GUIDELINES FOR THE LAPAROSCOPIC MANAGEMENT OF THE ADNEXAL MASS

This policy statement has been prepared by the SOGC/GOC/SCC Policy and Practice Guidelines Committee and was approved by the Council of the SOGC.

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torsions). However, this approach is being used over conventional surgery for procedures where the medical and therapeutic benefits are not as well established and prospective studies are still needed. Ovarian masses have been successfully treated by laparoscopy. Large studies, some with long-term follow-up have been published, demonstrating the safety and efficacy of this technique. However, we must keep in mind that these procedures were performed by highly skilled and trained gynaecologists. In recent years, reports have been published of undiagnosed ovarian cancers managed by laparoscopy with unfortunate consequences. Physicians are becoming concerned with the possibility of tumour spillage or delay in proper staging and management of malignant ovarian neoplasms. This guideline is meant to help in the adequate selection and in the management of adnexal masses by laparoscopy.

EVALUATION OF THE ADNEXAL MASS

The pre- or post-menopausal status of the patient with a pelvic mass must be borne in mind. The former carries a lower probability of malignancy than the latter. There are two steps in the evaluation: the pre-operative assessment and the intra-operative assessment.

1) PRE-OPERATIVE ASSESSMENT

Initially described by Mage and Parker, it includes:
- Detailed personal and family history;
- Thorough physical examination;
- Tumour markers;
- Ultrasonography.

PERSONAL HISTORY

Personal history should include any prior history of neoplasia, current or past use of oral contraceptives, information regarding duration and growth of the mass as well as the presence of symptoms that may be associated with neoplasia (e.g. anorexia, weight loss, gastrointestinal complaints, increasing abdominal girth). A family history of neoplasia and cancer syndromes (e.g. Lynch II Syndrome in association with colon cancer, familial breast and endometrial cancer) should be noted.

PHYSICAL EXAMINATION

Physical examination should include an abdominal examination to document the presence of ascites or abdominal masses, and a pelvic and rectovaginal examination to document the presence of adnexal cysts, fixed pelvic masses or cul-de-sac nodularities.

TUMOUR MARKERS

Tumour markers, including CEA and CA-125 levels should be obtained. In premenopausal women, the specificity of the CA-125 is low, as many benign conditions, including endometriosis, pregnancy and pelvic inflammatory disease, are associated with an elevated CA-125 value. Most authors agree that values above 200 or 300 kU/litre units are more commonly associated with ovarian cancer. In post-menopausal women, elevated CA-125 values are more specific for malignancy. However, only 50 percent of Stage I A tumours will be associated with an elevated CA-125 level. Thus, a negative value should not bring on a false sense of security and must be considered along with other parameters. Other tumour markers, for example, alpha-fetoprotein and beta-hCG, are useful in the management of the adnexal mass in young patients.

ULTRASONOGRAPHY

Ultrasonography is of primary importance in managing adnexal masses. Endovaginal transducers provide greater resolution, thus helping to discriminate benign from malignant lesions. Detailed findings must be documented (Table 1). Characteristics of adnexal masses displayed by ultrasonography include tumour size, number of loculi and septae, overall echodensity and papillary excrescences.

| TABLE 1 |

<table>
<thead>
<tr>
<th>SONOGRAPHIC PARAMETERS</th>
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<tr>
<td>Risk of Malignancy</td>
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<tr>
<td>Tumour size</td>
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<tr>
<td>Septae</td>
</tr>
<tr>
<td>Number of loculi</td>
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<tr>
<td>Overall echodensity*</td>
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<tr>
<td>Papillary excrescences</td>
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TUMOUR SIZE

Tumour size is important because the likelihood of cancer increases with volume. Studies from Granberg, Herman and Meire, though small in numbers, demonstrate an increased frequency of malignancy with increasing size, especially for lesions greater than 10 cm. “This tendency is more evident in post-menopausal women, especially with masses over five cm.” However, tumour size must be coupled with such other characteristics as internal echodensity, presence or absence of septae, papillary excrescences and number of loculi, to be of significance.
Unilocular versus Multilocular Cysts

Unilocular cysts are more likely to be benign. Made- lenat, in a review of the literature, found the incidence of malignancy to be 2.3 percent in premenopausal women and three percent in post-menopausal women when the unilocular aspect solely was considered. Most of these cysts were evaluated using transabdominal ultrasound. When endovaginal transducers were used, some cysts evaluated as unilocular were found in reality to be complex. The incidence of malignancy in truly unilocular cysts decreased to 0.8 percent. In this review, multi-locular cysts were associated with malignancy in approximately 15 percent of the cases. The presence of thick septae within the cyst was more indicative of suspicious masses but this finding was not completely reliable.

