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The Journal of Breast Health (J Breast Health) is an international, open access, online-only periodical published in accordance with the principles of independent, unbiased, and double-blinded peer-review.

The journal is owned by Turkish Federation of Breast Diseases Societies and it is published quarterly on January, April, July, and October. The publication language of the journal is English. The target audience of the journal includes specialists and medical professionals in general surgery and breast diseases.

The editorial and publication processes of the journal are shaped in accordance with the guidelines of the International Committee of Medical Journal Editors (ICMJE), World Association of Medical Editors (WAME), Council of Science Editors (CSE), Committee on Publication Ethics (COPE), European Association of Science Editors (EASE), and National Information Standards Organization (NISO). The journal is in conformity with the Principles of Transparency and Best Practice in Scholarly Publishing (doaj.org/bestpractice).

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Processing and publication are free of charge with the journal. No fees are requested from the authors at any point throughout the evaluation and publication process. All manuscripts must be submitted via the online submission system, which is available at www.thejournalofbreasthealth.com. The journal guidelines, technical information, and the required forms are available on the journal's web page.

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Tables should be included in the main document, presented after the reference list, and they should be numbered consecutively in the order they are

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Review Article	5000	250	50	6	10 or total of 20 images
Case Report	1000	200	15	No tables	10 or total of 20 images
Letter to the Editor	500	No abstract	5	No tables	No media

BI-RADS: Breast imaging, report and data systems

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All acronyms and abbreviations used in the manuscript should be defined at first use, both in the abstract and in the main text. The abbreviation should be provided in parentheses following the definition.

When a drug, product, hardware, or software program is mentioned within the main text, product information, including the name of the product, the producer of the product, and city and the country of the company (including the state if in USA), should be provided in parentheses in the following format: "Discovery St PET/CT scanner (General Electric, Milwaukee, WI, USA)"

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Books with a Single Author: Sweetman SC. Martindale the Complete Drug Reference. 34th ed. London: Pharmaceutical Press; 2005.

Editor(s) as Author: Huizing EH, de Groot JAM, editors. *Functional reconstructive nasal surgery*. Stuttgart-New York: Thieme; 2003.

Conference Proceedings: Bengissson S. Sothemin BG. Enforcement of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Rienhoff O, editors. *MEDINFO 92. Proceedings of the 7th World Congress on Medical Informatics*; 1992 Sept 6-10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. pp.1561-5.

Scientific or Technical Report: Cusick M, Chew EY, Hoogwerf B, Agrón E, Wu L, Lindley A, et al. Early Treatment Diabetic Retinopathy Study Research Group. Risk factors for renal replacement therapy in the Early Treatment Diabetic Retinopathy Study (ETDRS), Early Treatment Diabetic Retinopathy Study. *Kidney Int*; 2004. Report No: 26.

Thesis: Yılmaz B. Ankara Üniversitesi'ndeki Öğrencilerin Beslenme Durumları, Fiziksel Aktiviteleri ve Beden Kitle İndeksleri Kan Lipidleri Arasındaki İlişkiler. H.Ü. Sağlık Bilimleri Enstitüsü, Doktora Tezi. 2007.

Manuscripts Accepted for Publication, Not Published Yet: Slots J. The microflora of black stain on human primary teeth. *Scand J Dent Res*. 1974.

Epub Ahead of Print Articles: Cai L, Yeh BM, Westphalen AC, Roberts JP, Wang ZJ. Adult living donor liver imaging. *Diagn Interv Radiol*. 2016 Feb 24. doi: 10.5152/dir.2016.15323. [Epub ahead of print].

Manuscripts Published in Electronic Format: Morse SS. Factors in the emergence of infectious diseases. *Emerg Infect Dis* (serial online) 1995 Jan-Mar (cited 1996 June 5): 1(1): (24 screens). Available from: URL: [http:// www.cdc.gov/ncidod/EID/cid.htm](http://www.cdc.gov/ncidod/EID/cid.htm).

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Accepted manuscripts are copy-edited for grammar, punctuation, and format. Once the publication process of a manuscript is completed, it is published online on the journal's webpage as an ahead-of-print publication before it is included in its scheduled issue. A PDF proof of the accepted manuscript is sent to the corresponding author and their publication approval is requested within 2 days of their receipt of the proof.

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Body Image of Women with Breast Cancer After Mastectomy: A Qualitative Research

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ABSTRACT

Objective: To gain a holistic and deep understanding about how mastectomy effects the body image of women who have breast cancer.

Materials and Methods: The sample of this qualitative descriptive study consisted of twenty patients who underwent mastectomy procedures. Semi-structured interviews were conducted during the second week after mastectomy. Each interview was transcribed verbatim, and a thematic analysis was performed.

Results: After the mastectomy, the findings related to the women's body image and their experiences were specified as four main themes and seven sub-themes. The main themes were: meaning of the breast, mastectomy and me, my body image and body image changes, and social life. Most of the participants in this study stated that the breast meant femininity, beauty, and motherhood. It was found that the meaning of mastectomy varied according to individuals. Women used quite negative statements about their appearances. The participants also said that they felt that half themselves was missing, as individuals and women. The women stated that they preferred clothes that hid their lack of breast. Some of the participants mentioned that relations with their husbands were not like before, and they abstained from social interaction.

Conclusion: Our findings suggest that mastectomy as a surgical treatment for breast cancer may negatively affect a woman's body image and her self-image.

Keywords: Body image, mastectomy, breast care nursing, qualitative research

Introduction

Breast cancer is one of the four most frequent types of cancer seen in women and the second leading cause of death from cancer (1). As throughout the rest of the world, the rate of breast cancer in Turkey is steadily increasing. Breast cancer incidence in Turkey was 24/100 000 in 1993 and increased to 50/100 000 in 2010 (2). Regarding surgical procedures, modified radical mastectomy was the most common surgery (63%), and breast conserving surgery was the second (36%). Only 1% of patients had radical mastectomy (3). Mastectomy, as the surgical treatment of breast cancer, results in a permanent change to the appearance of women. The breast is considered a part of a woman's identity in Turkey and many cultures; it represents femininity, sexuality, beauty, motherhood, and feeding infants (4). The perceived loss of any of these attributes may lead to a negative change in body image (5).

Body image is defined as the mental picture of one's body, an attitude about the physical self, appearance, and state of health, wholeness, normal function, and sexuality (6). For some individuals, a change in appearance can lead to a negative body image and various psychosocial problems (5). Negative body image among breast cancer survivors includes dissatisfaction with appearance, perceived loss of femininity and body integrity, reluctance to look at one's self naked, feeling less sexually attractive, self-consciousness about appearance, and dissatisfaction with surgical scars (6). The relevant literature emphasizes that patients with breast cancer can experience changes in body image, self-concept, emotions, behavior, family dynamics, and the roles of the patient and her family (7).

The importance of a woman's breast has a dramatic impact upon her body image, and depending on the woman, the loss of a breast through mastectomy will have multiple meanings and can trigger conflicting emotions. Thus, the scale of the psychological reaction to the removal of a breast is closely related to the emotional importance that the woman attaches to her breasts. Consequently, depending on

the negative change in a woman's body, any perceived losses may lead to various psychosocial problems (8-11).

Providing professional psychosocial support for the patients after mastectomy is one of the important responsibilities of the nurse. Among the psychosocial problems that emerge as a result of mastectomy is the patient's experience of change in her body image (12).

During the treatment process of breast cancer, patients' body image and concerns related to their situation can impact both their physical and emotional health. Thoughts about body image, life, the possibility of metastasis, or the reconstruction of the breast can dominate patients' daily lives. A study on women with breast cancer can help us to better understand and improve patients' health, and we can learn about possible cultural similarities or differences when compared with other populations. Based on this need, the aim of this study was to identify the effects of mastectomy on women's body image soon after their surgery.

Materials and Methods

This descriptive study adopted a purposive sampling technique, whereby "particular settings, persons, or events were deliberately selected for the important information they can provide that cannot be obtained as well from other choices" (13). Participants were from two different city centers in the Eastern Black Sea region of Turkey. Thus, interviews were conducted during the second week after surgery. Inclusion criteria for this study required that participants had primary breast cancer, had undergone unilateral modified radical mastectomy due to breast cancer, had been informed of the diagnosis, had not undergone breast reconstruction, had not received systematic treatment, were in the age range of 18-60 years, were able to speak Turkish, did not have a psychiatric history, were not receiving psychiatric treatment at present, and did not have any another health problem that could affect body image (amputation, visible scar, blindness, visible physical disabilities). In qualitative research it is difficult to determine sample size. The researcher continues to gather data until the stage when the concepts and progress for the possible answer to the research question start to repeat (when the researcher reaches the saturation point) (14). When the emerging concepts and progress start to repeat, the researcher decides the sample number sufficiency. By depending on this principle, the sample number of the research is maintained until the researcher reaches the saturation point. Twenty patients met the necessary study criteria and were included in the sample. Approval for the study was obtained from the local Medical Faculty Clinical Studies Ethics Committee, and interviews were scheduled to be conducted in the homes of the study participants. Both written and oral consent were obtained accordingly. The data in the research were gathered using semi-structured interviews. The interview method is a mutual and interactive communication progress based on a style of asking questions and receiving answers in order to deeply understand what people think about a predetermined subject and about how they feel (14). In the process of preparing interview questions, two academics who were expert about qualitative research were consulted for their opinions.

