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· 临床研究 ·

Vimentin 和 E-cadherin 蛋白在乳腺癌组织中的表达及其临床意义

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[摘要] **目的:** 研究波形蛋白(Vimentin)和E-钙黏蛋白(E-cadherin)在人乳腺癌组织中的表达及其临床意义。**方法:** 回顾性分析2014年1月至2016年1月在安徽医科大学附属巢湖医院接受乳腺癌根治术的56例乳腺癌组织和相应癌旁组织标本以及病历资料,用免疫组织化学染色法和qPCR分别检测癌组织中Vimentin、E-cadherin蛋白和mRNA的表达,分析Vimentin和E-cadherin蛋白在乳腺癌组织中的表达与临床病理特征的关系。用Logistic多因素回归分析影响Vimentin和E-cadherin蛋白表达的独立因素,用Spearman分析Vimentin与E-cadherin蛋白表达的相关性,用Kaplan-Meier分析Vimentin和E-cadherin蛋白表达与预后的关系,用ROC曲线分析Vimentin和E-cadherin蛋白表达对预后的诊断。**结果:** 56例乳腺癌组织中Vimentin和E-cadherin蛋白高表达率分别为76.79%和19.64%;其中47例(47/56,83.93%)乳腺癌组织中Vimentin mRNA的表达量显著高于癌旁组织($P<0.05$),46例(46/56,82.14%)乳腺癌组织中E-cadherin mRNA的表达量显著低于癌旁组织($P<0.05$)。Vimentin蛋白表达与肿瘤大小、淋巴结转移、脉管侵袭、组织学分级、临床分期、分子分型、Ki67阳性、ER阴性、PR阴性及HER2阴性表达均有关(均 $P<0.05$);E-cadherin蛋白表达与淋巴结转移、脉管侵袭、组织学分级、临床分期、分子分型、Ki67阳性、ER阴性、PR阴性及HER2阴性表达均有关(均 $P<0.05$)。肿瘤大小、淋巴结转移、脉管侵袭、组织学分级、临床分期、分子分型、Ki67阳性、ER阴性、PR阴性及HER2阴性表达均是促进Vimentin和E-cadherin表达的独立影响因素($P<0.05$),且Vimentin与E-cadherin蛋白表达呈负相关关系($P<0.05$)。Vimentin蛋白高表达的患者3年生存率为67.44%,E-cadherin蛋白低表达的患者3年生存率为68.89%。**结论:** 在乳腺癌组织中Vimentin高表达和E-cadherin低表达与乳腺癌发生发展、侵袭转移及患者预后有关,可作为临床诊断与预后的评价指标。

[关键词] 乳腺癌;波形蛋白;E-钙黏蛋白;临床意义;预后

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Expression and clinical significance of Vimentin and E-cadherin in breast cancer tissues

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[Abstract] **Objective:** To study the expression and clinical significance of Vimentin and E-cadherin in human breast cancer tissues. **Methods:** The clinical data of 56 cases of breast cancer patients, who underwent radical mastectomy in Chaohu Hospital Affiliated to Anhui Medical University from January 2014 to January 2016, were retrospectively analyzed. The protein and mRNA expressions of Vimentin and E-cadherin in breast cancer tissues were detected by immunohistochemistry and qPCR, respectively; and the relationship between the expression of Vimentin and E-cadherin in breast cancer tissues and the clinicopathological characteristics was analyzed. Logistic multivariate regression was used to analyze the independent factors affecting the protein expressions of Vimentin and E-cadherin. Spearman was used to analyze the correlation between Vimentin and E-cadherin. Kaplan-Meier was used to analyze the relationship between protein expressions of Vimentin, E-cadherin and prognosis. ROC curve was used to analyze the diagnostic value of Vimentin and E-cadherin on prognosis. **Results:** The rates of breast cancer tissues with high positive expression of Vimentin and E-cadherin were 76.79% and 19.64%, respectively. Among them, 47 cases (47/56, 83.93%) of breast cancer tissues showed significantly higher Vimentin mRNA expression than adjacent tissues ($P<0.05$), and 46 cases (46/56, 82.14%) of breast cancer tissues showed significantly lower E-cadherin mRNA expression than adjacent tissues ($P<0.05$). Vimentin protein expression was associated with tumor size, lymph node metastasis, vascular invasion, histological grade, clinical stage, molecular typing, Ki67⁺, ER⁻, PR⁻ and HER2⁻ expression ($P<0.05$). And