Echodensity

Increased density or the presence of mixed components carries a higher risk of malignancy. There are two exceptions. One is the dermoid cyst which can have characteristic features on X-ray or CT-Scan imaging and the other is the endometrioma. The use of endovaginal ultrasound with a negative predictive value of 92 to 96 percent has greatly improved our ability to exclude a diagnosis of cancer. Unfortunately, ultrasound’s ability to diagnose malignancy correctly is poor, with a positive predictive value ranging from 39 to 73 percent.,”

Excrences

Grandberg et al. found a strong correlation between the number of excrescences and the likelihood of malignancy.” Cysts without papillary excrescences were benign in 92 percent of cases while all 37 cysts containing more than five excrescences were malignant. Using these criteria, Sassone and Granberg have proposed a scoring system which still needs to be validated by prospective studies. Although imperfect, using a scoring system encourages a thorough evaluation of each adnexal mass.

Doppler

The use of the Doppler pulsatility index may prove useful when combined with ultrasound parameters. Angiogenic activity is supportive evidence of tumour growth. The vessels of rapidly growing ovarian masses usually lack normal muscle components, and Doppler imaging techniques tend to demonstrate abnormal blood flow velocity wave forms. The distinction between benign and malignant tumours is based on the detection of these wave forms exhibiting low impedance or high diastolic blood flow. Unfortunately, an overlap exists between the haemodynamics of benign and malignant masses, hence its low specificity for diagnosing malignancy.”

Pre-operative Assessment Results

Once the pre-operative assessment is completed, there are four possible assumptions that can be made about an adnexal mass (Figure 1).

The mass can be:
1. at high risk for malignancy;
2. at low risk;
3. at intermediate risk;
4. solid.

1. High Risk Mass

The mass is considered at high risk when on ultrasound there is:
a) mixed or high echodensity (except dermoid and endometrioma);
b) two or more sonographic higher risk parameters (exclusive of size);

c) one suspicious parameter with concomitant clinical or biochemical findings suggestive of cancer, associated with tumour size greater than 10 cm and/or bilateral tumours.

These situations are associated with the highest probability of malignancy, and should be explored by laparotomy by a qualified gynaecologist. In premenopausal women, laparoscopic evaluation may still be proposed, as the prevalence of Stage 1 ovarian malignancy in this age group is less than three percent, when the masses are less than six cm and not associated with clinical or biochemical characteristics of malignancy.” Moreover, laparoscopic assessment could probably identify most malignant lesions.” Post-menopausal women may be subjected to diagnostic laparoscopy and assessment, keeping in mind that the risk of malignancy and intra-operative conversion to laparotomy will be high.

2. Low-risk Mass

If the cyst is sonolucent and unilocular, a follow-up pelvic examination and/or ultrasound should be carried out in six to eight weeks. The use of oral contraceptives may help in preventing the development of concomitant...
functional cysts during the observation period. If the cyst is still present at the time of follow-up, a laparoscopic assessment is required. In post-menopausal women with medical conditions that greatly increase surgical risk, follow-up may be offered when the cyst is small (3 cm or less), the tumour marker levels are normal and the history and physical examination are free from suspicious findings.

3. Intermediate-risk Mass

If the mass is not simple or highly suspicious, it may be evaluated by laparoscopy, depending on the patient's individual surgical risk, the operator's skill and experience and the possibility of safe retrieval of the mass by the same route. For these patients, the second phase of the evaluation is the intra-operative assessment.

4. Solid Mass

The mass appears solid but regular and homogenous. Although usually treated by laparotomy, a diagnostic laparoscopy in this case may help to distinguish whether the mass originates from the uterus (i.e. myoma) or from the ovary. In the latter case, a laparotomy is usually indicated.

INTRA-OPERATIVE LAPAROSCOPIC ASSESSMENT

Prior to surgery, patients should have a full bowel preparation. Informed consent must be obtained which includes permission for the surgeon to proceed to laparotomy and radical surgery when indicated. Rigorous surgical technique must be observed.

INSERTION OF TROCARS

Precautions must be taken to avoid accidental puncture of the mass with the blind introduction of the Verres needle or the main trocar. A variety of techniques has been proposed to decrease this risk, especially in the presence of a large mass. Initially, the Trendelenburg position is avoided. Pneumoperitoneum can be obtained by introducing the Verres needle in the left upper quadrant, with subsequent introduction of the main trocar at or above the umbilicus. An alternative is to insert a five millimetre trocar with the laparoscope (or hysteroscope) in the left upper quadrant or to use the recently developed "Needlescopes" to visualize the entry of the main trocar at or above the umbilicus. Finally, an open laparoscopy can be performed, especially if midline adhesions are expected.

