CHARACTERISTICS AND PREDICTIVE FACTORS OF REGIONAL LYMPH NODE METASTASIS IN FIGO I-III OVARIAN CANCER AT VIETNAM NATIONAL CANCER HOSPITAL

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ABSTRACT

Objective: To describe the characteristics of regional lymph node metastasis in ovarian cancer stages I-III and evaluate potential predictive factors for lymphatic spread in these cases.

Materials and Methods: A perspective and prospective study comprises 62 patients diagnosed with ovarian cancer, initially treated with cytoreductive surgery from January 2023 to August 2024 at the Department of Gynecological Surgery, National Cancer Hospital.

Results: The most common age group is 40-60 years (67.7 %). The avarage age at the time of diagnosis is 53.2±11.3 years. The majority of cases had High-grade Serous Carcinoma (HGSC) (62.9%). Preoperative MRI imaging characteristics: the detection rate of regional lymph nodes is 12.9%, with 75.0% of these nodes having a diameter ≥10mm. The proportion of disease stages II and III post-surgery (17.7% and 61.3%). The overall regional lymph node metastasis rates is 40.3%., High-grade serous carcinoma has the highest rate of lymph node metastasis (80%). The test determines the cut-off level for lymph node size on CT/MRI to be 10mm, with a sensitivity of 80% and specificity of 67%. The lymph node metastasis rate in stage III is 43.8%, and in stage I, it is 40.7%. There were no patients with lymph node metastasis in stage II. The difference is not statistically significant ($p > 0.05$).

Conclusion: In early-stage disease, thorough lymph node assessment is essential for precise staging, often necessitating systemic lymphadenectomy based on imaging diagnostics and intraoperative evaluation of visible lesions. For advanced stages, selective lymph node excision is advised on a case-by-case basis to achieve optimal surgical outcomes.

Keyword: Ovarian cancer, regional lymph node metastasis.

1. INTRODUCTION

Ovarian cancer is the third most prevalent gynecologic malignancy globally, following cervical and uterine cancers, with an age-standardized incidence rate of 6.6 per 100,000 females. In comparison, cervical and uterine cancers show incidence rates of 13.3 and 8.7 per 100,000, respectively, ovarian cancer contributed to approximately 325,000 new cases and 207,000 deaths worldwide. In Vietnam alone, 2022 statistics reported 1,534 new cases of ovarian cancer and 1,003 fatalities .

The extent of lymph node involvement is an important factor in determining prognosis and treatment pathways. Most cases (around 75%) are diagnosed at stage III - IV, limiting the prognostic value of lymph node dissection in advanced cases due to the extensive spread of disease beyond the ovaries. For patients with disease confinpproximately 15-20% may still have lymph node involvement, particularly if they present with high-grade histology, underscoring the importance of thorough nodal assessment in early-stage disease.

Lymphadenectomy has thus become a critical aspecsurgery, aiming to enhance staging accuracy, assist in risk stratification, and guide further treatment decisions. The National Comprehensive Cancer Network (NCCN), the International Federation of Gynecology and Obstetrics (FIGO), and the European Society for Medical Oncology (ESMO) guidelines all recommend lymphadenectomy for patients across both early and advanced stages of ovarian cancer. This recommendation is particularly relevant as lymphadenectomy can detect occult metastasis, which may influence postoperative chemotherapy decisions and overall management strategies, even in patients with

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apparent early-stage disease.

In Vietnam, existing research on lymph node metastasis in ovarian cancer has been limited, with only a few reports examining lymphatic involvement across stages I, II, and III. To address this gap, the present study—"Characteristics and Predictive Factors of Regional Lymph Node Metastasis in FIGO Stage I-III Ovarian Cancer at Vietnam National Cancer Hospital"—aims to explore the patterns of lymph node metastasis in patients treated at this hospital and identify predictive factors associated with nodal involvement. Specifically, the objectives are to (1) describe the characteristics of regional lymph node metastasis in ovarian cancer stages I-III and (2) evaluate potential predictive factors for lymphatic spread in these cases.

2. SUBJECTS AND RESEARCH METHODS

2.1. Research subject

The research subject comprises 62 patients diagnosed with ovarian cancer, initially treated with cytoreductive surgery from January 2023 to August 2024 at the Department of Gynecological Surgery, National Cancer Hospital.

- *Inclusion criteria:*

Patients were confirmed diagnosis of ovarian cancer clinical FIGO stage I, II, III in 2018

Patients were treated with primary surgery.

- *Exclusion criteria:* Patients do not agree to participate in research

2.2. Research methods: A perspective and prospective study.

2.3. Research tools and techniques for data collection and data anylysis: SPSS 20.0 software 2.4. Research Ethics.

This study is conducted with the aim of improving treatment effectiveness for patients and does not interfere with or affect the clinical management or treatment outcomes of the participants.

