Conversion of laparoscopy to laparotomy due to adenxal malignancy

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Summary

Purpose. The purpose of the present report was to assess the conversion rate from laparoscopy to laparotomy due to adnexal malignancy and to identify factors that might assist in the selection of the appropriate operative approach in patients with suspicious adnexal masses.

Methods. A retrospective review of the medical records of women who underwent laparoscopy due to ultrasonically complex adnexal masses. Ninety-five consecutive patients fulfilling these criteria, were identified. A comparison of patients with benign tumors who had laparoscopy only to those with invasive malignancies in whom laparoscopy was converted to laparotomy was performed.

Results. Malignancy was diagnosed in 18 (18.9%) patients. In 13 patients with malignancy (two borderline and 11 invasive), comprising 72.2% of the malignancies and 13.7% of the total group with complex adnexal masses, the laparoscopy was converted to laparotomy. Age of more than 50 years and a serum CA125 level above 35 U/ml were significantly more common in the malignant than in the benign group (90.9% vs. 15.6% and 63.6% vs. 11.6%, respectively; $p < 0.0001$ and $p < 0.003$, respectively). When both factors were present, the sensitivity and specificity for malignancy were 73.3% and 93.2%, respectively, and the positive and negative predictive values 73.3% and 95.6%, respectively.

Conclusion. When an ultrasonically complex adnexal mass is encountered, predictive factors for malignancy should be taken into account before the mode of intervention is chosen. The conversion from laparoscopy to laparotomy because of an invasive malignant tumor is acceptable, if it is performed immediately and a gynecologic oncologist is on stand-by.

Key words: Laparoscopy; Conversion to laparotomy; Complex adnexal masses, Adnexal malignancy.

Laparoscopic adnexal surgery has become a standard procedure in benign gynecologic conditions requiring invasive intervention [1, 2]. Even when early stage malignancy is encountered surgical staging and definitive management can be accomplished by some laparoscopists [3, 4, 5, 6] skilled in oncologic surgery. However, not every laparoscopist is trained in gynecologic oncology. The risk of malignancy is obviously increased when an ultrasonically complex mass is encountered. The proper selection of patients with ultrasonically complex masses, for either laparoscopy or laparotomy, seems therefore of great importance.

The purpose of the present report was an attempt to identify factors that might assist in the selection criteria for the appropriate operative approach in patients with complex adnexal masses.

Material and Methods

During the period between January 1999 and July 2000, 95 consecutive patients underwent laparoscopic surgery because of ultrasonically complex adnexal masses. Laparoscopic surgery was not undertaken when obvious disseminated cancer was evident preoperatively. A mass was considered ultrasonically complex when any one of the following features was present: septae, solid components or papillations. Malignancy was ultimately diagnosed in 18 (18.9%) patients. In three of these patients the specimen was not sent for frozen section at the time of laparoscopy and the pathology report was obtained postoperatively. One had a granulosa cell tumor and preferred not to be reoperated, another had bilateral endometrioid ovarian carcinoma and was treated with adjuvant chemotherapy, and the third patient had a serous borderline ovarian tumor and was re-explored only several months after the original diagnosis.

In the remaining 15 patients the diagnosis of malignancy was established by frozen section. In two of these patients frozen section indicated a serous borderline tumor and they underwent only laparoscopic adnexectomy according to their request prior to the procedure. Thus a subgroup of five patients with malignancies underwent laparoscopy only (Table 1).

Table 1. — *Patients with malignancies in whom laparoscopy was not converted to laparotomy*

Name	Age	Symptoms	Size (cm)	CA 125 (U/ml)	Histology
1. KM	34	Routine	8	26	Serous Borderline
2. CGM	39	Routine	8	16	Serous Borderline
3. BMS	40	Pain	7	31	Serous Borderline
4. DR	52	Pain	6	5	Endometrioid carcinoma
5. KS	50	Pain	8	3	Granulosa cell tumor

In the other 13 patients with malignancy, laparoscopy was converted to laparotomy comprising 72.2% of the malignancies and 13.7% of the total group patients with complex adnexal masses.

