International Surgery

# 12 years of Male Breast Cancer Experience at One Center

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| **Corresponding Author:** | Sedat ÇARKIT<br>Erciyes Universitesi Tip Fakultesi<br>MELİKGAZİ, KAYSERİ TURKEY |
| **Corresponding Author Secondary Information:** | |
| **Corresponding Author's Institution:** | Erciyes Universitesi Tip Fakultesi |
| **Corresponding Author's Secondary Institution:** | |
| **First Author:** | Sedat ÇARKIT |
| **First Author Secondary Information:** | |
| **Order of Authors:** | Sedat ÇARKIT |
| | Bahadir Oz |
| | Mustafa Gok |
| | Alper Celal Akcan |
| | Mustafa Karaagac |
| | Dicle Aslan |
| | Emel Mutlu |
| | İsmail Solak |
| | Erdogan Mutevelli Sozuer |
| **Order of Authors Secondary Information:** | |
| **Abstract:** | “Background”<br>Male breast cancer is a sporadic disease and only one in every 100 new breast cancer patients is male. There are few satisfactory clinical studies on male breast cancers in the literature. We aim to share the clinicopathologic and demographic characteristics of male breast cancer patients admitted to our clinic in the last 12 years and our experience in the treatment of these patients.<br>“Methods”<br>The data of patients who were referred to our clinic with a diagnosis of breast cancer, suspicion of breast cancer, or who presented to our outpatient clinic with symptoms of breast discharge, palpable mass in the breast and were diagnosed with breast malignancy or suspicion of malignancy between 2010 and 2022 were retrospectively evaluated from the data bank records of our hospital. 28 patients were included in the study. Patients’ clinical and pathologic data, treatment options, approach to the axilla, pathology results, and survival were evaluated.<br>“Results”<br>There were 28 patients in the research. 22 had mastectomies. No surgical intervention was carried out for the five patients who had metastases. One of these patients died during follow-up due to advanced comorbidities and metastatic disease. Another patient declined surgery following neoadjuvant chemotherapy and passed away during follow-up (ex). The third patient still undergoing neoadjuvant treatment.<br>“Conclusions” |

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|---|---|
| | Male breast cancers are rare diseases. RT after mastectomy increases survival in male patients as well as in female patients. However, RT in male patients is not standardized today. In our study, 15 patients received adjuvant RT. |

# 12 years of Male Breast Cancer Experience at One Center


## Abstract

**“Background”**

Male breast cancer is a sporadic disease and only one in every 100 new breast cancer patients is male. There are few satisfactory clinical studies on male breast cancers in the literature. We aim to share the clinicopathologic and demographic characteristics of male breast cancer patients admitted to our clinic in the last 12 years and our experience in the treatment of these patients.

**“Methods”**

The data of patients who were referred to our clinic with a diagnosis of breast cancer, suspicion of breast cancer, or who presented to our outpatient clinic with symptoms of breast discharge, palpable mass in the breast and were diagnosed with breast malignancy or suspicion of malignancy between 2010 and 2022 were retrospectively evaluated from the data bank records of our hospital. 28 patients were included in the study. Patients’ clinical and pathologic data, treatment options, approach to the axilla, pathology results, and survival were evaluated.

**“Results”**

There were 28 patients in the research. 22 had mastectomies. No surgical intervention was carried out for the five patients who had metastases. One of these patients died during follow-up due to advanced comorbidities and metastatic disease. Another patient declined surgery following neoadjuvant chemotherapy and passed away during follow-up (ex). The third patient passed away during neoadjuvant chemotherapy, and two patients are still undergoing neoadjuvant treatment.

**“Conclusions”**

Male breast cancers are rare diseases. RT after mastectomy increases survival in male patients as well as in female patients. However, RT in male patients is not standardized today. In our study, 15 patients received adjuvant RT.



**“Keywords”**

Male Breast Cancer, Segmental Mastectomy, Sentinel Lymph Node Biopsy, Breast Conversing Surgery, Radiotherapy

## 1- Introduction

Male breast cancer is a sporadic disease and only one in every 100 new breast cancer patients is male [1]. Moreover, only 0.2% of cancer-related deaths in men each year are due to breast cancer [2]. For these reasons, there are few satisfactory clinical studies on male breast cancers in the literature, and the diagnostic and therapeutic modalities and treatment algorithms are generally the same as in female breast cancer patients [1-3].

