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Features of ultrasonic diagnostics of breast pathology

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Abstract

Breast cancer is the leading oncological pathology in women. According to WHO figures more than 1 million women fall ill with breast cancer in the world, and the growth of this pathology cases is forecasted in coming years.

The work is based on the data of 260 patients referred for US investigation from the city's polyclinics to clarify the mammary pathology nature.

The women age varied from 20 to 56 years. US was performed on the Aloka 500 apparatus using a multifrequency linear transducer operating in 6-15 MHz band. Ultrasound study was performed according to a standard procedure with the conduct of a gray-scale investigation, colour and energy mapping. 174 of 260 women (66.9%) had the different mastopathy variants, 49 of them (18.8%) had the most frequent diffuse fibrous mastopathy and 37 (14.2%) – fibrocystic breast disease, less common cases (11) of nodal mastopathy (4.23%). The complex US revealed 39 benign focal formations in 39 of 260 studied women, 21 of them had the cysts (8.06%), 10 – fibroadenomas (3.84%), and 8 women (3.07%) had lipomas. Breast cancer was detected in 4 women (1.54%).

Taking into account the above mentioned provisions, one can be convinced of the need for US examination of mammary glands and women training in self-examination methods.

Aim: examination of mammary glands in women.

Materials and methods: the work is based on the data of 260 patients referred for US investigation from the city's polyclinics to clarify the mammary pathology nature.

The women age varied from 20 to 56 years. US was performed on the Aloka 500 apparatus using a multifrequency linear transducer operating in 6-15 MHz band. Ultrasound study was performed according to a standard procedure with the conduct of a gray-scale investigation, colour and energy mapping.

Results: Thus, a complex US investigation as an additional highly-informative diagnostic technique, is characterized by high informativeness in the breast cancer diagnosis. Method has the high sensitivity, and this feature will render assistance in diagnosis, systematization the tactics of dynamic examination and women management with various mammary gland diseases.

Taking into account the above mentioned provisions, one can be convinced of the need for US examination of mammary glands and women training in self-examination methods.

Keywords: cancer, ultrasound, fibrocystic mastopathy, nodal mastopathy, fibro adenomas

Introduction

Breast cancer is the leading oncological pathology in women. According to WHO figures more than 1 million women fall ill with breast cancer in the world, and the growth of this pathology cases is forecasted in coming years.

Investigators have reported approx. 80% of breast tumors detected by patients themselves, most of these tumors sized about 3 or more centimeters. It should be noted that a low pathology detectability in the early stages is often due to a lack of clinical mammology knowledge in primary care physicians and often in obstetrician-gynecologists, since this category of doctors is the most frequently visited by women.

It is important to note that a steady increase in the breast cancer rate in the twentieth century was accompanied by a parallel increase in the mastopathy prevalence.

The problem of mastopathy is a topical one since according to polls data up to 70% of patients on mammologist outpatient visit are the women with this pathology. It should not be underestimated the mastopathy role in the development of breast cancer. In the countries with a high breast cancer morbidity the mastopathy prevalence is high also.

An important task of primary care physicians is to assign the female population for a mammologic examination. This will reduce the mastopathy incidence and breast cancer mortality.

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To achieve this goal, it is necessary to change priorities for a preventive side and women selection to the risk group aimed to detect the cancers at the diagnostic stage. Examination and palpation are the important ones. These are the basic and available methods which performed by the doctor in a vertical (with the arms down and then raised) and the woman horizontal position. When examining the breast, the structural features are taken into account: additional lobuli, changes in shape and volume, changes in the skin colour, presence and intensity of the venous pattern. It should be examined all the mammary gland sequentially by a palpatory percussion along the quadrants and the submammary fold area.

Areas of poorly demarcated painful indurations are defined with mammary glands mastopathy, without clear boundaries in the fiber bands form, and the rough glandular lobuli in the form of "cobblestone pavement" as well. A localized painfulness is quite common. Mentioned changes are the most pronounced ones in the upper-outer quadrants which are the most functionally active.

The manual examination needs to be complemented with complex radiological, ultrasound (US), radiothermometric (RTM-diagnostics) and other types of instrumental studies.

The main method of an objective assessment of the mammary glands status in a patients group after the age up 40 is the mammography. Mammography is the mammary gland radiography without the use of contrast agents.