During the interview, participants were first asked, "Can you tell me about the journey you have experienced since you first learned that your breast must be removed? Feel free to say whatever comes to mind." Additional questions pertained to previous and present views of the women's assessment or reactions, the absence of the breast, perception of self, relationships with family members and others, and the

effects of mastectomy on clothing choices. The last question was "Is there anything else you think I should know about this?" Data collected in the Turkish language were also analyzed in Turkish according to Braun and Clarke (15) and then translated into English.

Analysis of Data

Interview responses were subjected to thematic analysis in a qualitative descriptive approach because thematic analysis is a way of ensuring that the analysis remains as close to the intended meaning as articulated by the respondent as possible, that is, "what" is spoken (or written) rather than "how" (16). The main aim of this research was to determine or 'capture' what women feel, like taking a photograph.

Data were analyzed as follows:

1. The first interview with each study participant sought to obtain a first impression of the experiences of living without a breast. It was then edited by making use of the notes taken by the researcher during the interview that documented the tone of voice, gestures, and facial expressions of the participant. In order to identify and code expressions of importance for the compilation of each woman's story, each interview was reread. The interviewer's reflective notes were used to supplement each transcript. The purpose of these notes was to enhance the richness of the data and to support the rigor and trustworthiness of the analysis.
2. Collected data that constituted a meaningful whole were coded. The authors generated initial codes individually and then met with other reviewers to discuss their initial codes.
3. All codes were brought together and similarities and differences were reviewed and revised. Related codes were put together to create themes, and based on these themes, main themes were formed.
4. This was done by creating a map of the codes and themes and generating themes and sub-themes. These themes were then reviewed in great detail and further refined to ensure that the codes were relevant to each theme.
5. At this stage, each transcript was reread to check for additional coding and to check that nothing had been missed in the earlier phases. Finally, the themes and subthemes were checked to make sure they told a clear story and captured the depth and breadth of the data. They were then given a concise name and defined to capture each theme. The thematic analysis was carried out by two researchers and one Ph.D student. Except for this study team, the analysis was carried out independently of each other. Once coding was complete, the group met and arrived at a combined analysis, which was then examined and agreed upon in a team discussion.
6. The last phase of the thematic analysis involved writing up the results, which are presented below.

Results

The study participants were aged between 32 and 58 years; the mean age was 45.9 years (SD $\pm$ 7.3). Sixty-five percent of the women had completed primary school (n=13), twenty-five percent had completed high school (n=5), five percent of the women had secondary school education (n=1) and five percent of the women in our study were university (n=1) graduates. Eighty-five percent of the study participants were housewives (n=17), and 85.0% (n=17) were married.

Analysis of the data revealed four main themes with subthemes emerging within each. The diagram depicts the first- and second-level themes coded in the final template with top-level themes in bold, and second-level themes in plain text. After the analysis was conducted to identify the body image of the women who had undergone a mastectomy operation, four main themes were determined.

Meaning of Breast

Most of the participants in this study stated that the breast meant femininity, beauty, motherhood, and attraction, and for them it was seen as an organ that perfects women. The statements of the participants show that the breast is not only an organ but also a symbol to which many meanings are attached.

"The breast is the organ that shows women as beautiful. I mean, my breast looked more beautiful when there were two. But I am not sad for that. I mean, they meant femininity, they were important for me. But I don't make much of it because I am not married now" (8th participant).

"Breast is part of me, of course. It evokes my femininity. I have three children. I breastfed them. It also reminds me of breastfeeding" (2nd participant).

"It represents my femininity. Also it is very important regarding how I look for my husband and my clothes on me. When I look in the mirror, my breast is not there. I don't want to look in the mirror (She seems to be sad)" (6th participant).

Mastectomy and Me

Although mastectomy can evoke negative emotions and thoughts for many women because of the loss of a breast generally, other women feel a sense of hope related to still being alive.

The First Encounter After Surgery with the Loss of the Breast

The first encounter with the surgical area was a difficult and exhausting experience for women because of the scar; they felt fearful of the surgical site. Some women might see the surgical site shortly after the operation; however, for many reasons, most women wait longer. Many participants mentioned that when they saw the operation area in the mirror, they were afraid and they felt bad, weird and different.

"I saw it the second day after the operation for the first time. At that moment, nothing came to my mind. Afterwards, when I went into the bathroom and looked in the mirror, "I feel so bad" (her eyes beginning to fill with tears) what have I become! I am crooked" (9th participant).

"I didn't want to see the operation area at all; I saw it when I was back home. Before seeing it, I knew that I was going to feel the emptiness but when I saw it, I felt very different (crying), words are never enough to explain" (14th participant).

Emotional Conflict

Women's thoughts and feelings about mastectomy revealed many differences. Some women were grateful to still be alive and saw this as more important than the loss of a breast. Other women understood the necessity of the surgery for their health, but after surgery, they experienced great sadness at the loss of their breast.

"As long as I enjoy good health, the breast doesn't mean a lot for me. The important thing is my health. I mean, an artificial breast or cosmetic surgery would do. Health was the priority for me" (13th participant).

"Before the operation, I was a normal person. But after the operation, your one side is missing. Of course, I am feeling a lack of it. One side is beauti-

ful; the other side has collapsed. But the operation is a must for health" (2nd participant).

Some participants expressed that they see their situation as the will of Allah and they turn to Allah, the Almighty.

"Allah, the Almighty, gave this disease to me. I am not pleased with my appearance. But Allah gave this to me, I have to be pleased. We will pull ourselves together a little" (9th participant).

The statements indicate that mastectomy affects women in different ways, and their reactions to it are dependent on personal attributes.

My Body Image

Altered Appearance

Many of the women spoke about the negative impact of an altered appearance on their body image. After the surgery, many women described what they saw as "wretched, horrible, scary, ugly, crooked, collapsed shape." But the most commonly used description of their appearance was that they looked incomplete and half because they did not have breast.

"I didn't appreciate myself before the operation anyway. I always thought "I wish I had blond hair", "I wish I had blue/green eyes." But now, after the operation, I think... I was prettier before. In the past, I was beautiful but now I lost my breast and to be honest, I am feeling worse and uglier (Her eyes beginning to fill with tears and crying)" (15th participant).

One woman stated that her appearance was deformed.

"I look at myself and think that a part of my body is nonexistent. To be honest (Smiling), I have never thought that I would be in this situation. I look in a mirror and the result is deformity. Nothing, but just deformity" (9th Participant).

One of the participants pointed out that she felt ashamed due to her appearance.

"I am ashamed so I try to cover my breast with my arm. I use fabric instead of brassiere" (17th participant).

Altered Self-Esteem as a Female

As already mentioned, the female breast is an organ that symbolizing feminine identity. Thus removal of the breast by mastectomy can adversely affect a woman's feelings of femininity and self-confidence. Most of the participants stated that they felt diminished as a woman, half, abnormal and depressed.

"Before the surgery, I seemed the same as other women. My two breasts were already existent, but after the surgery I have thought that contrary to other women, I am incomplete (She hesitates to look at my face)" (5th Participant).

"Frankly, I feel missing. As if my body is half. I feel that there are deficiencies on my body. Now, I am surely aware that I had self-love in the past" (15th Participant).

These statements reiterate once again that for women the breast stands for beauty, breast-feeding, sex, and femininity, and its removal may mean loss of identity for some women.

After mastectomy, a woman who is unable to fulfill her role and responsibilities can feel useless and as though she has lost her social iden-

tity. Some of the participants stated that they could not do the housework and garden as before and thus felt depressed and as half a person.

"I have not done the housework yet, I lift sundries but not heavy stuff. Yesterday, my daughter was cleaning the home and I said that I wish I could have done this, I am very sad about that. Does anybody want to do the housework? But I wanted to (Smiling)" (12th Participant).

"My daily life has been affected like that: I cannot use my right arm due to the removal of lymph nodes. This condition has resulted in my feeling as a half person because I generally do garden work and now I cannot" (20th Participant).

The participants' statements indicate that women who cannot fulfill their role and responsibilities after mastectomy may experience negative emotions such as depression and as though they are not a whole person.

Clothing Adjustments

Because the female breast symbolizes beauty and femininity, the removal of the breast may result in a desire to hide the new reality and change one's way of dressing. Most of the participants stated that they wanted to cover and hide the loss by changing their way of dressing and wearing loose-fitting clothing.

"As I said, as if any dress fits me no longer. I dress a bit casually or I put something over my breast, for example, a scarf. I cannot bear this condition even when I am alone. I try to hide it when I am alone, too" (14th Participant).

