Uterine Pathological Features and Their Association with Sentinel Lymph Node Status Among Endometrial and Uterine Cancer

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Introduction

Uterine and endometrial cancer has been increasing worldwide, with an incidence rate of 27.8% and 7.7%, respectively (American Cancer Society, 2022). Due to cancer symptoms becoming more present during later stages of cancer, it is difficult to detect and diagnose patients simply through screening. Many forms of endometrial cancer are stage IV, demonstrated by spreading to lymph nodes in the abdomen, not only the pelvis and para-ortic area regions of the woman's body.

Through efforts and attempts to improve detection, diagnoses, prevention, and surveillance of uterine cancer among patients, researchers and clinicians are examining the lymph node status through sentinel lymph node excision (SLN) and ultrastaging. Sentinel lymph node exision is the process in which a sentinel lymph node is identified, removed, and examined to determine whether cancer cells are present. Ultrastaging involves additional sectioning and staining of the SLN in order to examine for low-volume metastatic disease.

Researchers can detect potential metastatic endometrial and uterine tumors through this new health technological development, and avoid collecting data by resorting to unnecessary complete pelvic and para-aortic lymphadenectomies (Kang, 2020). This dataset describes the pathological features discovered of endometrial and uterine carcinomas and their association with sentinel lymph node involvement (Kang, 2020).

This markdown aims to depict and analyze the discovered stratified pathological features of endometrial and uterine carcinomas, and their association with sentinel lymph node excisions present among women. Specifically, we are measuring the detection of tumors present in lymph nodes, through the usage of SNL exision and ultrastaging.

