doi: 10.13241/j.cnki.pmb.2020.24.045

乳腺癌腋窝淋巴结转移患者应用多普勒超声与CT的诊断价值比较*

卢晓莉[1] 周国志[2△] 王君东[1] 陈颖彬[1] 夏丛燕[1]

（1南京医科大学附属南京医院（南京市第一院）功能检查科 江苏 南京 210000；
2南京医科大学附属逸夫医院肿瘤科 江苏 南京 210009）

摘要 目的：探讨乳腺癌腋窝淋巴结转移患者应用多普勒超声与CT的诊断价值比较。**方法：**回顾性分析2017年3月至2019年3月我院接诊的60例经过手术病理证实的乳腺癌患者。比较多普勒超声与128排螺旋CT在乳腺癌腋窝淋巴结转移中的检出率、声像特征比较及两组灵敏度、特异度、准确度。**结果：**在术后经过病理证实的60例乳腺癌手术患者中，有38例为腋窝淋巴结转移，有22例未腋窝淋巴结转移，在多普勒超声诊断结果对乳腺癌腋窝淋巴结转移诊断中，36例得到确诊，在128排螺旋CT诊断中，30例得到确诊；多普勒超声皮质向心性生长、淋巴结内钙化灶、淋巴结横直径比值及淋巴结边界模糊检出率均显著高于128排螺旋CT检出率，差异显著（$P<0.05$）；将病理结果作为金标准。多普勒超声灵敏度、特异度、准确度均比128排螺旋CT结果高，两组方式比较具有显著差异（$P<0.05$）。**结论：**多普勒超声在乳腺癌腋窝淋巴结转移中诊断价值高，可帮助临床提供正确诊断，以选择合适的治疗方案。

关键词：多普勒超声；128排螺旋CT；乳腺癌；腋窝淋巴结转移；诊断价值
中图分类号：R737.9；R730.41 **文献标识码：**A **文章编号：**1673-6273（2020）24-4797-04

Comparison of the Diagnostic Value of Doppler Ultrasonography and 128-slice Spiral CT in Breast Cancer with Axillary Lymph Node Metastasis*

LU Xiao-li[1], ZHOU Guo-zhi[2△], WANG Jun-dong[1], CHEN Ying-bin[1], XIA Cong-yan[1]

(1 Department of functional examination, Nanjing Hospital Affiliated to Nanjing Medical University (Nanjing First Hospital), Nanjing, Jiangsu, 210000, China; 2 Department of oncology, Yifu hospital, Nanjing Medical University, Nanjing, Jiangsu, 210009, China)

ABSTRACT Objective: To study Comparison of the diagnostic value of Doppler ultrasonography and 128-slice spiral CT in breast cancer with axillary lymph node metastasis. **Methods:** A retrospective analysis was performed on 60 cases of breast cancer confirmed by surgery and pathology from March 2017 to March 2019 in our hospital. To compare the detection rate, sonographic characteristics, sensitivity, specificity and accuracy of Doppler ultrasonography and 128-slice spiral CT in axillary lymph node metastasis of breast cancer. **Results:** Among the 60 patients with breast cancer confirmed by pathology after surgery, 38 had axillary lymph node metastasis and 22 had no axillary lymph node metastasis. In the diagnosis of breast cancer with axillary lymph node metastasis, 36 cases were confirmed by Doppler ultrasound, and 30 cases were confirmed by 128-slice spiral CT. The detection rate of cortical centripetal growth, intra-lymph node calcification, lymph node diameter ratio and lymph node boundary ambiguity by Doppler ultrasound was significantly higher than that by 128-slice spiral CT ($P<0.05$). Use pathology as the gold standard. The sensitivity, specificity and accuracy of Doppler ultrasound were higher than those of 128-slice spiral CT, and there were significant differences between the two groups ($P<0.05$). **Conclusion:** Doppler ultrasonography is of high diagnostic value in breast cancer with axillary lymph node metastasis, which can help to provide correct diagnosis and select appropriate treatment.