Although it can be seen at any age, it is more common in the 6th and 7th decades. Patients in this age group usually have advanced-stage disease findings such as large tumor diameter, lymph node involvement, and metastasis at the time of diagnosis. Genetic factors, BRCA mutation, family history, obesity, Kleinfelter syndrome, gynecomastia, liver disease, orchitis, undescended testis, alcohol use, exogenous estrogen and testosterone use, and radiation history are the most common causes in etiology [1-6,7] .

Patients usually present with a painless mass, ulcerated skin lesions, nipple discharge, or retraction. (8)The most common histologic type is invasive ductal carcinoma. The diagnosis is usually made by USG and MRI followed by a thick needle biopsy [6,7].

This study aims to share the clinicopathologic and demographic characteristics of male breast cancer patients admitted to our clinic in the last 12 years and our experience in the treatment of these patients.

**2- Material method:**

All procedures performed in this study involving human participants were by the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The study was approved by the local ethics committee.

The data of patients who were referred to our clinic with a diagnosis of breast cancer, suspicion of breast cancer or who presented to our outpatient clinic with symptoms of breast discharge, palpable mass in the breast and were diagnosed with breast malignancy or suspicion of malignancy between 2010 and 2022 were retrospectively evaluated from the data bank records of our hospital. Forty-one patients whose data could be accessed were obtained.

Thirteen patients were removed from the trial because their data could not be obtained..Out of these patients, the study included 26 with invasive carcinoma, 1 with mucinous carcinoma, and 1 with DCIS. Clinical and pathologic information, available treatments, the axilla approach, pathology findings, and survival were assessed in 28 cases.

All patients presented to the clinic with a breast mass. All patients were evaluated by physical examination. All patients underwent ultrasonography (USG) and trucut biopsy for pathological diagnosis. Metastatic cases were referred for neo-adjuvant chemotherapy. Primary surgery was performed on patients without metastasis. The surgical method was applied as segmental mastectomy and mastectomy. Sentinel lymph node biopsy (SLNB) was performed on patients with clinically negative axillary lymph nodes, and axillary lymph node dissection (ALND) was performed in cases with clinically positive axillary lymph nodes. Isosulfan blue and gamma probe (marked with Tc-99m) were applied in combination for sentinel lymph node sampling. The lymph nodes excised with this method were sent for intraoperative frozen examination.

Axillary dissection was performed according to the rate of positive lymph nodes according to the frozen result. Classic immunohistochemistry (IHC) markers such as estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2) were used to determine the tumor subtype. Patients were staged according to the Tumor Node Metastasis system (7th or 8th TNM) valid at the time of diagnosis. BRCA 1 and BRCA 2 gene mutation analysis was performed on patients with a suspicious family history. Clinicopathological data including patient age, tumor size, tumor location, histological type of the tumor, receptor status of the tumor, grade of the tumor, stages, type of surgery, number of SLNs taken, and follow-up period were evaluated in detail.

**3- Results**

In this study, 28 male patients diagnosed with breast cancer pathologically were evaluated in detail. The average age of the patients was 63.6 (31-92). The tumor was located in the right breast in 15 (53.6%) patients and in the left breast in 13 (46.4%) patients. The tumor location was mostly retroareolar (78.5%). 7 patients (25%) had a family history of breast cancer and only one patient (3%) had a family history of male breast cancer. For preoperative pathological diagnosis, tru-cut biopsy was performed on 20 (71.4%) patients, and fine needle aspiration (FNA) was performed on 3 (10.7%) patients. Incisional biopsy was performed on 1 (6%) patient (simple mastectomy was performed on this patient to diagnose due to metastatic appearance and open wound in the breast preoperatively) and excisional biopsy was performed on 4 (14.2%) patients. All patients were estrogen positive and 19 patients (67.8%) were progesterone positive. One of the progesterone negative patients was DCIS and 8 were invasive ductal carcinoma. HER2 was positive in 2 patients (7.1%) and negative in 25 patients (89.2%). One of these 2 patients had distant organ metastasis, and the other had axillary involvement. The Ki 67 index was low in 7 of the 28 patients, and high in the others (25%). When the genetic evaluation results of the patients included in the study were screened in our clinic, data of only 10 patients could be reached and no mutation was detected in 5 patients. A heterozygous pathogenic variant was found in the BRCA1 gene in 1 patient, a heterozygous pathogenic variant in the BRCA2 gene in 3 patients, and a mutation of unknown significance in the BRCA1 gene and a pathological variant in the BRCA2 gene in 1 patient **(Table 1)**.

