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Laparoscopic sentinel node mapping complicating endometrial cancer. Report of three cases and systematic review of the literature

Abstract

Endometrial cancer represents the second most frequent malignant entity among gynecologic malignancies.

Many predisposition factors reflect and affect the chronical outcome of the lesion.

Age of the patient, obesity, postmenopausal vaginal bleeding among with endometrial hyperplasia, histologic type, grading, staging, vascular or lymph node penetration consist factors with direct depiction concerning the therapeutic mapping.

Sentinel node consists the first regional lymph node infiltration, indicating local or external spread of the lesion.

In order to explore and investigate potential infiltration or metastatic capability of the lesion, sentinel mode infiltration represents optimal solution.

According to current bibliography, sentinel node infiltration depicts increased sensitivity and specificity concerning surgical or conservative therapeutic management.

Aim of our study represents assiduous decoding of sentinel node infiltration and potential metastatic pathways, with ultimate scope the increased optimal survival and quality of life of the patient.

Keywords: sentinel node, endometrial cancer, staging, grading

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Introduction

According to current bibliography, endometrial cancer consists the 2nd most common gynecologic malignancy in developed countries.[1]

Focusing on imaging depiction and assiduous reflection of all predisposition factors, most of cases are nearly diagnosed.[2]

Endometrial cancer classification remains the most diagnostic tool regarding the therapeutic mapping of such cases. (Figure 1). Among age of the patient, staging, grading, postmenopausal bleeding, histologic type, lymph node infiltration presents as most significant prognostic factor.[3]

Sentinel node consists as primary lymphatic external spread of each malignant entity.[4] Many recent studies have been conducted mostly in areas such breast malignancies or melanomas with great successful therapeutic management. Cutaneous melanomas presented as primary malignancies in which SLN mapping depicted worldwide acceptance.

Radio colloid and blue dye SLN mapping were first described in the early 1990s. Lymphoscintigraphy in the early 1980s was initially used for SLN mapping in breast malignancies. According to current bibliography, SLN mapping was depicted with Technetium Radio colloid (^{99}Tc) alone or with blue dyes. Besides the daily use of these substances, many side effects were described.

In many cases, skin and urine discoloration or allergic reactions were presented. Indocyanine green (ICG) consists an intravascular fluorescent dye, optimal tool concerning the visualization of retinal and choroid vascularization.[5]

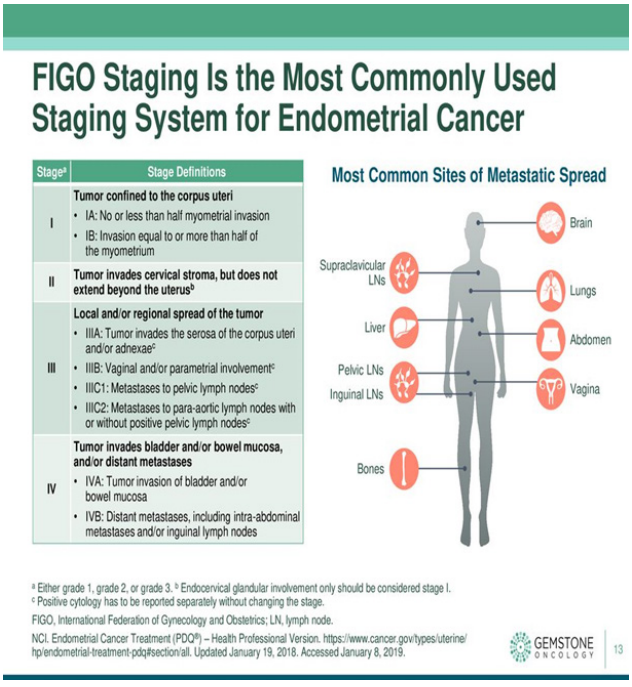

Figure 1 FIGO endometrial cancer classification. Gemstone oncology.

Many recent conducted studies, establish ICG as screening tracer regarding the SLN mapping in endometrial cancer. Isolation and detection of SLN biopsy enables complete mapping of potential lymphatic infiltration. Besides the low rate of lymphatic invasion in

early stages of endometrial malignancies, complete lymphadenectomy represents ultimate scope of precise endometrial cancer staging.[6]

Materials and methods

We report three cases of SLN mapping in endometrial malignant entities. SLN biopsy was depicted in order to establish optimal therapeutic management. Indocyanine green (ICG) was used as tracer concerning the detection and isolation of SLN (Figure 2).

Figure 2 Sentinel node depiction after ICG application.

The injection is diffused around 3rd and 9th para cervical hour, before setting and beginning of the laparoscopic exploration. (0,5-1ml superficial/1-3mm) and (0,5-1ml in depth/1-2cm). ICG injection is strongly accompanied with patient's body mass index. In almost 20 min. complete lymphatic spread is being depicted. SLN detection procedure is based on the SLN protocol of Memorial Sloan-Kettering Center with H& E stain and CKAE1/AE3 immunostaining (Table 1) (Figure 2).

