

# Imaging of Male Breast Cancer

Alexander N. Sencha  
*Editor*

 Springer

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## Preface

Breast cancer in men is a rare disease, with an incidence of less than 1 % of all breast tumors. Although the incidence in men has increased during the last 30 years, patients almost always think of breast carcinoma as an exclusively “female” condition. Men are less aware of breast cancer and other breast pathology than women. The signs of the disease at early stages are indistinct, so male patients are usually late in consulting a doctor. Low awareness of the male population and doctors of a breast tumor results in late treatment. More than 30 % of patients with breast carcinoma begin treatment when the tumor is nonresectable.

The successful treatment of breast cancer (as well as other diseases) in men depends on early diagnosis. Diagnostic principles, including imaging modalities and treatment strategies, are based on the knowledge obtained from identifying and treating tumors in women. This problem is not well addressed because the low incidence of the disease precludes large randomized studies. Almost all data are based on small studies, and therefore, there is no uniform view regarding early and differential diagnosis of breast cancer in men. There is no standard approach to treatment that would permit to avoid unnecessary surgery and provide predictable and stable results. Modern means of examination for breast cancer in men are often criticized, and state guidelines are not developed. The screening for breast cancer within the limits of national programs involves only women. Screening programs with mammography and/or ultrasound for men (similar to programs for women) are unreasonable and are not cost-effective because of the low incidence of the disease. In general, men also tend to have an attitude of avoiding examinations. During routine health checkups of men, general practitioners also do not pay enough attention to this problem. Only the combination of efforts of patients and doctors can change the current situation.

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## Abbreviations

3D	Three-dimensional image reconstruction
3DPD	Three-dimensional power Doppler vascular image reconstruction
ARFI	Acoustic radiation force impulse
CDI	Color Doppler imaging
CT	Computed tomography
EDV	End-diastolic blood flow velocity
FNAB	Fine needle aspiration biopsy
FSH	Follicle-stimulating hormone
ICD-10	International statistical classification of diseases and related health problems, 10th revision
LH	Luteinizing hormone
MRI	Magnetic resonance imaging
PDI	Power Doppler imaging
PET	Positron emission tomography
PI	Pulsatility index
PSV	Peak systolic blood flow velocity
PW	Pulsed wave
RI	Resistive index
T4	Thyroxine
TPO	Thyroid peroxidase
TSH	Thyroid-stimulating hormone
US	Ultrasound
VOCAL	Virtual organ computer-aided analysis
VTQ	Virtual Touch™ tissue quantification
WHO	World Health Organization



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# Contents

1	<b>Modern Approaches to the Diagnosis of Breast Cancer: Diagnostic Methods of Breast Pathology in the Male Population.</b> . . . . .	1
	Alexander N. Sencha, Elena V. Evseeva, Irina A. Ozerskaya, Elena P. Fisenko, Yury N. Patrunov, Mikhail S. Mogutov, Elena D. Sergeeva, and Anastasia V. Kashmanova	
2	<b>Anatomy, Physiology, and Development of the Male Breast</b> . . . . .	17
	Alexander N. Sencha, Elena V. Evseeva, Irina A. Ozerskaya, Elena P. Fisenko, Yury N. Patrunov, Mikhail S. Mogutov, Elena D. Sergeeva, and Anastasia V. Kashmanova	
3	<b>Healthy Breast with Ultrasound.</b> . . . . .	25
	Alexander N. Sencha, Elena V. Evseeva, Irina A. Ozerskaya, Elena P. Fisenko, Yury N. Patrunov, Mikhail S. Mogutov, Elena D. Sergeeva, and Anastasia V. Kashmanova	
4	<b>Ultrasound of Male Breast Cancer.</b> . . . . .	35
	Alexander N. Sencha, Elena V. Evseeva, Irina A. Ozerskaya, Elena P. Fisenko, Yury N. Patrunov, Mikhail S. Mogutov, Elena D. Sergeeva, and Anastasia V. Kashmanova	
5	<b>Classification of Breast Masses.</b> . . . . .	69
	Alexander N. Sencha, Elena V. Evseeva, Irina A. Ozerskaya, Elena P. Fisenko, Yury N. Patrunov, Mikhail S. Mogutov, Elena D. Sergeeva, and Anastasia V. Kashmanova	
6	<b>Ultrasound Imaging of Breast Cancer Metastases</b> . . . . .	81
	Alexander N. Sencha, Elena V. Evseeva, Irina A. Ozerskaya, Elena P. Fisenko, Yury N. Patrunov, Mikhail S. Mogutov, Elena D. Sergeeva, and Anastasia V. Kashmanova	
7	<b>Differential Diagnosis of Male Breast Cancer.</b> . . . . .	97
	Alexander N. Sencha, Elena V. Evseeva, Irina A. Ozerskaya, Elena P. Fisenko, Yury N. Patrunov, Mikhail S. Mogutov, Elena D. Sergeeva, and Anastasia V. Kashmanova	