As a result of the biopsies performed in the preoperative evaluation, the most common diagnosis was invasive ductal carcinoma (22 patients), malignant lesion in 1 patient, invasive carcinoma in 2 patients, adenocarcinoma in 1 patient, mucinous carcinoma in 1 patient, and DCIS in 1 patient. After surgery, the most common histological type was invasive ductal carcinoma in 26 patients (92.8%), mucinous tumor in 1 patient (3.5%), and low-grade DCIS in 1 patient (3.5%) **(Table 2)**. Pathological stages were; I (n=1), IIA (n=9), IIB (n=3), IIIA (n=6), IV (n=9) **(Figure)**. Mastectomy was performed on 22 of the 28 patients, and breast-conserving surgery was performed on 1 patient. SLNB was performed on 8 patients, ALND on 9 patients, and ALND after SLNB on 3 patients (1 was operated after neoadjuvant chemotherapy) **(Table 3)**. In 3 patients, only simple mastectomy was performed due to metastatic disease, and axillary sampling was not needed. Four patients received neoadjuvant chemotherapy; two patients died during treatment and two patients are still receiving treatment. One metastatic patient died during follow-up. There were nine metastatic patients. Surgical intervention was not performed on five patients with metastasis. One patient died during follow-up due to advanced comorbidities and metastatic disease. One patient refused surgery after neoadjuvant chemotherapy and died during follow-up. One patient died during neoadjuvant chemotherapy and two patients are still receiving neoadjuvant treatment.

Simple mastectomy was performed on three of the metastatic patients, mastectomy and SLNB were performed on one patient following neoadjuvant chemotherapy, and ALND was performed following SLNB. In patients who underwent isolated SLNB, the average number of LNs removed was 3.87 (3-5 LNs), and the positivity rates are included in the table **(Table 4)**. One patient, who was proven to have metastatic lymph nodes in the axilla by trucut biopsy before surgery, was evaluated as having a good response after neoadjuvant chemotherapy, and after SLNB was reported as 1/3 metastatic and 19/19 reactive LN (final result 1/22 positive), ALND was performed

**(Table 5)**. In metastatic patients, the most common site of metastasis was bone (7 patients), followed by lung (4 patients), brain (3 patients), and contralateral axilla (2 patients) (some patients had multiple metastases). Six (21.4%) of the patients who were initially metastatic or later developed metastases implemented chemotherapy as first-line systemic treatment, and 3 (3%) hormone therapy. In response to first-line treatment, partial response was achieved in 5 (17.9%) patients and stable disease response was achieved in 4 (10.7%) patients. The median invasive disease-free survival (IDFS) was 90 months in 19 patients who were not initially metastatic. The median OS in the entire group was 93 months. 10 (35.7%) patients received adjuvant radiotherapy (RT) at our clinic, while 5 patients received RT at an outside center. A total dose of 50 Gy to the chest wall and 60 Gy to the breast was given using the simultaneous integrated boost (SIB) technique with a boost to the tumor bed. In 3 (10.7%) of the patients who are still being treated at our clinic, RT was applied only to the chest wall without lymph node irradiation, while in 6 (21.4%) patients, the lymph nodes were included in the RT treatment area. One (3.5%) patient received RT to the breast and lymph nodes. Intensity-modulated RT (IMRT) technique was used in 7 (25%) patients; three-dimensional (3D) RT was preferred in 1 (3.5%) patient, and two-dimensional (2D) RT technique was preferred in 1 (3.5%) patient. Two (7.1%) patients underwent 30 Gy RT for bone and brain due to bone metastasis.

