Obesity does not affect the number of retrieved lymph nodes and the rate of intraoperative complications in gynecologic cancers

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Objective: Lymphadenectomy, in general, is a safe and well-tolerated procedure in gynecologic oncology. However, some technical difficulties may be experienced in obese women which may result in inadequate lymphadenectomy and increased complications. The purpose of this study is to retrospectively evaluate the effect of obesity on lymph node counts retrieved and complication rates observed during lymphadenectomy in gynecologic cancers.

Methods: Patients with ovarian, endometrial or cervical cancers treated with initial surgery including bilateral pelvic and paraaortic lymph node dissection were grouped as non-obese and obese. These two groups were compared in terms of the number of retrieved lymph nodes and the rate of intraoperative complications directly related to lymph node dissection.

Results: One hundred twenty-three patients were eligible with a mean age of 55.1 years and mean body mass index of 29.2 kg/m². Fifty-nine patients were obese while 64 were non-obese. Lymph node counts obtained in different stations and in total were similar among non-obese and obese patients. Rates of lymphadenectomy-related intraoperative complications including vascular, neural, intestinal, and bladder injury were also similar in non-obese and obese patients.

Conclusion: The obesity does not affect the lymph node counts and intraoperative complication rates adversely in women with gynecologic cancers. Therefore, adequate lymph node dissection should not be omitted based solely upon obesity in gynecologic oncology patients.

Key Words: Obesity, Body mass index, Lymphadenectomy, Lymph node count, Complication, Gynecologic cancer

INTRODUCTION

Gynecologic cancers commonly involve pelvic and paraaortic lymph nodes. Detection of this involvement provides important prognostic information and significantly impacts postoperative treatment decisions. At present, the best method available for the detection of nodal involvement is lymph node dissection (LND) with histopathological examination. In general, LND is a safe and well-tolerated surgical procedure. Also, failure to perform LND may adversely affect the oncologic prognosis. However, difficulties may sometimes be experienced during LND due to some factors. Among such factors, obesity is a well-recognized one because it may act as a potential impediment to proper surgical therapy. This may result from multiple factors. In addition to increased incidence of comorbid medical problems related with complications observed during the postoperative course, obesity also negatively influences the surgical management of gynecologic malignancies due to technical difficulties with exposure which may result in inadequate LND and increased intraoperative complications. As a result, obese women are less likely to undergo a LND compared to non-obese women despite its documented benefits in gynecologic cancers. Nevertheless, it is evident that the necessity of performing an adequate operation is the same for obese women even if their body habitus causes technical difficulties.

The aim of this article was to retrospectively investigate whether body mass index (BMI) or obesity affects the number of lymph nodes retrieved or the frequency of intraoperative complications experienced during LND performed via laparotomy in women with gynecologic cancers.

MATERIALS AND METHODS

The study group consisted of women with ovarian, endometrial or cervical cancers who were consecutively subjected
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One hundred twenty-three women with gynecologic cancers were eligible. Of them, 61 (49.6%) had ovarian cancer, 48 (39.0%) had endometrial cancer, and 14 (11.4%) had cervical cancer. Mean age of the patients was 55.1±14.2 years (range, 15 to 80 years). Mean BMI was 29.2±4.9 kg/m² (range, 20.2 to 39.7 kg/m²). Basic characteristics of patients are shown in Table 1.

According to preoperative BMIs, 64 patients (52.0%) were classified as non-obese and 59 (48.0%) as obese. 64.6% of patients with endometrial cancer were obese while the rates of obesity were 41.0% and 21.4% in patients with ovarian and cervical cancer, respectively. Mean number of lymph nodes retrieved in obese and non-obese groups is shown in Table 2. The lymph node counts obtained in different stations and in total were all similar among non-obese and obese patients. However, only a marginal significance in favor of non-obese group was detected in total paraaortic lymph node counts be-

Table 1. Characteristics of patients

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Non-obese (N=64)</th>
<th>Obese (N=59)</th>
<th>Total (N=123)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, yr</td>
<td>51.0±16.1 (15-76)</td>
<td>59.6±10.2 (32-80)</td>
<td>55.1±14.2 (15-80)</td>
</tr>
<tr>
<td>Weight, kg</td>
<td>63.5±7.8 (48-83)</td>
<td>81.5±7.3 (70-99)</td>
<td>72.1±11.8 (48-99)</td>
</tr>
<tr>
<td>Height, m</td>
<td>1.58±0.07 (1.43-1.75)</td>
<td>1.56±0.06 (1.42-1.70)</td>
<td>1.57±0.06 (1.42-1.75)</td>
</tr>
<tr>
<td>BMI, kg/m²</td>
<td>25.3±2.6 (20.2-29.9)</td>
<td>33.5±2.6 (30.0-39.7)</td>
<td>29.2±4.9 (20.2-39.7)</td>
</tr>
</tbody>
</table>

