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Endoscopic sentinel lymph node biopsy and endoscopic axillary lymphadenectomy without liposuction in patients with early stage breast cancer

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ABSTRACT

Background: Our purpose was to present a new method of endoscopic sentinel lymph node biopsy (ESLNB) and endoscopic axillary lymphadenectomy (EALND) without liposuction for treating early-stage breast cancer, and compare results with traditional open dissection.

Methods: The medical records of patients with early-stage breast cancer who underwent EALND/ESLNB without liposuction or traditional open dissection between March 2015 and September 2016 were retrospectively reviewed. Outcomes between the 2 groups were compared.

Results: A total 65 patients with a mean age of 41.2 ± 9.3 years (range, 23–60 years) were included. Thirty-three patients underwent traditional open lymph node dissection and 32 patients underwent endoscopic treatment. The 2 groups were similar with respect to age, body mass index (BMI), menopausal status, tumor location, and tumor disease stage (all, $p > 0.05$). The mean operating time was significantly higher in the endoscopic group (91.2 vs. 75.2 min, $p = 0.022$), while the mean blood loss was significantly lower (28.7 vs. 37.0 ml, $p = 0.034$). The mean number of SLNs harvested in the open (2.4 ± 1.6) and the endoscopic (2.3 ± 1.4) groups were not different ($p = 0.829$), with a sentinel lymph node retrieval rate of 80%. The mean number of axillary lymph nodes harvested in the open (13.8 ± 3.3) and the endoscopic (13.3 ± 3.1) groups were not different ($p = 0.457$). Scars were minimal in the endoscopic group.

Conclusion: ESLNB and EALND without liposuction for early-stage breast cancer is feasible, has a low complication rate, a lymph node harvest rate similar to that of open dissection, and has good cosmetic results. Future studies, however, are required to evaluate oncological outcomes.

1. Introduction

Conventional open axillary lymphadenectomy (ALND) may result in obvious axillary scars, lymphedema, seroma, postoperative pain, paresthesia, and decreased range of motion of the arm. Endoscopic ALND (EALND) and endoscopic sentinel lymph node biopsy (ESLNB) were developed to reduce the occurrence of these complications [1]. Because of the architecture of the axilla, and the absence of a natural cavity, liposuction usually is needed prior to endoscopic axillary surgery in order to establish a working space [2–4]. Unfortunately, liposuction can interfere with the retrieval of lymph nodes in EALNB because the sentinel and other lymph nodes may be sucked away with the fat. Thus, liposuction may decrease the accuracy of EALNB, especially for SLNs [5]. In addition, because the integrity of fat and lymphatic tissues can be affected during EALND, the procedure does not conform to the

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oncological principle of *en bloc* tumor removal [6,7].

Recent technical innovations have made it feasible to conduct endoscopic axillary surgery without liposuction [8,9]. Endoscopic axillary surgery without liposuction, however, is challenging because of difficulties in visualization and access. In addition, very few reports have been published about this technique. We developed an improved technique for ESLNB and EALND without liposuction.

The purpose of this study was to present the technique, and compare the results with those of standard open axillary lymphadenectomy and sentinel node biopsy.

2. Patients and methods

2.1. Patients

The medical records of patients with early-stage breast cancer who underwent EALND without liposuction or traditional open dissection between March 2015 and February 2016 were retrospectively reviewed. Inclusion criteria for the analysis were early-stage (stage I and II) breast cancer and axillary detection. This study was approved by the Institutional Review Board of our hospital, and because of the retrospective nature the requirement of informed patient consent was waived. All patients provided written informed consent for all surgical procedures performed.

All patients were evaluated preoperatively using mammography, ultrasonography, and computed tomography (CT) or magnetic resonance imaging (MRI). All patients had a diagnosis of breast cancer based preoperative or intraoperative biopsy. Patients with a tumor in the axillary tail in close proximity to the axilla were excluded from the study. For the analysis, patients were divided into those that received traditional open dissection and those that received EALND, and outcomes of the 2 groups were compared.

In addition to surgery, all patients were treated with systemic therapy and radiation therapy according to standard institutional protocols (National Comprehensive Cancer Network [NCCN] Breast Cancer Practice Guideline). In addition, patients with Her-2 (+++) tumors were treated with Herceptin.