**4- Discussion**

MBC, unlike breast cancer in women, is a rare and under-studied disease. The American Cancer Society records for 2020 have shown the diagnosis of breast cancer in the year in 2620 men and the death in total of 526 men them [9]. The 5-year age-adjusted incidence of breast cancer in men varies from 0.67 to over 2.4 per 100,000 people [10]. The mean age at diagnosis is 62 years in women and 67 years in men. The mean age at diagnosis in our patients is 63.6 ± .12 (31–92) is close to this value. A group of risk factors for MBC identifed this general risk factors and genetic factors.

General risk factors include age, a positive family history, exposure to high estrogen levels, a history of orchitis/epididymitis, gynecomastia, Klinefelter syndrome, radiation exposure, obesity, and use of external estrogen or testosterone preparations. In a very large prospective cohort study, Brinton et al. reported MBC at nearly twice normal for people reporting a history of breast cancer in first-degree relatives. The relative risk was 1.92 and the 95% confidence interval was 1.19 to 3.09. [11]

In our series of 28 patients, 7 or 25% of the probands had a first-degree relative with breast cancer, and 1 or 3% had a family member with male breast cancer. Therefore, a family history of breast cancer was found in 8 of 28 persons. Our study confirmed high-stage, estrogen receptor-positive male cases. A study by the ample Veterans Affairs Database system likewise indicated that gynecomastia, obesity, and orchitis/epididymitis are connected to MBCs [12]. Klinefelter syndrome, a chromosomally connected embryologic defect with a high estrogen/androgen ratio, is also a significant positive factor [13].

Several high penetrance genes have been found to increase a man's risk of developing breast cancer. The most extensively researched are mutations in the BRCA1 and BRCA2 genes. BRCA1 and BRCA2, tumor suppressor genes involved in DNA repair, were discovered in 1994 [14] and 1995 [15], respectively. Mutations in either gene have been linked to an increased risk of numerous cancers, the most prevalent of which are ovarian and breast cancers. As noted by Thorlacius et al. [16] in 1995 and later discovered in numerous other investigations, individuals with a harmful germline BRCA2 mutation have a markedly elevated risk of MBC.

1939 households were examined in a sizable research using data from the National Cancer Institute Database [17]. 2.6% and 7%, respectively, of the 97 individuals with MBC who had detectable BRCA2 and BRCA1 mutations. BRCA1 and BRCA2 mutation carriers had a greater cumulative risk of breast cancer than non-carriers did at all ages. Men with BRCA1 mutations had an age-adjusted cumulative breast cancer risk of 1.2% (95% CI = 0.22% to 2.8%) at age 70, while those with BRCA2 mutations had an age-adjusted cumulative risk of 6.8% (95% CI = 3.2% to 12%). Because our investigation was retrospective, a BRCA panel was completed on 10 of the 28 individuals, and 5 of them had negative results. One patient had positive BRCA 1 results, while three patients had positive BRCA 2 results.

Although there are various ways that MBC might manifest, palpable breast mass is the most typical observation [18]. Other less frequent symptoms include ulceration, skin retraction, and nipple discharge or bleeding. In more

severe situations, some patients may even show up with axillary lymphadenopathy. Comparably, in our series, 85.7% of patients had a palpable lump in their breast as their initial complaint. Ninety percent of individuals receive an early-stage diagnosis. According to one study, the patients' diagnoses for stages 1, 2, 3, and 4 of the disease were 37%, 21%, 33%, 33%, and 9%, respectively [19]. These rates were discovered to be, in our investigation, 4%, 42%, 22%, and 32%, respectively (Figure).

The majority of the histopathologic variations of breast cancer observed in women are also present in men, albeit at varying rates. Men are seldom diagnosed with ductal carcinoma in situ (DCIS), and over 85% of BC cases are invasive [20]. As Table 2 illustrates, ductal carcinoma in situ was found in just 1 patient in our investigation. One possible explanation for this could be the low rate of screening mammography among men.

Most MBCs were negative for the human epidermal growth factor receptor 2 (HER-2) and positive for the estrogen and progesterone receptors (ER+ and PR+). Cardoso F et al. conducted a retrospective evaluation of 1483 patients in a very large International MBC program collaboration between 1990 and 2010. Eighty-two percent of the patients were PR+, eighty-seven percent were ER-2 negative, and just three percent were triple negative [21]. These rates were 100% ER+, 67.8% PR+, and 7.1% HER-2 positive in our investigation.

