

## Laparoscopic management of ovarian dermoid cysts: a review of 47 cases

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**Background:** Mature cystic teratomas, often referred to as dermoid cysts, are the most common germ cell tumors of the ovary. In the recent years, transvaginal sonographic diagnosis of ovarian dermoid cysts together with laparoscopic approach have greatly improved the treatment of this benign lesion. We retrospectively reviewed the outcome of laparoscopic surgery for suspected ovarian dermoid cysts.

**Patients and Methods:** The preoperative findings, operative techniques and post-operative complications were retrospectively reviewed in women who underwent laparoscopic surgery for dermoid cysts, between January 2000 and May 2003.

**Results:** In 47 women aged 21 to 53 years (median, 38.8 years), 93.6% had a unilateral cyst with a diameter of 17 to 108 mm (median, 51 mm). Clinical presentations were pain (62%), abnormal vaginal bleeding (21%) and ovarian torsion (2%), whilst 17% were diagnosed incidentally during routine examination. Surgery included cystectomy (57%), total (36%) or partial oophorectomy (6.4%) and laparoscopy-assisted vaginal hysterectomy with bilateral salpingo-oophorectomy (2%). During the cyst extraction, minimal spillage occurred in 42.5% of the cases and none developed chemical peritonitis. In 2 patients, conversion to laparotomy (4.3%) was required, one for sigmoid colon injury and one for malignant ovarian tumor detected via frozen section. The median operating time was 80 minutes (range, 35-180 minutes).

**Conclusion:** Using strict adherence to guidelines for preoperative clinical assessment and intra-operative management, laparoscopic treatment of dermoid cysts appears to be a safe procedure.

**Key words:** Ovarian dermoid cyst, laparoscopy, safety, adverse events

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**M**ature cystic teratoma of the ovary (dermoid cyst) usually occurs during the reproductive period and represents 5% to 25% of all ovarian neoplasms.<sup>1,2</sup> Although less than 3% of dermoid cysts managed by surgery prove to be malignant, a benign cystic teratoma may appear to be suspiciously malignant during the initial scan due to its complex solid and cystic nature.<sup>3-5</sup>

High-quality vaginal ultrasound transducers are now the first preoperative work-up method of choice for the assessment of adnexal masses; in clinical practice other imaging methods are rarely needed. Expectant management with a follow-up ultrasound examination may be appropriate in asymptomatic dermoid cysts. However, if associated with adnexal torsion (16%), pain, or with rupture leading to chemical peritonitis (3-7%), surgical treatment may become necessary.<sup>5-7</sup> The management of a dermoid cyst therefore depends more on its symptoms and clinical findings than the very small risk of actual malignancy.<sup>8,9</sup> A decision can then be made between conservative management, laparoscopic surgery or laparotomy depending upon the patients' symptoms, age, clinical findings and ultrasonographic features.<sup>10</sup>

Laparoscopy represents a major improvement in surgery because of its better magnification, reduced invasiveness, and shorter hospitalization. Ovarian surgery is one of the most frequently performed laparoscopic procedures in routine practice. Laparoscopic removal of dermoid cysts was first described in 1989 by Nezhat et al and now, more liberal use of the operative laparoscopy has led to the treatment of many suspected cases of dermoid cysts.<sup>7,11</sup> Many studies have shown that laparoscopic treatment of adnexal masses is safe even in postmenopausal women who are at greater risk of developing a malign ovarian neoplasm.<sup>12-15</sup>

The extraction of an intact cyst within a bag (closed technique) is the recommended technique for the removal of dermoid cysts.<sup>11,14</sup> Rupture of the cyst with spillage of its fluid content may be deleterious with teratomas. Chemical peritonitis and granuloma formation with intestinal obstruction have been reported after laparoscopic removal of benign cystic teratomas due to spillage.<sup>16</sup> Adequate intra-abdominal isolation within an Endobag to avoid the most common event of spillage during laparoscopic removal of dermoid cysts is now advocated by several investigators.<sup>17,18</sup> On the other hand, unilateral adnexal masses in women of reproductive age are benign in up to 95% of cases and lapa-



roscopic surgery is perceived as a less invasive technique for women who are thought to have a dermoid cyst.<sup>15,24</sup>

We retrospectively reviewed the diagnosis and removal of benign cystic teratomas via laparoscopy in 47 women.

### Patients and Methods

A total of 47 patients were admitted to the SSK Maternity and Women's Health Teaching Hospital Endoscopic Surgery Clinic between January 2000 and May 2003, with a confirmed diagnosis of dermoid cyst. The patients presented with lower abdominal pain or a palpable adnexal mass. The findings on transvaginal ultrasound imaging determined patient selection. For ultrasonographic examination, an EUB 505 Hitachi (Tokyo, Japan) was used with a 6.5 MHz transvaginal probe. Patients who had adverse features such as large or multilocular cysts with thick septa, solid areas, or neovascularization seen with color Doppler and a low resistance index (RI) were excluded from the study. An abnormal result on serum tumor markers was also an exclusion criteria.