2.2. Surgical method

2.2.1. Working space

In all patients in both groups, removal of the breast tumor was performed at the same time as axillary dissection. Under general anesthesia, the patient was placed in the supine position with the affected breast near the edge of the operating table. The ipsilateral arm was abducted to 90° with a soft pad to elevate the arm. All instruments were identical to those commonly used for abdominal laparoscopic surgery. A methylene blue tracer was injected subcutaneously under the areola or around the tumor before ESLNB. Epinephrine (1:200,000) was injected into the lateral chest wall near the trocar location to prevent bleeding. A 10-mm trocar was placed caudally in the midaxillary line at the level of the nipple, and 2 additional 5-mm trocars were placed, 1 in the posterior axillary line and the other in the margin of the mammary areola (Fig. 1). The position of the SLN is usually located approximately 1–2 cm below the hairline in the axillary area [1]. For ESLNB, trocars were inserted subcutaneous in the expected location of the SLN, and were joined together. For EALND, trocars were inserted through the lateral chest wall directly into the subcutaneous tissue, and were joined together. The working area was inflated with CO_2 gas at pressure of 6–8 mm Hg, and a 10-mm videoscope was inserted through the 10-mm trocar. After the trocars had been joined together, the working space was widened under direct vision using a monopolar hook electrode.

2.2.2. ESLNB and EALND

Operations were performed endoscopically using a 5-mm monopolar hook electrode, 5-mm atraumatic forceps, and a 5-mm ultrasonic coagulation device. A retractor designed specifically for EALND was used for better exposure when level II and level III lymph node dissection was needed (Fig. 2). The retractor was placed into the working space by piercing the skin, and was designed to be sufficiently fine so as not to scar the skin. In ESLNB, dissection was started at the SLN position and guided by the blue dye, and the blue-stained sentinel node was resected (Fig. 3). A completion EALND was subsequently performed.

For EALND, preparation was begun at the lateral chest wall with identification of the serratus anterior muscle, followed by dissection along the serratus anterior muscle fascia until the latissimus dorsi was visible. At that point, the thoracodorsal nerve and vessels were identified (Fig. 4). Using the thoracodorsal vessels as a guide, dissection proceeded cephalad, along the anterior border of the latissimus dorsi until the tendinous portion of the muscle was reached. The axillary vein was identified, and dissection proceeded medially along the serratus anterior muscle fascia, and the long thoracic nerve was identified and preserved. The dissection then proceeded towards the border of the pectoralis major, and along the undersurface of this muscle. The intercostobrachial nerves were isolated and preserved. Rotter's lymph nodes between the pectoralis major and minor were dissected (Fig. 5). For better dissection of level II and level III lymph nodes, traction was applied over the major and minor pectoralis muscles, which were thus oriented medially (Fig. 6). Using the axillary vein as a guide, lymph nodes were removed, proceeding medial to lateral, and branches of the axillary vein were ligated using a harmonic scalpel. The lymph node tissues were then removed *en bloc* through the incision. After hemostasis was assured, the wound was irrigated with warm distilled water (to possibly reduce the occurrence of seeding), and a suction drain was placed in the inferior trocar hole. The incisions were closed, and bandages placed.

The procedures are illustrated in Video 1 and Video 2: Video 1; Endoscopic axillary lymphadenectomy without liposuction, Video 2; Level II and Level III lymph node dissection.

Supplementary video related to this article can be found at http://dx.doi.org/10.1016/j.suronc.2017.07.005.

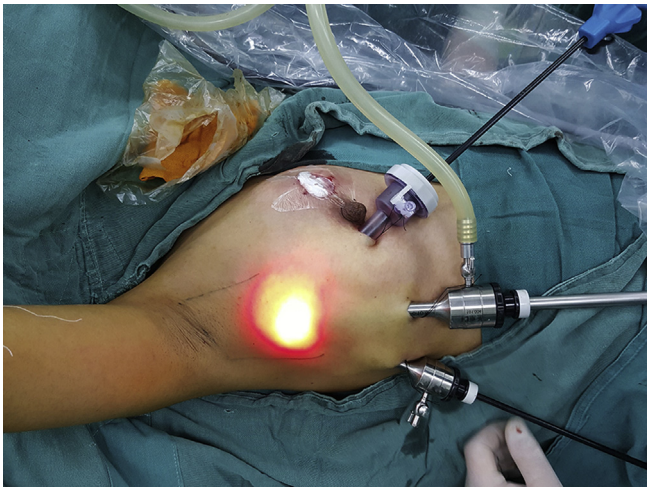

Fig. 1. A modified route for endoscopic axillary lymphadenectomy (EALND). Two trocars are placed in the lateral chest wall, and another trocar is placed in the margin of the mammary areola.