It is evident that, albeit surgeon-dependent, our clinic's approach to the axilla has shifted toward conservatism since the start of this study in 2010.(9 ALND-3 SLNB+ALND, 8 SLNB) Mastectomies are still the preferred method of treating breasts. (One BCS; 22 mastectomies) Both male and female patients' survival rates are increased by RT following mastectomy [22]. However, RT is not currently standardized for male patients. Adjuvant RT was administered to 15 individuals in our research. In this study, no patient's treatment decision was made using genomic testing.

Early-stage MBC is managed in the same way as it is for women. Depending on the results of the operation, the presence or absence of hormone receptors, and other prognostic markers, the majority of patients with early-stage breast cancer have surgery followed by adjuvant endocrine therapy, chemotherapy, or radiation therapy [23]. In contrast to women, males prefer not to have BCS, and the majority of men have mastectomy. However; Research suggests that survival rates of MBC patients treated by BCS and RT are near same if not better than. Only when all mastectomy patients had stage I cancer and had radiation therapy following surgery was the five-year case-specific survival rate found to be equivalent between treatment groups in a study of 1777 cases of MBC, in which 17% of males underwent BCS and 40% underwent radical or simple mastectomy. With only 46% of patients undergoing RT, the necessity for RT did not, however, substantially impact the survival of patients receiving BCS [24]. Out of the 22 patients in our series, only one had axillary dissection and BCS. In MBC-eligible instances, BCS may now be recommended because of its comparable long-term oncologic outcomes to mastectomy. There are no prospective data on the function of adjuvant radiation therapy (RT) in MBC, and most of the time, breast cancer patient guidelines are adhered to.

Male breast cancers are high-stage, estrogen-positive instances, as our investigation has shown. Similar to Spreafico et al.'s study [25], we also discovered that the number of metastatic cases at the time of diagnosis was high in our investigation. Endocrine therapy should be the first-line treatment for males with advanced or

metastatic HR+ breast cancer, according to the most recent ASCO guidelines [26]. Chemotherapy should only be used in cases of visceral crisis or fast progressing disease. Endocrine therapy was not the first choice for our metastatic patients. With the latest methods, we should now treat metastatic patients with hormone therapy.

## 5- Conclusion

Just like in women, male breast cancer patients undergo breast-conserving surgery, but more importantly, axilla-conserving surgery [27]. In addition to this approach, which is important to prevent possible morbidities, studies with larger samples are needed in terms of genetic counseling and prophylactic procedures.

Due to the low prevalence, there have not been many male patients included in prospective studies on the treatment of breast cancer, which has led to a lack of information on Male Breast Cancer (MBC). Increasing the viability of including male patients in organized clinical trials will undoubtedly aid in the creation of evidence-based guidelines for the treatment of MBC. To understand tumor genesis, risk factors, and prognostic variables in male breast cancer, further molecular research is required.


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## Footnote

**Conflicts of Interest:** The authors have no conflicts of interest to declare.

**Availability of data and materials:** The datasets generated and/or analyzed in this study are available from the corresponding author upon reasonable request.

**Authors' contributions**: SC, BO, and MG wrote the paper. MK, DA, EM and IS collected the data and the literature for the article. SC, BO, MG, and MK analyzed and interpreted the data. ES, SC, AA and DA revised the manuscript for important intellectual content. All the authors read and approved the final manuscript.

**Ethical Statement:** The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013) and was approved by the Ethics Committee of the Erciyes University Faculty of Medicine. (2024/278)

**6- References**


1. Abdelwahab Yousef AJ. Male Breast Cancer: Epidemiology and Risk Factors. Semin Oncol. 2017;44(4):267-72.

2. Gucalp A, Traina TA, Eisner JR, Parker JS, Selitsky SR, Park BH, et al. Male breast cancer: a disease distinct from female breast cancer. Breast Cancer Res Treat. 2019;173(1):37-48.

3. da Silva TL. Male breast cancer: Medical and psychological management in comparison to female breast cancer. A review. Cancer Treatment Communications. 2016;7:23-34.

4. Liu N, Johnson KJ, Ma CX. Male Breast Cancer: An Updated Surveillance, Epidemiology, and End Results Data Analysis. Clin Breast Cancer. 2018;18(5):e997-e1002.

