

## **Exploring the Combined Application of Two Methods for the Diagnosis of Breast Cancer -Color Doppler Ultrasound and Molybdenum Target X Ray Examination**

*Bo Wang<sup>1\*</sup>, Lili Hu<sup>1\*</sup>, Hongna. Tan<sup>1</sup>, Lulu Sun<sup>2</sup>, Jianbo Gao<sup>1</sup>*

*Bo Wang and Lili Hu Contributed equally to this work and should be considered co-first authors.*

<sup>1</sup>Department of Radiology, The First Affiliated Hospital of Zhengzhou University, Zhengzhou, 450000, China

<sup>2</sup>Department of Ultrasound, The First Affiliated Hospital of Zhengzhou University, Zhengzhou, 450000, China

### **ABSTRACT**

**Objective** To investigate the application value of color B-mode ultrasound and mammography in the diagnosis of breast cancer. **Methods** 81 patients with suspected breast cancer were selected from Sep. 2011 to Jul 2014 in our hospital, color B-mode ultrasound and mammography examination were used to all patients, and the test results were compared with pathological results. **Results** The diagnose accordance rate, sensitivity, specificity and accuracy of B-mode ultrasound and mammography were lower than those of color B-mode ultrasound combined with mammography, the differences were statistically significant ( $P < 0.05$ ). The positive predictive value of the three detection methods had no statistically significant difference ( $P > 0.05$ ). **Conclusions** The diagnostic accordance rate, sensitivity, specificity and accuracy of color B-mode ultrasound and mammography were lower than those of combination of the two methods, it suggest that combination of the two methods can improve the accuracy of breast cancer diagnosis.

**Keywords:** Breast cancer; Color B-mode ultrasound; Mammography

### **INTRODUCTION**

Breast cancer is a malignant tumor is a serious threat to women health and life safety, the incidence of breast cancer ranked first in female malignant tumor [1]. In most countries, the incidence of breast cancer continues to grow, the clinical use of surgery and radiotherapy and chemotherapy treatment, but the disease still has a high mortality rate, and early diagnosis is a key factor to reduce the mortality of patients with breast cancer, but also conducive to improving the quality of life of patients. In the diagnosis of breast cancer, the X line of molybdenum target [2] line and B is a very

Corresponding author: weipingz2015@sina.com

important method in clinical application. The authors collected 81 patients with suspected breast cancer who were treated in our hospital from July 2014 to September 2011, Color B and molybdenum target X were used to diagnose, and the diagnosis results were compared with pathology. The results were reported as follows.

### **MATERIALS AND METHODS**

#### **General Information**

The study object was 81 patients with suspected breast cancer who were treated in our hospital from September 2011 to July, 51.6 patients were female, aged 37~72 years old, average (+8.3) years old, excluding patients before examination.

### **Detection Methods**

81 cases were examined by color B and X, and the results were compared with pathological findings. X (Rom12-Rot207 SONOLINE).The X line of molybdenum target was examined by the use of the X line of molybdenum target mammography, B

ultra check is performed by using color Doppler ultrasonic diagnostic apparatus (SIEMENS, G60 S SONOLINE).

### **Statistical Analysis**

Computer data entry shall be treated with SPSS 16.0 statistical software, Count data is expressed by rate (%), the  $\chi^2$  test was used to compare between the different examination methods. The difference was statistically significant with  $p < 0.05$ .

**Table 1:** Comparison of the diagnostic accuracy of breast cancer pathology, B ultra and molybdenum target X line(case).

