Para aortic lymphadenectomy in ovarian carcinoma

Dr Nadine EL KASSIS
Gynecologic Oncology
Notre Dame du Secours hospital, Byblos, Lebanon
and Saint Joseph University, Beirut, Lebanon
Ankara, 2016/02/27
introduction

- Epithelial ovarian cancer is the leading cause of gynecologic cancer-related deaths.
- Intraperitoneal spread, and the highest propensity to spread via the lymphatic system compared to the other genital malignancies. (1,2)
- The therapeutic efficacy of lymphadenectomy!
- Lymphatic status is valuable in determining both the exact stage and the prognosis of the patient.
- Proper evaluation can only be performed by systematic pelvic and para aortic lymph node dissection.

1. Di Re F, Baiocchi G. Gynecol Oncol 1991
2. Brughardt E, Girardi F, Lahousen M Gynecol Oncol 1991
<table>
<thead>
<tr>
<th>da1</th>
<th>ok</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>david atallah; 11.04.2009</td>
</tr>
</tbody>
</table>
Trials and studies

During the 1970s, intraperitoneal spread had been thought to be a primary route of dissemination.

During the last decade we realized the importance of lymphatic spread.

FIGO classification (III c) has been modified in order to classify lymphatic spread.
FIGO staging 2014

Stage I - Growth limited to the ovaries

Stage IA - Tumor limited to 1 ovary, capsule intact, no tumor on surface, negative washings.

Stage IB - Tumor involves both ovaries otherwise like IA.

Stage IC - IC Tumor limited to 1 or both ovaries
  - IC1 Surgical spill
  - IC2 Capsule rupture before surgery or tumor on ovarian surface.
  - IC3 Malignant cells in the ascites or peritoneal washings.
FIGO staging

- **Stage II** - Tumor involves 1 or both ovaries with pelvic extension (below the pelvic brim) or primary peritoneal cancer

  Stage IIA: Extension and/or implant on uterus and/or Fallopian tubes

  Stage IIB: Extension to other pelvic intraperitoneal tissues
FIGO staging

- Stage III - Tumor involves 1 or both ovaries with cytologically or histologically confirmed spread to the peritoneum outside the pelvis and/or metastasis to the retroperitoneal lymph nodes

- IIIA1 Positive retroperitoneal lymph nodes only
  - IIIA1(i) Metastasis ≤ 10 mm
  - IIIA1(ii) Metastasis > 10 mm

- IIIA2: Microscopic, extrapelvic (above the brim) peritoneal involvement ± positive retroperitoneal lymph nodes

- IIIB: Macroscopic, extrapelvic, peritoneal metastasis ≤ 2 cm ± positive retroperitoneal lymph nodes. Includes extension to capsule of liver/spleen.

- IIIC: Macroscopic, extrapelvic, peritoneal metastasis > 2 cm ± positive retroperitoneal lymph nodes. Includes extension to capsule of liver/spleen.
Debate...

- THERAPEUTIC EFFECT OF LYMPHADENECTOMY
- Disease free survival/ overall survival
- Early v/s advanced stage
- Laterality of lymph node metastasis especially in early unilateral tumor
- Extent of lymphadenectomy
- MORBIDITY!
Basic principle

• Basic principles in ovarian cancer surgery:
  • an effort to achieve maximal cytoreduction to < 1 cm residual disease in appropriate circumstances;
  • That’s what was said previously

Actually, **NO residual (0)** disease must be left if conceptually removable.

Du Bois A et al., Cancer March 15, 2009
Late 70’s Early 80’s

- Some authors have noticed the interrest of Systematic lymph node dissection (pelvic then para aortic).

- UROLOGISTS → Gyn Onc
A rationale for para aortic lymph node dissection in ovarian cancer

The therapeutic effect of lymphadenectomy is reflected in the marked improvement in survival of all patients with Stage III ovarian cancer after the introduction of lymphadenectomy.