Key words: Doppler ultrasound; 128-slice spiral CT; Breast cancer; Axillary lymph node metastasis; Diagnostic value
Chinese Library Classification(CLC): R737.9; R730.41 Document code: A
Article ID: 1673-6273(2020)24-4797-04

前言

乳腺癌是临床常见的恶性肿瘤，多发于45~55岁，近年来其发病率呈上升趋势，据调查显示[1]，我国每年因乳腺癌死亡的女性达1.3万人，居我国女性恶性肿瘤的首位，严重威胁人们的生命安全[2]。乳腺癌最为常见的首发转移部位是腋窝淋巴结，也是乳腺癌患者疾病进展的重要标志，有数据显示[3]，约80%乳腺癌患者伴有同侧或对侧腋窝淋巴结转移，一旦出现转移，可累及全身多个脏器，严重危及患者的生命。因此，早期有效诊断乳腺癌是否伴有腋窝淋巴结的转移意义重大。淋巴活检是判断

* 基金项目：江苏省自然科学基金项目(BK2012162)
作者简介：卢晓莉（1983-），女，硕士，住院医师，研究方向：乳腺癌超声诊断，电话：15852927926，E-mail: tian8501@21cn.com
△ 通讯作者：周国志（1981-），男，硕士，主治医师，研究方向：乳腺癌的诊断及治疗，电话：13851709116，E-mail: 124278956@qq.com
（收稿日期：2020-07-24 接受日期：2020-08-17）

乳腺癌是否转移的重要手段，但部分患者不适合接受淋巴活检，近年来，多普勒超声与 128 排螺旋 CT 在乳腺癌的检查中取得了显著效果[4,5]。螺旋 CT 有高分辨率、干扰少等优点，128 排螺旋 CT 更能较好的显示乳腺肿瘤内部结构及周围组织；随着影像学发展，彩色多普勒超声广泛应用于妇科疾病的诊断中，彩色多普勒超声可清晰显示乳腺肿瘤的彩色血流信号和血管分布[6-8]。为明确两种方法在乳腺癌腋窝淋巴结转移中的诊断价值，本研究对多普勒超声与 128 排螺旋 CT 在乳腺癌腋窝淋巴结转移中的诊断价值进行比较。

1 资料与方法

1.1 一般资料

对我院 2017 年 3 月至 2019 年 3 月的 100 例手术病理证实的乳腺癌患者进行回顾性分析。年龄 33~65 岁，平均（49.79± 5.33）岁，病理分型：浸润性导管癌 75 例、导管内癌 13 例、浸润性小叶 12 癌。分化程度：高分化 39 例，中分化 46 例，低分化 15 例。

参照《中国抗癌协会乳腺癌诊治指南与规范》[9]，（1）伴有食欲不振、消瘦、乏力或贫血等症状；（2）乳房肿块、乳房皮肤异常等症状；病理检查证实。

纳入标准：（1）符合上述诊断标准；（2）预计生存期＞3 月；（3）无和本研究相关治疗禁忌症；（4）既往无肿瘤史；（5）单侧原发乳腺癌的女性患者；（6） 患者知情签署知情同意书。排除标准：（1）严重心肝肾功能不全患者；（2）免疫功能、凝血机制异常患者；（3）沟通障碍者；（4）深度昏迷，意识模糊者；（5）拒绝治疗，中途退出研究者；（6）妊娠、围产、哺乳期妇女的患者；（7）复发性乳腺癌；（8）外院行放化疗、分子生物治疗等特殊治疗。

1.2 方法

所有患者均行乳腺高频彩色多普勒超声检查：仰卧位，上肢外展，暴露两侧乳房和腋窝；探头对乳房区域及腋窝淋巴结区域分别进行多切面扫查；对乳腺肿块及其内部和周边血流进行连续多切面扫查。128 排螺旋 CT 组：使用飞利浦 128 层螺旋 CT 机，应用心电门控技术，患者保持仰卧位，一次性屏住呼吸，CT 平扫，扫描参数：120kV，管电流 100 mA，球管旋转时间 0.5s/slice，层厚 0.625 mm，间距 0.3 mm 螺距比 0.984:1，矩阵 512× 512。检测结果需由资历丰富的医师阅片，并测量各项数据。