All procedures were performed under general anesthesia and endotracheal intubation. A fiberoptic laparoscope (K. Storz GmbH & Co; Tuttlingen, Germany) together with a standard Veress needle was used routinely and all the procedures were recorded via a laparoscopic camera and a video recorder. Following the insertion of the second and third operative trocars under direct vision, we carried out a thorough inspection of the abdominal cavity, including the subdiaphragmatic area. The fluid from the pouch of Douglas was aspirated for cytology before any contamination, and peritoneal washings were sent for cytology. The ovaries were inspected to ensure that the cyst wall was smooth and there was no vegetation or other evidence to suggest malignancy.

The pelvic and abdominal peritoneal and ovarian surfaces were thoroughly examined. The size and the intra-ovarian location of the cyst were determined in order to select the proper site for the ovarian incision. The dissection was facilitated by aquadissection with an irrigating probe and either ovarian cystectomy or adnexectomy, according to the presence of a normal ovarian tissue and patient age, was applied with great care to avoid rupture of the cyst wall. During the course of this manipulation to free the cyst, a wide-bore suction irrigator device was used to remove this material and vigorous washing was carried out using at least 10 liters of saline solution in case of rupture of the cyst wall and the leakage of the contents. The operation specimen was placed within an Endobag, and dermoid cysts were then decompressed by incision and aspiration of their contents. Following decompression, the bag was drawn through the second port or through the abdominal wall after removing the port. All specimens were sent for frozen section and histopathological examination for definitive pathology data. Once hemostasis by bipolar elec-

trocautery was completed, the entire abdominal cavity was thoroughly cleansed, removing all blood, clots and debris. Approximately one liter of isotonic irrigating fluid was left in the abdomen. The incisions were sutured after careful removal of the trocar. In the case of a fascial incision >2 cm, fascial stitches were placed.

The patients were on a general diet for 24 hours and oral analgesics were prescribed in required cases. Prophylactic antibiotics were given once in all cases. Forty-five of the patients were discharged from the hospital within 24 to 36 hours, and all patients were invited for a postoperative control 1 month and 3 months after the initial surgery.

### Results

The median age of the patient group was 38.8 years (range, 21-53 years). The main indications for surgery were lower abdominal pain (62%), abnormal vaginal bleeding (21%), incidental findings during routine clinical examination (17%) and ovarian torsion (2%). Medical history showed that 38% of the patients had a previous laparotomy mainly for either cesarean section (n=8), appendectomy (n=6), adnexal surgery (n=3) or cholecystectomy (n=1). Slightly elevated serum levels of Ca 125 and Ca 19.9 (<40 mIU/mL) were found in 6.4% (n=3) and 8.5% (n=4) of the patients, respectively.

Median cyst diameter measured by transvaginal ultrasonography was 51 mm (range, 17-108 mm). In this series of women, 44 (94%) unilateral and three (6%) bilateral dermoid cysts were recorded. On the ultrasound examination, 19 (55.7%) had full characteristics of dermoid cysts by an echogenic focus with acoustic shadowing situated within a predominantly cystic mass. In the remaining 44.3% of the cases, the cysts had a mixed echogenic component and were definitely identified as dermoid cysts at the time of the laparoscopic surgery and final histopathological examination.

During laparoscopic surgery, 27 patients required no other surgery than cystectomy (57%), whilst 43% underwent either unilateral salpingo-oophorectomy (n=17), partial oophorectomy (n=3) or laparoscopy assisted vaginal hysterectomy (n=1). Minimal intra-abdominal spillage (1-2 cc) occurred in 20 cases (42.5%). There was no intraoperative complication in 98% of the patients and only one patient with dense pelvic adhesions required a conversion to laparotomy to manage sigmoid colon injury.

The frozen section analysis and the final histopathological reports were reputed to be benign for 46 of the cases, confirming the diagnosis of mature cystic teratomas. In one of the cases, with typical dermoid cyst characteristics observed during ultrasonographic examination, a granulosa cell tumor was detected by frozen section analysis. Immediate staging laparotomy through a midline incision was performed. This was an early ovarian malignancy defined by accurate means of staging, as stage Ia.