Pathological typing	Pathology	ltra B	molybdenum target X line	Ultra B + molybdenum target X line
infiltrating ductal carcinoma	49	43	45	48
Infiltrating lobular carcinoma	5	4	3	5
Micro ductal carcinoma	5	0	0	2
Medullary carcinoma	3	2	0	3
Mucinous adenocarcinoma	2	2	2	2
Intraductal carcinoma	1	1	1	1
Total	65	52	51	61
Diagnostic coincidence rate (%)	100.00	80.00	78.46	93.85

Note: compared with Ultra B +molybdenum target X line,  $p < 0.05$

**Table 2:** The sensitivity, specificity, accuracy and positive predictive value of Ultra B and molybdenum target X line

Examination method	Sensitivity	Specificity	Accuracy	Positive predictive value
Ultra B	86.1	86.1	83.7	95.8
Molybdenum target X line	82.4	79.3	78.5	92.7
Ultra B + Molybdenum target X line	91.9	91.2	91.9	97.5
$\chi^2$	8.03	5.11	6.29	0.41
P	$< 0.05$	$< 0.05$	$< 0.05$	$< 0.05$

Note: compared with Ultra B +molybdenum target X line,  $p < 0.05$

### **RESULTS**

The diagnosis coincidence rate of breast cancer pathology,Ultra B, molybdenum target X line inspection diagnostic accuracy by comparing can be seen from table 1.

The diagnostic coincidence rate of Ultra B and molybdenum target X line was significantly lower than that of Ultra B + molybdenum target X line, the difference was statistically significant ( $p < 0.05$ ). There was no significant difference in the diagnostic accuracy of Ultra B and molybdenum target X line ( $p > 0.05$ ).

Comparison of sensitivity, specificity, accuracy and positive predictive value of Ultra B and molybdenum target X line can be seen from table 2.

The sensitivity, specificity, accuracy and positive

predictive value of Ultra B and molybdenum target X line was significantly lower than that of Ultra B +molybdenum target X line , the difference was statistically significant ( $p < 0.05$ ). There was no significant difference in the positive predictive value of 3 detection methods ( $p > 0.05$ ).

## **DISCUSSION**

Breast cancer is a common malignant tumor in women. It is very important to improve the survival rate and quality of life of patients. It is very important for early diagnosis and treatment of [3]. There are many methods for the diagnosis of breast cancer, such as X line, Ultra B, infrared and CT, MRI, etc. At present, the application of digital mammography and X line is the most widely used in clinical diagnosis of breast cancer, and its application in the diagnosis of breast cancer has been significantly improved [4]. Ultra B in the diagnosis of breast cancer has significant advantages, Color B ultrasound is more prominent. The diagnostic level of breast cancer is similar to that of X line, which is the first choice for clinical diagnosis of breast cancer [5]. Color B has many advantages, such as has non radioactive, in the process of examination will not cause damage to the patient's body, the operation is easy to master, patients has no pain, the repeatability is strong, the cost is low [6], it is effective for the identification of the nature of the tumor, and has little effect on the causes of the dense glands, even if cystic lesions can accurately distinguish, accurate positioning. As a result, it is an indispensable inspection means of clinical diagnosis, but if the diameter of the tumor is less than the diameter of the probe, the effect of using color B super detection is poor [7]. Retrospective analysis of 58 cases of breast cancer patients with ultrasound examination by Mu Fang [8], all patients were confirmed by postoperative pathological examination for breast cancer. 52 cases among them were diagnosed as definite diagnosis. The diagnostic

accuracy rate was 95.52%, the accuracy rate confirmed after the operation is 100%. The accuracy rate of them are similar, no significant difference ( $p > 0.05$ ). The authors believe that the accuracy rate of color B in diagnosis of breast cancer patients is relatively high, the patient is easy to accept. In the present study, the diagnostic accuracy of Ultra B and molybdenum target X line (80% and 78.46% respectively) was significantly lower than that of Ultra B + molybdenum target X line (93.85%), which showed obvious advantages in the diagnosis of breast cancer. The difference was statistically significant ( $p < 0.05$ ), and it showed that the diagnostic accuracy of X line in the diagnosis of breast cancer was obviously superior.