1.3 观察指标

根据病理检查结果作为 " 金标准 "，对不同检查结果进行分析乳腺癌患者腋窝淋巴结转移的诊断准确性。

1.4 统计学分析

采用统计学专用软件 spss18.0 进行分析，计量资料采用（$\bar{x}\pm s$）表示，行 t 检验，计数资料以率表示，x^2 检验，当 $P<0.05$ 时，数据之间差异具有统计学意义。

2 结果

2.1 两种检查方法诊断与病理结果的符合率比较

在术后经过病理证实的 60 例乳腺癌手术患者中，有 38 例为腋窝淋巴结转移，多普勒超声检查结果与病理结果诊断一致的有 36 例，128 排螺旋 CT 检查结果与病理结果诊断一致的有 30 例，具体情况见表 1。

表 1 多普勒超声与 128 排螺旋 CT 诊断与病理结果的符合率比较[n(%)]

Table 1 Comparison of the coincidence rate between the diagnosis and pathological results of the two methods[n(%)]

Pathological results	Doppler ultrasound		64 row spiral CT	
	Positive	Negative	Positive	Negative
Positive	36*	2	30	6
Negative	2	20	6	16
Total	38	22	36	22

Note: compared with 64 slice spiral CT, *P<0.05, x^2 value is 4.146 respectively.

2.2 多普勒超声与 128 排螺旋 CT 的声像特征对比

检查结果中显示，多普勒超声皮质向心性生长、淋巴结内钙化灶、淋巴结横直径比值及淋巴结边界模糊检出率均显著高于 128 排螺旋 CT，差异显著（$P<0.05$），见表 2。

表 2 多普勒超声与 128 排螺旋 CT 的声像特征对比[n(%)]

Table 2 Comparison of acoustic image characteristics between two groups[n(%)]

Inspection method	n	Cortical centripetal growth	Calcification in lymph nodes	Ratio of transverse diameter of lymph nodes	Fuzzy border of lymph nodes
Doppler ultrasound	38	29(76.32)	30(78.95)	23(60.53)	27(71.05)
64 row spiral CT	38	20(55.56)	22(55.26)	14(36.84)	19(47.37)
x^2 value		4.653	4.828	4.266	4.413
P value		0.031	0.028	0.039	0.036

2.3 多普勒超声与 128 排螺旋 CT 的灵敏度、特异度、准确度结果比较

将病理结果作为金标准。多普勒超声灵敏度、特异度、准确度均比 128 排螺旋 CT 结果高，两组方式比较具有显著差异

（$P<0.05$），见表 3。

表 3 多普勒超声与 128 排螺旋 CT 的灵敏度、特异度、准确度结果比较（%）

Table 3 Comparison of sensitivity, specificity and accuracy of two groups（%）

Inspection method	Sensitivity	Specificity	Accuracy
Doppler ultrasound	94.74%（36/38）	95.45%（21/22）	93.33%（56/60）
64 row spiral CT	78.95%（30/38）	72.73%（16/22）	76.67%（46/60）
x^2 value	4.146	4.247	6.536
P value	0.032	0.039	0.011

3 讨论

乳腺癌是由于机体的乳腺腺泡及导管上皮出现病变所致，早期无明显症状，部分患者伴有明显的乳腺肿块，难以发现，随着疾病的发展，患者出现乳头橘皮样、乳晕变深等。乳腺癌原位癌早期对患者生命威胁较小，但若伴随腋窝淋巴结转移可导致全身脏器癌变，危及生命[10-14]。局部浸润、淋巴转移等是乳腺癌常见的转移途径，其中腋窝淋巴结是肿瘤最易侵犯的组织，在乳腺癌中发生转移率高达 80%，因此，早期准确判断乳腺癌是否发生腋窝淋巴结淋巴转移对患者具有重要意义[15-17]。