"I cannot wear my old clothes any longer. Earlier I preferred to wear slim fitting dresses. I strive hard to hide this. I do not want anybody to see me in this condition. Whoever I am with, I try to hide it and mostly I wear a waistcoat. I wear loose-fitting clothes to avoid people's glance (Crying)" (15th Participant).

Statements indicate that women who experienced a negative body image after mastectomy preferred to adjust their way of dressing in order to cope with their new reality.

Body Image Change and Social Life

Changes in Relationships with Family Members

A few of the participants mentioned that relations with their husbands were not like before, and they worried about this.

"Maybe my husband feels nothing bad towards me, but I do not want to show myself to him. I do not want to show that part because of the loss. Generally, I avoid environments where people come with their partners; other women do not struggle with this problem and I necessarily wonder what my husband is thinking about these other women. They have breasts but I do not. That's all I think about (Her voice falters)" (6th Participant).

"It affected relations with my husband, of course. It affected my sex life and also I can not serve my husband. I think that my husband has mercy on me because of illness" (9th Participant).

One participant stated that she was worried how her health status affected her children.

"I do not care about myself but my children. I wonder if they are affected by this condition?" (7th Participant).

Our study results revealed that after mastectomy, many women suffer from a negative body image. They may also be concerned with how

their own family and other people perceive their bodies after this radical surgery.

Changes in Relationships with Other People

The removal of a woman's breast can greatly affect her relationship to the environment, resulting in a limited social life and tendency to avoid social situations. Most study participants pointed out that they avoided social situations and felt they needed to hide their breast loss. However, two of the participants stated they received support from others.

"I say to myself I shouldn't go to some places, such as social events and weddings. The women there are all right but I'm missing my breast. Of course, I would like to cover and to hide the lack of my breast" (10th Participant).

Discussion and Conclusion

The research was carried out with volunteers who had undergone mastectomy for primary breast cancer and were recruited from two hospitals in the same geographic region. Most of the women who participated in the study were traditional Muslim housewives from rural regions of Turkey with little education. In other studies on this topic, these women have been underrepresented, and there is very little data about the psychosocial condition of this particular group of women after mastectomy.

Meaning of Breast

This study was performed to learn more about women's perception of mastectomy and body image. For most study participants, interviews confirmed that the breast was an organ that symbolized femininity, beauty, and motherhood. Other studies have confirmed that women feel that the breast symbolizes femininity and is one of the most important features of womanhood (4, 17, 18).

Mastectomy and Me

In our study, patients reported that when they first saw their surgical site, they felt frightened, bad, strange, and different. In the first studies related to this topic, the women remembered their first look at the surgical site as difficult and upsetting, and they avoided looking at it (19-21). Some women also indicated that their first look at the surgical incision shocked them and caused mixed emotional reactions (11, 21).

The women's statements showed that they attached different meanings to mastectomy. While some women felt their health was more important than not having breast, others experienced sadness resulting from the loss of the breast and hope in which they believed that they could handle this significant health challenge. Drageset et al. (22) stated that mastectomy was necessary to regain health, but they also noted that loss of the breast after mastectomy might result in conflicting or negative emotions. Sometimes this loss can cause women to become more devout in their religious beliefs and practices. During the interviews some women expressed that they regarded their situation as the will of God, and they turned to God as a source of strength and acceptance.

My Body Image

In our study, all of the women used negative assessments related to their appearances (ugly, missing, weird). These statements show that women experience negative emotions due to the physical changes resulting from the operation. Studies related to this issue have reported that women regarded their appearances as deformed, irregular, non-proportional, and ugly after mastectomy (23, 24).

In our study, most of the women stated that they were inclined to wear loose-fitting clothing, and they tried to cover their surgical incisions.

This negative response is the woman's attempt to hide the loss of a breast from her social environment. Women who experience a negative body image after the loss of a breast often try to change their dressing style in order to deal with their unhappiness and discomfort. Many women find it difficult to find a way to dress that makes them feel comfortable with their new body, their new situation (5, 19, 25, 26).

Thus, the loss of a breast to mastectomy will be perceived by many individuals as a serious blow to a woman's identity and sense of self (27). Most of the participants in our study stated that they felt something missing, and they felt ill and abnormal. The existing literature emphasizes the female breast as a symbol of femininity and womanliness. Women characterize the loss of a breast as deprivation of womanhood or identity (28-31). Some of the participants in our study declared that after mastectomy they could not do housework or work in the garden, and this situation made them feel empty and inadequate. Other studies have reported that women felt unable to carry out daily life activities such as shopping, cleaning the home, and hanging clothes (32-34). Women who cannot fulfill their role in life after undergoing a mastectomy may experience feelings of loss related to the things they used to do so easily. This situation may affect their sense of self, which may in turn, affect their body image in a negative way.

A positive body image is associated with a person's satisfaction about their appearance, and it can be affected by others' opinions as well. The participants' statements expressed their perception that people felt sorry for women who had undergone mastectomy. The women themselves knew they were viewed differently, and they could sense the negative attitudes of others.

Body Image Change and Social Life

The statements of the women in our study indicated that the loss of a breast affected relations with their husbands, and they were worried about this because of their own negative body image. Women who had undergone mastectomy were concerned that this change in their appearance could impact their sex lives negatively (22, 35). Mastectomy has a negative impact on husband and wife relationships and also impacts relationships with their children. Studies have shown that after mastectomy, women wanted to appear stronger for their children. Some had even placed breast prostheses in their brassiere to hide their loss of a breast (22, 26).

After breast loss, some women want to avoid social situations because of their appearance, and our study participants felt the same and also avoided social situations. Other studies in various countries have also reported the common finding of the negative impact of mastectomy on women's social life (21, 36).

Patients need medical, social, and psychological support during and after completion of treatment for breast cancer. In order to offer patients the best health care possible, the health care team needs to use an integrative approach in the treatment of their patients. This concept considers both the patient's physiologic as well as psychological needs. The multidisciplinary team consists of a doctor, nurse, psychiatrist, psychologist, social services expert, dietician, physical therapist, a pharmacist, and clergyman or other spiritual advisor (37, 38). During this process, nurses should provide patients with information and support both prior to and after surgery. Nurses can teach effective coping skills to help patients through the difficult health challenge they face. Furthermore, nurses can also serve as consultants as needed by patients. After the surgery, patients should also be encouraged to look

at and to touch the site of their operation. In order to more fully support patients who must undergo mastectomy, reconstruction options should be discussed either before surgery or soon thereafter. Results of research on the effect of reconstruction for body image showed an increase in positive body image and satisfaction of patients (39, 40).

The results of the study contributed information for thoughts and feelings related to changes in the appearance of the early post-mastectomy women. This study will also be a guide to assist health care teams in developing ways that will help patients become more attuned to their experiences and to discover effective methods of coping with their new health reality.

Limitations of the research

This exploratory study reflects the situation of women shortly after mastectomy. With time, women may or may not adjust better to their altered appearance. We aim to conduct a longitudinal follow-up study to determine changes of mastectomy-related concerns in the course of time.

Researchers have long known that mastectomy negatively affects a woman's body image. However, the results of our research, provided by the women's own very personal statements, emphasize the experiences of the trauma and loss of patients with breast cancer after mastectomy. The study is very important for providing a more intimate and personal sense of body image that until now has usually been presented with statistical results. It is hoped that this small exploratory study will contribute to improving body image-related supportive care of women who are treated with mastectomy.

With the recent advances in medical care and technology, more and more women are surviving breast cancer. Therefore, nurses need to become more knowledgeable about breast cancer treatments and how these affect women who will be in their care. The results of this study show that body image and experiences after mastectomy are individual and contextual, but the one unchanging result is that mastectomy negatively changes women's body image. Nurses and other healthcare professionals will need to develop a more comprehensive understanding of body image changes among women after diagnosis and treatment. Rather than relying on vague preconceptions of what each woman needs because of her age or the phase of her life, healthcare professionals can learn from each woman's own and very personal story of what losing a breast means to her.

Ethics Committee Approval: Ethics committee approval was received for this study from local ethic committee.

Informed Consent: Informed consent was obtained from patients who participated in this study.

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Retrospective Analysis of Women with Only Mastalgia

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ABSTRACT

Objective: Mastalgia is the most common symptom in women, who has gone under breast imaging. 70% of women face with mastalgia at least once in their lifetime. In our study, we aimed to investigate the examinations and the results of the females referred to our outpatient clinics with mastalgia and to determine the frequency of malignancy.

Materials and Methods: Files of all women patients referred to General Surgery Outpatient Clinics between 01.06.2014-31.05.2015 has been investigated retrospectively. Cases only with breast pain complaint (n=789) out of 2798 women has been included in the study. Women with lump in breast, nipple discharge, redness, breast retraction and pregnant and lactating women were excluded. Breast examination findings, ultrasonography (USG), mammography results, whether biopsies are done or not and diagnoses have been investigated retrospectively.