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E-cadherin protein expression was associated with lymph node metastasis, vascular invasion, histological grade, clinical stage, molecular typing, Ki67⁺, ER⁺, PR⁺ and HER2⁺ expression ($P < 0.05$). Tumor size, lymph node metastasis, vascular invasion, histological grading, clinical staging, molecular typing, Ki67⁺, ER⁺, PR⁺ and HER2⁺ expression were all independent factors affecting the expression of Vimentin and E-cadherin ($P < 0.05$). There was a negative correlation between Vimentin and E-cadherin expression ($P < 0.05$). The 3-year survival rate of patients with high expression of Vimentin protein was 67.44%, while that of patients with low expression of E-cadherin protein was 68.89%. **Conclusion:** The high expression of Vimentin and low expression of E-cadherin in breast cancer tissues may be related to the occurrence, development, invasion and metastasis of breast cancer. It can be used as a reliable indicator of clinical diagnosis and prognosis.

[Key words] breast cancer; vimentin; E-cadherin; clinical significance; prognosis

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乳腺癌是威胁女性健康的最常见的恶性肿瘤之一,其发病率在全世界范围内呈现逐年上升的趋势,在中国正以每年3%~4%的增速增长,且出现年轻化的趋势^[1-2]。乳腺癌的发生与多种因素有关,不健康的饮食习惯、缺乏运动、染发、压力、吸烟与被动吸烟、初潮早(≤ 13 岁)和未生育等均是乳腺癌的危险因素^[3-6]。超声检查对乳腺癌早期发现、诊治及提高患者生活质量、延长生命具有重要意义^[2];同时,在分子水平检测乳腺癌患者BRCA1/2基因突变对患者临床诊断与预后具有重要意义^[7]。但在临床上乳腺癌的难治率和复发率仍然是急需解决的问题^[8-9]。

寻找特异性分子标志物对于癌症的治疗和预后预测具有重要意义。在乳腺癌中基底标志物细胞角蛋白18(cytokeratin 18, CK18)^[10]、B淋巴细胞瘤-2(B-cell lymphoma-2, Bcl2)、Ki-67^[11]、雌激素受体(estrogen receptor, ER)^[12]、孕激素受体(progesterone receptor, PR)^[13]和人表皮生长因子受体2(human epidermal growth factor receptor 2, HER2)^[14]等异常表达,与乳腺癌的临床诊断与不良预后有关。

波形蛋白(Vimentin)和E-钙黏蛋白(E-cadherin)是乳腺癌上皮间质转化(epithelial-mesenchymal transition, EMT)的分子标志物^[15-16],它们在乳腺癌中的表达变化可促进乳腺癌细胞发生EMT和转移。而乳腺癌的转移是影响患者预后的重要因素。因此本研究用免疫组织化学与qPCR对Vimentin和E-cadherin蛋白与mRNA的表达进行检测,并对Vimentin和E-cadherin蛋白表达与临床病例特征间的关系做了分析,评估其与乳腺癌病理特征的关系,并探讨其临床意义与预后的关系。

1 资料与方法

1.1 患者资料

回顾性收集2014年1月至2016年1月在安徽医科大学附属巢湖医院接受乳腺癌根治术的56例乳腺癌组织和相应癌门店组织标本以及病历资料,均为女性,患者年龄28~63岁,中位年龄47岁。