Mammography X camera line in the process of clinical use improve continuously. The image mainly use different density groups of X ray absorption and attenuation of different principles to complete [9]. Its image post-processing feature is very powerful. The spatial resolution and contrast are also relatively high, which can clearly show the small calcification and the shallow calcification in the gland. Tumor nodules and micro calcification was the direct signs of it. At present in the diagnosis of breast cancer molybdenum target X-ray has become one of the most important, the most widely used method of examination. It is reported that the accuracy rate of X lines in the diagnosis of breast cancer is 92% [10]; Some scholars believe that there are large differences in the applicability of the X line census of women of different ages. Women older than 50 years can be early detection of breast cancer, women under the age of 40 had lower applicability. The X line is mainly based on the density difference between the lesions and the surrounding tissue, compared with the surrounding glands, the density of the tumor is higher, The malignant degree of the tumor increase with increasing density [6]. However,

there are some deficiencies in the molybdenum target X line: The dense glands are poorly developed, and the masses close to the chest wall are easy to leak. In addition, the method of the examination is radioactive, which limits the wide use of [11, 12] molybdenum target X line as a routine examination and physical examination items in breast cancer screening.

### **CONCLUSION**

The results showed that the sensitivity, specificity, accuracy and positive predictive value of Ultra B and molybdenum target X line was significantly lower than that of Ultra B + molybdenum target X line, the difference was statistically significant ( $p < 0.05$ ), which note that the effect of ultrasonic combined with molybdenum target X line is better than that of the two inspection methods alone. In short, the diagnostic coincidence rate, sensitivity, specificity and accuracy of color B and molybdenum target X line is in a similar level, which were significantly lower than the two examination methods combined use. It is suggested that the combination of two methods for checking the patient can improve the diagnostic accuracy rate obviously. But there is no obvious advantage in the combination of the two methods in the positive predictive value.

### **REFERENCES**

1. Xu XF, Bai YH. Comparison of color ultrasound and mammography in female breast cancer screening[J]. *Hebei Medicine*, 2011, 33 (12): 1869.
2. Yu FW, Feng YL, He XH, et al. The comparative study of clinical diagnosis for breast cancer of PET-CT and molybdenum target X line, B ultra[J]. *The International Journal of Radiation Medicine and Nuclear Medicine*, 2010, 30 (3): 148-151.
3. Qiu RS, Zhang JL. New progress in the treatment of breast cancer [J]. *South of the Five Ridges Modern Clinical Surgery*, 2014, 14 (3): 335-338.
4. Cai J, Cai QP, Wang Q, et al. A comparative study of Ultra B and X line in the diagnosis of breast cancer in Chinese[J]. *Regional Anatomy and Operative Surgery*, 2003, 12(5): 344-346.
5. Qiu XJ. Analysis of the clinical application of high frequency Ultra B in the diagnosis of breast diseases[J]. *Chinese Contemporary Medicine*, 2013, 20 (36): 110-111.
6. Hu XK. Advantages and value of mammography and color Doppler ultra B in early diagnosis of breast cancer[J]. *Jilin Medicine*, 2013, 34(11): 2107-2108.
7. Chen X, Sun HQ, Lin Q, et al. Clinical application evaluation of several special imaging examination of breast cancer[J]. *Primary Health Care in China*, 2005, 19(7): 91-92.
8. Mu F. Application discussion of color Doppler ultrasound B in diagnosis of breast cancer[J]. *The North Pharmacy*, 2014, 11(2): 158-159.
9. Hu YY. Clinical value analysis of the of ultra B sound and molybdenum target X line in the examination in breast cancer[J]. *Journal of Chengdu Medical College*, 2012, 7 (3Z): 452-453.
10. Wang LH. The diagnostic value of molybdenum target X line and ultra B in early breast cancer[J]. *Chinese Journal of Medicine*, 2012, 2: 89-90.
11. Ba MX, Wang QP. Comparative analysis of breast cancer molybdenum target, B ultra diagnosis and pathological diagnosis[J]. *Chinese Health Industry*, 2013, 10(19): 20-21.
12. Wang FL, Shen H, Lu C. Value comparison of mammography X line and B ultrasound in diagnosis of breast cancer[J]. *Journal of Nanjing Medical University (Natural Science Edition)*, 2012, 32 (2): 268-269