Results: Mean age was 42.97 ± 12.36 (16-74) years. 59.7% (n=471) of the women had bilateral mastalgia and 91.1% (n=719) of the breast examinations were found to be normal. USG was required from 664 (84.2%) women and mammography was required from 448 (56.8%) women. Considering diagnoses; fibrocystic changes in 32.3% (n=201), ductal ectasia in 8.8% (n=55), fibroadenomas in 6.1% (n=38), reactive lymphoid hyperplasia in 1.1% (n=7) was observed. Only 1 (0.2%) woman was diagnosed with invasive ductal carcinoma.

Conclusion: According to researches, 0.5% of the women with mastalgia were diagnosed with breast cancer. In our study this rate was found as 0.2%. Women with only mastalgia without any abnormality in physical examination should be informed about dealing with pain.

Keywords: Cancer, frequency, mastodynia

Introduction

Mastalgia is the most common symptom encountered in women who have gone under breast imaging, and 70% of women suffer from breast pain at least once in their lifetimes (1, 2). Mastalgia is defined as tension, discomfort and pain in one or both breasts (3). This pain is usually experienced bilaterally and in the upper outer quadrant (4). Mastalgia could stem from breast tissue itself, extra-mammary tissues or psychological reasons. Some of these are macromastia, diet or lifestyle changes, hormone replacement therapy (HRT), ductal ectasia, mastitis, increased water and salt retention, and high-dose caffeine intake (3). Slight premenstrual breast pain for 1-4 days is considered normal (5, 6). It should be kept in mind that mastalgia is a chronic problem that affects physical and social activity, work-school activities and sexual activity, and can last years (5). Breast pain not only disrupts women's daily life quality, but also causes women to worry frequently over whether or not they have breast cancer (2). As breast cancer is the most common cancer in women worldwide, the main goal is to exclude the diagnosis of cancer in women with mastalgia according to current examination methods (3, 7). This is because the incidence of breast cancer has recently increased based on the technological advances in screening methods and imaging technics (8). As a screening method for women who apply outpatient clinics with symptoms of mastalgia are usually asked to undergo ultrasonography (USG) if under the age of 40, and mammography if aged above 40 years. USG examinations are also an option for women that are above the age of 40 and have dense breast tissue in addition to mammography (9). Female patients with mastalgia are sufficiently relieved when told they do not have cancer after gathering normal findings from clinical examinations and imaging (10). However, they should be informed that pain can resurface after treatment and approximately 20% of patients have mastalgia that is resistant towards treatment methods (5).

In our study, we aimed to analyze the physical examination findings, required investigations and results of the female patients who applied the general surgery outpatient clinic in our hospital with symptoms of mastalgia and to determine the incidence of malignancy.

Materials and Methods

The documents of all the female patients that visited İzmir Katip Çelebi University Atatürk Training and Research Hospital General Surgery Outpatient Clinics between 01.06.2014 and 31.05.2015 with symptoms of mastalgia were scanned through the hospital information system retrospectively. Prior to the study, ethics committee approval was obtained from İzmir Katip Çelebi University Ethics Committee for Non-invasive Clinical Trials with the decision number of 252. Of 2798 women who applied with symptoms of mastalgia, only those who had mastalgia symptoms alone (n=789) were included in the study, excluding those who also had lump in breast, nipple discharge, retraction on breast skin and similar symptoms as well as those who were in their gestation or lactation period. The female patients' age, which breast was in pain, physical examination findings, USG and mammography imaging results if taken, whether or not they had a biopsy, and their diagnoses were examined retrospectively. The classification of breast imaging-reporting and data system (BI-RADS) in the mammography imaging reports and the USG reports were analyzed. The assessment of mammography reports were performed according to the classification by the American College of Radiology using "BI-RADS 0: assessment is incomplete, BI-RADS 1: normal, BI-RADS 2: benign, BI-RADS 3: probably benign, BI-RADS 4: suspicious abnormality, BI-RADS 5: highly suggestive of malignancy, BI-RADS 6: known biopsy-proven malignancy" (11).

Statistical analysis

The descriptive data were assessed in percentage (number), mean± standard deviation (minimum-maximum values). The obtained data were analyzed using SPSS 22.0 demo package software. The inter-group comparisons were carried out by chi-square test (χ^2). In the results of the analyses with 95% confidence interval, values $p < 0.05$ were considered significant.

Result

The study included the data of 789 cases with only symptoms of mastalgia, the mean age of whom was 42.97 ± 12.36 (16-74) years. Of the female patients, 5.3% (n=42) were aged 65 or older, 59.7% (n=471) had bilateral mastalgia, and 91.1% (n=719) had uncomplicated breast exams (Table 1).

The records showed 664 (84.2%) women were required to undergo a breast USG, however, 120 (15.2%) of these women had not had a USG. It was determined that of the female patients who had undergone USG, 42.3% (n=230) had normal symptoms, 37.1% (n=202) had a cyst, followed by ductal dilatation with 9.9% (n=54) and fibroadenoma with 6.4% (n=35). There was a statistically significant difference in the distribution of USG results between the age groups (aged 40 or younger, aged 40 or older) ($p < 0.05$) (Table 2).

We discovered that of 448 (%56.8) female patients who had been asked for a mammography, 10.4% (n=82) had not had a mammography. Of the women who had undergone mammography, 1.9% (n=7) were evaluated with BI-RADS 0, 33.6% (n=123) BI-RADS 1, 51.6% (n=189) BI-RADS 2, 11.5% (n=42) BI-RADS 3, 1.4% (n=5) BI-RADS 4. None of the female patients were determined to have

Table 1. Demographic differences of the cases who included in the study

		n	%
Age groups	Aged 40 years or younger	329	41.7
	Aged between 41-64	418	53.0
	Aged 65 or older	42	5.3
Breast with mastalgia	Bilateral	471	59.7
	Right breast	122	15.5
	Left breast	196	24.8
	Normal	719	91.1
	Increased nodularity	32	4.1
Physical Examination	Macromastia	13	1.6
	Mass	10	1.3
	Lymphadenopathy	2	0.3
	Folliculitis	2	0.3
	Nipple discharge	2	0.3
	Hyperemia	2	0.3
	Deformation	5	0.6
	Edema	2	0.3

Table 2. Comparison of ultrasonography results by age group

	Aged 40 or younger (n)	Aged 40 or older (n)	Total (n)	p (x2)
Normal	115	115	230	0.026
Cyst	78	124	202	
Fibroadenoma	14	21	35	
Ductal dilatation	18	36	54	
Papilloma	0	2	2	
Lymphadenopathy	1	8	9	
Solid lesion	3	5	8	
Infection	0	3	3	
Lipoma	0	1	1	

BI-RADS 5 or BI-RADS 6. A comparative analysis of BI-RADS score and whether pathological examination was performed is presented in Table 3. There was no statistically significant difference in the distribution of mammography results between the age groups (aged 40 or younger, aged between 41-64 years, aged 65 or older) ($p = 0.166$). The ratio of not undergoing an examination in women aged 40 years or younger was found significantly higher compared with the women aged 41 years or older ($p < 0.05$) (Table 4). A pathological examination was required from 39 people (4.9%) who were included in the study, 2 of which (0.3%) had not undergone a pathological examination. The patients were mostly diagnosed as having fibrocystic disease (32.3%) as can be seen in Table 5 in which the diagnosis distribution is presented.

Table 3. The relationship between mammography scoring and status of pathological examination

		Undergone pathological examination		Did not undergo pathological examination		Total		p (x ²)
		n	%	n	%	n	%	
Mammography	BI-RADS 0	2	33.3	4	66.7	6	1.7	0.001
	BI-RADS 1	1	0.8	122	99.2	123	33.9	
	BI-RADS 2	3	1.6	186	98.4	189	52.1	
	BI-RADS 3	17	41.5	24	58.5	41	11.3	
	BI-RADS 4	4	100	0	0	4	1.1	

Table 4. Comparison of examination status by age group

Age groups	n	%	Had an examination	Did not have an examination	p (x ²)
Aged 40 or younger	329	41.7	244	85	0.005
Aged 41 or older	460	58.3	379	81	
Total	789	100	623	166	

Table 5. Distribution of the cases' diagnoses

	n	%
Normal	308	49.4
Fibrocystic disease	201	32.3
Ductal ectasia	55	8.8
Fibroadenoma	38	6.1
Reactive lymphoid hyperplasia	7	1.1
Mastitis	4	0.6
Apocrine metaplasia	3	0.5
Folliculitis	2	0.3
Intraductal papilloma	2	0.3
Granulomatous inflammation	1	0.2
Lipoma	1	0.2
Invasive ductal carcinoma	1	0.2
Total	623	100

Discussion and Conclusion

Although mastalgia is the most common reason of breast-related symptoms patients consult general surgery outpatient clinics and primary care physicians with, its etiology has not yet been clarified and it reduces women's quality of life considerably (12, 13). The increasing worry for cancer in women with mastalgia results in more doctor appointments and consequently significant cost increase. Controlled

Risk Insurance Company recommends that in breast care management algorithm, a radiological method should be determined depending on whether the case is aged younger or older than 30 years after mastalgias are divided into cyclical-non-cyclical, unilateral-bilateral, diffuse-focal, and women over the age of 30 with diffuse and unilateral pain should undergo bilateral mammography whereas women with focal pain regardless of their age should be examined through USG (9, 14).