纳入标准:所有患者经影像学、病理学等手段确诊;入组前未行化疗及其他免疫治疗;患者或亲属签署知情同意书,并上报医院伦理委员会批准。

排除标准:有家族性腺瘤性息肉病的患者;失访的患者及其他有遗传性乳腺癌综合征的患者;其他部位肿瘤、肝肾功能障碍及血液系统疾病的患者。

1.2 主要试剂

鼠抗人Vimentin和E-cadherin单克隆抗体、免疫组织化学试剂盒均购自Abcam公司,TRIzol、Prime-ScriptTM RT reagent Kit with gDNA Eraser和SYBR Premix Ex TaqTM II均购自TaKaRa公司,引物由TaKaRa公司合成。

1.3 免疫组织化学法检测乳腺癌组织中Vimentin和E-cadherin蛋白表达

用鼠抗人Vimentin和E-cadherin单克隆抗体、免疫组织化学试剂盒,对石蜡切片根据试剂盒说明说进行免疫组织化学染色和分析。

评分标准^[17]:根据染色组织的染色强度评分,无色评为0分、淡黄色评为1分、黄褐色评为2分、棕褐色评为3分;根据染色细胞密度评分,阳性比例 $< 25\%$ 评为0分、 $25\% \leq$ 阳性比例 $< 50\%$ 评为1分、 $50\% \leq$ 阳性比例 $< 75\%$ 评为2分、 $75\% \leq$ 阳性比例 $\leq 100\%$ 评为3分。免疫组织化学染色评分为以上两个评分相加,0~3分为低表达,4~6分为高表达。

1.4 qPCR检测乳腺癌组织中Vimentin和E-cadherin mRNA的表达

取液氮冻存的乳腺癌组织1g/例,液氮研碎后提取总RNA。将其稀释至500 ng/ml,用逆转录试剂盒进行反转录,获得的cDNA作为模板,扩增Vimentin和E-cadherin mRNA及内参,引物序列见表1。反应条件为94 °C 4 min,之后94 °C 20 s、60 °C 30 s、72 °C 30 s,进行35个循环。其中在72 °C 30 s阶段中获取数据进行熔解曲线分析,反应结束后由仪器自带软件计算出Ct值并给出定量结果。基因相对表达量 $F = 2^{-\Delta\Delta Ct}$ 。

$\Delta\Delta Ct = (\text{待测样品目的基因Ct平均值} - \text{待测样})$

本内参基因 Ct 平均值)-(对照样品目基因 Ct 平均值- 对照样本内参基因 Ct 平均值)。

表1 qPCR引物序列
Tab.1 Sequence of qPCR primers

Gene	Forward	Reverse	Gene length (bp)
Vimentin	CGCTTCGCCAACTACAT	AGGGCATCCACTTCACAG	609
E-cadherin	CGCATTGCCACATACA	CGTTAGCCTCGTTCTCA	502
β-actin	ATCGTGC GTGACATTAAGGAGAAG	AGGAAGGAAGGCTGGAAGAGTG	179

1.5 统计学处理

采用 SPSS21.0 统计软件分析, 计量资料用 $\bar{x} \pm s$ 表示。计数资料用 χ^2 检验, 用 Logistic 对影响 Vimentin 蛋白表达的 10 项分子病理特征因素与影响 E-cadherin 蛋白表达的 9 项分子病理特征因素行多因素回归分析, 用 Spearman 对乳腺癌组织中 Vimentin 和 E-cadherin 蛋白表达行相关分析, Kaplan-Meier 分析 Vimentin 和 E-cadherin 蛋白表达与预后的关系, 用 ROC 曲线分析 Vimentin 和 E-cadherin 蛋白表达对预后的诊断。以 $P < 0.05$ 或 $P < 0.01$ 表示差异具有统计学意义。

2 结果

2.1 Vimentin 和 E-cadherin 蛋白在乳腺癌组织中的表达

免疫组织化学染色检测结果(图1)显示, 56 例乳腺癌组织中, 43 例 Vimentin 蛋白高表达, 13 例 Vimentin 蛋白低表达, 高、低表达率分别为 76.79% 和 23.21%; 11 例 E-cadherin 蛋白高表达, 45 例 E-cadherin