A rationale for para aortic lymph node dissection in ovarian cancer

- Between 1980 and 1988, 350 women suffering from ovarian cancer stage I-IV were admitted to the Department of Gynaecology and Obstetrics of the University of Graz. **320 patients underwent surgery, 174 of 175 with stage III disease, 95 patients had pelvic lymphadenectomy and 76 both pelvic and para-aortic lymphadenectomy.** During the last 4 years, 75% of all patients with stage III disease underwent lymphadenectomy; in 30% the abdomen could be completely cleared of the disease. Bowel resection was necessary in 29% of these patients. After surgery and adjuvant chemotherapy, actuarial 5-year survival was 80% in stage I, 65% in stage II, and 45% in stage III. **Lymph node status and amount of residual tumour were the most important factors affecting survival.** After pelvic lymphadenectomy 23% patients of stage III showed no evidence of disease (NED) after 5 years. If there was no residual tumour at primary surgery, survival with NED increased to 62% and to 71% in patients with negative pelvic nodes.

- The data indicates, that pelvic lymphadenectomy improved the 5-year survival of patients with stage II-IV ovarian cancer.

A rationale for para aortic lymph node dissection in ovarian cancer

Between 1985 and 2001, 276 women with epithelial ovarian carcinoma underwent systematic bilateral pelvic and paraaortic lymphadenectomy.

A rationale for lymph node dissection in ovarian cancer

- The frequency of lymph node metastases according to the stage of the disease were:
  - 20% (17 of 85) for stages I
  - 40% (6 of 15) for stages II
  - 55% (99 of 176) for stages III and IV

A rationale for para aortic lymph node dissection in ovarian cancer

- The overall frequency of lymph node involvement was 44% (122 of 276)

- The frequency of pelvic and paraaortic metastases were 30% (82 of 276) and 40% (122 of 276), respectively.

A rationale for para aortic lymph node dissection in ovarian cancer

None of 15 patients with stage IA grade 1 disease had nodal involvement.

None of the 20 patients with mucinous tumors confined to the ovary(ies) (stage I disease) had nodal involvement.

A rationale for para aortic lymph node dissection in ovarian cancer

- When paraaortic nodes were involved, the left paraaortic chain above the level of the inferior mesenteric artery was the most frequently involved site (70 patients, 63%).

- One of nine patients (11%) with a macroscopic stage I unilateral tumor and paraaortic involvement had contralateral metastases.

A rationale for para aortic lymph node dissection in ovarian cancer

• Lymphadenectomy should involve the whole pelvic and paraaortic chain up to the level of the left renal vein.

• Bilateral dissection should be performed even in cases of patients with a unilateral tumor.

A rationale for para aortic lymph node dissection in ovarian cancer

<table>
<thead>
<tr>
<th>stage</th>
<th>Para aortic (%)</th>
<th>Pelvic (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>II</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>III</td>
<td>41.9</td>
<td>12.9</td>
</tr>
<tr>
<td>IV</td>
<td>66.7</td>
<td>33.3</td>
</tr>
</tbody>
</table>

A rationale for para aortic lymph node dissection in ovarian cancer

- review of 116 patients with stage IIIC or IV epithelial ovarian carcinoma treated at Mayo Clinic who underwent systematic bilateral pelvic and aortic lymphadenectomy between 1996 and 2000.

- There was no significant difference between the mean size of positive (1.8 cm) and negative nodes (1.6 cm).

- The most representative group for detection of nodal metastases was the aortic group (83%) followed by the external iliac group (59%) and the obturator nodes (53%).

A rationale for para aortic lymph node dissection in ovarian cancer

- positive nodes bilaterally
- positive high aortic nodes
- need for bilateral pelvic and aortic node dissection

Neither pelvic lymph node status nor intraoperative clinical evaluation could sufficiently predict para-aortic lymph node metastasis.

<table>
<thead>
<tr>
<th>Localization</th>
<th>% of all pts.</th>
<th>% of pts. with positive nodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: upper para-aortic</td>
<td>32</td>
<td>61</td>
</tr>
<tr>
<td>B: lower para-aortic</td>
<td>23</td>
<td>43</td>
</tr>
<tr>
<td>C: interaortocaval</td>
<td>36</td>
<td>63</td>
</tr>
<tr>
<td>D: paraaortal</td>
<td>22</td>
<td>40</td>
</tr>
<tr>
<td>Σ para-aortic</td>
<td>48</td>
<td>80</td>
</tr>
<tr>
<td>E1: right iliaca communis</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>E2: left iliaca communis</td>
<td>17</td>
<td>32</td>
</tr>
<tr>
<td>F1: right iliaca externa</td>
<td>18</td>
<td>35</td>
</tr>
<tr>
<td>F2: left iliaca externa</td>
<td>26</td>
<td>40</td>
</tr>
<tr>
<td>G1: left fossa obturatoria</td>
<td>14</td>
<td>27</td>
</tr>
<tr>
<td>G2: right fossa obturatoria</td>
<td>18</td>
<td>35</td>
</tr>
<tr>
<td>H1: left iliaca interna</td>
<td>13</td>
<td>24</td>
</tr>
<tr>
<td>H2: right iliaca interna</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>Σ pelvic</td>
<td>41</td>
<td>77</td>
</tr>
</tbody>
</table>
EARLY OVARIAN CANCER
Lymph node metastasis in grossly apparent clinical stage Ia epithelial ovarian cancer: Hacettepe experience and review of literature
Guldeniz Desteli, Murat Gultekin, Alp Usubutun, Kunter Yuce, Ali Ayhan
*World Journal of Surgical Oncology* 2010, *8*:106