INTRA-ABDOMINAL EVALUATION

Once the peritoneal cavity has been entered, a panoramic inspection of the abdominal and pelvic cavity is performed. If gross malignancy is encountered, immediate laparotomy should be carried out, or the patient should be sent to a gynaecologic oncologist after obtaining pathological confirmation of the diagnosis (biopsy) and thoroughly washing the trocar sites. If no overt malignancy is observed, the other trocars may then be inserted. Once the ovarian origin of the mass is confirmed, any free peritoneal fluid should be aspirated and/or peritoneal washings obtained for cytologic examination. The effects of CO₂ on peritoneal cytology are unknown. In the search for metastatic disease, all peritoneal surfaces including the paracolic gutters, the under surface of the diaphragm, must be visualized. The serosa and mesentery of the entire gastrointestinal tract and the omentum are scrutinized. The pelvis, opposite ovary, uterus and tubes should be carefully evaluated. At any point, if malignancy is suspected, biopsies should be taken and sent for rapid frozen section.

OVARIAN MASS EVALUATION

The affected ovary is then examined. At this point, the surgeon must bear in mind the results of the preoperative assessment. If external papillary excrescences are found, a laparotomy should be performed. The presence of dense adhesions carries a high risk of rupture and, unless there are obvious signs of endometriosis, removal of the ovary by laparotomy is advocated to reduce the risk of rupture.

Table 2 shows the recommendations of Mage et al. for the characteristics to be assessed during the laparoscopic evaluation of ovarian masses.

| TABLE 2 |
|------------------|-------------------|------------------|
| Cyst/mass features | Organic appearance | Functional appearance |
| Lesion            | Single, multiple or multilocular | Single |
| Cyst wall         | Thick             | Normal           |
| Utero-ovarian ligament | Elongated     | Normal           |
| Vascular pattern  | Regular, comb-like | Irregular, coral-like |
| Cyst fluid        | Clear, dark brown or thick (dermoid) | Saffron yellow |
| Internal cyst wall| Smooth/irregular  | Retina-like       |

* Implies cist puncture which is standard procedure for cystectomy for some authors but not advocated here.

SURGICAL MANAGEMENT

FUNCTIONAL APPEARANCE

In the series from Canis et al., 15 to 20 percent of the cysts having a "functional appearance" were in fact organic tumours (serous/mucinous etc.), although none
was malignant.' During the reproductive years, if the cyst is of functional appearance by laparoscopic inspection and previous ultrasound evaluation suggests it to be a simple sonolucent mass, the chances of malignancy are very low. In these cases, a cystectomy can be performed. Simple aspiration of the cyst is not recommended as it is followed by a high recurrence rate and 15 to 20 percent of those cysts are organic. Ideally, an intact cystectomy should be performed. Hydrodissection may be helpful in identifying the plane of cleavage. The cyst should be placed inside an endobag with or without cyst puncture within the bag. In selected cases, when the capsule is very thin or the cyst is larger than eight to ten cm, rupture with gross spillage may occur. One might first consider decompressing the cyst by puncturing it opposite to the hilum using a five mm trocar, and aspirating with an aspiration-lavage cannula. This will minimize spillage. The fluid should be clear or saffron yellow and the inner lining of the cyst smooth. Once cystectomy is completed, the cyst is removed in an endoscopic bag through a 10 to 12 cm suprapubic trocar to avoid any parietal contamination. If there is any doubt as to the nature of the cyst, it should be sent for rapid frozen section.

In peri- or post-menopausal women, cystectomy alone should not be considered. A salpingooophorectomy without cystic rupture and retrieval in an endoscopic bag is the preferred technique. The trocar is pulled out, carrying along with it the edges of the bag which are brought up through the abdominal wall. Still in the bag, the cyst is punctured, thus reducing its volume, and then the bag is extracted. Widening the skin incision may be required. If the tumour is less than four or five cm, the cyst can also be removed in the endoscopic bag through a posterior colpotomy if the cul-de-sac is easily accessible. Some authors advocate puncture and aspiration while the endoscopic bag is still in the abdominal cavity. This technique involves some risks of spillage. The canula and the trocar are automatically contaminated. Care should be taken not to contaminate the outer edges of the trocar or bag, as the abdominal wall would then be exposed to cystic fluid or content which could be malignant.