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<b>8</b>	<b>Treatment Strategies for Breast Diseases, Types of Breast Surgery, the Postoperative Breast, and Follow-Up Principles . . . . .</b>	<b>125</b>
	Alexander N. Sencha, Elena V. Evseeva, Irina A. Ozerskaya, Elena P. Fisenko, Yury N. Patrunov, Mikhail S. Mogutov, Elena D. Sergeeva, and Anastasia V. Kashmanova	
<b>9</b>	<b>Recurrent Breast Cancer. . . . .</b>	<b>133</b>
	Alexander N. Sencha, Elena V. Evseeva, Irina A. Ozerskaya, Elena P. Fisenko, Yury N. Patrunov, Mikhail S. Mogutov, Elena D. Sergeeva, and Anastasia V. Kashmanova	
	<b>Conclusion . . . . .</b>	<b>139</b>
	<b>References. . . . .</b>	<b>139</b>

# Modern Approaches to the Diagnosis of Breast Cancer: Diagnostic Methods of Breast Pathology in the Male Population

1

Alexander N. Sencha, Elena V. Evseeva, Irina A. Ozerskaya, Elena P. Fisenko, Yury N. Patrunov, Mikhail S. Mogutov, Elena D. Sergeeva, and Anastasia V. Kashmanova

The terms “male breast” and “male mammary gland” are both used in medical literature. Experimental and clinical studies demonstrate a similar origin and development of hyperplastic processes in breast in men and women, as well as common etiology and pathogenetic mechanisms of development of breast carcinoma in male and female organisms. The international standard for anatomical terminology (Terminologia Anatomica 1998) omitted the separate term “mamma masculine” because the male breast contains no unique elements but those of the female breast developed to a lesser extent. In the European and North American literature, several terms are used for breast carcinoma both in women and in men along with the Latin term “cancer mammae.” The common term in English is “breast cancer,” but with reference to men, the additional word “male” is applied.

The success in the treatment of breast diseases, including malignancies, substantially depends on timely diagnosis. Early diagnosis of breast diseases in men remains a problem, along with an increasing incidence of male breast carcinoma, and leads to corresponding mortality despite significant achievements in the study of cancer biology and modern approaches to treatment.

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Cases of late-stage breast carcinoma in men are most often the consequence of insufficient attention of patients to their own health, which results in them seeking medical treatment late. Sometimes, the low oncologic awareness of general practitioners may lead to unreasonable or insufficient medical actions, which may worsen the clinical course. Because of the typical late presentation to the doctor, 60 % of patients have complications, including regional or remote metastases, by the time of the diagnosis (Svyatuhina 1979). Breast carcinoma in 20 % of patients remains undiagnosed (Letyagin and Makarenko 1983). The mortality among men with breast carcinoma is up to 0.3 % of the mortality from other malignancies.

Early detection of breast carcinoma is the principal diagnostic aim. The equipment of medical institutions permits the so-called secondary preventive maintenance (screening) of breast carcinoma in healthy women without palpable breast masses. Screening is an initial, preliminary, but effective enough stage of examination of a certain population. Its main objective is to detect the disease at such an early stage that the following treatment results in a change in the clinical flow and forecast of the disease. Screening provides the elements of a differential diagnosis that helps to optimally choose further examination methods, apply early treatment, and increase life expectancy. Optimal screening is safe for a patient, easily reproduced, and almost independent of the operator's skills and quality of equipment. It is comparatively cheap and not time-consuming. Its cost is definitely less than the expenses of preventive maintenance and treatment of corresponding pathology. One expected disadvantage of screening is low diagnostic accuracy. Early detection enables curing breast cancer completely. In addition to revealing latent cancers, for men, screening involves a psychological aspect.