5. Fentiman IS. Male breast cancer is not congruent with the female disease. Crit Rev Oncol Hematol. 2016;101:119-24.

6. Ruddy KJ, Winer EP. Male breast cancer: risk factors, biology, diagnosis, treatment, and survivorship. Ann Oncol. 2013;24(6):1434-43.

7. Khan NAJ, Tirona M. An updated review of epidemiology, risk factors, and management of male breast cancer. Med Oncol. 2021;38(4):39.

8. Gomez-Raposo C, Zambrana Tevar F, Sereno Moyano M, Lopez Gomez M, Casado E. Male breast cancer. Cancer Treat Rev. 2010;36(6):451-7.

9. Cancer Statistics Center. American Cancer Society. 2020. Breast Statistics | American Cancer Society - Cancer Facts & Statistics. https:// cance rstat istic scent er. cancer. org/ cancer- site/ Breast/ 91Q4dqjU

10. Surveillance, Epidemiology, and End Results Program. SEER cancer statistics review (CSR) 1975–2016. https:// seer. cancer. gov/ csr/ 1975_ 2016/. Accessed 24 Oct 2019

11. Brinton LA, Richesson DA, Gierach GL, Lacey JV Jr, Park Y, Hollenbeck AR, Schatzkin A. Prospective evaluation of risk factors for male breast cancer. J Natl Cancer Inst. 2008;100(20):1477–81.

12. Brinton LA, Carreon JD, Gierach GL, McGlynn KA, Gridley G. Etiologic factors for male breast cancer in the US Veterans affairs medical care system database. Breast Cancer Res Treat. 2010;119(1):185–92

13. Swerdlow AJ, Schoemaker MJ, Higgins CD, Wright AF, Jacobs PA. Cancer incidence and mortality in men with Klinefelter syndrome: a cohort study. J Natl Cancer Inst. 2005;97(16):1204–10.

14. Miki Y, Swensen J, Shattuck-Eidens D, Futreal PA, Harshman K, Tavtigian S, Liu Q, Cochran C, Bennett LM, Ding W, Bell R. A strong candidate for the breast and ovarian cancer susceptibility gene BRCA1. Science. 1994;7:66–71.

15. Wooster R, Bignell G, Lancaster J, Swift S, Seal S, Mangion J, Collins N, Gregory S, Gumbs C, Micklem G, Barfoot R. Identification of the breast cancer susceptibility gene BRCA2. Nature.1995;378(6559):789.

16. Thorlacius S, Tryggvadottir L, Olafsdottir GH, Jonasson JG, Ogmundsdottir HM, Tulinius H, Eyfjord JE. Linkage to BRCA2 region in hereditary male breast cancer. Lancet. 1995;346(8974):544–5.

17. Tai YC, Domchek S, Parmigiani G, Chen S. Breast cancer risk among male BRCA1 and BRCA2 mutation carriers. J Natl Cancer Inst. 2007;99(23):1811–4.

18. National Cancer Institute: Male breast cancer treatment (PDQ®)-patient version . (2021). Accessed: September 9, 2021: https://www.cancer.gov/types/breast/patient/male-breast-treatment-pdq.

19. Ribeiro GG, Swindell R, Harris M, Banerjee SS, Cramer A. A review of the management of the male breast carcinoma based on an analysis of 420 treated cases. Breast. 1996;5(3):141–6.

20. Pappo I, Wasserman I, Halevy A. Ductal carcinoma in situ of the breast in men: a review. Clin Breast Cancer. 2005;6(4):310–4.

21. Cardoso F, Bartlett JMS, Slaets L, et al. Characterization of male breast cancer: results of the EORTC 10085/TBCRC/BIG/NABCG international male breast cancer program. Ann Oncol. 2018;29(2):405–17. https:// doi. org/ 10. 1093/ annonc/ mdx651.

22. Lin AP, Huang TW, Tam KW. Treatment of male breast cancer: meta-analysis of real-world evidence. Br J Surg. 2021;108(9):1034-42

23. Chavez-MacGregor M, Clarke CA, Lichtensztajn D, Hortobagyi GN, Giordano SH. Male breast cancer according to tumor subtype and race: a population-based study. Cancer. 2013;119(9):1611–7.