In post-menopausal patients, a bilateral salpingooophorectomy should be considered. Both ovaries are put in the same bag. Most often, during laparotomy, an incidental hysterectomy may also be performed in post-menopausal women with adnexal masses. As laparoscopic bilateral salpingooophorectomy has a low morbidity rate, in the asymptomatic patient with a benign ovarian mass, the uterus may not be removed but an adequate endometrial sample could be obtained to exclude any underlying uterine lesions.

**Organic Appearance**

When the cyst has an "organic appearance" at the time of laparoscopy, there are three main therapeutic strategies, the choice of which depends on the age of the patient, the pre-operative assessment, the size of the mass and the surgeon’s experience.

a) Laparoscopic oophorectomy. An oophorectomy should be performed for all peri- or post-menopausal patients, independently of the aspect of the cyst. Safe retrieval in an endoscopic bag and immediate rapid frozen section analysis will dictate further management. When the tumour is malignant, staging and prognosis will not be adversely influenced by this technique. A laparotomy can be performed or the patient can be referred promptly for staging and definitive treatment.

b) In younger patients, ovarian cystectomy can be considered. Obviously, an intact cystectomy is the goal, but this is more difficult to achieve by laparoscopy than by laparotomy, and is more dependent on the operator’s skills and experience. The surgeon must keep in mind the risk of a laparoscopic rupture and spillage of a malignant tumour, and must weigh the risks of laparoscopy versus laparotomy. Each case must be individualized, the pre-operative assessment being of the utmost importance. Even moderately suspicious masses (one single suspicious characteristic on ultrasound i.e. multilocular, thick septae, increased or mixed echodensity) combined with an "organic appearance" at laparoscopy (except endometrioma/dermoid cyst) would probably be managed best by laparotomy, unless the tumour is small and the surgeon’s experience considerable. Rapid frozen section analysis should always be obtained. If, at the time of pre-operative assessment, the mass is considered to be benign, laparoscopic cystectomy can be attempted because the risk of cancer, even with an "organic appearing" tumour, is minimal. In the event of rupture, immediate irrigation and aspiration are carried out and a rapid frozen section analysis is obtained.

c) Laparotomy is always a safe alternative in the management of adnexal masses, and should be performed when papillary excrescences or dense adhesions (except for endometriosis) are encountered. Highly suspicious tumours (2 or more higher risk sonographic parameters) with “organic appearance” at the time of laparoscopy should be managed by laparotomy. Moderately suspicious tumours are probably also managed best using this approach. Laparotomy should not be considered a defeat but a safe alternative.
CONCLUSION

When the pre-operative and intra-operative assessments are combined, the majority of malignant masses can be identified and managed adequately. The risk of tumour spillage while performing a laparoscopic oophorectomy in appropriately selected cases is minimal. Using these criteria and rigorous technique, the risk of rupturing an undiagnosed ovarian cancer while performing a laparoscopic cystectomy will also be quite low. Nezhat et al. found only four cancers in a series of 1,011 patients. It must be noted that laparotomy also carries a risk of tumour rupture and spillage.

In a 12-year study by Canis et al., 819 masses in 757 patients were managed by laparoscopy. Nineteen malignant masses (12 borderlines, 7 cancers) were found. Of the seven cancers, four had extra-ovarian signs of malignancy. Only two were punctured as part of the laparoscopic management protocol, thus converting stage IA to IC in 0.3 percent of the patients. In this study, 3.6 percent of patients underwent laparotomy for a lesion felt to be malignant at the time of laparoscopy. The effect of tumour spillage on prognosis still remains unclear. The "Federation Internationale des Gynecologues et Obstetriciens" (FIGO) does increase the Stage from IA to IC, when spillage occurs. If multiple lavages and adequate surgery are performed immediately after rupture, the prognosis is probably better than when spillage and dissemination have occurred prior to surgery, or when there has been a prolonged delay between the initial surgery and definitive surgery.

Dembo et al. and Seveida et al. have concluded that intra-operative spillage does not influence recurrence or survival. In contrast, Sains de la Cuesta et al. have found that the risk of recurrence is higher in patients with Stage IC (intra-operative spillage) compared to stage IA, but survival is not affected. The small number of patients limits these authors' conclusions. It is important to note that, in all these studies, patients reclassified from IA to IC received adjuvant therapy.

In a few centres, patients who are reclassified to a higher Stage as the result of intra-operative rupture do not receive additional treatment. However, in many centres, most of these patients are subjected to adjuvant therapy. Considering the morbidity, both psychological and physical, associated with chemotherapy or other adjuvant therapies, all efforts should be made to avoid cyst rupture.

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