- prospective study: 33 ov cancer patients stage Ia
- 2 patients had lymph node metastasis (6%), 1 paraaortic node metastasis and the other metastasis was in ipsilateral pelvic lymph node.
- Ovarian capsule was intact in all of the patients with lymph node involvement and the tumor was grade 3.
Lymph node metastasis in grossly apparent stages I and II epithelial ovarian cancer.

- Of the 79 patients, 10 (12.7%) had lymph node metastasis.
- The incidence of serous-type lymph node metastasis was higher than nonserous type.
PLN: 5-14%, PAN: 4-12%

Table 1. Frequency of lymph node metastasis in pT1 disease according to the stage and site

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>No. of patients</th>
<th>Positive rate (%)</th>
<th>Stage (%)</th>
<th>Positive rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ia</td>
<td>Ib</td>
</tr>
<tr>
<td>Sakuragi et al. (2000)</td>
<td>78</td>
<td>5.1</td>
<td>3.2</td>
<td>NA</td>
</tr>
<tr>
<td>Suzuki et al. (2000)</td>
<td>47</td>
<td>10.6</td>
<td>5.6</td>
<td>NA</td>
</tr>
<tr>
<td>Cass et al. (2001)</td>
<td>96</td>
<td>14.5</td>
<td>-</td>
<td>NA</td>
</tr>
<tr>
<td>Takeshima et al. (2005)</td>
<td>156</td>
<td>12.8</td>
<td>9.3</td>
<td>33.3</td>
</tr>
<tr>
<td>Harter et al. (2007)</td>
<td>48</td>
<td>6.2</td>
<td>0</td>
<td>25.0</td>
</tr>
<tr>
<td>Fournier et al. (2009)</td>
<td>54</td>
<td>9.3</td>
<td>3.8</td>
<td>0</td>
</tr>
<tr>
<td>Nomura et al. (2010)</td>
<td>60</td>
<td>13.3</td>
<td>28.0</td>
<td>0</td>
</tr>
<tr>
<td>Mikami (Tokai Univ.)</td>
<td>89</td>
<td>12.3</td>
<td>4</td>
<td>50</td>
</tr>
</tbody>
</table>

PAN, para-aortic Lymph node; PLN, pelvic lymph node.

Mikami M, J Gynecol Oncol 2014 Vol. 25, No. 4:279-281
A total of 268 eligible patients with macroscopically intrapelvic ovarian carcinoma were randomised to Systematic pelvic and aortic Lymph node dissection (SL) (N = 138) or CONTROL (picking) (N = 130).

More patients in the Systematic pelvic and aortic Lymph node dissection group had positive nodes at histologic examination than patients on control (22% vs 9%, P=0.007).
**Figure 3** Progression-free survival (PFS) for patients with optimally debulked early ovarian carcinoma undergoing systematic aortic and pelvic lymphadenectomy (Lymphad.) vs lymph nodes sampling only (No lymphad.). Five-year progression-free survival was 73.4% and 78.3% (difference = 4.9%, 95% CI = -5.9 to 12.5%) respectively, for lymph nodes sampling only and lymphadenectomy.

**Figure 2** Overall survival (OS) for patients with optimally debulked early ovarian carcinoma undergoing systematic aortic and pelvic lymphadenectomy (Lymphad.) vs lymph nodes sampling only (No lymphad.). Five-year overall survival was 81.6% and 84.0% (difference = 2.4%, 95% CI = -8.3 to 8.9%) respectively for lymph nodes sampling only and lymphadenectomy.
Analysis of para-aortic lymphadenectomy up to the level of the renal vessels in apparent early-stage ovarian cancer.
Chang SJ1, Bristow RE, Ryu HS. J Gynecol Oncol. 2013 Jan;24(1):29-36.