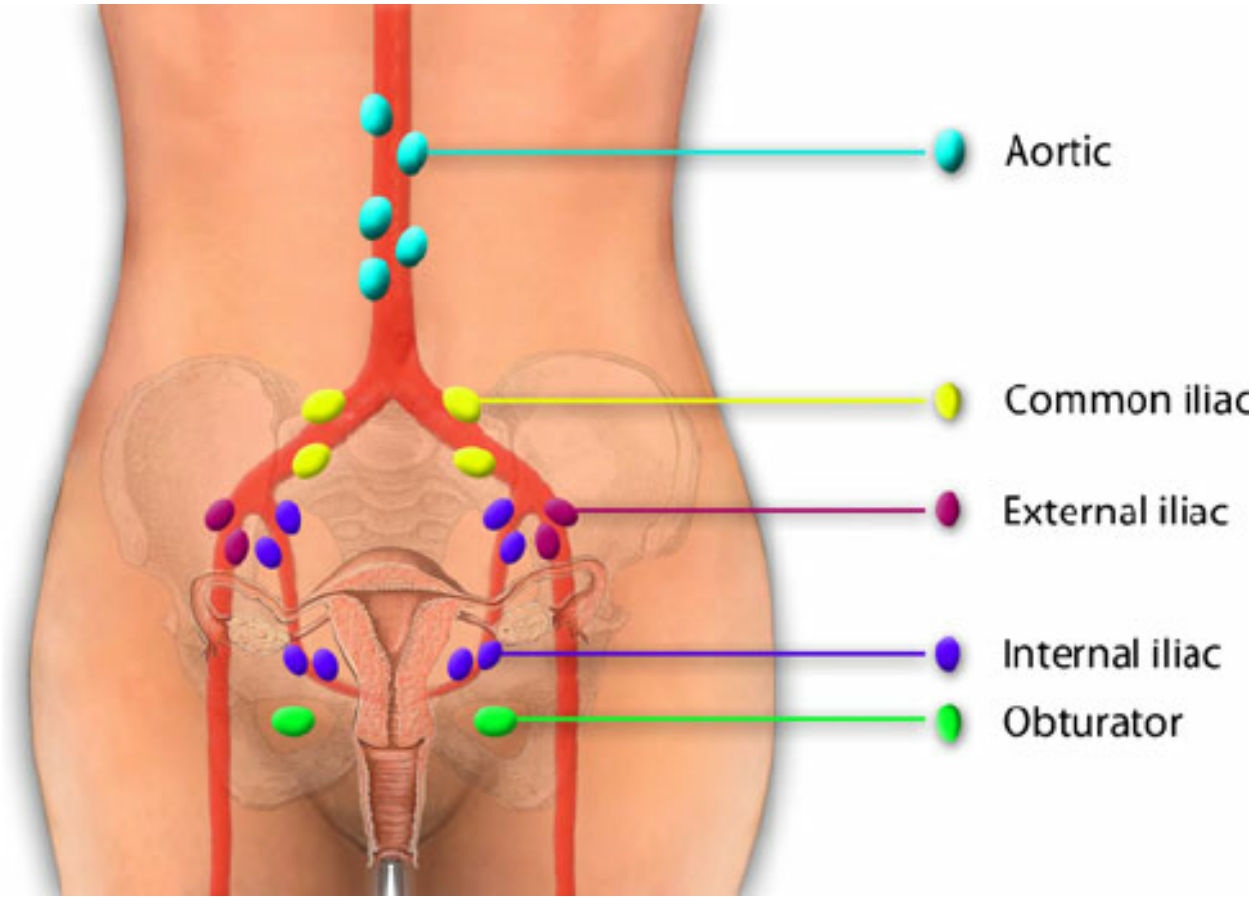

Figure 1.) Lymph drainage of the uteri is complex, bilateral, and can affect lymph nodes in several areas. Nine SNL's were found and localized in the left obturator fossa (three), right obturator fossa (two), left external iliac (one), right external iliac (one), right common iliac (one), and on the junction of the right internal iliac and obturator fossa (one).

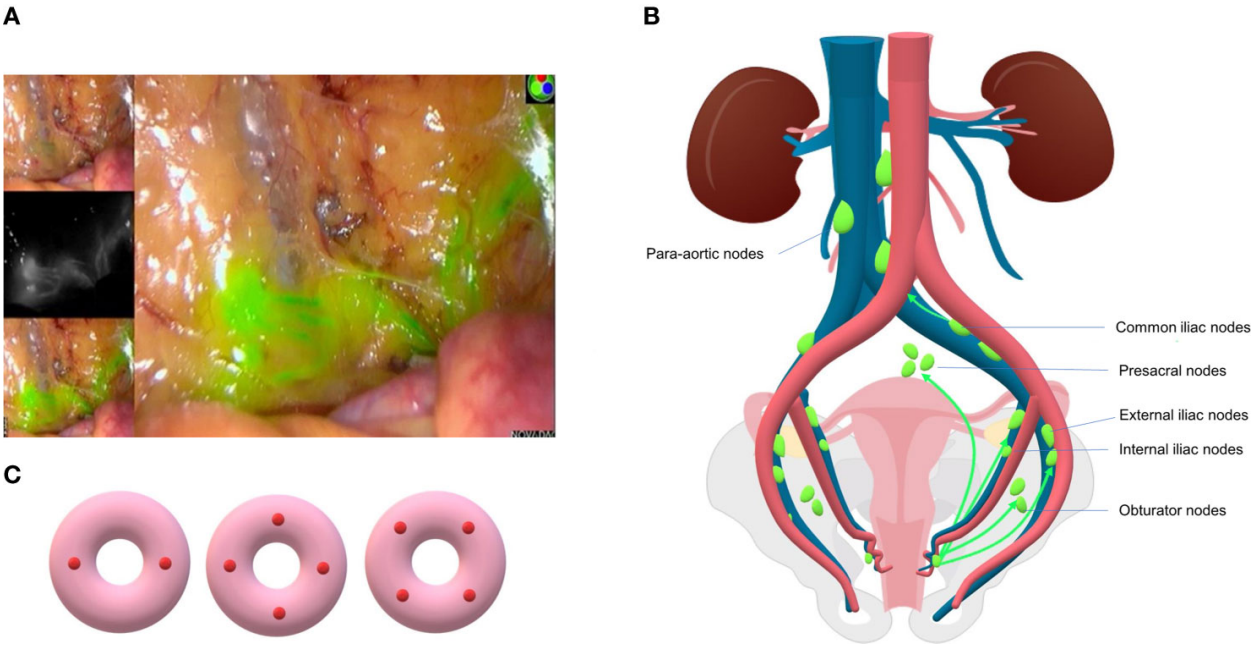

Figure 2.) (A) SLN and lymphatic vessel mapped in surgery using ICG dye and intraoperative fluorescence imaging system. surgeon injects a radioactive substance, a blue dye, or both near the tumor. The surgeon then uses a device to detect lymph nodes that contain the radioactive substance or looks for lymph nodes that are stained with the blue dye. Once the sentinel lymph node is located, the surgeon makes a small incision in the overlying skin and removes the node. The sentinel node is then checked for the presence of cancer cells by a pathologist.(B) Common lymphatic drainage pathway of endometrial cancer. SLN's are mostly located in external iliac and obturator region and less commonly in presacral and common iliac area. (C) Three patterns of cervical injection sites of SLNM: two sides or four quadrants.