蛋白低表达, 高、低表达率分别为 19.64% 和 80.36%。对染色评分进行统计分析(表2)显示, 乳腺癌组织中 Vimentin 蛋白高表达显著高于低表达 ($P < 0.01$), E-cadherin 蛋白低表达显著高于高表达 ($P < 0.01$)。

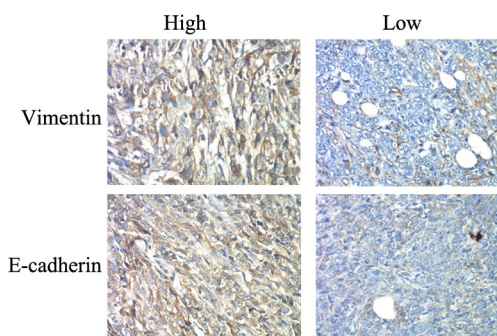


图1 乳腺癌组织中 Vimentin 和 E-cadherin 蛋白的表达(免疫组织化学染色, ×400)

Fig.1 Protein expressions of Vimentin and E-cadherin in breast cancer tissue (Immunohistochemical staining, ×400)

表2 乳腺癌组织中 Vimentin 和 E-cadherin 免疫组织化学染色评分统计
Tab.2 Immunohistochemical staining score of breast cancer tissues

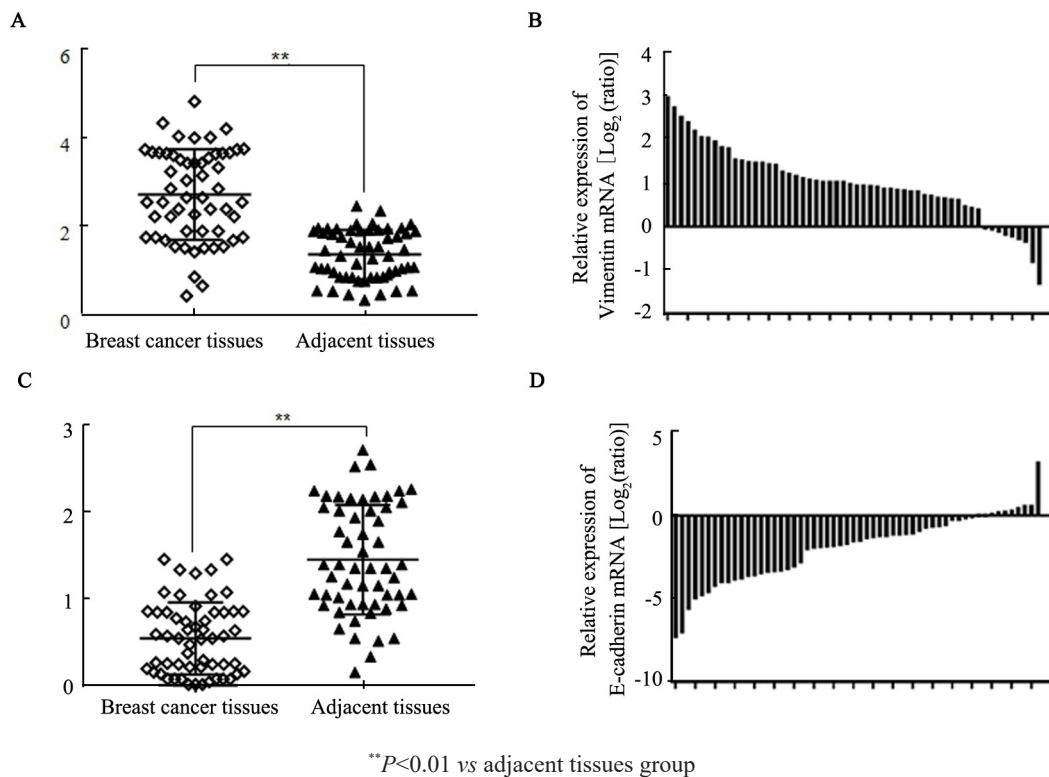
Factor	Group	n	Mean	t	P
Vimentin	High(4~6)	43	5.32	16.438	0.000
	Low(0~3)	13	1.85		
E-cadherin	High(4~6)	11	5.10	14.252	0.000
	Low(0~3)	45	1.56		