Values are presented as mean±SD (range).
Table 2. The number of lymph nodes retrieved in non-obese and obese patients

<table>
<thead>
<tr>
<th>Lymph node station</th>
<th>Number of lymph nodes</th>
<th>Non-obese (N=64)</th>
<th>Obese (N=59)</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right external iliac</td>
<td>7.4±4.0 (2-18)</td>
<td>8.0±4.6 (2-26)</td>
<td>0.43</td>
<td></td>
</tr>
<tr>
<td>Right obturator</td>
<td>5.5±3.8 (1-22)</td>
<td>6.0±2.7 (1-12)</td>
<td>0.39</td>
<td></td>
</tr>
<tr>
<td>Right pelvic</td>
<td>12.9±6.3 (4-38)</td>
<td>13.9±5.7 (4-38)</td>
<td>0.37</td>
<td></td>
</tr>
<tr>
<td>Left external iliac</td>
<td>7.8±3.7 (2-18)</td>
<td>8.3±4.2 (3-23)</td>
<td>0.46</td>
<td></td>
</tr>
<tr>
<td>Left obturator</td>
<td>6.9±4.1 (1-19)</td>
<td>7.5±6.0 (1-35)</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>Left pelvic</td>
<td>14.6±5.9 (4-34)</td>
<td>15.8±8.8 (4-51)</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td>Total pelvic</td>
<td>28.1±11.1 (11-72)</td>
<td>30.7±13.5 (9-89)</td>
<td>0.24</td>
<td></td>
</tr>
<tr>
<td>Paraortic</td>
<td>10.4±6.8 (2-38)</td>
<td>8.4±4.3 (2-18)</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Total pelvic-paraaortic</td>
<td>38.8±15.8 (14-98)</td>
<td>38.7±14.0 (11-93)</td>
<td>0.95</td>
<td></td>
</tr>
</tbody>
</table>

Values are presented as mean±SD (range).
*Independent samples t-test was used to compare the results between groups.

Table 3. Intraoperative complications related solely to lymphadenectomy in non-obese and obese patients

<table>
<thead>
<tr>
<th>Type of intraoperative complications</th>
<th>Observed complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-obese (N=64)</td>
<td>Obese (N=59)</td>
</tr>
<tr>
<td>Vascular injury</td>
<td>3 (4.7)</td>
</tr>
<tr>
<td>Neural injury</td>
<td>1 (1.6)</td>
</tr>
<tr>
<td>Intestinal injury</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Bladder injury</td>
<td>1 (1.6)</td>
</tr>
<tr>
<td>Any complications</td>
<td>5 (7.8)</td>
</tr>
</tbody>
</table>

Values are presented as number (%).
* Chi-square test or Fisher’s exact test was used to compare the results between groups.

DISCUSSION

Obesity, defined as an excess of adipose tissue and quantified by body mass index, is a major public health problem with gradually increasing prevalence in many countries.\(^{9,17}\) It is associated with a greater incidence of medical conditions including severe cardiovascular and pulmonary diseases. Even if these co-morbid problems rarely render the patient inoperable, they may complicate the postoperative course in patients who were subjected to surgical approach. Furthermore, obesity may cause technical difficulties due to limited exposure during surgery which may consequently lead to less extensive surgical interventions or higher incidence of intraoperative complications.\(^{9,11}\)

Obesity appears to be especially important in gynecologic oncology because surgery is considered the cornerstone in the treatment of various gynecologic malignancies.\(^{12}\) Several attempts were performed to minimize the adverse effects of leg without adversely affecting her daily activities.

Small intestinal injury occurred during retraction for paraaortic LND. The injury involved the full thickness of jejunal wall and was approximately 1 cm in length. It was managed with primary repair using 3.0 polyglactin sutures and the patient was not given orally for 5 days postoperatively. Total parenteral nutrition was used during this period. Thereafter, oral intake was initiated and was increased gradually without any signs or symptoms of intolerance.

Injury to urinary bladder resulted from retraction during right obturator LND. It involved the dome of bladder and was repaired primarily using 3.0 polyglactin sutures. Foley catheter was kept in place for 7 days on postoperative period to allow healing process without distention.