Patient underwent laparoscopic total hysterectomy and bilateral salpigoopherectomy due to staging of the endometrial malignancy. Patient in lithotomy position. Staining with Betadine solution of the peritoneal cavity. Donnez uterus manipulator. Penetration in the peritoneal cavity performed by Hasson method (periumbilical trocar) and three assisted trocars 5mm (left and right hypogastrium, middle line suprapubic).

Coagulation and dissection of left and right round ligament. Preparation of left and right iliac vessels (Figure 3). Bilateral route identification and revelation of ureters and obturator nerves. Bilateral dissection of SLN inside from obturator fossa (Figure 4).

Preparation and ligation of bilateral broad ligament. Bilateral coagulation and dissection of uterine vessels. Final dissection of hysterectomy and bilateral salpigoopherectomy through use of monopolar hook. Removal all surgical specimens through vaginal walls. Suturing of vaginal stump by vicryl sutures. Assiduous hemostasis. Bladder methyl blue test negative. (Control of bladder impermeability). Trocar suturing by monocryl 3.0.

Table 1 Memorial sloan kettering cancer centre sln mapping. *Int J Gynecol Cancer*. 2013;23(5):964–970

All lymph nodes are routinely sectioned and stained with H&E. Our institution's pathology protocol in assessing SLNs is based on work by Yared et al., who determined that reexamining SLNs at two additional levels with H&E and IHC could reliably detect low volume micro metastases.
SLNs are initially examined by routine H&E staining, and subsequent ultra-staging is performed if the initial H&E assessment is negative. SLN ultra staging is performed by cutting two adjacent 5-µm sections at each of two levels, 50-µm apart, from each paraffin block lacking metastatic carcinoma. At each level, one slide is stained with H&E and with IHC using the anti-cytokeratin AE1:AE3 (Ventana Medical Systems, Inc., Tucson, AZ) for a total of five slides per block.

Figure 3 Laparoscopic round ligament dissection.

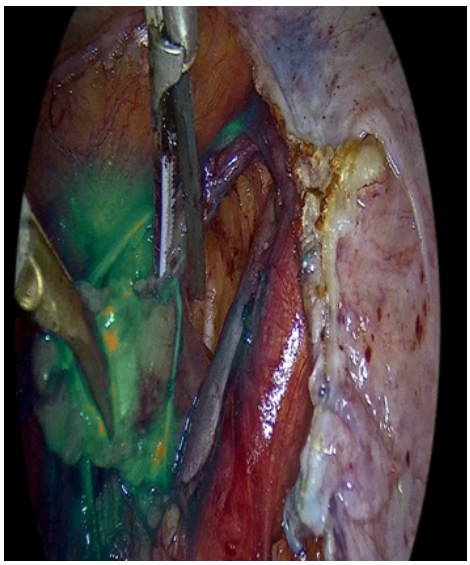

Figure 4 Laparoscopic right sentinel node dissection.

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Case 1

Patient 83-year-old (G2P2), with free gynecologic history and arterial hypertension under agent therapy, attended our Department with abdominal pain and episodes of vaginal bleeding. Pap smear negative for malignancy. Transvaginal ultrasound evaluation depicted endometrium hyperplasia (9mm).

Patient underwent hysteroscopic visualization and diagnostic curettage. Histologic confirmation revealed endometrial carcinoma, endometroid type, with extended mucinous differentiation and tubular growth pattern. (low malignancy grade, WHO 2020).

Abdominal MRI confirmed all ultrasound imaging findings. Parametrial areas free for malignancy. Myometrial infiltration less than 50%. Ovaries small diameter (13mm) and homogenous composition. Solitary lymph node enlargement (11mm diameter) dorsal left iliac vessels. Patient underwent laparoscopic total hysterectomy, bilateral salpigoopherectomy, dissection of one left and one right sentinel lymph node.

Final histologic evaluation revealed endometrial carcinoma, low malignancy grade (WHO 2020), endometroid type, with local mucinous differentiation, and tubular growth pattern without lymph vascular penetration. Myometrial infiltration less than 50%.

Cervical area free for malignancy. Bilateral adnexal dissection without any signs of infiltration. Both sentinel nodes are assiduously examined under the Sloan Kettering Cancer Center protocol. They depicted any signs for metastatic lesion.

Pathologic staging under TNM (p T 1 b N 0).

Oncologic council suggested extended patient's follow up with tumor markers and depiction of peritoneal cavity.

Case 2

Patient 54-year-old, (P1G1), with free gynecologic history, attended our Department with postmenopausal bleeding. Pap smear free for malignancy. Transvaginal ultrasound evaluation revealed endometrial hyperplasia (10mm) and potential presence of endometrial polyp.