Yüksekkaya et al. (9) determined no significant difference among the USG findings of the study and control groups and encountered no cancer case in their case-control study. In their study that included 937 mastalgia patients, Bilgin et al. (2) declared that 41.1% of the cases were radiologically normal while 50.6% had fibrocystic changes and 0.6% had cancer, 83.3% of which were above the age of 40. In a case-control study by Balci et al. (6) found that marital status, smoking and anxiety affected mastalgia, and there was no significant relationship between breast self-exam and mastalgia. This proves that psychological factors are influential on mastalgia. This kind of patients can benefit from psychological support, regular clinic evaluation and follow-ups, breast-supporting clothing and non-steroidal anti-inflammatory creams (15). In our study, we obtained data that are in concordance with the literature.

In a prospective study by Plu-Bureau et al. (16), 247 women with mastalgia were monitored for 16±5 years; 77 of these women still had mastalgia during the monitoring, fibrocystic disease was discovered in 61.6%, and 22 women developed breast cancer. They stated that cyclical mastalgia increased the risk of breast cancer. Yakut et al. (17) indicated that the cause of cyclical mastalgia could be related to the pressure from venous congestion. These studies reveal that there should be more extensive and further studies regarding the relationship between cyclical/non-cyclical mastalgia and cancer.

In a case-control study by Dinç et al. (13) that included 376 cases, no statistical difference was detected in terms of USG findings amongst the groups, and it was reported that in both groups, fibrocystic changes were the most frequently encountered finding, and those with nipple discharge had 2.4 times, those with a physical examination finding had 5.1 times, and those with biopsy history had 1.2 times more mastalgia. In their prospective study, Yıldırım et al. (3) found no statistically significant difference between the BI-RADS categories and pain types of the cases, and reported that the female patients who only had mastalgia with no physical examination or radiological finding had not carried an extra risk in terms of breast cancer.

In a prospective study by Joyce et al. on 5841 patients, 3331 (57%) of the cases had mastalgia as their only symptom, 1.2% of the cases had cancer and all the cancer patients were aged above 35 years. Furthermore, in this study, in cases where the women aged less than 35 years with only mastalgia symptom had normal clinical examination, breast imaging was considered unnecessary and they could be managed in primary care (18). In our study, the incidence of breast cancer in the cases with only breast pain was found 0.2%. Low ratio of malignancy reveals the importance of counseling services for cases with mastalgia. Regular diaries for pain assessment, after-treatment such as written description of mastalgia, and effective treatments such as evening primrose oil should be provided for patients younger than 35 years old with mastalgia in primary care services (18).

Women who only have symptom of mastalgia and did not receive a result of any abnormality in their physical examination should be

comforted on their worries for cancer and informed about pain management by family physicians in primary care. However, it should be kept in mind that women with only breast pain could still develop breast cancer, and patients with extra risks for breast cancer should be referred onwards immediately. Subsequently, family physicians should receive training on the management of mastalgia in primary care which would help us progress significantly on this health problem that creates a heavy inconvenience for women.

We discovered that there was no scale with which level of pain was measured in our study, and the fact that last menstrual dates, breast cancer history in family, use of hormone preparations, smoking, pain spreading in upper arm and axilla were not questioned and mastalgia was not classified (cyclical/non-cyclical) is a limiting factor. Of the patients who were required for a mammography, 10.4% and of the patients who were required for a USG, 15.2% did not complete the necessary examinations, and therefore their results remained unknown. As the data in our study were obtained retrospectively, any data not recorded in the system or not questioned could not be attained.

Ethics Committee Approval: Ethics committee approval was received for this study from İzmir Katip Çelebi University Ethics Committee for Non-invasive Clinical Trials with the decision number of 252.

Informed Consent: Written informed consent was not received due to the retrospective nature of this study.

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Informational Needs of Postmastectomy Patients

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ABSTRACT

Objective: The aim of this study was to determine informational needs of postmastectomy patients.

Materials and Methods: This descriptive study was conducted in the general surgery clinics of a university health center for medical research and practice with 72 voluntary patients. For data collection, a patient identification form was used, which was prepared by the researchers in accordance with the literature.

Results: The mean age of the patients was 52.66 ± 13.39 years, 87% were married, 58% had primary school education, 76% had moderate economic status, and 53% had undergone simple mastectomy.

It was determined that 83% of the patients wanted to be informed about hospital and home care interventions, 82% about symptoms and prevention of post-surgical problems, 76% regarding breast cancer and treatment options, and in the range of 54-68%, patients wanted information on the effects of surgery on the body, shoulder and arm exercises, breast self-examination, the effects of breast cancer on family and work life, lymphedema and prevention interventions.

Conclusion: We recommend that patients with mastectomy should be informed about topics including care interventions, breast cancer and treatment options, effects of surgery, and reducing these effects.

Keywords: Breast cancer, informational needs, nursing care, mastectomy

Introduction

A complex disease that affects women both physically and psychologically, breast cancer is the most common type of cancer in women (1). According to data from the Health Statistics Yearbook 2013, breast cancer is the most common cancer type in women in Turkey, and its incidence in 2011 was 45.1 per hundred thousand (2, 3). Surgical treatment is one of the most frequently used treatment options for breast cancer. Mastectomy is often chosen as the treatment option in Turkey (4).

Mastectomy, removal of breast tissue partially or completely, creates physiologic, psychological, and social problems in patients (5). Infection, pain, phantom breast syndrome, seroma, hematoma, lymphedema, and frozen shoulder syndrome are amongst the important complications (3, 6). Additionally, mastectomy affects women negatively in terms of body image, self-esteem and dyadic adjustment, causes sexual dysfunction, and leads to psychosocial problems such as anxiety and social isolation (7-10).

Patients' educational needs should be determined and sufficient information should be provided in order to prevent problems that occur in patients who undergo surgical intervention because of breast cancer, ensure patients' adaptation, and speed up the healing process (5). Educating patients and their families is an inseparable part of nursing care. Previous studies concluded that educating breast cancer patients improved their self-care behaviors, diminished anxiety, had a positive effect on their emotions and attitudes, helped them prepare for the future, strengthened their ability to cope with treatment and adverse effects, increased their quality of life, decreased symptoms, and the need of postoperative analgesia and duration of hospital stay while maintaining patient satisfaction (11-15).

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Table 1. The patients' personal characteristics

Mean Age (years)		52.66±13.39	
Marital Status	Married	63	87.5
	Single	9	12.5
Education Status	Primary Education	42	58.3
	Secondary Education	22	30.6
	Bachelor's Degree	8	11.1
Level of Economic Status	Low	16	22.2
	Moderate	55	76.4
	High	1	1.4
Applied Surgical Intervention	Simple Mastectomy	38	52.8
	Radical Mastectomy	25	34.7
	Modified Radical Mastectomy	9	12.5

Table 2. The topics of the patients' informational needs

The topics of informational needs	n	%
Postoperative hospital and home care practices	60	83.3
Symptoms and prevention of postoperative problems	59	81.9
Breast cancer and treatment options	55	76.4
The effects of surgery on the body	49	68.1
Shoulder and arm exercises	45	62.5
Breast self-examination	41	56.9
Effects of breast cancer on domestic and occupational life	40	55.6
Lymphedema and interventions for its prevention	39	54.2
Breast reconstruction	20	27.8

The relevant literature states that patients with breast cancer have a high demand for information (16, 17). In a study by Findik (18), it was found that patients who underwent surgical intervention because of breast cancer were in great need for information; however, this need was very rarely met. Batte and Odoi-Adome (19) reported that 41% of patients did not receive satisfactory information regarding treatment, and Gül and Erdim (20) reported that nurses frequently educated patients with breast cancer regarding lymphedema; however, the education content was flawed and patients were not provided with thorough education. Understanding patients' informational needs makes nurses more competent in helping patients cope with treatment and adverse effects, and diminishes anxiety and problems (13, 21).

The aim of this study was to determine the subjects about which patients undergoing mastectomy need to be informed.

Materials and Methods

This descriptive study was conducted in the general surgery clinics of a university's health center for medical research and practice. The re-

quired research ethics committee approval (Trakya University, School of Medicine, Scientific Research Ethics Committee, decision number: 05/05, 2013/6) and institutional approval (Trakya University, Health Research and Application Center, Central Management) were obtained. In order to determine the sample number, power analysis was conducted in accordance with the literature with a margin of error of 0.05, tolerance rate parameter not exceeding 5%, 90% power; N=72 volunteer patients. A data collection form was prepared and used by the researchers to gather data in accordance with the literature. This form included the patients' personal variables (Table 1) and the main topics of the information that should be delivered to patients undergoing mastectomy (Table 2). The patients whose treatment continued post-mastectomy in the clinic were visited in their rooms and informed about the purpose of the study. Verbal consent was received from the patients who voluntarily participated in the study. The data collection forms were completed using the face-to-face interview method.

