Risk factors of para-aortic lymph node metastasis in patients with endometrial carcinoma

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Abstract

Objectives: To explore the risk factors of para-aortic lymph node (PALN) metastasis in patients with endometrial carcinoma.

Methods : A retrospective analysis of patients with endometrial carcinoma admitted to Obstetrics and Gynecology Hospital of Fudan University from January 1st, 2009 to April 30th, 2017. 514 cases with comprehensive staging surgery were included. Univariate and multivariate analysis were performed with SPSS 23.0 and R software in order to explore the relationships between para-aortic lymphatic metastasis and clinical pathological factors. Meanwhile, a meta-analysis was performed to investigate the risk factors of PALN metastasis in endometrial cancer, which were reported in previous literature.

Results:

79 (15.3%) cases had pelvic lymph nodes (PVLN) metastasis, 59 (11.5%) PALN metastasis, and 21 of 59 cases were PALN metastasis without PVLN metastasis. According to the “Mayo” risk stratification system, we divided our patients into three groups, the ratio PVLN metastasis and PALN metastasis were 1.9% and 0.9% in low-risk group, 14.9% and 11.4% in intermediate-risk group, 23.8% and 18.3% in high-risk group, respectively (figure 1) . The multivariate logistic regression model showed that, PVLN metastasis was the most relative factor of PALN metastasis with the OR of 7.21. Cervical stromal invasion (CI) and TSIZE followed it with the OR 4.022 and 2.855 (figure 2) . The meta-analysis we did with published references from 1988 to 2017 in the database showed that adnexal involvement (OR=6.62, 95%CI[4.84-9.06]), cervical stromal invasion (OR=4.47 95%CI[3.33-6.01]), peritoneal cytology positive (OR=3.34 95%CI [2.24-4.97]) , LVSI positive (OR=6.08 95%CI[4.17-8.86]) and PVLN positive (OR=36.11 95%CI[25.93-51.11]) were risk factors of PALN metastasis (figure 3) .

Conclusion: adnexal involvement, deep myometrium invasion, peritoneal cytology positive, CI, TSIZE, LVSI positive and PVLN positive increased the risk of PALN metastatic. Our data indicated CI, TSIZE, LVSI positive, PVLN positive were the top 4 risk factors of PALN metastatic, especially PVLN positive. We commend PALN dissection should be performed for those who have the high-risk factors mentioned above.

Risk factors	df	Beta	S.E.	Wald	P	OR	95% CI for Wald	
							lower	upper
Intercept	1	-8.3914	0.8153	105.932	<.0001			
PVLN	1	1.9764	0.3526	31.4229	<.0001	7.217	3.616	14.403
CI	1	1.3917	0.3903	12.7115	0.0004	4.022	1.871	8.643
TSIZE	1	1.049	0.3872	7.3382	0.0068	2.855	1.336	6.098

Figure 2. Multivariate analysis of risk factors associated with PALN metastasis with multivariate logistic regression model.

A				
	Total(N)	% (N/sum)	PALN (-)	PALN (+)
Age at diagnosis (y)				
< 60	329	64	310	19
>= 60	185	36	145	40
FIGO stage				
Ia	276	53.7	276	0
Ib	73	14.2	73	0
II	40	7.8	40	0
IIIa	21	4.1	21	0
IIIB	4	0.8	4	0
IIIC1	41	8.0	41	0
IIIC2	54	10.5	0	54
IV	5	1.0	0	5
Histologic subtype				
Endometrioid	385	74.8	350	35
Serous carcinoma	62	12.2	47	15
Clear cell carcinoma	31	6.0	27	4
Other subtypes	36	7.0	31	5
Histologic grade (EEC)	385	74.8		
G1	198	38.5	187	11
G2	119	23.1	104	15
G3	68	13.2	59	9
Level of PALN				
< IMA level	417	81.1	372	45
IMA ~ Renal vein level	39	7.6	34	5
~ Renal vein level	58	11.3	49	9
Pelvic lymph nodes				
Negative	435	84.7	414	21
Positive	79	15.3	41	38
CA125	378	73.6		
≤35U/ml	281	54.7	264	17
>35U/ml	97	18.9	71	26
Lymphovascular space invasion (LVSI)				
Negative	351	68.4	339	12
Positive	163	31.6	116	47
Peritoneal cytology	356	69.1		
Negative	342	66.8	311	32
Positive	14	2.3	6	8
Primary tumor diameter	483	93.8		
≤ 2cm	161	31.5	151	10
> 2cm	321	62.3	276	45
Myometrial invasion				
Only endometrium	45	8.7	44	1
> 1/2	297	57.7	285	12
≥ 1/2	157	30.5	120	37
Serosal infiltration	15	3.1	6	9
Cervical stromal invasion				
No	432	84.0	394	38
Yes	80	16.0	59	21
Adnexal involvement				

B			
Risk group	Sum	Metastatic PVLN % (N)	Metastatic PALN % (N)
Low	105	1.9% (2)	0.9% (1)
Intermediate	120	6.7% (8)	4.2% (5)
High	289	23.8% (69)	18.3% (53)
	P<0.001	P<0.001	P<0.001

Figure 1. Clinical pathological characteristic of patients and lymph node metastasis. (A) Clinical pathological characteristic of patients rate in different groups. (B) The lymph node metastasis rate in different groups. Legend: PALN= para-aortic lymph nodes, PVLN= pelvic lymph nodes, IMA= inferior mesenteric artery, MELF in ltration= microcystic, elongated and fragmented pattern in ltration. Low risk group: a, Endometrioid, grade 1-2, < 1/2 myometrial invasion , Primary tumor diameter ≤ 2cm; b, Endometrioid, Tumor limited in only endometrium (grade 1-3, Primary tumor diameter no limit) ; Intermediate risk group: Endometrioid, grade 1-2, <1/2 myometrial invasion, Primary tumor diameter>2cm; High risk group: a, Non-endometrioid (serous or clear-cell or undifferentiated carcinoma, or carcinosarcoma; b, Endometrioid G3 with myometrial invasion; ≥1/2 myometrial invasion.

Figure 3. Meta-analysis of risk factors for PALN metastasis in endometrial cancer patients with comprehensive surgical staging. A meta-analysis of risk factors for PALN metastasis was conducted, which included 8 studies.

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