24. Zaenger D, Rabatic BM, Dasher B, Mourad WF: Is breast conserving therapy a safe modality for early-stage male breast cancer?. Clin Breast Cancer. 2016, 16:101-4. 10.1016/j.clbc.2015.11.005

25. Spreafico FS, Cardoso-Filho C, Cabello C, Sarian LO, Zeferino LC, Vale DB. Breast cancer in men: clinical and pathological analysis of 817 cases. American journal of men's health. 2020;14(4):1557988320908109.

26. Hassett MJ, Somerfield MR, Baker ER, Cardoso F, Kansal KJ, Kwait DC, Plichta JK, Ricker C, Roshal A, Ruddy KJ, Safer JD. Management of male breast cancer: ASCO guideline. J Clin Oncol. 2020;38(16):1849–63.

27. Cardoso F, Bartlett JMS, Slaets L, van Deurzen CHM, van Leeuwen-Stok E, Porter P, et al. Characterization of male breast cancer: results of the EORTC 10085/TBCRC/BIG/NABCG International Male Breast Cancer Program. Ann Oncol. 2018;29(2):405-17.

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# 12 years of Male Breast Cancer Experience at One Center

**Authors:**

**Sedat Carkit[1];** 0000-0001-7360-5121,

**Bahadir Oz[1];** 0000-0002-3791-0521,

**Mustafa Gok[1];** 0000-0003-4272-1087,

**Alper Akcan[1];** 0000-0001-9469-4274,

**Mustafa Karaagac[1];** 0000-0002-3423-7941

**Dicle Aslan[2];** 0000-0002-3716-3925

**Emel Mutlu[3];** 0000-0002-1008-2527

**İsmail Solak[1];**

**Erdogan Sozuer[1];** 0000-0002-3332-2570

**Affiliations:** [1]Erciyes University Faculty of Medicine, Department of General Surgery, Kayseri, Turkey,

[2] Department of Radiation Oncology, Faculty of Medicine, Erciyes University, Kayseri, Turkey

[3] Erciyes University Faculty of Medicine, Department of Medical Oncology, Kayseri, Turkey

**Correspondence to:** Sedat Carkit MD, Erciyes University Faculty of Medicine, Department of General Surgery, Köşk Street, Postal Code: 38030 MELİKGAZİ / KAYSERİ Kayseri, Turkey.