CT 与超声是临床常见的诊断方法，CT 能评估骨髓周围软组织肿块与血管神经受累情况，发现转移病变与周围软组织的关系，其中 128 排螺旋 CT 有较高的时间与空间分辨率，采用平面重建、曲面重建等技术对肿块位置、大小等进行清晰地观察，准确地确定病变为主[18-20]。超声检查是一种操作简便、无创的检查方案，其定位较普通超声准确，分辨率较高，同时还能提供乳腺癌腋窝转淋巴结的血流信号分级等信息，提高疾病的临床诊断正确率[21-25]。通过影像学看，正常腋窝淋巴结组织多呈现小肾脏形状，且回声均匀，淋巴结髓质显示回声略高，影像学显示为细条形；良性淋巴结影像学表现为髓质，部分髓质表现为无增厚，低回声状态，恶性淋巴结整体形态呈圆形，皮质不均匀。当淋巴管浸润时，部分皮质淋巴窦，然后增生，使皮质和髓质损伤更加平衡，导致结节中心区域变形和偏移[26-29]。本研究中将 60 例乳腺癌手术患者进行诊断，其中多普勒超声诊断结果对乳腺癌腋窝淋巴结转移诊断中，36 例得到确诊，在 128 排螺旋 CT 诊断中，30 例得到确诊，结果提示，多普勒超声检出率较高，同时也证实了上述观点。Kodera A[30]等研究也显示，多普勒超声能有效判断淋巴结的血流分布及血流信号情况，对腋窝淋巴结转移诊断较为准确。分析其原因可能是因为超声对患者病灶部位及乳腺组织无损伤，可准确区别乳腺内的液性和实质肿块，且能清晰显示微小乳腺肿瘤的细微结构，鉴别乳腺小肿瘤的良、恶性质，因此其检出率高于 CT。

较多研究显示，转移的淋巴结不均匀强化可能是因为淋巴结内转移，使得强化程度不同，同时当癌细胞和异物等到达局部淋巴结时可造成淋巴结肿大，刺激淋巴细胞，导致部分淋巴结体积较大，内部出现坏死及不均匀强化，而当淋巴结出现转移时先通过淋巴管，使边缘窦出现异常增生，造成淋巴门消失，随着癌组织向周围浸润，表现出周围脂肪间隙模糊[31-34]。本研究结果显示，多普勒超声皮质向心性生长、淋巴结内钙化灶、淋巴结横直径比值及淋巴结边界模糊检出率均显著高于 128 排螺旋 CT 检出率，分析其原因可能是因为乳腺癌的癌细胞呈不规则型排列，而多普勒超声表现内部回声不均，可观察包块及周围血流信号、钙化灶，因此多普勒超声皮质向心性生长、淋巴结内钙化灶等检出率高于对照组。You K[35]等研究显示，医生在应用多普勒超声诊断时，可采用多切面，仔细观察二维图像，多处测量峰值血流速度。本研究运用多普勒超声灵敏度、特异度、准确度均比 128 排螺旋 CT 结果高。结果提示，多普勒超声在乳腺癌腋窝淋巴结转移中有一定的诊断价值，且通过超声显示的图像可初步判断肿瘤性质，为治疗提供依据。但由于多普勒超声受技术人员的经验影响，由于存在一定的误差，有必要在规范的成像条件下提高高频彩色多普勒超声的灵敏度和特异性。

综上所述，多普勒超声在乳腺癌腋窝淋巴结转移中诊断价值高，可推广应用。

参 考 文 献（References）

[1] Kinoshita H, Teraoka H, Maekawa Y, et al. A Case of Breast Cancer with Infarcted Necrosis That Was Diagnosed Based on Axillary Lymph Node Metastasis [J]. Gan to Kagaku Ryoho Cancer & Chemotherapy, 2018, 45(13): 2217-2219

[2] Jiao D C, Qiao J H, Zhu J J, et al. Analysis of factors influencing the axillary lymph node metastasis and breast cancer-specific survival in patients with T1 breast cancer [J]. Zhonghua Yi Xue Za Zhi, 2018, 98 (40): 3258-3262

[3] Yanjun X, Xiaojun B, Yini , et al. Application of Real-time Elastography Ultrasound in the Diagnosis of Axillary Lymph Node Metastasis in Breast Cancer Patients[J]. Scientific Reports, 2018, 8(1): 10234

[4] June B S, Tae P J, Young P A, et al. Ex Vivo Shear-Wave Elastography of Axillary Lymph Nodes to Predict Nodal Metastasis in Patients with Primary Breast Cancer[J]. Journal of Breast Cancer, 2018, 21(2): 190