2.2 Vimentin 和 E-cadherin mRNA 在乳腺癌组织中的表达

qPCR 检测结果显示, 癌组织中 Vimentin mRNA 总体相对表达量高于癌旁正常组织 ($P < 0.01$, 图2A), 其中 47 例 (47/56, 83.93%) 乳腺癌组织中 Vimentin mRNA 的表达量高于癌旁组织(图2B); 癌组织中 E-cadherin mRNA 总体相对表达量低于癌旁正常组织 ($P < 0.01$, 图2C), 其中 46 例 (46/56, 82.14%) 乳腺癌组织中 E-cadherin mRNA 的表达量低于癌旁组织(图2D)。

2.3 Vimentin 和 E-cadherin 蛋白的表达与乳腺癌临床病理特征的关系

统计分析结果(表3)显示, Vimentin 蛋白的表达与肿瘤大小、淋巴结转移、脉管侵犯、组织学分级、临床分期、分子分型、Ki67 阳性、ER 阴性、PR 阴性及 HER2 阴性相关(均 $P < 0.05$), 而与年龄无关; E-cadherin 蛋白表达与淋巴结转移、脉管侵犯、组织学分级、临床分期、分子分型、Ki67 阳性、ER 阴性、PR 阴性及 HER2 阴性相关(均 $P < 0.05$), 而与年龄和肿瘤大小无关。



A: The relative expression of Vimentin mRNA; B: Vimentin expression in 47 breast cancer tissues was higher than that in adjacent tissues; C: The relative expression of E-cadherin mRNA; D: E-cadherin expression in 46 breast cancer tissues was lower than that in adjacent tissues. Ratio: Breast cancer tissues/Adjacent tissues

图2 乳腺癌组织中 Vimentin 和 E-cadherin mRNA 的相对表达量

Fig.2 Relative mRNA expressions of Vimentin and E-cadherin in breast cancer tissues

表3 Vimentin 和 E-cadherin 蛋白表达与乳腺癌临床病理特征的关系

Tab.3 Relationship between expression of Vimentin and E-cadherin protein and clinicopathological features of breast cancer

Factor	Assignment	Cases (n)	Vimentin protein				E-cadherin protein				
			High (43)	Low (13)	χ^2	P	High (11)	Low (45)	χ^2	P	
Age	<50	0	18	12(27.91)	6(46.15)	1.524	0.217	5(45.45)	13(28.89)	1.112	0.292
	≥ 50	1	38	31(72.09)	7(53.85)			6(54.55)	32(71.11)		
Tumor size	<1.5cm	0	39	33(76.74)	6(46.15)	4.418	0.036	6(54.55)	33(73.33)	1.476	0.224
	$\geq 1.5cm$	1	17	10(23.26)	7(53.85)			5(45.45)	12(26.67)		
Lymph node metastasis	No	0	40	27(62.79)	13(100)	6.772	0.009	2(18.18)	38(84.44)	19.01	0.000
	Yes	1	16	16(37.21)	0(0)			9(81.82)	7(15.56)		
Vascular invasion	No	0	26	24(55.81)	2(15.38)	6.560	0.010	9(81.82)	17(37.78)	6.893	0.009
	Yes	1	30	19(44.19)	11(84.62)			2(18.18)	28(62.22)		
Histological grade	I+II	0	42	35(81.40)	7(53.85)	4.041	0.044	11(100)	31(68.89)	4.563	0.033
	III+IV	1	14	8(18.60)	6(46.15)			0(0)	14(31.11)		
Clinical stage	I+II	0	43	35(81.40)	8(61.54)	4.998	0.025	5(45.45)	38(84.44)	7.539	0.006
	III+IV	1	13	8(18.60)	5(38.46)			6(54.55)	7(15.56)		
Molecular typing	Luminal A	0	11	5(11.63)	6(46.15)	7.539	0.006	5(45.45)	6(13.33)	5.778	0.016
	Luminal B	1	45	38(88.37)	7(53.85)			6(54.55)	39(86.67)		
Ki67	Ki67-	0	21	18(41.86)	3(23.08)	4.563	0.021	4(36.36)	17(37.78)	1.456	0.000
	Ki67+	1	35	25(58.14)	10(79.92)			7(63.64)	28(62.22)		
ER	-	1	36	29(67.44)	7(53.85)	6.612	0.007	6(54.55)	30(66.67)	4.527	0.014
	+	0	20	14(32.56)	6(46.15)			5(45.45)	15(33.33)		
PR	-	1	33	25(58.14)	8(61.54)	6.253	0.012	4(36.36)	29(64.44)	6.734	0.028
	+	0	23	18(41.86)	5(38.46)			7(63.64)	16(35.56)		
HER2	-	1	35	23(53.49)	12(92.31)	6.418	0.011	4(36.36)	31(68.89)	3.990	0.046
	+	0	21	20(46.51)	1(7.69)			7(63.64)	14(31.11)		