Statistical analysis

The statistical analysis of this study was performed with descriptive analyses on SPSS 19.0. The data analysis involved numbers, percentage, mean, and standard deviation.

Results

We found that the patients' mean age was 52.66±13.39 years, 87% were married, 58% had elementary school education, 76% were of average economic status, and 53% had undergone simple mastectomy surgery (Table 1). Of the patients, 83% conveyed that they wanted to be informed about the post-operative hospital and home care practices, 82% about the symptoms and prevention of post-operative problems, 76% about breast cancer and treatment options, and 54% to 68% of the patients wanted to know about the effects of surgery on the body, shoulder and arm exercises, breast self-exam, effects of breast cancer on the domestic and occupational life, and lymphedema and interventions for its prevention. The topic the patients wanted to be informed about the least was breast reconstruction with 28% (Table 2).

Discussion and Conclusions

We determined that the patients in this study most wanted to be informed about post-operative care practices in hospital and at home (83.3%), and the symptoms and prevention of post-operative problems (81.9%). Mohamed and El-Sebae (17) found that patients who had undergone modified radical mastectomy wanted information regarding breast cancer and preventive, regenerative, and care practices after its treatment, whereas Schmidt et al. (22) discovered that patients post mastectomy mostly required information about care practices and how to cope with adverse effects. In conclusion, patients who undergo mastectomy require information about care practices, complications and their prevention.

Seventy-six percent of the patients stated that they wanted information regarding breast cancer and its treatment options. Findik (18) reported patients who underwent mastectomy primarily needed information about the medication, whereas Jenkins et al. (23) reported patients wanted to know about treatment options and their adverse effects. Li et al. (24) discovered the subject patients with breast cancer most wanted to know about was breast cancer metastasis and the chances of recovery. These studies show that patients with breast cancer want to be informed about breast cancer and its treatment.

The patients in our study wished to know about the effects of surgery on the body, shoulder and arm exercises, breast self-exam, the effects of

breast cancer on domestic and occupational life, and lymphedema at varying rates (54% to 68%). Schmid-Büchi et al. (25) found that patients who received breast cancer treatment predominantly needed to be informed about supportive care in daily life. Evsine (26) concluded that female patients with breast cancer wanted nurses to inform them about the prevention, treatment, and care of lymphedema. Abdollahzadeh et al. (27) reported that according to patients, the primary topics of information needed were the effects of the disease on daily life and physical condition. Salminen et al. (28) stated that patients most needed information on the disease and its effects on daily life after being diagnosed as having breast cancer, and they were not satisfied with the way their needs were met. These findings prove that patients with breast cancer wish to be comprehensively informed about various topics.

The patients in our study revealed that they wanted information on points that would affect their lives post mastectomy in an extensive and comprehensive manner. We recommend that nursing care of patients undergoing mastectomy should include information of hospital and home care practices, breast cancer and treatment options, the effects of surgery on the body, shoulder and arm exercises, breast self-examination, effects of breast cancer on the domestic and occupational life, and lymphedema.

Ethics Committee Approval: Ethics committee approval was received for this study from Trakya University School of Medicine, Scientific Research Ethics Committee, decision number: 05/05, 2013/6.

Informed Consent: Verbal informed consent was obtained from patients who participated in this study.

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Phyllodes Tumor of the Breast: Analysis of 48 Patients

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ABSTRACT

Objective: Phyllodes tumor (PT) is a rare biphasic breast neoplasm that accounts for less than 1% of all breast tumors. The aim of this study was to evaluate the clinicopathologic features, diagnostic difficulties, and therapeutic outcomes of patients with PT.

Materials and Methods: A total of 48 female patients who underwent surgery for PT were included in the study. Patient characteristics, clinicopathologic features of tumors, diagnostic findings, surgical outcomes, adjuvant therapies, and follow-up findings were retrospectively evaluated.

Results: The mean age of patients was 35 years. Painless breast mass was the most common (85.4%) presenting symptom. Total excision with at least 1 cm macroscopic clear margins was the most frequently performed (87.5%) surgery. Most patients (n=34, 70.8%) had benign PT; however, borderline and malignant tumors were found in 9 (18.8%) and 5 (10.4%) patients, respectively. During the mean follow-up period of approximately 30 months, local and distant recurrence was detected in three (6.3%) patients and one (2.1%) patient, respectively. Patients with malignant PT had larger tumors than those with benign and borderline PTs ($p=0.010$). No significant difference in other clinical, diagnostic, and pathologic characteristics was found between the groups.

Conclusion: PT can be easily confused with other breast masses such as fibroadenoma due to the non-specific clinical and radiologic findings. Surgical excision with at least 1 cm clear margins is of great importance to reduce the risk of local recurrence. However, recurrence can develop even after appropriate surgery, thus patients should be closely followed up after surgery.

Keywords: Breast, diagnosis, phyllodes tumor, treatment

Introduction

Phyllodes tumor (PT) is a rare breast neoplasm that accounts for less than 1% of all breast tumors (1). It was first described and named as “cystosarcoma phyllodes” in the 1800s due to its morphologic and histologic characteristics. However, its name was changed to PT by the World Health Organization in 1982 because most tumors have benign characteristics and this term did not clearly reflect the biologic behavior (2). PTs are biphasic tumors that comprise epithelial and mesenchymal components, and are classified into three categories, benign, borderline, and malignant, according to the mitotic activity, cellularity, stromal overgrowth, and the nature of the tumor margins (3, 4). Most PTs are benign, whereas malignant tumors comprise 10–25% of cases (1, 5). Surgery is the mainstay treatment; the major concern after surgical intervention is the high risk of local recurrence. Therefore, accurate preoperative diagnosis plays an important role in the management of these tumors, especially for those with borderline and malignant histopathology.

In this paper, we aimed to evaluate the clinicopathologic features, diagnostic difficulties, and therapeutic outcomes of patients with PT.

Materials and Methods

Patients

The medical records of 48 female patients who underwent surgery because of PT at Ankara Numune Training and Research Hospital between 2008 and 2015 were retrospectively evaluated. The patients' demographic data such as age, menopausal status, marital status, personal and family history of breast cancer, initial clinical findings, and duration of symptoms prior to diagnosis were recorded. This study was conducted

in accordance with the Helsinki Declaration. Informed consents of the patients were waived due to the retrospective nature of the study.

Diagnostic tests

A detailed breast examination that included the axillary region was routinely performed in all patients. Breast ultrasonography (US) was used in all patients, and mammography (MM) was performed in patients aged more than 35 years. The definitive diagnosis was based on fine-needle aspiration cytology (FNAC), core biopsy, or excisional biopsy with histopathologic confirmation.

Therapeutic approach and final histopathology

Total excision with at least 1 cm surgical margins and mastectomy were the surgical methods performed for the tumors. Patients who had positive surgical margins after the initial surgery underwent re-excision to obtain tumor-free margins.

Histopathologic types of PTs were classified into three categories: benign, borderline, and malignant, according to standard criteria previously reported (6) (Table 1). All resected specimens were also evaluated in terms of surgical margins and invasion of pectoral muscle.

Adjuvant therapies and follow-up period

All patients were discussed at local multidisciplinary oncology meetings. Adjuvant radiotherapy to the breast and tumor bed was administered to patients who underwent breast conserving surgery for malignant PT. In addition, patients who underwent mastectomy for malignant PT and had a high mitotic index received radiotherapy to the chest wall. A chemotherapy regimen containing doxorubicin and cyclophosphamide was also given to these patients.

All patients were evaluated at regular intervals during the follow-up period due to the high risk of local and/or distant metastasis. The type and time of recurrence was also recorded.

Statistical analysis

The Statistical Package for the Social Sciences (SPSS Inc.; Chicago, Illinois, USA) version 21 was used for statistical analysis. Descriptive analyses are presented as mean±SD/percentage for continuous vari-

ables and numbers/percentages for categorical variables. The Kruskal-Wallis test was used to compare continuous variables between three tumor groups. Categorical values were compared using the Chi-square test or Fisher's exact test. The patients were then classified as having benign, borderline/malignant PTs, and statistical analysis of these two groups was conducted using the Mann-Whitney U, Chi-square, and Fisher's exact tests. $P<0.05$ was considered statistically significant.

Results

A total of 48 female patients with a median age of 35 years (range, 18 to 58 years) were included in the study. The majority of patients (81.2%) were of reproductive age; only 18.8% of the patients were postmenopausal. No patients had a personal or family history of breast cancer. Painless breast mass was the most common (85.4%) presenting symptom. The median duration of symptoms prior to diagnosis was 4.5 months. All demographic and clinical characteristics of the patients are presented in Table 2.