Patient underwent hysteroscopic visualization and diagnostic curettage. Histologic evaluation reflected superficial segments of endometrial carcinoma, endometroid type, upper differentiation. The lesion pointed segments of mucinous and squamous differentiation.

Immunohistochemical report suggested positive results concerning ER, PR, Vimentin receptors. Abdominal MRI, confirmed all ultrasound imaging findings. Myometrial infiltration more than 50% without any signs of lymph vascular penetration.

Patient underwent laparoscopic total hysterectomy, bilateral salpigoopherectomy, dissection of bilateral three sentinel nodes. Final histologic evaluation revealed segments of endometrial carcinoma, endometroid type, upper differentiation. Myometrial infiltration more than 50%.

Infiltration depth 15mm. Serosa infiltration range 5,5mm. The lesion has mostly tubular growth pattern and depicts cellular colonies with mild and moderate atypia. In few segments, there is malignancy formation in areas of adenomyosis. Cervical area and bilateral adnexal dissection free for malignancy. All three sentinel nodes assiduously examined under the Sloan Kettering Cancer Center protocol. They depicted any signs for metastatic lesion.

Pathologic staging under TNM (p T 1 b N 0).

Oncologic council suggested due to lesion staging series of brachytherapy.

Case 3

Patient 39-year-old, (P2G2) with history of PCOS (Polycystic Ovary Syndrome) and secondary amenorrhea, attended our Department with episodes of vaginal bleeding. Pap smear negative for malignancy. Transvaginal ultrasound evaluation revealed endometrial thickness compatible with menstrual day and patient's age.

Patient underwent hysteroscopic visualization and diagnostic curettage. Histologic report reflected endometrial carcinoma, endometroid type, upper differentiation. Abdominal MRI, confirmed all ultrasound imaging findings. Myometrial infiltration less than 50%. Tubular growth pattern without lymph vascular penetration.

Endometrial cavity without signs of enlargement. Naboth cyst (1cm) in cervical area. Adnexal depiction and bladder architecture free for malignancy. Patient underwent laparoscopic total hysterectomy, bilateral salpigoopherectomy, dissection of two left and three right lymph nodes.

Final histologic evaluation revealed endometrial cancer, endometroid type, upper differentiation. Lesion boundary inside endometrial cavity, without signs of myometrial penetration.

Cervical area and adnexal architecture free of malignancy. All five sentinel nodes are assiduously examined under the Sloan Kettering Cancer Center protocol. They depicted any signs for metastatic lesion covered by distortions of reactive lymphadenitis.

Pathologic staging under TNM (p T 1 a N 0).

Oncologic council suggested extended patient's follow up with tumor markers and depiction of peritoneal cavity.

Discussion

Many recent conducted studies have pointed the significance of all predisposition factors concerning therapeutic mapping, overall free survival and patient's quality of life. Lymph node staging and lymph vascular invasion and infiltration consist without doubt ultimate prognostic factors.[7]

Myometrial infiltration is strongly accompanied with nodal metastasis. Recent bibliography depicts nodal metastasis less than 3% in cases with less than 50% myometrial infiltration.[8]

Due to anatomic area of the uterus (midline structure), lymphatic spread divides into bilateral pelvic lymph nodes. On the other side, depiction of one at least SLN in every hemi pelvis area, underlies the significance of SLN mapping. Classical surgical therapeutic mapping in cases of endometrial cancer consists total hysterectomy, bilateral salpigoopherectomy and complete pelvic lymphadenectomy due to staging of the lesion.[9]

Less radical mapping reflects in low risk cases (FIGO IA, grade 1-2). Decoding current bibliography, lymph vascular dissection seems to be controversial. Focusing on SLN mapping as ultimate recurrence factor, depiction of lymph vascular infiltration, leads to postoperative strategy, such as adjuvant therapy.

Although in most of cases preferred SLN technique consists ^{99m}Tc and preoperative lymphoscintigraphy, SLN detection with ICG reflects new diagnostic pathways. Many conducted studies suggest SLN mapping with ICG incidence of overall detection from 84% and 100% and more specific increased bilateral detection rate from 71%

and 84%, without doubt higher than 58% and 75% of the classical technique (^{99m} Tc and blue dye).[10]

SLN mapping with ICG allows more increased drainage of the contrast substance and depicts visualization of the whole pelvic lymphatic route in real time. IGC technique consists an easily medical intervention, independent from patient's BMI without adequate surgeon's experience.

Conclusion

SLN mapping in cases of endometrial cancer allows more accurate and assiduous depiction of pelvic lymph node infiltration and proper malignant staging.

Negative SLN histologic evaluation reflects overtreatment avoidance and complete pelvic lymphadenectomy. Positive SLN histologic evaluation reflects proper therapeutic strategy, lesion staging and postoperative mapping.

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Conflicts of interest

All authors declare any financial interest with respect to this manuscript.

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