2.4 乳腺癌组织中 Vimentin 和 E-cadherin 蛋白表达的影响因素分析

将影响 Vimentin 蛋白表达的 10 项分子病理特征因素与影响 E-cadherin 蛋白表达的 9 项分子病理特征因素行 Logistic 回归分析, 结果显示, 除肿瘤大小外, 淋巴结转移、脉管侵犯、组织学分级、临床分期、Ki67 阳性、ER 阴性、PR 阴性、HER2 阴性和分子分型均是

影响 Vimentin(表 4)和 E-cadherin(表 5)表达的独立因素($P < 0.05$)。

2.5 乳腺癌组织中 Vimentin 和 E-cadherin 蛋白表达的相关性分析

Spearman 相关分析显示如表 5, 人乳腺癌组织中 Vimentin 蛋白表达与 E-cadherin 蛋白表达呈负相关关系($r = -0.272, P < 0.05$)。

表 4 乳腺癌 Vimentin 蛋白表达与临床病理特征关系的 Logistic 多因素回归分析

Tab.4 Logistic multivariate regression analysis of the relationship between Vimentin protein expression and clinicopathological features of breast cancer

Factor	Regression coefficient	Standard error	Wals value	P	OR	95% CI
Tumor size	3.691	2.142	2.969	0.085	1.224	0.083~18.010
Lymph node metastasis	3.304	1.158	8.133	0.004	0.037	0.004~0.356
Vascular invasion	3.237	0.985	10.807	0.001	0.039	0.006~0.271
Histological grade	3.827	1.741	4.832	0.028	0.022	0.001~0.661
Clinical stage	2.647	0.867	9.319	0.002	0.071	0.013~0.388
Molecular typing	2.581	0.857	9.065	0.003	0.076	0.014~0.406
Ki67 expression	3.238	0.982	10.875	0.001	0.039	0.006~0.269
ER expression	3.971	1.747	5.169	0.023	0.019	0.001~0.578
PR expression	3.535	1.146	9.515	0.002	0.029	0.003~0.276
HER2 expression	2.794	1.283	4.738	0.03	0.061	0.005~0.757
Constant	3.422	1.161	8.681	0.003	0.033	

表 5 乳腺癌 E-cadherin 蛋白表达与临床病理特征关系的 Logistic 多因素回归分析

Tab.5 Logistic multivariate regression analysis of the relationship between E-cadherin protein expression and clinicopathological features of breast cancer