[5] Novak J, Besic N, Dzodic R, et al. Pre-operative and intra-operative detection of axillary lymph node metastases in 108 patients with invasive lobular breast cancer undergoing mastectomy [J]. Bmc Cancer, 2018, 18(1): 137

[6] KW He, W Wei, ZY Liu, et al. Clinicopathological features of second primary lung cancer and pulmonary metastasisin patients with breast cancer[J]. Zhonghua Zhong Liu Za Zhi, 2018, 40(3): 201

[7] Zhang J, Mao F, Niu G, et al. 68Ga-BBN-RGD PET/CT for GRPR and integrin αvβ3 imaging in patients with breast cancer[J]. Theranostics, 2018, 8(4): 1121-1130

[8] Wang L, Qi Y, Xiong Y, et al. Ezrin-Radixin-Moesin Binding Phos-

phoprotein 50 (EBP50) Suppresses the Metastasis of Breast Cancer and HeLa Cells by Inhibiting Matrix Metalloproteinase-2 Activity[J]. anticancer research, 2017, 37(8): 4353-4360

[9] Breast cancer Professional Committee of China Anti Cancer Association. Guidelines and norms of breast cancer diagnosis and treatment of China Anti Cancer Association (2015 Edition) [J]. Chinese Journal of cancer, 2015,191 (09): 692-754

[10] Jieying Y, Tianqun L, Dongmei C, et al. pH-Sensitive Nano-Complexes Overcome Drug Resistance and Inhibit Metastasis of Breast Cancer by Silencing Akt Expression [J]. Theranostics, 2017, 7(17): 4204-4216

[11] Zheng Q, Cui X, Zhang D, et al. miR-200b inhibits proliferation and metastasis of breast cancer by targeting fucosyltransferase IV and 1,3-fucosylated glycans[J]. Oncogenesis, 2017, 6(7): e358

[12] Li M, Qi Y, Chen M, et al. GATA Binding Protein 3 Boosts Extracellular ATP Hydrolysis and Inhibits Metastasis of Breast Cancer by Up-regulating Ectonucleoside Triphosphate Diphosphohydrolase 3[J]. International journal of biological sciences, 2019, 15(12): 2522-2537

[13] Liu Y, Zhang J, Sun X, et al. Down-regulation of miR-29b in carcinoma associated fibroblasts promotes cell growth and metastasis of breast cancer[J]. Oncotarget, 2017, 8(24): 39559-39570

[14] Lv Z D, Wang H B, Liu X P, et al. Silencing of Prrx2 Inhibits the Invasion and Metastasis of Breast Cancer both In Vitro and In Vivo by Reversing Epithelial-Mesenchymal Transition[J]. Cellular Physiology and Biochemistry, 2017, 42(5): 1847-1856

[15] Zhang Y, Zhu M, Sun Y, et al. Upregulation of lncRNA CASC2 Suppresses Cell Proliferation and Metastasis of Breast Cancer via Inactivation of the TGF-β Signaling Pathway [J]. Oncology Research Featuring Preclinical & Clinical Cancer Therapeutics, 2019, 27 (3): 379-387

[16] Yuan Y, Lingli Q, Ye L. RBMS3 Inhibits the Proliferation and Metastasis of Breast Cancer Cells [J]. Oncology Research Featuring Preclinical and Clinical Cancer Therapeutics, 2018, 26(1): 9-15

[17] Xiao-Wei D, Yuan-Ke L, Hao-Yu L, et al. Notch3 Maintains Luminal Phenotype and Suppresses Tumorigenesis and Metastasis of Breast Cancer via Trans-Activating Estrogen Receptor-α [J]. Theranostics, 2017, 7(16): 4041-4056

[18] Liu H, Huang X, Ye T. MiR-22 down-regulates the proto-oncogene ATP citrate lyase to inhibit the growth and metastasis of breast cancer [J]. American Journal of Translational Research, 2018, 10(3): 659-669