**E-Mail:** opdrsedatcarkit@gmail.com **Telephone:** 00 90 506 553 73 14

**Figure: Stage of Patients at the time of Admission**

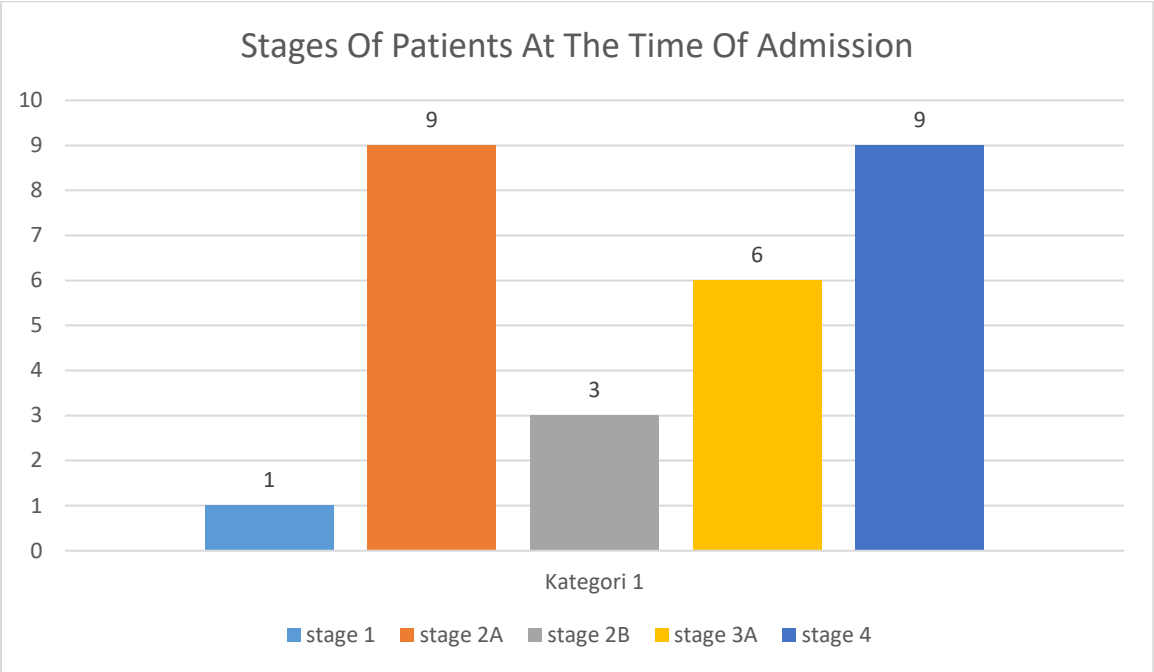

**Table 1: Clinical and Demographic Data of Patients**

| **Patient** | **n=28** |
|---|---|
| Age | 63.6(31-92) |
| **Symptom** | **n=28** |
| Palpabl Mass | 24 (% 85.7) |
| Metastatic disease | 1 |
| Nipple discharge | 1 |
| Wound on nipple | 1 |
| Joint pain and hoarseness | 1 |
| **Settlement** | **n=28** |
| Retroareolar | 22 (%78.5) |
| Upper outer quadrant | 4 |
| Lower outer quadrant | 2 |
| **Risk factors** | **n=28** |
| Family history of breast cancer | 7 |
| Family history of male breast cancer | 1 |
| **Imaging method** | **n=28** |
| Usg | 28(%100) |
| Mamography | 17 (%60.6) |
| Mri | 24 (%81.8) |
| Other | 9 (%30.3) |
| **Hormone Receptor Status** | **n=28** |
| ER (+) | 28 (%100) |
| PR (+) | 19 (%67.8) |
| Kİ67 (<%14) | 7 (%25) |
| HER2 + | 2 (%7.1) |
| **BRCA1/BRCA2** | **n = 10** |
| NEGATIVE | 5 |
| BRCA1 | 1 |
| BRCA2 | 3 |
| BRCA1 + BRCA2 | 1 |

**Table 2: Pathological Pre-Post Operative Diagnosis**

| Pathological diagnosis (pre-operative) | n=28 | Pathological diagnosis (Post-operative) |
|---|---|---|
| İnvasive ductal carcinoma | 22 (78.5) | İnvasive ductal carcinoma |
| Mucinous tm | 1 | Mucinous tumor |
| Ductal carcinoma in stu | 1 | Ductal carcinoma in stu |
| İnvasive carcinoma | 2 | Invasive ductal carcinoma |
| Adenocarcinoma | 1 | Invasive ductal carcinoma |
| Malignant Lesion | 1 | Invasive ductal carcinoma |

**Table 3. Surgical approach to the breast and axilla**

| | No intervention | SLNB | ALND | SLNB+ALND | Total |
|---|---|---|---|---|---|
| **Mastectomy** | 3 | 8 | 8 | 3 | 22 |
| **BCS** | 0 | 0 | 1 | 0 | 1 |
| **Total** | 3 | 8 | 9 | 3 | 23(5 patients without surgery) |

**Table 4. Patients Who Underwent SLNB and Positivity Rates**

| Patient no | Sentinal LN | Nonsentinel LN | Positive LN | Total |
|---|---|---|---|---|
| **1** | 2 | 1 | 0 | 3 |
| **2** | 4 | 1 | 1(nSLN) | 5 |
| **3** | 3 | 1 | 0 | 4 |
| **4** | 3 | 2 | 0 | 5 |
| **5** | 1 | 2 | 0 | 3 |
| **6** | 2 | 1 | 0 | 3 |
| **7** | 3 | 2 | 0 | 5 |
| **8** | 3 | 0 | 0 | 3 |

**Table 5. Patients with Isolated ALND and Positivity Rates**

| Patient no | Metastatic LN | Reactive LN | Total |
|---|---|---|---|
| **1** | 15 | 1 | 16 |
| **2** | 1 | 6 | 7 |
| **3** | 8 | 9 | 17 |
| **4** | 0 | 9 | 9 |
| **5** | 4 | 23 | 27 |
| **6** | 5 | 9 | 14 |
| **7** | 5 | 3 | 8 |
| **8** | 4 | 8 | 12 |
| **9** | 0 | 10 | 10 |