- upstaged disease
- lymph node metastasis above the level of the inferior mesenteric artery.
- help in tailoring appropriate adjuvant treatment
- evaluate the prognosis.
IN MACROSCOPICALLY EARLY OVARIAN CANCER ..... 

• Accurate staging $^{1,2}$

• Survival improvement $^{1,2}$ (OS and PFS, disease-specific survival from 87 to 92.6%)

• The volume of the lymph node dissection is significant prognostic factor for better survival rate$^3$.

1-JK Chan et al British Journal of Cancer (2008) 98(7), 1191 - 1196


Advanced ovarian cancer
The potential therapeutic role of lymph node resection in epithelial ovarian cancer: a study of 13 918 patients
British Journal of Cancer (2007) 96, 1817 - 1822
Chan JK et al.

- On multivariate analysis, the extent of lymph node dissection and number of positive nodes were significant independent prognostic factors after adjusting for age, year at diagnosis, stage, and grade of disease.

- The extent of lymphadenectomy is associated with an improved disease-specific survival of women with advanced epithelial ovarian cancer.
Figure 2  Kaplan–Meier analysis of patients by extent of lymphadenectomy (n = 13918; P < 0.001).
<table>
<thead>
<tr>
<th>Prognostic factor</th>
<th>Hazard ratio</th>
<th>95% confidence interval</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at diagnosis&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.018</td>
<td>1.016–1.019</td>
<td>P&lt;0.005</td>
</tr>
<tr>
<td>Year of diagnosis&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.977</td>
<td>0.970–0.984</td>
<td>P&lt;0.005</td>
</tr>
<tr>
<td>Stage&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1.266</td>
<td>1.220–1.315</td>
<td>P&lt;0.005</td>
</tr>
<tr>
<td>Grade&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1.933</td>
<td>1.684–2.219</td>
<td>P&lt;0.005</td>
</tr>
<tr>
<td>Histology&lt;sup&gt;e&lt;/sup&gt;</td>
<td>1.994</td>
<td>1.716–2.316</td>
<td>P&lt;0.005</td>
</tr>
<tr>
<td>Uterine vs. Vaginal/Rectal</td>
<td>0.411</td>
<td>0.387–0.436</td>
<td>P&lt;0.005</td>
</tr>
<tr>
<td>Pathologic staging</td>
<td>1.198</td>
<td>1.075–1.347</td>
<td>P&lt;0.005</td>
</tr>
</tbody>
</table>

<sup>a</sup>Continuous. <sup>b</sup>Continuous. <sup>c</sup>Stage IIA/B vs IIC vs IV. <sup>d</sup>Grade 1 vs 2–3. <sup>e</sup>Others vs clear cell. 0 vs 1 vs 2–5 vs 6–10 vs ≥11. <sup>f</sup>No vs yes.
1924 patients

- Lymphadenectomy was associated with superior survival ONLY in patients without gross residual disease (P=0.0166).

- For patients with small residual tumors and clinically suspect nodes, lymphadenectomy resulted in a 16% gain in 5-year OS.

- No recommendation for lymphadenectomy in patients with residual intraperitoneal disease, unless node dissection would change residual disease status from bulky to minimal.
Fig. 1. Overall survival of patients with FIGO stage III–IV with residual tumor <1 cm according to the performance of lymphadenectomy.

Mikami M, J Gynecol Oncol 2014 Vol. 25, No. 4:279-281
Therapeutic and prognostic value of lymphadenectomy in gynecological oncology

Perzyło K1, Miotła P, Lis E, Rechberger T.

- In patients with advanced ovarian cancer systematic lymphadenectomy prolongs the survival rate.
Schwartz L1, Schrot-Sanyan S2, Brigand C3, Baldauf JJ2, Wattiez A2, Akladios C
Anticancer Res. 2015 Oct;35(10):5503-9

- lymphadenectomy does not seem to improve the survival rate.