US was the first-step imaging method in all patients, MG was performed in half (50%) of the patients owing to the limitation of age. Well-defined hypoechoic solid lesion (77.1%) was the most frequently reported sonographic finding. Similarly, well-circumscribed nodular

Table 1. Classification of PTs according to histopathologic features (6)

	Margin	Stromal atypia	Mitoses/10 HPF*	Stromal overgrowth
Benign	pushing	minimal	<5	absent
Borderline	pushing/ infiltrating	moderate	5-9	present
Malignant	pushing	severe	≥10	present

*HPF: high-power field

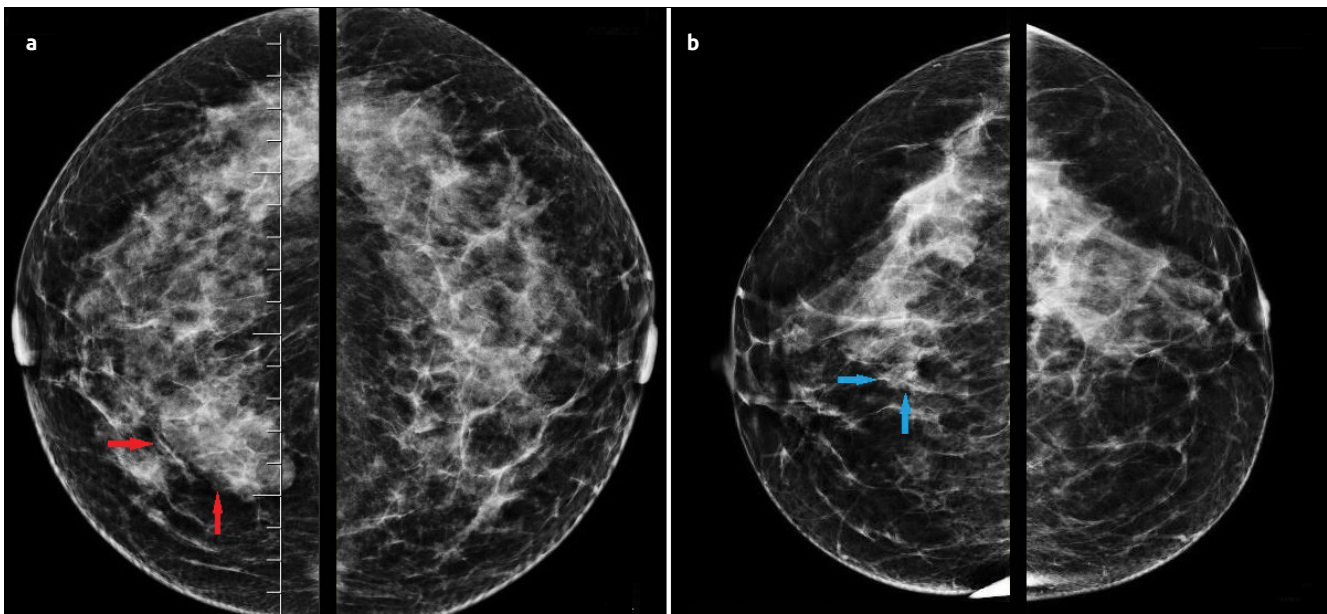


Figure 1. a, b. Mammographic images of PTs. (a) Benign PT: Well-defined nodular opacity at the lower-inner quadrant of right breast (red arrows), (b) Poorly-defined lobulated nodular opacity at the lower-inner quadrant of the right breast (blue arrows)

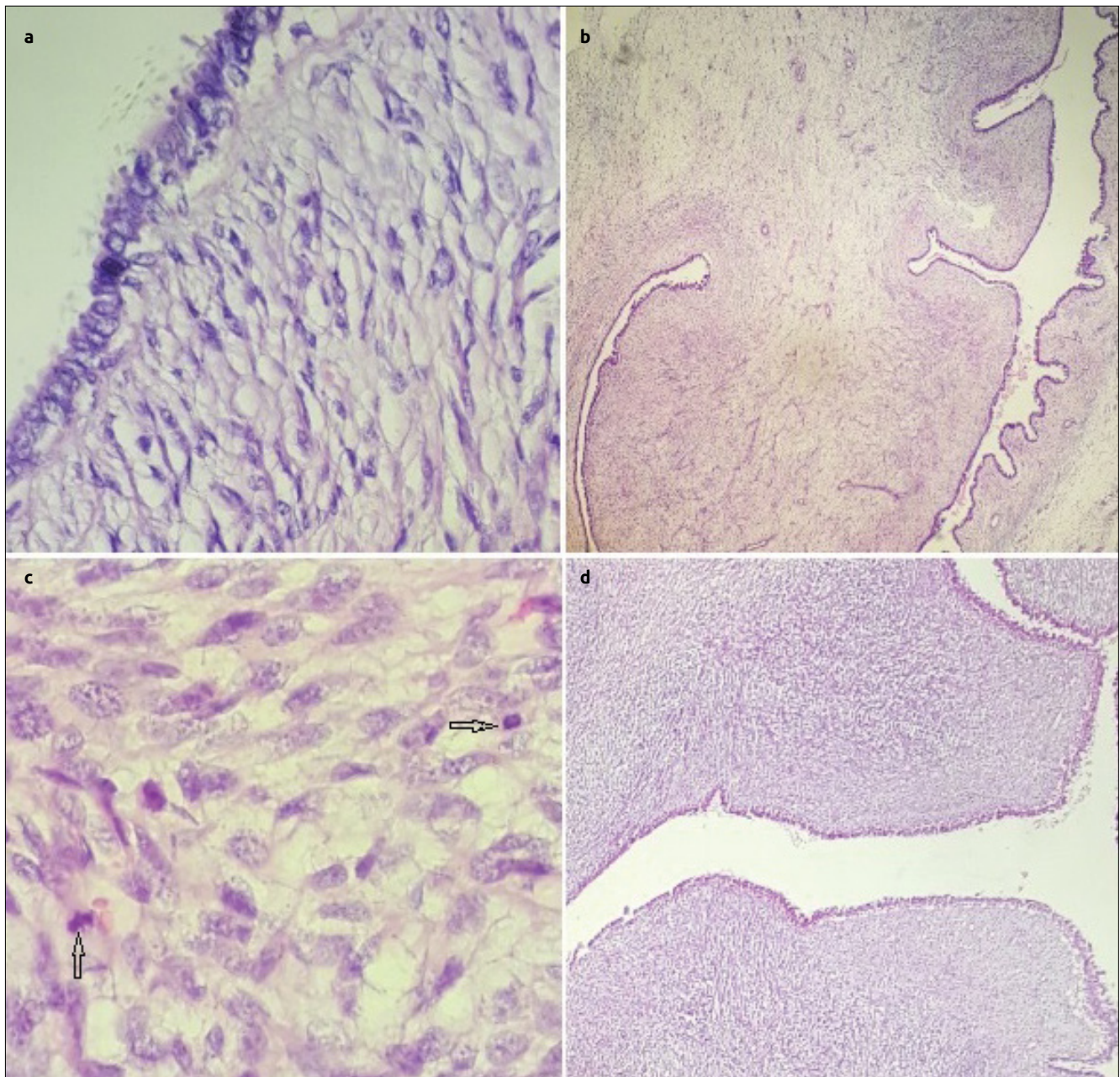


Figure 2. a-d. Microscopic illustrations of benign (a, b) and malignant (c, d) PTs. (a) Subepithelial proliferative stromal cells without nuclear atypia, (b) Leafy stromal fronds and surrounding proliferative epithelium, (c) Atypical stromal cells with pleomorphic enlarged nuclei and many scattered mitoses (arrows) (d) Atypical hypercellular stromal cells with stromal fronds

opacity was the most (33.3%) frequent radiologic finding in MG. All radiologic findings are presented in Table 3.

Histopathologic diagnoses, types of surgery, adjuvant therapies, and oncologic outcomes are summarized in Table 4. Core needle biopsy was the most commonly ($n=27$, 56.3%) used histopathologic diagnostic method, and suspicion of PT was reported in 21 (77.8%) patients. FNAC was only performed in two (4.2%) patients, one of which was benign, the other was non-diagnostic. The remaining 19 (39.6%) patients underwent excisional biopsy with normal surrounding tissue for both diagnosis and treatment of the masses.

Total excision with at least 1 cm macroscopic clear margins was the most frequent (87.5%) surgery. Although most patients ($n=34$, 70.8%) were diagnosed as having benign PT, borderline and malignant tu-

mors were found in 9 (18.8%) and 5 (10.4%) patients, respectively. Mean tumor size was 38 mm (7-170 mm). During the mean follow-up time of 29.5 months, local and distant recurrence as detected in three (6.3%) patients and one (2.1%) patient, respectively. Local recurrence occurred in patients with benign, borderline, and malignant PTs within the second year of surgery. A distant metastasis was detected the lung of a patient with malignant PT, 16 months after the operation.