Factor	Regression coefficient	Standard error	Wals value	P	OR	95% CI
Lymph node metastasis	5.254	2.023	6.743	0.009	0.005	0.000~0.276
Vascular invasion	3.168	1.309	5.856	0.016	23.762	1.826~309.223
Histological grade	3.190	1.482	4.636	0.031	0.041	0.002~0.751
Clinical stage	2.870	1.179	5.925	0.015	17.633	1.749~177.761
Molecular typing	3.864	1.736	4.910	0.027	0.021	0.001~0.641
Ki67 expression	3.119	1.301	5.746	0.017	22.613	1.766~189.549
ER expression	5.254	2.023	6.743	0.009	0.005	0.000~0.276
PR expression	3.168	1.309	5.856	0.016	23.762	1.826~109.223
HER2 expression	4.038	1.696	5.672	0.017	0.018	0.001~0.489
Constant	-6.253	1.128	7.653	0.012	0.034	

表 6 Vimentin 和 E-cadherin 蛋白 Spearman 相关性分析

Tab.6 Spearman correlation analysis of Vimentin and E-cadherin protein

Vimentin protein	E-cadherin protein		r	P
	High expression	Low expression		
High expression	6	37	-0.272	0.043
Low expression	5	8		
Total	11	45		

2.6 乳腺癌组织中 Vimentin 和 E-cadherin 蛋白表达与预后的关系

根据乳腺癌组织中 Vimentin 和 E-cadherin 蛋白表达情况评估患者 3 年生存率, 结果发现(图 3), Vi-

mentin 蛋白高表达的患者 3 年生存率为 67.44%, E-cadherin 蛋白低表达的患者 3 年生存率为 68.89%。

2.7 乳腺组织中 Vimentin 和 E-cadherin 蛋白表达对预后诊断的意义

对 Vimentin、E-cadherin、Vimentin/E-cadherin 与乳

腺癌 3 年生存率的关系采用 ROC 曲线分析结果(图 4)显示, 由曲线下面积(AUC)比较发现, Vimentin/E-cadherin 比值的面积大于 Vimentin 和 E-cadherin 单独的面积, 即 Vimentin/E-cadherin 比值对于预后的诊断意义优于 Vimentin 和 E-cadherin 单独的诊断意义。

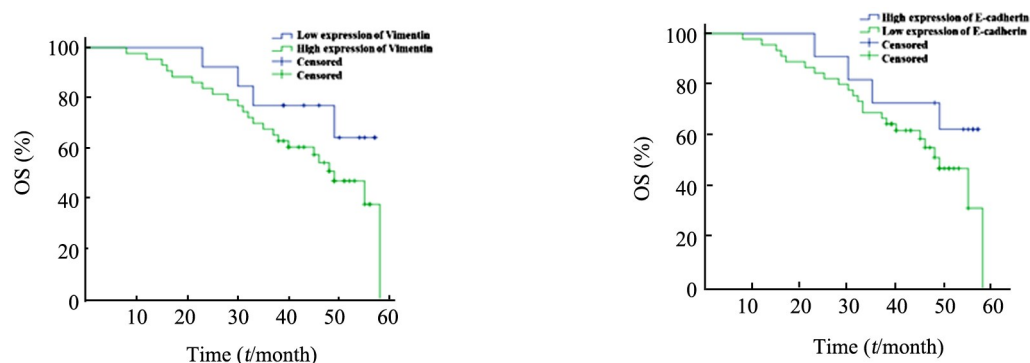


图 3 乳腺癌组织中 Vimentin 和 E-cadherin 蛋白表达与预后的关系

Fig.3 Relationship between expression of Vimentin and E-cadherin in breast cancer tissues and prognosis

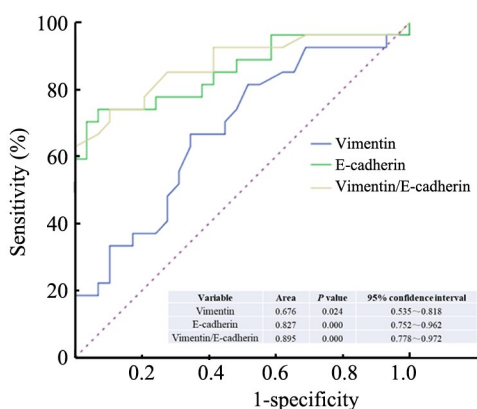


图 4 乳腺组织中 Vimentin 和 E-cadherin 蛋白表达对预后诊断的意义

Fig.4 The significance of expressions of Vimentin and E-cadherin in breast tissues for prognosis prediction