- Current prospective studies like the LION study (AGO-Ovar) investigate the therapeutic role
Prognostic value of lymph node ratio in patients with advanced epithelial ovarian cancer

Beyhan Ataseven *, Christoph Grimm, Philipp Harter, Sonia Prader, Alexander Traut, Florian Heitz, Andreas du Bois

Department of Gynecology and Gynecologic Oncology, Kliniken Essen-Mitte, Evangische Hospiz-Stiftung, Hemmestrasse 92, 45136 Essen, Germany

Fig. 1. Overall survival by lymph node status. Kaplan-Meier.

Fig. 2. Overall survival by lymph node ratio (LNR). Kaplan-Meier.
SO?

- Prognostic factor
- And Therapeutic effect?
- lymphadenectomy for patients with complete or near complete resection of abdominal disease appears to be justified, in advanced ovarian cancer.

Effect of chemotherapy on lymph node metastasis
Effect of chemotherapy on lymph node metastasis

- nodal metastases are not totally sterilized by chemotherapy

Who should have lymphadenectomy?

Indications & Risk factors for lymph nodes metastasis
Histology

- This procedure could be omitted in patients with mucinous apparent stage I grade 1 tumor.

- Serous adenocarcinoma: high risk of lymph node metastasis even stage Ia

- In serous tumor, the para-aortic region, particularly above the IMA; no difference in non-serous


93 patients with primary mucinous ovarian carcinomas stage I at surgical exploration,

51 (55%) underwent lymphadenectomy

none had metastatic disease to the pelvic or paraaortic lymph nodes.

no significant differences in PFS and OS rates between LND and no LND.
Pelvic and aortic lymph node metastasis in epithelial ovarian cancer/ Pattern of metastasis

<table>
<thead>
<tr>
<th>Histologic findings</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serous</td>
<td>76 (66)</td>
</tr>
<tr>
<td>Mucinous</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Endometrioid</td>
<td>13 (11)</td>
</tr>
<tr>
<td>Clear cell</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Brenner</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Undifferentiated</td>
<td>7 (6)</td>
</tr>
<tr>
<td>Mixed</td>
<td>12 (10)</td>
</tr>
<tr>
<td>Unclassified</td>
<td>3 (2)</td>
</tr>
</tbody>
</table>

*A. Pereira et al. / Gynecologic Oncology 105 (2007) 604-608*
Grade 3 tumors were associated most frequently with nodal involvement, with an incidence of positive para-aortic nodes of 52.5% and of positive pelvic nodes of 15.5%.

Pelvic and aortic lymph node metastasis in epithelial ovarian cancer/ Patterns of metastasis

<table>
<thead>
<tr>
<th>Stage</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IIIIC</td>
<td>85 (73)</td>
</tr>
<tr>
<td>IV</td>
<td>31 (27)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 (0)</td>
</tr>
<tr>
<td>2</td>
<td>3 (3)</td>
</tr>
<tr>
<td>3</td>
<td>50 (43)</td>
</tr>
<tr>
<td>4</td>
<td>63 (54)</td>
</tr>
</tbody>
</table>

*a N=109. (Data about the ages of 7 of the 116 total patients were not available.)*  
*b N=116.*
Other factors

- The surgeon
- Age
- The residual disease
Lymph node dissection or sampling?

- the decision to do lymphadenectomy versus lymph node sampling was associated independently with the surgeon (P < .001), low residual disease (P < .001), and patient age of <65 years (P < .001).

Lymphatic metastasis in epithelial ovarian carcinoma with respect to clinicopathological variables

- 420 EOC patients retrospectively evaluated.
- **Age and grade** were significant factors for paraaortic metastasis both in univariable and multivariable analysis (P = 0.003 and P = 0.02, respectively).
- Most of the patients with unilateral tumors had contralateral pelvic and/or paraaortic metastasis.

A. Ayhan et al. Gynecologic Oncology 97 (2005) 400-404
### Distribution of patients by age, histologic type, stage, and tumor grade

<table>
<thead>
<tr>
<th>Age, years</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20–29</td>
<td>1 (1)</td>
</tr>
<tr>
<td>30–39</td>
<td>2 (2)</td>
</tr>
<tr>
<td>40–49</td>
<td>15 (14)</td>
</tr>
<tr>
<td>50–59</td>
<td>25 (23)</td>
</tr>
<tr>
<td>60–69</td>
<td>32 (29)</td>
</tr>
<tr>
<td>70–79</td>
<td>32 (29)</td>
</tr>
<tr>
<td>≥80</td>
<td>2 (2)</td>
</tr>
</tbody>
</table>

---

*A Pereira et al. / Gynecologic Oncology 105 (2007) 604–608*
Survival considering lymph node involvement

Fig. 1. The 5-year survival rates of patients by the number of metastatic lymph nodes.