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A comparison of patients with benign tumors who had laparoscopy only to those with invasive malignancies in whom laparoscopy was converted to laparotomy was performed.

Statistical differences were calculated by the Fisher's exact test. A p value of < 0.05 was considered as significant.

Results

Table 2 presents the histologic distribution of the adnexal masses. A large proportion of the benign (42.9%) and the majority (76.9%) of the malignant masses were of ovarian epithelial origin.

Table 3 shows selected characteristics of 77 patients with benign masses who underwent laparoscopic surgery only and 11 patients with adnexal invasive malignancies in whom laparoscopy was converted to laparotomy. The two borderline tumors that were also converted to laparotomy were not included in this comparison. No significant difference between the two groups was found with regard to the rate of symptoms and size of the mass. Age of more than 50 years and a serum CA125 level above 35 U/ml were significantly more common in the malignant than in the benign group (90.9% vs. 15.6% and 63.6% vs. 11.6%, respectively; $p < 0.0001$ and $p < 0.003$, respectively). When both factors were present, the sensitivity and specificity were 73.3% and 93.2%, respectively, and the positive and negative predictive values 73.3% and 95.6%, respectively.

Table 2. — *Histological distribution of the adnexal masses*

	Type of adnexal mass			
	Benign		Malignant	
Histology	No.	%	No.	%
Ovarian				
Epithelial	31	42.8	10	76.9
Invasive	–	–	8	
Serous	*12*	*17.9*	*3*	
Mucinous	*8*	*5.1*	*4*	
Endometrioma	*11*	*10.2*	*1*	
Borderline*	–	–	2	
Benign teratoma	17	28.2	–	
Functional	13	17.9	–	
Other	16	20.6	–	
Tubal carcinoma	–	–	2	15.4
Metastatic to ovary	–	–	1	7.7

* Not included in the comparison

Table 3. — *Selected characteristics of patients with benign masses who underwent laparoscopic surgery only and patients with adnexal invasive malignancy in whom laparoscopy was converted to laparotomy because of malignancy*

	Type of adnexal mass			
	Benign		Malignant	
Characteristic	No.	%	No.	%
Total	77	100.0	11	100.0
Age				
50+	12	15.6	10	90.9
Range	17-71		34-93	
Symptomatic	57	74.0	7	63.6
Size 6+ cm	48	62.3	7	63.6
CA125 > 35*	9	11.6	5	45.4

* Available for 55 patients with benign tumors

Information about the duration of the procedure was available in 62 patients. The median duration of the laparoscopic procedures in patients with benign adnexal tumors was 60 minutes and the overall duration of the procedure in those with conversion to laparotomy was 205 minutes. The majority (70%) of patients who had laparoscopy only were discharged the day following the procedure, as compared to a median hospital stay of seven days in those in whom laparoscopy was converted to laparotomy.

The only serious complication of laparoscopy occurred in one patient who sustained thermal injury to the ureters requiring additional surgical intervention.

Discussion

The overall rate of malignancy in laparoscopically resected adnexal masses is less than 2% (2,7,8) . A higher rate has been reported with ultrasonically complex masses ranging from 5% to 18% (4,5,9).The rate of malignancies in our group of patients with complex adnexal masses was similar (18.7%). Thus, even in this group, the majority of patients had benign lesions and profited from the shorter duration of surgery, the shorter hospital stay and the other advantages of the laparoscopic procedure. When an adnexal malignancy is encountered at the time of laparoscopy, the presence of a gynecologic oncologist is required for optimal management. But not every laparoscopist or gynecologic oncologist is also trained in laparoscopic oncologic surgery, therefore the procedure is most often converted to laparotomy for further management. In these cases the patient is subjected to an overall longer duration of anesthesia and operating time. In addition the possibility of conversion may interfere with operative room scheduling. In some institutions a gynecologic oncologist is not readily available and the definitive procedure has to be postponed for reoperation at a later date. The proper selection of patients with adnexal, ultrasonically complex masses for either laparoscopy or for direct laparotomy is therefore of particular significance when a gynecologist skilled in oncologic endoscopic surgery is not available.