3 讨论

EMT 是指上皮细胞通过特定程序转化为具有间质表型细胞的生物学过程, 是恶性肿瘤上皮细胞向间质表型转化的启动过程, 可促进恶性肿瘤的侵袭和转移^[18-19], 其主要的特征有细胞黏附分子(如 E-cadherin)表达的减少、细胞角蛋白细胞骨架转化为 Vimentin 为主的细胞骨架及形态上具有间充质细胞的特征等。Vimentin 是维持细胞完整性的中间丝, 参与细胞迁移、运动和黏附, 在癌组织中过表达驱动 EMT, 最终导致转移^[20-21]并影响预后^[15], 是癌细胞 EMT 支架标志物。本研究发现 Vimentin 蛋白和 mRNA 在乳腺癌组织中高表达; Vimentin 蛋白表达与

肿瘤大小、淋巴结转移、脉管侵袭、组织学分级、临床分期、分子分型、Ki67 阳性、ER 阴性、PR 阴性及 HER2 阴性表达之间均具有显著性差异; 肿瘤大小, 淋巴结转移、脉管侵袭、组织学分级、临床分期、分子分型、Ki67 阳性、ER 阴性、PR 阴性及 HER2 阴性表达均是促进 Vimentin 表达的独立影响因素, 提示 Vimentin 可能参与乳腺癌的发生发展与转移。

E-cadherin 是一种穿膜糖蛋白, 主要参与细胞间质之间特异性黏附连接过程^[22-23], E-cadherin 功能的缺失与各种癌症患者的不良预后和生存有关^[19, 24], 是癌细胞 EMT 表面标志物^[25]。本研究发现 E-cadherin 蛋白和 mRNA 在乳腺癌组织中低表达; E-cadherin 蛋白表达与淋巴结转移、脉管侵袭、组织学分级、临床分期、分子分型、Ki67 阳性、ER 阴性、PR 阴性及 HER2 阴性表达之间均具有显著性差异; 肿瘤大小, 淋巴结转移、脉管侵袭、组织学分级、临床分期、分子分型、Ki67 阳性、ER 阴性、PR 阴性及 HER2 阴性表达均是抑制 E-cadherin 表达的独立影响因素, 提示 E-cadherin 可能参与乳腺癌的发生发展与转移。

相关性分析显示, Vimentin 与 E-cadherin 蛋白表达呈负相关关系, 提示在乳腺癌组织中 Vimentin 高表达和 E-cadherin 低表达与癌组织的发生发展及侵袭转移有关。Vimentin 蛋白高表达的患者 3 年生存率为 67.44%, 同样 E-cadherin 蛋白低表达的患者 3 年生存率为 68.89%, 提示 Vimentin 高表达和 E-cadherin 低表达参与乳腺癌的不良预后, 具有临床诊断价值。由 ROC 曲线下面积(AUC)比较发现, Vimentin/E-cadherin 比值的面积大于 Vimentin 和 E-cadherin 单独的面积, 提示 Vimentin/E-

cadherin 比值对于乳腺癌预后的诊断意义优于 Vimentin 和 E-cadherin 单独的诊断意义。

综上所述, Vimentin 蛋白与 mRNA 在乳腺癌组织中异常高表达, E-cadherin 蛋白与 mRNA 在乳腺癌组织中异常低表达; Vimentin 高表达与 E-cadherin 低表达患者具有肿瘤较大、发生淋巴结转移、脉管侵犯、较高组织学分级和临床分期、分子分型 B 型、Ki67 阳性和 ER、PR 及 HER 三阴性表达等独特的病理学特征, 且影响患者 3 年生存率, 本研究结果有助于乳腺癌患者的临床诊断和预后评估。

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