A. Ayhan et al. / Gynecologic Oncology 97 (2005) 490-494
Recommendations
PRINCIPLES OF SURGERY (2 of 3)\(^1\)

**Newly diagnosed invasive epithelial ovarian cancer apparently confined to an ovary or to the pelvis:**

- On entering the abdomen, aspiration of ascites or peritoneal lavage should be performed for peritoneal cytologic examinations.
- All peritoneal surfaces should be visualized, and any peritoneal surface or adhesion suspicious for harboring metastasis should be selectively excised or biopsied. In the absence of any suspicious areas, random peritoneal biopsies should be taken from the pelvis, paracolic gutters, and undersurfaces of the diaphragm (diaphragm scraping for Papanicolaou stain is an acceptable alternative).
- BSO and hysterectomy should be performed with every effort to keep an encapsulated mass intact during removal.
- For selected patients desiring to preserve fertility, USO may be considered.
- Omentectomy should be performed.

\*Para-aortic lymph node dissection should be performed by stripping the nodal tissue from the vena cava and the aorta bilaterally to at least the level of the inferior mesenteric artery and preferably to the level of the renal vessels.

\*The preferred method of dissecting pelvic lymph nodes is bilateral removal of lymph nodes overlying and anterolateral to the common iliac vessel, overlying and medial to the external iliac vessel, overlying and medial to the hypogastic vessels, and from the obturator fossa at a minimum anterior to the obturator nerve.\(^2\)

**Newly diagnosed invasive epithelial ovarian cancer involving the pelvis and upper abdomen:**

In general, every effort should be made to achieve maximum cytoreduction. Residual disease <1 cm defines optimal cytoreduction; however, maximal effort should be made to remove all gross disease since this offers superior survival outcomes.\(^3\)

- Aspiration of ascites (if present) should be performed for peritoneal cytologic examinations. All involved omentum should be removed.
- Suspicious and/or enlarged nodes should be resected, if possible.

\*Those patients with tumor nodules outside the pelvis ≤2 cm (presumed stage IIIIB) should have bilateral pelvic and para-aortic lymph node dissection as previously described.

- Procedures that may be considered for optimal surgical cytoreduction (in all stages) include bowel resection and/or appendectomy, stripping of the diaphragm or other peritoneal surfaces, splenectomy, partial cystectomy and/or ureteroneocystotomy, partial hepatectomy, partial gastrectomy, cholecystectomy, and/or distal pancreatectomy.
La place de la chirurgie dans la prise en charge des stades précoces

- Curage pelvien et para-aortique vs exploration pelvienne et para-aortique -

**Standards**

Stadification complète incluant une lymphadénectomie pelvienne et para-aortique bilatérale (accord d’experts).

Si une lymphadénectomie pelvienne et para-aortique bilatérale n’a pas été réalisée au cours de la chirurgie initiale, il est recommandé d’en réaliser une sauf pour les formes mucineuses de stade I (à discuter en fonction de l’état général des patientes).

**Option**

Il n’y a pas d’Option.
6.3.5. Recommandations 2007

La place de la chirurgie dans la prise en charge des stades avancés

- Curage pelvien et para-aortique vs exploration pelvienne et para-aortique ou abstention d’une chirurgie -

Standard

Considérant l’intérêt majeur de la durée de survie sans récidive dans cette pathologie, si l’intervention permet une réduction tumorale péritonéale complète, une lymphadénectomie pelvienne et para-aortique est recommandée si les conditions générales de la patiente le permettent (niveau de preuve B1).