All patient information is kept strictly confidential and is used solely for scientific research purposes.

3. RESEARCH RESULTS

Table 1. General Characteristics of the Study Population

		Patients	%
Age (years)		53.2 ±11.3 (13~81)	
	< 40 years	05	8.1
	40-60 years	42	67.7
	>60 years	15	24.2
Type of pathology	High-grade Serous Carcinoma	39	62.9
	Clear cell carcinoma	08	12.9
	Endometrial Carcinoma	03	4.8
	Mucious Carcinoma	05	8.1
	Boderline Tumor	3	4.8
	Adult Granulosa Cell Tumor	1	1.6
	Immature Teratoma	1	1.6
	Carcinosarcoma	1	1.6
	Mixed High-grade Serous Carcinoma and Mucious Carcinoma	1	1.6
MRI/CT features	Detection of regional lymph nodes	08	12.9
	No Detection of regional lymph nodes	54	87.1
Diameter of lymph nodes on CT/MRI	<10mm	02	25.0
	≥ 10mm	06	75.0
Postoperative FIGO stage	I	13	21.0
	II	11	17.7
	III	38	61.3

Comments: The most common age group is 40-60 years (67.7 %). The avarage age at the time of diagnosis is 53.2±11.3 years. The majority of cases had High-grade Serous Carcinoma (HGSC) (62.9%). The detection rate of regional lymph nodes is 12.9%, with 75.0% of these nodes having a diameter ≥10mm. The detection rate of regional lymph nodes is 12.9%, with 75.0% of these nodes having a diameter ≥10mm. The proportion of disease stages II and III post-surgery (17.7% and 61.3%).

Table 2. Regional node metastasis rates and Location

Location	Left pelvic lymph node	Right pelvic lymph node	Para-aortic lymph node	Regional lymph node
Regional node metastasis rates				
Patients, n/N	12/32	10/35	19/38	25/62
Percentage (%)	19.4	16.1	30.6	40.3
Number of resected lymph nodes				
Median	3.50	4.00	3.00	
Mean	3.94	4.49	5.26	
Min~Max	1~9	1~13	1~22	

Location	Left pelvic lymph node	Right pelvic lymph node	Para-aortic lymph node	Regional lymph node
Sum	126	157	200	483
Number of metastasis lymph nodes				
Median	2.00	3.00	3.00	
Mean	2.50	3.40	6.21	
Min~Max	1~5	1~7	1~22	
Sum	30	34	118	182

Comments: The overall regional lymph node metastasis rates is 40.3%.

Table 3. Regional node metastasis rates and Pathology

Pathology	Left pelvic lymph node	Right pelvic lymph node	Para-aortic lymph node	Regional lymph node
High-grade Serous Carcinoma (n=39)				
Patients	9	10	17	20 (80%)
Numb of LNs	23	34	114	171
Clear cell carcinoma (n=8)				
Patients	2	0	2	4 (16%)
Numb of LNs	2	0	4	6
Endometrial Carcinoma (n=3)				
Patients	0	0	0	0 (0%)
Numb of LNs	0	0	0	0
Mucious Carcinoma (n=5)				
Patients	0	0	0	0 (0%)
Numb of LNs	0	0	0	0
Boderline Tumor (n=3)				
Patients	0	0	0	0 (0%)
Numb of LNs	0	0	0	0
Adult Granulosa Cell Tumor (n=1)				
Patients	0	0	0	0 (0%)
Numb of LNs	0	0	0	0
Immature Teratoma (n=1)				
Patients	0	0	0	0 (0%)
Numb of LNs	0	0	0	0
Carcinosarcoma (n=1)				
Patients	0	0	0	0 (0%)
Numb of LNs	0	0	0	0
Mixed (n=1)				
Patients	1	0	0	1 (4%)
Numb of LNs	5	0	0	5
Total				
Patients	12	10	19	25
Numb of LNs	30	34	118	182

Comments: High-grade serous carcinoma has the highest rate of lymph node metastasis (80%).

Table 4. Correlation with lymph node detection on preoperative CT/MRI

CT/MRI	Lymph node metastasis on pathology	No lymph node metastasis on pathology	Total
Suspected lymph node metastasis (≥10mm)	04	02	06
No suspected lymph node metastasis (<10mm)	01	01	02
Total	05	03	08

Comments:

+ Out of the 05 patients with lymph node metastasis on pathology, 04 were detected with suspected nodes on CT/MRI, resulting in a sensitivity of 80%.

+ Among the 03 patients without lymph node metastasis on pathology, 01 had no suspected nodes on CT/MRI, yielding a specificity of 33 %.