The experience with laparoscopic management of malignant adnexal masses is limited and should be regarded as experimental [10]. It is supported by some [6] and strongly opposed by others [11]. The main issues raising concern with regard to laparoscopic management of malignant adnexal masses prior to a definitive diagnosis are the effects of spillage, port-site metastases and an inadequate endosurgical procedure that may require reoperation and delayed definitive surgery. The possible adverse effect of operative spillage is still controversial. Some authors have reported that surgical rupture influences the prognosis unfavorably [12] while in other studies this has not been confirmed by multivariate analysis [13, 14]. Nevertheless an attempt should be made to avoid spillage. There are numerous reports documenting port-site metastasis following laparoscopic removal of malignant adnexal masses [15-18]. Attempts to define the risk

factors and to prevent port-site metastases have been made [17, 19]. The risk of this complication has been estimated to be as low as about 1% and as high as 16% [6, 20]. Nonetheless, in some cases it may be detrimental when it occurs. No port-site metastasis occurred in our series. An adverse effect of delayed definitive surgery on the disease stage has been clearly demonstrated in several studies [12, 21, 22]. The observed progression rate from apparently early to advanced stage being a function of the delay duration. Therefore, when at the time of laparoscopy malignancy is confirmed by frozen section examination, the operation should either continue with laparoscopical surgical staging and the appropriate surgical procedure, or should be immediately converted to laparotomy in order to avoid delayed surgery.

Our study indicates that age older than 50 years and CA125 serum levels of more than 35 U/ml are significant predictors of malignancy. These factors have also been previously identified as having predictive value. It is known that the risk of malignancy is higher in postmenopausal women [2, 23, 24]. Jacobs *et al.* [25] devised a risk for malignancy index incorporating menopausal status. The serum level of CA125 is obviously also of great importance [25, 26]. We found that when both of these factors are present the positive predictive value and sensitivity are relatively high (73.3%) and the negative predictive value and specificity even higher (95.6% and 93.2%, respectively). Although in our study size of the adnexal mass was not a significant predictor for malignancy others have shown that the risk of malignancy increases with size (23). Childers *et al.* [5] found that if the serum CA125 level was >35 mIU/ml and the mass was >10 cm there was a 54% chance of malignancy. This decreased to 27% if the mass was <10 cm. If the serum CA125 level was <35 mIU/ml and the mass was >10 cm there was a 12% chance of malignancy, which decreased to 6.4% if the mass was <10 cm.

A survey of the membership of the American Association of Gynecologic Laparoscopists [27] indicated that among those performing laparoscopy for suspected cancer there was a 14% conversion rate to laparotomy compared to 9% among those who performed laparotomies in these cases. Even when laparoscopy for suspicious adnexal masses is performed by expert gynecologic oncologic laparoscopists [5] the conversion rate to laparotomy because of inability to dissect the mass, for staging or for debulking, is 8%. Conversion to laparotomy in our series of ultrasonically complex adnexal masses was 13.7%.

The preoperative diagnosis of borderline ovarian tumors can also be made using a sophisticated multiparametric scoring system [28]. The number of borderline tumors in our study was too small for meaningful analysis. Compared to invasive epithelial tumors, these tumors are generally diagnosed at an earlier stage, they affect younger women who frequently wish to conserve fertility, and are therefore usually treated by conservative surgery, i.e. by adnexectomy of the involved side or even only by cystectomy. No difference in outcome was found between patients treated conservatively and those treated radically. The necessity for surgical staging is also under dispute since even in advanced stages the value of adjuvant chemotherapy is controversial [29]. The preoperative diagnosis of these tumors is therefore less crucial. Nevertheless, in a series of 25 borderline tumors treated laparoscopically, seven had conversion to laparotomy [30]. In our small series of borderline tumors two of five were converted to laparotomy. It should be mentioned that port-site metastasis after laparoscopic resection has also been reported with borderline tumors [31, 32].