[19] Xiaomei Z, Li Y, Shu C, et al. Suspension state promotes metastasis of breast cancer cells by up-regulating cyclooxygenase-2 [J]. Theranostics, 2018, 8(14): 3722-3736

[20] Razia S, Nakayama K, Tsukao M, et al. Metastasis of breast cancer to an endometrial polyp, the cervix and a leiomyoma: A case report and review of the literature[J]. Oncology letters, 2017, 14(4): 4585-4592

[21] Laakmann E, Witzel I, Müller Volkmar. Efficacy of Liposomal Cytarabine in the Treatment of Leptomeningeal Metastasis of Breast Cancer[J]. Breast Care, 2017, 12(3): 165-167

[22] Wang Y, Li L, Wang H, et al. Silencing TGIF suppresses migration, invasion and metastasis of MDAMB231 human breast cancer cells[J]. Oncology Reports, 2018, 39(2): 802-808

[23] Kelley D E, GalvãO K N, Mortensen C J, et al. Using Doppler ultrasonography on day 34 of pregnancy to predict pregnancy loss in lactating dairy cattle [J]. Journal of Dairy Science, 2017, 100 (4): 3266-3271

[24] Sebastian Harth, Christopher Behrens, Fritz Christian Roller, et al. Breast Ultrasonography: Findings in Pediatric Patients[J]. Ultraschall in Der Medizin, 2017, 38(05): 500-507

[25] Hassan S Z, Gheith R E, Baz A A, et al. Evaluation of asymptomatic venous disease by Doppler ultrasonography in Behçet's disease patients[J]. Egyptian Rheumatologist, 2017, 39(3): 165-170

[26] Abaza E D, Abdel-Salam A, Baz A A, et al. Carotid Doppler ultrasonography as a screening tool of early atherosclerotic changes in children and young adults with β-thalassemia major[J]. Journal of Ultrasound, 2017, 20(4): 301-308

[27] Marchetti P, Maass N, Gligorov J, et al. Patient database analysis of fulvestrant 500 mg in the treatment of metastatic breast cancer: A European perspective[J]. The Breast, 2017, 32(Complete): 247-255

[28] Printz C. Circulating tumor cell count could be used to determine treatment of metastatic breast cancer [J]. Cancer, 2019, 125 (7): 1021-1021

[29] Fujii T, Horiguchi J, Yanagita Y, et al. Phase II Study of S-1 plus Trastuzumab for HER2-positive Metastatic Breast Cancer (GBCC-SG-01)[J]. Anticancer Research, 2018, 38(2): 905-909

[30] Kodera A, Inoue H, Ogura K, et al. Bevacizumab plus Pacli taxel Therapy Was Effective for Metastatic Breast Cancer with Dysphagia Due to Mediastinal Lymph Node Metastasis-A Case Report[J]. Gan to kagaku ryoho. Cancer & chemotherapy, 2018, 45(13): 2276-2278

[31] Bernstein V, Ellard S L, Dent S F, et al. A randomized phase II study of weekly paclitaxel with or without pelareorep in patients with metastatic breast cancer: final analysis of Canadian Cancer Trials Group IND.213[J]. Breast Cancer Research and Treatment, 2017, 167 (5): 1-9

[32] Karyln Porter, Margaret Quinn Rosenzweig. Current and Emerging Therapies for HER2-Positive Women With Metastatic Breast Cancer [J]. journal of the advanced practitioner in oncology, 2017, 8 (2): 164-168

[33] Jauch SF, Riethdorf S, Sprick MR, et al. Sustained prognostic impact of circulating tumor cell status and kinetics upon further progression of metastatic breast cancer[J]. Breast Cancer Res Treat, 2019, 173(1): 155-165

[34] Liu, Zhao, Wang, et al. Suppressive role of diallyl trisulfide in the activated platelet-mediated hematogenous metastasis of MDA-MB-231 human breast cancer cells [J]. International Journal of Molecular Medicine, 2017, 39(6): 1516-1524

[35] You K, Su F, Liu L, et al. SCARA5 plays a critical role in the progression and metastasis of breast cancer by inactivating the ERK1/2, STAT3, and AKT signaling pathways [J]. Molecular & Cellular Biochemistry, 2017, 435(1-2): 1-12