+ From the 06 patients with suspected nodes on CT/MRI, 04 had lymph node metastasis on pathology, providing a positive predictive value of 66.7%.

+ Out of the 02 patients without suspected nodes on CT/MRI, 01 had no lymph node metastasis on pathology, resulting in a negative predictive value of 50.0%.

+ The overall accuracy is 62.5%.

Table 5. Relationship with nodes detected on preoperative MRI and with preoperative disease stage

Nodes size	Lymph node metastasis	No lymph node metastasis	OR (95%CI)
<10mm	1 (50.0)	1 (50.0)	1
≥ 10mm	4 (66.7)	2 (33.3)	2.00 (0.08-51.59)
Stage	**Lymph node metastasis**	**No lymph node metastasis**	**p**
I	11 (40.7%)	16 (59.3%)	p>0.05
II	0 (0%)	03 (100%)	p>0.05
III	14 (43.8%)	18 (56.2%)	p>0.05

Comments: The rate of lymph node metastasis in the ≥10mm group (66.7%) was higher than in the <10mm group (50.0%); however, the difference was not statistically significant (p > 0.05). The lymph node metastasis rate in stage III is 43.8%, and in stage I, it is 40.7%. There were no patients with lymph node metastasis in stage II. The difference is not statistically significant (p > 0.05).

4. DISCUSSION

The results of our study provide important insights into the incidence of lymph node metastasis and related factors in ovarian cancer patients. These findings are critical for improving preoperative assessment and surgical planning for patients with ovarian cancer.

4.1. Lymph Node Metastasis and Its Incidence

Our study provides an overview of the distribution and rate of lymph node metastasis in the pelvic and para-aortic regions among ovarian cancer patients. These findings show significant differences in metastasis rates across different lymph node regions and emphasize the critical role of systematic lymphadenectomy in staging and treatment of ovarian cancer.

4.1.1. Left Pelvic Lymphadenectomy

In our study, the metastasis rate in the left pelvic lymph nodes was 19.4%, with 12 out of 32 patients having metastatic nodes. Compared to previous literature, particularly the study by Kleppe et al. (2011), this rate falls within the 15-25% range reported for early-stage ovarian cancer. This suggests that lymph node metastasis can occur even in the early stages of the disease, underscoring the importance of complete pelvic lymph node dissection to ensure accurate assessment of disease spread. The metastasis rate in the left pelvic nodes in our study reflects a moderate risk of pelvic node involvement, which is significant for treatment planning.

4.1.2. Right Pelvic Lymphadenectomy

The metastasis rate in the right pelvic lymph nodes was 16.1%, slightly lower than the left side (19.4%). This aligns with some previous studies showing subtle asymmetry in lymphatic involvement, though this difference is usually minor. The metastasis rate in the right pelvic nodes in our study is consistent with other ovarian cancer studies, reinforcing the need for bilateral pelvic lymphadenectomy to ensure comprehensive staging.

4.1.3. Para-aortic Lymphadenectomy

The metastasis rate in the para-aortic lymph nodes was 30.6%, significantly higher than in the pelvic regions, with 19 out of 38 patients having metastatic nodes. This result is consistent with the study by Burghardt et al. (1991), which found that para-aortic lymph node involvement is more common than pelvic node involvement in ovarian cancer. The para-aortic region, particularly around the renal vessels, serves as a crucial pathway for the spread of ovarian cancer. The high metastasis rate in this area highlights the need for systematic para-aortic lymphadenectomy to avoid under-staging and ensure complete treatment planning.

4.1.4. Overall region Lymphadenectomy

The overall pelvic metastasis rate in our study was 40.3%, higher than the average reported in studies of early-stage ovarian cancer, which typically range from 20-30%. This high rate also underscores the significant risk of lymphatic spread in ovarian cancer, even in cases that may clinically appear to be early-stage.

Lymphatic spread is a key prognostic factor in ovarian cancer, with higher lymph node involvement typically correlating with more aggressive disease and worse outcomes. Therefore, for patients with high lymph node involvement, as seen in our study, more aggressive treatment strategies, including adjuvant chemotherapy, should be considered to ensure better disease control.

The findings of our study are consistent with previous research, highlighting the importance of systematic lymphadenectomy, including both pelvic and para-aortic lymph nodes, in ovarian cancer. The high lymph node metastasis rates, particularly in the para-aortic region, emphasize that if thorough lymphadenectomy is not performed, there is a risk of under-staging and incomplete treatment. Thus, lymphadenectomy should be performed carefully and comprehensively to improve staging accuracy and ensure appropriate treatment planning.

4.2. Pathological Subtypes and Metastasis

The fact that 80% of the lymph node metastasis cases in our study were attributed to high-grade serous carcinoma (HGSC) is particularly significant.