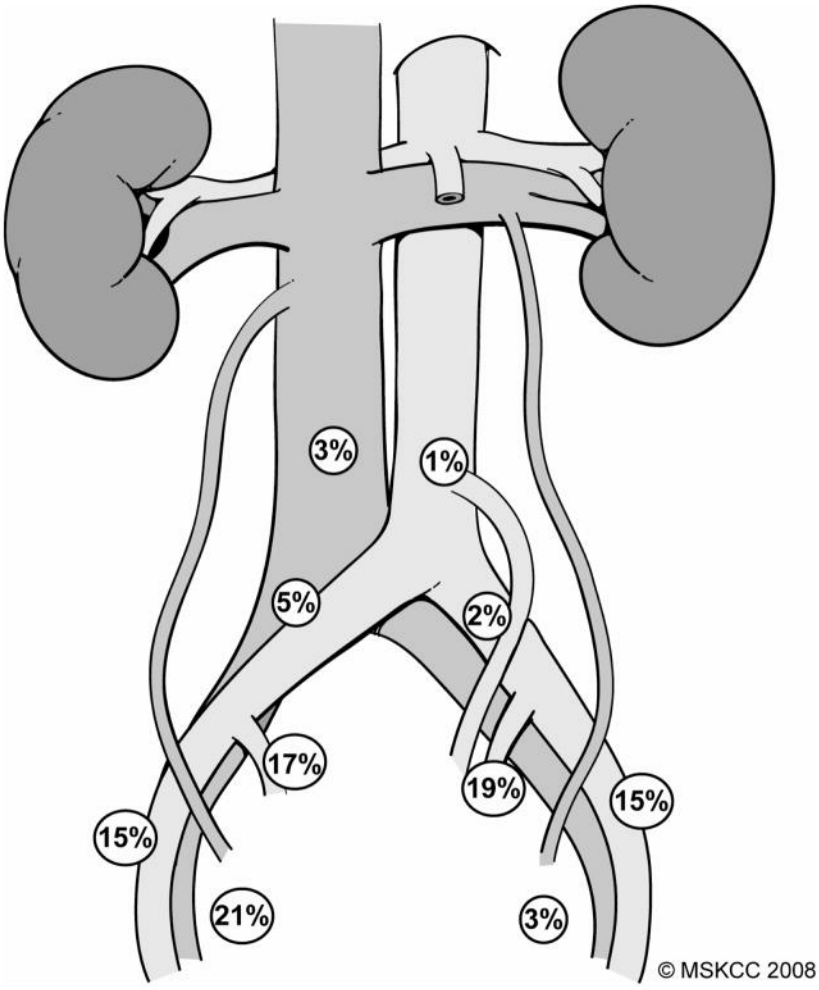

Figure 3.) Schematic representation of the location and frequency of sentinel lymph nodes in Grade 1 endometrial cancer. The proximal obturator nodes and the internal iliac nodes are anatomically difficult to distinguish and frequently overlap.

Characteristic	**Overall**, N = 75	**< 2**, N = 29	**= 2**, N = 46	**p-value**
Location of Lymph Node				0.019
	5 (6.7%)	5 (17%)	0 (0%)	
3 SLN pelvic positive. LN aortic positive	1 (1.3%)	0 (0%)	1 (2.2%)	
common iliac	1 (1.3%)	1 (3.4%)	0 (0%)	
One pelvic SLN positive ITC. Other Pelvic and paraaortic LN are negative	1 (1.3%)	0 (0%)	1 (2.2%)	
One pelvic SLN positive ITC. Other Pelvic LN and paraaortic are negative	1 (1.3%)	0 (0%)	1 (2.2%)	
One pelvic SLN positive ITC. Other Pelvic LN are negative	1 (1.3%)	0 (0%)	1 (2.2%)	
One pelvic SLN positive micromet. Other Pelvic LN are negative	2 (2.7%)	0 (0%)	2 (4.3%)	
one SLN Pelvic positive. Other pelvic and paraaortic are negative	1 (1.3%)	1 (3.4%)	0 (0%)	
paraaortic SLN negative	1 (1.3%)	0 (0%)	1 (2.2%)	
Pelvic and common iliac are negative	6 (8.0%)	1 (3.4%)	5 (11%)	
pelvic and paraaortic are negative	6 (8.0%)	4 (14%)	2 (4.3%)	

