	IH
17	31	25.9	LIM for 2 years, pain in recent 2 weeks	Yes	CRL

BMI, body mass index; RIM, right inguinal mass; LIM, left inguinal mass; PE, progressive enlargement; CT, computed tomography; IH, inguinal hernia; CRL, cyst of the round ligament.

Table 2. Surgical procedures, intraoperative diagnosis, postoperative findings and follow-up results.

Patient	Surgical procedure	Intraoperative diagnosis	Cyst size (cm)	Follow-up (years)
1	TAPP	CRL	2 × 3 × 3	4.0
2	TAPP	CRL	3 × 3 × 2	0.5
3	TAPP	CRL	2 × 4 × 3	0.5
4	TAPP	CRL	2 × 2 × 2	1.5
5	TAPP	CRL+IH	2 × 2 × 2	2.0
6	TAPP	CRL	3 × 4 × 3	1.0
7	TAPP + OS	CRL + IH	5 × 4 × 5	1.5
8	TAPP	CRL	2 × 2 × 3	1.0
9	TAPP	CRL + IH	3 × 3 × 2	2.0
10	TAPP	CRL	3 × 3 × 4	4.0
11	TAPP + OS	CRL + IH	2 × 4 × 5	3.0
12	TAPP + OS	CRL + IH	3 × 4 × 2	2.0
13	TAPP + OS	CRL + IH	3 × 3 × 2	1.5
14	TAPP	CRL	3 × 2 × 2	3.5
15	TAPP + OS	CRL	4 × 2 × 3	3.5
16	TAPP	CRL	3 × 2 × 2	0.5
17	TAPP	CRL + IH	2 × 3 × 3	5.0

TAPP, transabdominal preperitoneal procedure; OS, open surgery; CRL, cyst of the round ligament; IH, inguinal hernia.

the cyst, the abdominal wall was fixed using a polypropylene hernia patch regardless of whether a coexisting hernia was present. The size of the excised lesion was measured and did not substantially differ among the patients (Table 2). The cyst in 12 patients was completely resected using the TAPP procedure alone. In the remaining five patients, however, the cyst extended distally beyond the inner ring of the inguinal canal, making complete removal of the cyst by the TAPP procedure impossible. Therefore, following the TAPP procedure, open surgery was carried out to remove the residual lesion. All resected samples were histopathologically analyzed, thus confirming the diagnosis of MCURL. All patients recovered uneventfully, and no recurrence was noted during the follow-up period (range, 0.5–5.0 years) (Table 2).

Discussion

We have herein presented our study of 17 patients who underwent surgical procedures for the removal of MCURLs. The six main findings are as follows. First, most of the patients were middle-aged women with a normal body mass index (18.5–23.9 kg/m²). Second, the MCURLs occurred predominantly on the right side. Third, half of the patients were preoperatively misdiagnosed with inguinal hernias. Fourth, 70% (12/17) of the lesions were localized medial to the inner ring of the inguinal canal and could be resected by the TAPP procedure alone. Fifth, when the cyst extended distally beyond the inner ring, the TAPP procedure combined with open surgery was required for complete excision of the cyst. Finally, no recurrence was observed during the follow-up period.

An MCURL is a rare entity. In their search of all English databases from 1986 to 2015, Tirnaksiz et al.¹ retrieved only 10 case reports of MCURLs. More recently, Vargas-Ávila et al.⁷ reported one case and

Habibi et al.¹⁹ described two cases of MCURL. In contrast, more cases described as cysts of Nuck's canal have been reported.⁸ In the present study, 5.7% (17/298) of the women who underwent groin hernia repair were diagnosed with MCURLs; this is higher than the rate of 2.2% reported in a previous study.¹ In the largest series documented to date, six of the nine patients ranged in age from 31 to 51 years.¹ Harper et al.³ described MCURLs in four women aged 34 to 41 years. Some single case studies revealed that women with MCURLs ranged in age from 31 to 37 years.^{2,4,10,14} Among the cases reported as cysts of Nuck's canal, most patients were also middle-aged.^{6,8,11–14} These data together with ours suggest that MCURLs occur mostly in middle-aged women. In our series, 64.7% (11/17) of the patients had an MCURL on the right side, which is in line with the findings of other studies showing right-side dominance in MCURL occurrence.^{1,2,4} Although ultrasonography is regarded as a modality of choice for the diagnosis of MCURL,¹ and although all patients in our study underwent an ultrasound examination, we found a preoperative misdiagnosis rate of 52.9% (9/17). This is similar to the rate of 56.6% (5/9) reported by Tirnaksiz et al.¹

Generally, symptomatic or progressively enlarging cysts should be excised. Open surgical treatment for MCURLs or cysts of Nuck's canal has been documented in most cases to date.^{2,3,6,8,9,11–15} Qureshi and Lakshman²⁰ were the first to describe laparoscopic excision of a cyst of Nuck's canal in a woman. Following that study, Matsumoto et al.²¹ reported another case of laparoscopic treatment of a cyst of Nuck's canal. To our knowledge, the present report describes the largest series managed by a laparoscopic procedure.

The condition of all patients in the present study met the criteria for an operation (Table 1). In our practice, we adopt an

endoscopic technique as the first-choice procedure for elective surgery in groin hernia repairs. As a result, all 17 patients in this study initially underwent the TAPP procedure. Complete resection of the cyst was accomplished in 12 patients by the TAPP procedure alone, while 5 patients required an additional open operation. Endoscopic procedures have been shown to be safe and effective for the repair of inguinal and femoral hernias.^{18,22–24} Additionally, clinical studies comparing endoscopic procedures versus open surgery for groin hernia repair have revealed that endoscopic procedures, namely, TAPP repair and total extraperitoneal techniques, result in a lower wound infection rate, faster recovery and return to normal activities/work, and a lower incidence of chronic pain.^{25–28} However, no studies to date have investigated the anatomical localization of MCURLs relative to the inguinal canal. A novel finding in our study is that 70% (12/17) of the lesions were localized medial to the inner ring of the inguinal canal, indicating that most MCURLs can be treated with the TAPP procedure alone. Considering the high percentage of cases suitable for the TAPP procedure and the advantages of TAPP repair over open surgery, we feel the TAPP procedure may be an optimal method for resection of MCURLs.

The round ligament of the uterus mainly consists of fibromuscular connective tissue arising from the uterus and extending to the labium majora. During embryologic development, a portion of the peritoneum is incorporated into the round ligament; thus, the formation and development of an MCURL can cause defects in the abdominal wall. In view of this, we routinely fix the abdominal wall after resection of an MCURL regardless of whether a coexisting hernia is present.

The main limitation of this study is its inclusion of only 17 patients from a single

center; this may have led to overestimation of the results, limiting the generalizability of our findings.

In conclusion, we validated previous findings about MCURLs; i.e., that it affects mostly middle-aged women, occurs predominantly on the right side, and has a high misdiagnosis rate. More importantly, this study provided three new insights: most lesions are localized medial to the inner ring of the inguinal canal and can be resected by the TAPP procedure, the vast majority of patients with MCURLs have a normal body mass index, and the TAPP procedure might be a more favorable choice over open surgery for the treatment of MCURLs.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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