Median operating time was 80 minutes (range, 35-180 minutes) and estimated blood loss was less than 50 mL in the present series. After the operation, no postoperative complication such as chemical peritonitis, fever or postoperative bleeding was encountered. All patients were discharged within 48 hours, except one patient with sigmoid injury and another, in which frozen section revealed an ovarian carcinoma and who had a laparotomy and was eventually discharged 96 hours post-operatively. In the follow-up, all patients were seen after the first and the third month of initial surgery. Minor complaints were reported, which were not due to the procedure itself. All physical examinations, pelvic sonograms and laboratory findings were within normal limits.

### Discussion

Laparoscopic surgery has become a valuable tool in both diagnostic and operative gynecologic procedures. In many cases, laparoscopy may replace conventional laparotomy for diagnosis and treatment of adnexal masses.<sup>12-15</sup> However, the negative effect of an intraoperative rupture and spillage of malign cells during laparoscopic surgery on the prognosis of patients with early stage ovarian cancer is still controversial. On the other hand, mature cystic teratomas, commonly referred as dermoid cysts, comprise some 40% to 50% of all benign ovarian neoplasms. Certain characteristics, such as hair and sebum or irregular solid components within fluid-containing masses on ultrasound examination, may help to distinguish malign neoplasms from benign dermoid cysts, but malignant degeneration of the ovary may present in 1% to 3% of all cystic teratomas.<sup>4,10,18-20</sup>

A presumptive diagnosis of dermoid cysts often can be made during the initial clinical evaluation, but special features such as the existence of septa or solid components and papillomatous structures may appear, mimicking other malign ovarian mass that would mandate against laparoscopic removal.<sup>21</sup> Improved ultrasound techniques and scoring systems have made the preoperative diagnosis of dermoid cysts more common. Although, Benacerref et al reported a 15% failure rate in differentiation of benign and malignant cysts during transvaginal ultrasonographic diagnosis of complicated cysts,<sup>22</sup> histologic results revealed the accurate benign diagnosis in 97% of the cases in our study group. Careful preoperative evaluation of the patients and a precise definition of the cysts with transvaginal ultrasonography allowed us to use laparoscopic surgery for dermoid cysts with special features.

Tumor markers, especially Ca 125 and Ca 19-9 have a special predictive value in premenopausal women with dermoid cysts.<sup>23</sup> In the present series, slightly elevated levels of Ca 19-9 and Ca 125 were found in 8.5% and 6.4% of the patients, respectively.

The role of laparoscopic surgery in the uncontrolled spillage of dermoid cyst contents has been addressed by Huss, Coccia and Langebrekke et al.<sup>16-18</sup> Recent studies have shown that dermoid cysts can often be removed laparoscopically using a closed technique with controlled spillage.<sup>24-26</sup> When intraoperative spillage does occur, use of copious saline irrigation until the lavage is clear is recommended to minimize the potential risk of chemical peritonitis or excess adhesion formation. In Zanetta's series of 49 women who underwent laparoscopic cystectomy for dermoid cysts, it was reported that spillage had occurred in 43 cases (88%), but no case of peritonitis was recorded.<sup>27</sup> The incidence of spillage was 42.5% in our study group and the rate of chemical peritonitis was nil in 47 cases undergoing laparoscopic dermoid surgery. The main question in endoscopic surgery is the risk of spreading an early ovarian cancer because of spillage, which may compromise patient survival unless additional therapies are administered. In one large published series of 1011 women with ovarian cysts that was managed laparoscopically and with a careful approach, the risk of operating on an undetected malignancy was found to be less than 3%.<sup>24</sup> Nezhat and Balen stated that all benign dermoid cysts could be treated by laparoscopic surgery by relying on the experience of the surgeon and the use of appropriate technique.<sup>7,28</sup> Nezhat reported in his ten years experience that a total of 39 intraoperative spillages occurred in 81 patients with dermoid cysts with no case of chemical peritonitis, but one case had incisional infection in the umbilicus.<sup>29</sup>

Laparoscopic ovarian surgery is now a method of choice due to its advantages, most of which focus on preserving ovarian tissue and minimizing postoperative adhesion formation in reproductive age women.<sup>30,31</sup> This study demonstrated similar outcomes in patients treated via laparoscopy for dermoid cysts. Although there were no clinically relevant adverse effects, this study did not have sufficient power to detect changes in serious rare adverse outcomes.

In conclusion, dermoid cysts, most of which are benign, can be efficiently treated via endoscopic surgery using closed technique to avoid spillage of the cyst contents into the abdominal cavity. The fear of missing a diagnosis of early malignancy dictates a strict policy of meticulous preoperative evaluation and use of frozen section in complex cysts. However, prospective controlled clinical trials with a large number of patients are necessary to compare conventional methods with laparoscopy in cases with teratomas and to assess more rare events like undetected malignancy, chemical peritonitis or excess adhesion formation.

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