Characteristic	**Overall**, N = 75	**< 2**, N = 29	**= 2**, N = 46	**p-value**
Pelvic are negative	18 (24%)	5 (17%)	13 (28%)	
SLN ILIAC and Obturator and LN pelvic are negative	1 (1.3%)	1 (3.4%)	0 (0%)	
SLN Pelvic and LN pelvic are negative	1 (1.3%)	0 (0%)	1 (2.2%)	
SLN Pelvic and LN Pelvic obturator	1 (1.3%)	1 (3.4%)	0 (0%)	
SLN pelvic are negative	2 (2.7%)	1 (3.4%)	1 (2.2%)	
SLN pelvic are negative and LN pelvic and common iliac are negative	1 (1.3%)	0 (0%)	1 (2.2%)	
SLN pelvic are negative. LN paraaortic positive	1 (1.3%)	0 (0%)	1 (2.2%)	
SLN pelvic are negative. LN pelvic and common iliac negative	1 (1.3%)	0 (0%)	1 (2.2%)	
SLN pelvic are negative. LN pelvic and paraaortic negative	11 (15%)	3 (10%)	8 (17%)	
SLN pelvic are negative. LN pelvic negative	5 (6.7%)	4 (14%)	1 (2.2%)	
SLN pelvic are negative. LN pelvic, common iliac and paraaortic negative	1 (1.3%)	1 (3.4%)	0 (0%)	
SLN pelvic negative	2 (2.7%)	0 (0%)	2 (4.3%)	
SLN pelvic negative. LN pelvic negative	1 (1.3%)	1 (3.4%)	0 (0%)	
SLN pelvic positive	1 (1.3%)	0 (0%)	1 (2.2%)	
SLN pelvic positive. LN pelvic negative	1 (1.3%)	0 (0%)	1 (2.2%)	
SLN pelvic positive. LN pelvic negative. Paraaortic non sent. Positive	1 (1.3%)	0 (0%)	1 (2.2%)	
Grade of Uterine Cancer				<0.001
	5 (6.7%)	5 (17%)	0 (0%)	
complex atypical hyperplasia	7 (9.3%)	0 (0%)	7 (15%)	
endometrioid adenocarcinoma FIGO grade I	31 (41%)	13 (45%)	18 (39%)	
endometrioid adenocarcinoma FIGO grade II	18 (24%)	4 (14%)	14 (30%)	
endometrioid adenocarcinoma FIGO grade III	5 (6.7%)	1 (3.4%)	4 (8.7%)	
High grade serous carcinoma	7 (9.3%)	6 (21%)	1 (2.2%)	
No residual	1 (1.3%)	0 (0%)	1 (2.2%)	
No residual tumor	1 (1.3%)	0 (0%)	1 (2.2%)	
Patient Age	62 (57, 71)	62 (56, 68)	62 (57, 72)	0.6
Unknown	5	5	0	

Table 1.) This table analyzes and depicts the association between SLN excision and ultrastaging, and the detection of tumors/tumor cells present in respective lymph nodes. Detection of these tumor cells is categorized as follows: On the left side, there are three main characteristics, location of lymph node, grade of uterine cancer, and patient age. Under the "Location of Lymph Node", there are 27 unique lymph node locations distinguished to have been detected for carrying uterine/endometrial tumors. Under "Grade of Uterine Cancer", there are three defined grades of uterine/endometrial cancer given to the cases. "Patient Age" details the average age of the patients, along with the lowest to highest age recorded. The locations of these lymph nodes are also grouped by tumor size, less than 2 mm or greater than 2 mm. 2 mm is considered one standard of detecting if the tumor has spread to lymph nodes or metastasized.

Locations of Lymph Node

There are 27 unique locations of these lymph nodes analyzed. These include SLN pelvic, common iliac, external iliac, inernal iliac, para-aortic, and obturator lymph nodes. The pelvic lymph nodes mainly include the external iliac, internal iliac, and obturator lymph nodes, which are below the bifurcation of the common iliac artery. SLN indicates that it is a sentinel lymph node, or the lymph node in which the cancer reached first. When a specific lymph node is recorded, this indicates detection of uterine/endometrial cancer primarily in that location.

Grade of Uterine Cancer

There are primarily three assigned grades for the dicovered uterine cancers: Grade I, Grade II, and Grade III. Grade I is defined as cancer cells that are 5% or less of tumour tissue that is solid tumour growth. These are well differentiated, tend to be slow growing, and less likely to spread. Grade II indicates that 6%–50% of tissue is solid tumour growth, and that the cancer cells are moderately differentiated. Grade III is the severest of all, in that more than 50% of tissue is solid tumour growth. These cells are poorly differentiated and are more likely to grow quickly and spread, than Grade I cells.

Tumor Size

The locations of these lymph nodes are also grouped by tumor size, less than 2 mm or greater than 2 mm. 2 mm is considered one standard of detecting if the tumor has spread to lymph nodes or metastasized.

Cite:

1.) https://cancer.ca/en/cancer-information/cancer-types/uterine/grading

2.) https://www.frontiersin.org/articles/10.3389/fonc.2021.701758/full

3.) https://www.researchgate.net/figure/Lymph-drainage-of-the-cervix-uteri-is-complex-bilateral-and-can-affect-lymph-nodes-in_fig1_46221277

4.) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3959736/

5.) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7685478/

6.) https://www.cancer.gov/about-cancer/diagnosis-staging/staging/sentinel-node-biopsy-fact-sheet#what-is-a-sentinel-lymph-node-biopsy