Intraoperative complication rates resulting solely from lymph node dissection were similar in non-obese and obese patients (7.8% and 11.9%, respectively, p=0.45). When visceral injuries were evaluated separately as vascular, neural, intestinal, and bladder injuries, they were seen in similar rates in these two groups (Table 3).

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obesity on surgical management in women with gynecologic cancers. These include modifications in surgical incision, pan-niculectomy, and use of self-retaining retractors and instruments of adequate length. All these surgical adaptations actually aim to perform an adequate surgery. In gynecologic oncology, the adequacy of surgery is usually determined by the number of lymph nodes retrieved, the negativity of surgical margins, and finally the survival of patients. Among them, the number of lymph nodes retrieved is considered to be an objective measure of the thoroughness and radicalness of the surgery. Also, the extent of LND is directly associated with oncological benefits since a more extensive lymph node resection was shown to be associated with an improved survival in patients with endometrial, ovarian, and cervical cancers. The potential benefits of extensive LND by means of survival may be explained by several mechanisms. First of all, the probability of finding a lymph node metastasis is significantly higher when more lymph nodes are removed. Also, micrometastatic nodal disease is removed by a more extensive LND. The undetected micrometastatic nodal disease may worsen prognosis because it may be missed during routine hematoxylin-eosin analyses and it may be resistant to adjuvant therapies. Furthermore, LND significantly impacts postoperative treatment decisions in clinically early stage disease due to upstaging solely resulting from lymph node involvement. Therefore, the surgeon should make an effort to retrieve as many lymph nodes as possible even in obese patients. Unfortunately, obese women were less likely to undergo a surgical assessment of their lymph nodes than non-obese women in the past. In fact, it was later demonstrated that the ability to perform adequate LND was not significantly impaired in most morbidly obese patients and median lymph node yields were similar between ideal body weight and morbidly obese patients. This was also confirmed even when pelvic and paraaortic yields were examined separately. In our study population, the mean number of lymph nodes removed was not affected by the BMI of patients and similar lymph node counts could be achieved in total and separately in different stations when patients were classified as non-obese and obese.

On the other hand, the safety of the surgery is even more important than its adequacy in most instances. The surgical intervention should not expose the patient to increased rates of intraoperative complications while the surgeon is making efforts to perform a more extensive LND. Because the lymph nodes are located adjacent to important structures including great vessels and nerves, some injuries may be seen during LND. Some visera may also be injured due to retractions performed to aid LND. Such injuries could be expected to occur more often in obese patients due to limited exposure of surgical field. Fortunately, LND itself or comprehensive surgical staging including LND was shown to be performed safely in obese patients without any difference in intraoperative complication rates. This was also confirmed in our study where the intraoperative complication rates were similar in patients with different BMI categories. Most of the complications observed in our study group were vascular injuries, especially the venous injuries which occurred during paraaortic LND. However, none of them required transfusion and all were repaired primarily by the gynecologic oncologist. Among other three intraoperative injuries, injuries of urinary bladder and jejunum occurred due to resections performed by attending surgeons via Deaver retractors and obturator nerve transaction was experienced inadvertently with electrocautery during a right obturator LND.

There are some limitations of this study. First, it was designed retrospectively and investigated specifically and solely the numbers of lymph nodes retrieved and the rates of intraoperative complications experienced. It involved relatively low number of patients and the patients had different types of gynecologic malignancies. Also, none of the patients were morbidly obese. However, all lymphadenectomies were performed by the same team using the same surgical technique in a single institution to avoid the possible effects of different surgical techniques on lymph node yield and complication rates. In addition, the lymph node stations were described in detail and the number of lymph nodes was determined by the same pathologist. Therefore, the study may document that BMI is not the only factor that determines the adequacy and safety of the operation in terms of lymph node yield and intraoperative complications in women with gynecologic cancers.

Several variables other than BMI and obesity may definitely affect the number of retrieved lymph nodes in women with gynecologic cancers. These variables include but are not limited to the age and performance status of the patient, the type and the stage of the malignancy. Also, major surgical outcomes such as operation time and amount of intraoperative blood loss as well as intraoperative and postoperative complications may differ in patients with different BMIs as clearly shown in some other studies. Nevertheless, current study was not designed in an attempt to investigate those issues.

In conclusion, the obesity per se should not be considered as a factor that forces the gynecologic oncologist to perform a more conservative surgery due to technical difficulties. Given the benefits of an extensive or adequate LND and in order to prevent undertreatment, the procedure should not be omitted based upon obesity alone. The obese women with endometrial, ovarian or cervical cancer may safely undergo staging or debulking surgery including extensive LND via laparotomy without significantly increasing the rates of intraoperative complications.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.
REFERENCES