Studies by Takeshima et al. (2005) and Kleppe et al. (2014) emphasize that HGSC, due to its aggressive biological behavior, tends to involve the lymphatic system early in the disease process. This subtype is often associated with widespread peritoneal dissemination and is prone to metastasizing to both pelvic and para-aortic lymph nodes.

Compared to HGSC, other histological subtypes such

as mucinous and endometrioid carcinomas tend to have lower rates of lymphatic involvement. Both of these subtypes are more likely to remain confined to the ovary, especially in early stages, and have a more favorable prognosis. For example, mucinous carcinoma, while known for its bulky primary tumors, tends to metastasize less frequently to the lymph nodes. Instead, it often exhibits hematogenous spread or direct peritoneal dissemination. In studies like those by Chan et al. (2008) and Höger et al. (2017), mucinous and endometrioid carcinomas showed lower rates of lymphatic metastasis, often less than 10%, compared to the high rates seen in HGSC. This distinction suggests that in mucinous and early-stage endometrioid carcinoma cases, routine lymphadenectomy may not be as crucial, particularly in clinically early-stage patients where imaging does not suggest nodal involvement.

The predominance of lymph node metastasis in high-grade serous carcinoma (HGSC) in our study aligns with its known aggressive nature and frequent lymphatic involvement. This highlights the critical need for systematic lymphadenectomy, particularly for patients with HGSC, to ensure accurate staging and guide appropriate treatment strategies.

4.3. Imaging Modalities and Their Diagnostic Accuracy

We found that MRI/CT scans demonstrated a sensitivity of 80%, indicating a strong ability to identify patients with lymph node metastasis. However, this sensitivity came with a low specificity of 33%. This discrepancy suggests that while MRI and CT are effective in detecting enlarged lymph nodes, they struggle significantly with ruling out false positives. In other words, a high sensitivity means that the imaging can accurately identify a large number of patients who do have metastasis, but the low specificity indicates that many patients without metastasis may also be incorrectly identified as having it.

This aligns with the findings of Yun Mao et al. (2014), who emphasized the limitations of imaging techniques in accurately diagnosing lymph node metastasis, particularly when relying solely on size criteria. Our study also utilized a size threshold of ≥10mm for lymph nodes, which showed a positive predictive value of 66.7%. This indicates that although enlarged lymph nodes are a strong indicator of potential metastasis, they are not definitive. The relatively high positive predictive value suggests that a considerable proportion of patients with enlarged nodes on imaging do indeed have metastasis, but there remains a substantial risk of false positives.

The findings of our study highlight the need for a multimodal approach that combines imaging with pathological examination to improve diagnostic accuracy.

In clinical practice, while MRI and CT scans are invaluable tools for initial assessment and surgical planning, their limitations must be recognized. The reliance on imaging criteria alone can lead to significant gaps in diagnosis, emphasizing the importance of subsequent pathological evaluation for any lymph nodes that appear suspicious on imaging.

In summary, while our study confirms the utility of MRI/CT scans in detecting lymph node metastasis in ovarian cancer, it also highlights their limitations, particularly in terms of specificity

Lymph Node Metastasis and Disease Stage

Our analysis indicated that lymph node metastasis occurred in 40.7% of Stage I patients and 43.8% of Stage III patients, while no cases of metastasis were observed in Stage II patients.

Comparison with Existing Literature:

+ Increased Metastasis in Early-Stage Ovarian Cancer: The rate of 40.7% lymph node metastasis in Stage I is considerably higher than the 15-30% reported by studies such as Kleppe et al. (2014) and Takeshima et al. (2005). This discrepancy could be attributed to several factors, including differences in the patient population, tumor biology, or the histological subtypes involved. High-grade serous carcinoma (HGSC) is notably aggressive and may contribute to the observed higher rates of metastasis in our cohort, suggesting that early-stage patients should not be underestimated regarding potential lymphatic involvement.

+ The lack of lymph node metastasis in Stage II patients in our study because of small sample size. While some literature suggests that Stage II tumors can exhibit metastasis.

+ Consistency in Advanced Disease: The 43.8% rate of lymph node metastasis in Stage III aligns with previous studies, such as those by Burghardt et al. (1991), which indicated a higher prevalence of para-aortic lymph node involvement in advanced-stage ovarian cancer. This consistency emphasizes the importance of lymphadenectomy in Stage III patients to accurately stage the disease and inform treatment decisions.

5. CONCLUSION

The findings from our study highlight the importance of systematic lymph node dissection to accurately assess disease stage in ovarian cancer. The observed rates of lymph node metastasis in early and advanced stages emphasize the necessity of thorough surgical evaluation to guide effective treatment planning and improve patient outcomes.

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