Conclusions

When an ultrasonically complex adnexal mass is encountered, predictive factors for malignancy, and the availability of a gynecologic oncologist should be taken into account before the mode of intervention is chosen. The conversion from laparoscopy to laparotomy because of an invasive malignant tumor seems acceptable if it is performed immediately and a gynecologic oncologist is on stand-by.

References

[1] Pittaway D. E., Takacs P., Bauguess P.: "Laparoscopic adnexectomy: a comparison with laparotomy". *Am. J. Obstet. Gynecol.*, 1994, *171*, 385.
[2] Hidlebaugh D. A., Vulgaropulos S., Orr R. K.: "Treating adnexal masses. Operative laparoscopy vs. laparotomy". *J. Reprod. Med.*, 1997, 42,551.
[3] Kadar N.: "Laparoscopic management of gynecologic malignancies". *Curr. Opin. Obstet. Gynecol.*, 1997, *9*, 247.
[4] Canis M., Pouly J. L., Wattiez A., Mage G., Manhes H., Bruhat M. A.: "Laparoscopic management of adnexal masses suspicious at ultrasound". *Obstet. Gynecol.*, 1997, *89*, 679.
[5] Childers J. M., Nasseri A., Surwit E. A.: "Laparoscopic management of suspicious adnexal masses". *Am. J. Obstet. Gynecol.*, 1996, *175*, 1451.
[6] Magrina J. F.: "Laparoscopic surgery for gynecologic cancers". *Clin. Obstet. Gynecol.*, 2000, *43*, 619.
[7] Koonings P. P., Campbell K., Mishell D. R., Grimes D. A.: "Relative frequency of primary ovarian neoplasms: A ten year review". *Obstet. Gynecol.*, 1989, *74*, 921.
[8] Nezhat F., Nezhat C., Welander C. E., Benigno B.: "Four ovarian cancers diagnosed during laparoscopic management of 1011 women with adnexal mass". *Am. J. Obstet. Gynecol.*, 1992, *167*, 790.
[9] Ulrich U., Paulus W., Schneider A., Keckstein J.: "Laparoscopic surgery for complex ovarian masses". *J. Am. Assoc. Gynecol. Laparosc.*, 2000, *7*, 373.
[10] Childers J. M.: "The virtues and pitfalls of minimal invasive surgery for gynecological malignancies". *Curr. Opin. Obstet. Gynecol.*, 1999, *11*, 51.
[11] Hopkins M. P.: "The myths of laparoscopic surgery". *Am. J. Obstet. Gynecol.*, 2000, *183*, 1.
[12] Maiman M., Seltzer V., Boys J.: "Laparoscopic excision of ovarian neoplasm subsequently found to be malignant". *Obstet. Gynecol.*, 1991, *77*, 563.
[13] Sevelda P., Dittrich C., Sazer H.: "Prognostic value of the rupture of the capsule in stage I epithelial ovarian cancer". *Gynecol. Oncol.*, 1989, *35*, 321.
[14] Dembo A. J., Davy M., Stenwig A. E., Berll E. J., Bush R. S., Kjorstad K.: "Prognostic factors in in patients with stage I ovarian carcinoma". *Obstet. Gynecol.*, 1990, *75*, 263.
[15] Childers J. M., Aqua K. A., Surwit E. A., Hallum A. V., Hatch K. D.: "Abdominal-wall tumor implantation after laparoscopy for malignant conditions". *Obstet. Gynecol.*, 1994, *84*, 765.