Option

Il n’y a pas d’Option.
• The problem:
  
  • Major surgery, not able to be done in any setting
<table>
<thead>
<tr>
<th>Procedures and score groups</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>TH-BSO</td>
<td>1</td>
</tr>
<tr>
<td>Omentectomy</td>
<td>1</td>
</tr>
<tr>
<td>Pelvic lymphadenectomy</td>
<td>1</td>
</tr>
<tr>
<td>Paraortic lymphadenectomy</td>
<td>1</td>
</tr>
<tr>
<td>Pelvic peritoneum stripping</td>
<td>1</td>
</tr>
<tr>
<td>Abdominal peritoneum stripping</td>
<td>1</td>
</tr>
<tr>
<td>Rectosigmoidectomy</td>
<td>3</td>
</tr>
<tr>
<td>Large bowel resection</td>
<td>2</td>
</tr>
<tr>
<td>Diaphragm stripping/resection</td>
<td>2</td>
</tr>
<tr>
<td>Splenectomy</td>
<td>2</td>
</tr>
<tr>
<td>Liver resection</td>
<td>2</td>
</tr>
<tr>
<td>Small bowel resection</td>
<td>1</td>
</tr>
<tr>
<td>Complexity score groups</td>
<td></td>
</tr>
<tr>
<td>1 (low)</td>
<td>≤ 3</td>
</tr>
<tr>
<td>2 (intermediate)</td>
<td>4–7</td>
</tr>
<tr>
<td>3 (high)</td>
<td>≥ 8</td>
</tr>
</tbody>
</table>

EEA, end-to-end anastomosis; TH-BSO, total hysterectomy, bilateral salpingo-oophorectomy.
Number of Ovarian Cancer Cases Operated on by Participants in Last Year
Table 3. Components of surgical staging performed by participants during the clinical case simulation

<table>
<thead>
<tr>
<th>Component</th>
<th>Participants performing (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frozen section</td>
<td>85.5</td>
</tr>
<tr>
<td>Bilateral salpingo-ophorectomy*</td>
<td>99.0</td>
</tr>
<tr>
<td>Hysterectomy*</td>
<td>98.6</td>
</tr>
<tr>
<td>Omentectomy*</td>
<td>98.0</td>
</tr>
<tr>
<td>Peritoneal washings*</td>
<td>98.3</td>
</tr>
<tr>
<td>Appendectomy</td>
<td>14.9</td>
</tr>
<tr>
<td>Peritoneal biopsies*</td>
<td>74.0</td>
</tr>
<tr>
<td>Splenectomy</td>
<td>1.0</td>
</tr>
<tr>
<td>Low anterior resection</td>
<td>1.4</td>
</tr>
<tr>
<td>Diaphragmatic biopsy*</td>
<td>46.6</td>
</tr>
<tr>
<td>Pelvic lymphadenectomy†</td>
<td>29.4</td>
</tr>
<tr>
<td>Para-aortic lymphadenectomy†</td>
<td>24.7</td>
</tr>
</tbody>
</table>

*Recommended by SOGC CPGs for the clinical scenario represented in the clinical case simulation.
†See text for interpretation of CPGs regarding lymph node dissection recommendations.
Figure 2 Kaplan–Meier analysis of patients by extent of lymphadenectomy ($n = 13918; P < 0.001$).
Nodes number

> 30 according to LION trial (20 pelvic, 10 PAN)

<table>
<thead>
<tr>
<th>Nodal site</th>
<th>No lymphadenectomy (n = 211)</th>
<th>Lymphadenectomy (n = 216)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelvic</td>
<td>1 (0–6)</td>
<td>28.5 (22–41)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Lumbo-aortic</td>
<td>1 (0–5)</td>
<td>23 (16–32)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Pelvic and lumbo-aortic</td>
<td>4 (0–11)</td>
<td>51.5 (41–70)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Missing data</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
technique
1. Precaval
2. Preaortic
3. Intercaval
4. Paracaval
5. Paraaortic
6. Ovarian
7. Presacral
8. Common iliac
9. External iliac
conclusions

- Para aortic lymph node dissection by stripping for aorta and vena cava is actually a standard of care in epithelial ovarian cancer

- Direct relationships between nodal metastasis and clinical stage, tumor grade, and histologic type of tumor were demonstrated.

- MORICE... BENEDITTI...
In early stage disease:

- prognostic (upstaging)
- therapeutic value (removing retroperitoneal micrometastatic disease including cell clones which may be resistant to chemotherapy).
conclusion

In advanced-stage disease,

• Survival benefit for complete lymph node dissection has not been evaluated by randomized controlled trials (LION);

• several non-randomized studies and two long-term prospective trials have shown objective improvement in disease-free survival and improved quality of life when debulking surgery leaves no residual tumor.
Therefore, the ability to perform an extensive RPLND is an important skill in the surgical armamentarium of the gynecologic oncologist.
Thank you