The main mammography advantages used in the diagnosis of breast diseases

- the possibility of mammary gland image positional gaining;
- high information capability in the course of examination;
- possibility of visualization for impalpable formations;
- possibility of the pictures comparative analysis in dynamics.
- Method shortcomings which restrict its application:
- radiation burden of 0.5 mSv;
- the literature suggests that non-radiopaque cancer is occurred in 1.8–6%;

US diagnostics is constantly increasing its potential due to improvement of existing diagnostic techniques and development of the ones.

The study is conducting in the first phase of menstrual cycle. The main advantages of mammary glands US investigation:

- absence of contraindications;
- high resolution;
- high capacity;
- safety for radiation burden;
- rendering capability of impalpable formations;
- it can repeat the investigation without terms limit;
- it is possible to study axillary, supraclavicular and infraclavicular lymph efflux zones.

Aim: examination of mammary glands in women.

Materials and Methods

The work is based on the data of 260 patients referred for US investigation from the city's polyclinics to clarify the mammary pathology nature.

The women age varied from 20 to 56 years. US was performed on the Aloka 500 apparatus using a multifrequency linear transducer operating in 6-15 MHz band. Ultrasound study was performed according to a standard procedure with the conduct of a gray-scale investigation, colour and energy

mapping.

Results and Discussion

174 of 260 women (66.9%) had the different mastopathy variants, 49 of them (18.8%) had the most frequent diffuse fibrous mastopathy and 37 (14.2%) – fibrocystic breast disease, less common cases (11) of nodal mastopathy (4.23%). The complex US revealed 39 benign focal formations in 39 of 260 studied women, 21 of them had the cysts (8.06%), 10 – fibroadenomas (3.84%), and 8 women (3.07%) had lipomas. Breast cancer was detected in 4 women (1.54%). The women distribution according to nosological forms of changes in the mammary glands revealed in the US investigation, is presented in the table below.

Nosological entities of breast pathology

Table 1

Nosology	Absolute number (n)	%
Diffuse fibrous mastopathy	49	18.8
Fibrocystic mastopathy	37	14.2
Nodal mastopathy	11	4.23
Cysts	21	8.06
Fibro adenomas	10	3.84
Lipomas	8	3.07
Breast cancer	4	1.54
Breast, normal finding	120	46.15

The largest group consisted of women with mastopathy. Anatomical changes in various forms of mastopathy are various, but fibrous bands interlacing each other and passing without clear boundaries into the surrounding tissue are the mandatory ones. Proliferation of connective tissue, atrophic lobuli, small cysts with a non-uniform epithelium are the common signs for various forms of mastopathy

If the nodal formation is identified, its contours, internal structure, homogeneity and acoustic density have been evaluated.

Regional lymph efflux zones were assessed in all patients. The sites of nodal mastopathy did not look like as cancerous growth. They were distinguished by a more or less even contour, homogeneous echostructure, tissue deformations around the nodal zone were not observed, the vessels had a linear orientation, there were no signs of vascular pattern intensification.



Fig 1: Echo signs of fibrocystic mastopathy

Cysts looked like an anechogenic homogeneous liquid formation of round or ovoid form,, with a clear even contour, without reflection from the inner content, lateral acoustic shadows and dorsal signal amplification. Blood flow inside the cyst was not recorded.

Fibroadenomas had an even contour, more often the ovoid form, horizontal orientation, decreased or isoechogenic echo density, symmetrical lateral shadows. The vessels circumflexing the formation were recorded with colour Doppler mapping.

Lipomas had the even contour, horizontal orientation, isoechogenic or increased echo-density, without signs of vascular enhancement.

Uneven contour of the tumour, the vertical orientation, the inhomogeneous internal structure were the specific ultrasonic criteria for malignized formations; predominance of a solid component with a smaller content of connective tissue structures caused a distal amplification of the ultrasonic wave. All observations of focal pathology had morphological verification in the form of a cytological conclusion by the results of a fine needle puncture. The diagnosis of breast cancer was confirmed morphologically, after surgical treatment being based on histological findings. Herewith, ultrasound diagnosis of breast cancer was not cytologically established in one woman, however cancer cells were detected after morphological examination of postoperative material.

Conclusions

Thus, a complex US investigation as an additional highly-informative diagnostic technique, is characterized by high informativeness in the breast cancer diagnosis. Method has the high sensitivity, and this feature will render assistance in diagnosis, systematization the tactics of dynamic examination and women management with various mammary gland diseases.

Taking into account the above mentioned provisions, one can be convinced of the need for US examination of mammary glands and women training in self-examination methods.

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