[16] Gleeson N. C., Nicosia S. V., Mark J. E., Hoffman M. S., Cavanagh D.: "Abdominal wall metastases from ovarian cancer after laparoscopic removal". *Am. J. Obstet. Gynecol.*, 1993, *169*, 522.
[17] Wang P. H., Yuan C. C., Lin G., Ng H. T., Chao H. T.: "Risk factors contributing to early occurrence of port site metastases of laparoscopic surgery for malignancy". *Gynecol. Oncol.*, 1999, *72*, 38.
[18] Hopkins M. P., von Gruenigen V., Gaich S.: "Laparascopic port site implantation with ovarian cancer". *Am. J. Obstet. Gynecol.*, 2000, *182*, 735.
[19] Van Dam P. A., DeCoedt J., Tjalma W. A. A., Buytaert P., Becquart D., Vergote I. B.: "Trocar implantation metastases after laparoscopy in patients with advanced ovarian cancer: can the risk be reduced?". *Am. J. Obstet. Gynecol.*, 1999, *181*, 536.
[20] Kruitwagen R. F. P., Swinkels B. M., Keyser K. G. G., Doesburg W. H., Schijf Ch. P. Th.: "Incidence and effect on survival of abdominal wall metastases at trocar or puncture sites following laparoscopy or paracentesis in women with ovarian cancer". *Gynecol. Oncol.*, 1996, *60*, 233.
[21] Lehner R., Wenzl R., Heinzl H., Husslein P., Sevelda P.: "Influence of delayed staging laparotomy after laparoscopic removal of ovarian masses later found to be malignant". *Obstet. Gynecol.*, 1998, *92*, 967.
[22] Kindermann G., Maassen V., Kuhn W.: "Laparoscopic management of ovarian tumors subsequently diagnosed as malignant". *J. Pelv. Surg.*, 1996, *2*, 245.
[23] Rulin M. C., Preston A. L.: "Adnexal masses in postmenopausal women". *Obstet. Gynecol.*, 1987, *79*, 578.
[24] Ovadia F., Godman G. A.: "Ovarian masses in postmenopausal women". *Int. J. Obstet. Gynecol.*, 1992, *39*, 35.
[25] Jacobs I. *et al.*: "A risk of malignancy index incorporating CA125, ultrasound and menopausal status for the accurate preoperative diagnosis of ovarian cancer". *Br. J. Obstet. Gynecol.*, 1990, *97*, 922.
[26] Van Nagell J. R., Ueland F.: "Ultrasound evaluation of pelvic masses: predictors of malignancy for the general gynecologist". *Curr. Opin. Obstet. Gynecol.*, 1999, *11*, 45.
[27] Hulka J. F., Parker W. H., Surrey M. W., Phillips J. M.: "Management of ovarian masses AAGL 1990 survey". *J. Reprod. Med.*, 1992, *37*, 599.
[28] Zaneta G., Lissoni A., Cha S. *et al.*: "Pre-operative morphology and color doppler features of borderline ovarian tumors". *Br. J. Obstet. Gynecol.*, 1995, *102*, 990.
[29] Burger C. V., Prinssen H. M., Baak J. P. A., Wagenaar N., Kenemans P.: "The management of borderline epithelial tumors of the ovary". *Int. J. Gynecol. Cancer.*, 2000, *10*, 181.
[30] Darai E., Teboul J., Fauconnier A., Scoazec J. Y., Benifla J. L., Madelenat P.: "Management and outcome of borderline ovarian tumors incidentally discovered at or after laparoscopy". *Acta Obstet. Gynecol. Scand.*, 1998, *77*, 451.
[31] Hsiu J. G., Given F. T., Kemp G. M.: "Tumor implantation after diagnostic laparoscopic biopsy of serous ovarian tumors of low malignant potential". *Obstet. Gynecol.*, 1986, *68*, 90S.
[32] Shepherd J., Carter P. G., Lowe D. G.: "Wound recurrence by implantation of a borderline ovarian tumor following laparoscopic removal". *Br. J. Obstet. Gynaecol.*, 1994, *101*, 265.

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