Patients with breast pathology are subject to further examination, first with X-ray mammography or complex ultrasound (US) with all available diagnostic options. Such an examination leads to differential diagnoses with subsequent choices of therapeutic tactics or – in cases of suspected malignancy – a biopsy with morphological verification, operative treatment, and dynamic observation.

However, these questions are not yet answered for the male population. Current examinations of men with breast changes are criticized because common guidelines are absent and not all clinics apply to men the generally accepted algorithm of examination of women with the same pathology. Examination reports vary from ordinary clinical examination with biopsy to mammography without a biopsy, or US alone with or without biopsy, depending on the results of the scan.

A unified diagnostic algorithm for the diagnosis of breast diseases and carcinoma particularly in men does not yet exist. In the case of precise preoperative diagnosis in early stages of breast cancer, a highly effective complex of medical actions, such as breast-conserving operations in combination with modern optimized programs of radiotherapy and chemotherapy, can be applied. The list of such procedures is similar to those in early and differential diagnosis of breast pathology in women. However, the indications, technologies, and order of their application may be different.

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## Diagnostic Methods of Breast Carcinoma

### 1. Preoperative

#### Principal

##### (a) Noninvasive

- Clinical examination (anamnesis, survey, palpation)
- X-ray mammography
- US of the breast and regional lymph nodes
- Analysis of steroid hormone receptors of tumors

##### (b) Invasive

- Stereotactic core needle biopsy with histology
- US-guided fine needle aspiration biopsy (FNAB) with cytology
- Vacuum aspiration biopsy with US or X-ray guidance
- Nipple discharge cytology
- Preoperative marking of impalpable tumors with barbed needles

Additional (if indicated on the basis of individual features of breast development)

- Ductography
- MRI
- CT of the breast and thorax
- Scintigraphy
- Others (electrical impedance tomography, radiothermometry, etc.)

### 2. Intraoperative

- Urgent histology

### 3. Postoperative

- Histology of the specimen

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## 1.1 Clinical Data

*Clinical examination* in upright and supine positions permits assessment of the breast size and symmetry, the shape of the nipples and areola, deformation, lesions, and the state of axillary lymph nodes. Positioning the patient with the arms raised facilitates detection of tumors, skin infiltration, and deformation of the nipple, areola, or nearby regions (Fig. 1.1). Comparison with the contralateral breast is always necessary.

Diagnostic accuracy of clinical examination in revealing benign breast changes in men and women does not exceed 65 %, and in the detection of breast cancer, 50–60 %. The sensitivity of clinical examination for breast carcinoma in women is



**Fig. 1.1** Clinical survey. (a) (1, 2) Skin deformation (b) Nipple retraction

40–69 %, with a specificity of 88–95 % (Todua 1980; Korzhenkova 2004; Sencha et al. 2010a, b).

The experience of our clinic and literature analysis demonstrated that mistakes in the diagnosis of breast cancer arose in approximately 30 % of patients who saw the doctor for the first time for this purpose. Being aware of breast oncology often prevents incorrect medical decisions. It is necessary to remember this during routine examinations of men, especially for men older than 50–60 years.

*Palpation* of abnormal breast tissue is capable of revealing lesions (often of cartilaginous density) with rough contours that are located centrally behind the nipple or areola, or near to them. A detected lesion requires a more careful palpation of this area to determine the size, shape, consistency, motility of the mass, and status of the skin over the mass. The relatively thin layer of subcutaneous fat in men, as compared with women, and the affinity of the gland to the skin and underlying tissues mean that the tumor attaches early to the anterior thoracic wall and the skin, and the skin becomes wrinkled. However, palpation of a small breast tumor at early stages is often difficult, and the revelation of such tumors is often incidental.

The study of the status of *steroid hormone receptors* shows that receptors to estrogen and progesterone are often observed in men. The incidence of estrogen-positive malignant breast tumors in men is 65–100 %. Clinically significant levels can be registered in greater than 85 % of cases. Nevertheless, the expression of receptor-positive tumors in men does not increase with age, as compared with women. There is a correlation between clinically significant levels of estrogen receptors and the effects of hormone therapy.