Benign, borderline, and malignant PTs were statistically evaluated in terms of clinical, radiologic, and therapeutic characteristics. Malignant PT had a mean tumor size of 61.6 mm (47-90 mm), whereas benign and borderline PTs had a mean tumor size of 32.3 mm (7-170 mm) and 43.2 mm (17-150 mm), respectively. Tumor size was found statistically significantly different among the three histologic variants of PT ($p=0.010$). However, other continuous parameters including age ($p=0.091$)

Table 2. Basic demographic and clinical characteristics of the patients with PT (n=48)

Characteristics	n (%)
Age (years) (mean±SD)	35.06±12.1 y (18-58 y)
Menopausal status	
Premenopausal	39 (81.2%)
Postmenopausal	9 (18.8%)
Marital status	
Single	17 (35.4%)
Married	28 (58.3%)
Divorced/widowed	3 (6.3%)
Presenting symptom/sign	
Painless breast mass	41 (85.4%)
Painful breast mass	6 (12.5%)
Skin changes over the tumor	7 (14.6%)
Nipple discharge	1 (2.1%)
Incidental (during screening MG)	1 (2.1%)
Side of tumor	
Right	26 (54.2%)
Left	19 (39.6%)
Bilateral	3 (6.3%)
Location of tumor	
Upper-outer	28 (58.3%)
Retroareolar	10 (20.8%)
Other quadrants (total)	7 (14.7%)
More than one quadrants	3 (6.3%)
Duration of symptoms (median, 25-75% IQR)	4.5 mo (3-8 mo)
Age is presented as mean±SD, Duration of symptoms is presented as median (25-75% IQR), other variables are presented as n (%).	
SD: standard deviation; MG: mammography; y: year; mo: month; IQR: Interquartile range	

and duration of symptoms ($p=0.843$) were similar between each tumor group. No statistical analyses of categorical parameters including menopausal and marital status, presenting symptoms, side and location of tumor, US and MG findings, or recurrence could be performed because of the small number of patients. Therefore, all patients were classified as having benign and borderline/malignant PTs to obtain better statistical results. No significant differences between these two groups were found in terms of those categorical parameters ($p>0.05$).

Discussion and Conclusion

PT is an uncommon breast neoplasm with considerable uncertainty about its biologic behaviour. These tumors usually occur in women aged 35-50 years; however, malignant PTs have a slightly older presentation than others (5-7). In our case series, 5 patients had malignant PT with an average age of 36 years; the mean age of patients with benign PT was 22 years.

Table 3. Sonographic and mammographic findings in patients with PT

Radiologic findings	n (%)
Ultrasonographic findings (n=48)	
Well-defined hypoechoic mass	37 (77.1%)
Lobulation	24 (50%)
Mass with irregular margins	11 (22.9%)
Heterogeneous internal echogenicity	6 (12.5%)
Axillary lymphadenopathy	6 (12.5%)
Increased vascularity in Doppler US	22 (45.8%)
Mammographic findings (n=24)	
Well-defined nodular opacity	16 (66.6%)
Lobulation	7 (29.1%)
Asymmetric density	7 (29.1%)
Axillary lymphadenopathy	7 (29.1%)
Microcalcification	6 (25%)
US: ultrasonography	

Table 4. Histopathologic diagnosis, surgical, and oncologic outcomes of the patients

Radiologic findings	n (%)
Type of histopathologic diagnosis	
Core needle biopsy	27 (56.3%)
Excisional biopsy	19 (39.6%)
FNAC	2 (4.2%)
Type of surgery	
Total excision with wide margins	46 (95.8%)
Mastectomy	2 (4.2%)
Re-excision after initial surgery	2 (4.2%)
Histopathologic tumor type	
Benign	34 (70.8%)
Borderline	9 (18.8%)
Malign	5 (10.4%)
Adjuvant radiotherapy	4 (8.3%)
Adjuvant chemotherapy	5 (10.4%)
Duration of follow-up	29.5±16.2 (8-59)
Recurrence	
Local	3 (6.3%)
Distance	1 (2.1%)
Duration of follow-up is presented as mean±SD (range); other variables are presented as n (%).	
FNAC: fine needle aspiration cytology	

Non-tender, sharply demarcated, and mobile breast lump is the most common clinical finding in patients with PT. Dilated breast veins can sometimes be observed through the underlying skin over the tumor. Although these tumors have an average size of 5 cm, lesions of up to 40 cm have been reported (8). The association between tumor size and malignancy is controversial; however, rapid growth may be detected in malignant tumors (5). In our study, the mean tumor size was 38 mm, consistent with previous studies, and the largest PT was 170 mm in diameter, which was diagnosed as benign PT. In addition, the mean size of malignant PTs was higher than that of the others, and the mean tumor sizes of benign, borderline, and malignant PTs were statistically significantly different. There are no clinical features to distinguish benign or malignant PT from other benign breast lesions. Enlarged axillary lymph node is also an infrequent clinical finding in PT. Similarly, a small number of patients in the present study had palpable axillary lymph nodes.

The upper outer quadrant of the breast is the most frequent location of PT, and both sides are often equally affected. Multifocality and bilaterality are seen infrequently (9, 10). In our study population, right breasts were affected slightly more than left breasts, and the most common tumor location was the upper outer quadrant. Additionally, both multifocality and bilaterality were found in a small number of patients, similar to previous reports.

In general, PT is difficult to diagnose using imaging methods due to the lack of specific radiologic characteristics. Radiologically, PT is often confused with fibroadenoma (FA), cysts, and well-circumscribed carcinoma. With US, the majority of PTs are described as well-defined hypoechoic oval lesions surrounded by a capsule or pseudocapsule. Contrary to FAs, several sonographic findings including heterogeneous internal structure with irregular margins, septae, lobulation, and the absence of microcalcifications were reported to be associated with PT (11-13). In addition, increased intralesional vascularity with Doppler US is a frequent feature of these tumors. However, no specific color Doppler US finding was found to help differentiate PT from FA, or benign PTs from malignant (14). MG also has limited diagnostic value in differentiating PT and other benign breast lesions (12). In our study, US was used as the first-step imaging method in all patients, and MG was only performed in patients aged more than 35 years. The sonographic and mammographic findings were parallel to the literature; no specific radiologic feature was identified to differentiate the histologic subtypes of PTs. In addition, FA was the most commonly reported radiologic diagnosis with both US and MG, consistent with previous works (15-17). In recent years, several studies regarding the potential role of magnetic resonance imaging (MRI) in the diagnosis of PT have been published. However, no significant differences in MRI findings were found between benign PT and FA (18). MRI was not used in the diagnostic examinations of our patients.

FNAC, core needle biopsy, incisional and excisional biopsies were used in the preoperative histopathologic diagnosis of PT. Distinction of benign PT from cellular FA and malignant PT from spindle cell metaplastic carcinoma and primary breast sarcoma are the main problematic issues in the histopathologic evaluation (4). FNAC has quite low sensitivity due to the similarities with FA (19). Additionally, false-negative results can be obtained from FNAC when sampling is performed in an area of hypocellular stroma. PT can be histologically distinguished from FA by nuclear atypia, increased stromal cellularity, mitotic activity, and ratio of stroma to epithelium (20). Core needle biopsy is considered more reliable than FNAC in obtaining a correct diagnosis because it can provide specific histopathologic find-

ings. However, its sensitivity was reported as approximately 65% in the definitive diagnosis of PT (21). Therefore, some surgeons advocate excisional biopsy for both diagnosis and surgical treatment of PTs. In our study, core needle biopsy was the most commonly used histopathologic diagnostic method, with an approximately 80% diagnostic accuracy for PT. Accordingly, in a study by Gatta et al. (14), core needle biopsy was found a valuable tool in the differential diagnosis of PT and FA, with high specificity and sensitivity rates. In our experience, core needle biopsy plays an important role in the preoperative histopathologic diagnosis of PTs. FNAC was only used in two patients, and excisional biopsy was preferred for PTs that were strongly considered as FA or another benign lesion in preoperative clinical and radiologic evaluations.

Wide surgical excision, generally defined as removal of tumor with at least 1 cm clear microscopic margins, is the primary treatment in PT (22). Mastectomy may be needed in patients with large malignant tumors or an inappropriate tumor-breast tissue ratio. In the present study, surgical excision with adequate surrounding tissue was the most commonly performed surgery, and mastectomy was needed in only two patients with large malignant tumors. Axillary dissection is not recommended as a routine surgical approach because PT mainly spreads via a hematogenous route and nodal involvement is extremely rare (23, 24). However, axillary dissection may be considered in patients with malignant PT who have axillary metastasis. In our study, axillary dissection was not performed in any patients due to the absence of axillary involvement both clinically and radiologically. Benign PTs with positive margins or less than 1 cm clear margin may not require re-excision; however, such patients should be closely followed up because of the local recurrence risk of up to 15% (23). On the other hand, it is mandatory to obtain at least 1 cm tumor-free margins in borderline and malignant PTs because the local recurrence rate was reported as 21% even when surgical borders were clear (25). The local recurrence rate in our study population was 5.3%, which was less than those reported in previous works. However, a recurrence rate of 6.3% was found in a recent study of approximately 500 patients with benign and borderline PTs, consistent with our results. An interesting result from that study was that wide excision margins of nonmalignant PTs were not found correlated with the development of local recurrence (26). In our study, re-excision after the initial surgery was performed in two patients with borderline PTs. Tumor-free surgical margins were achieved in all patients with borderline or malignant PTs. Three patients developed local recurrence during the follow-up periods, of whom one had malignant, one had borderline, and one had benign tumors. All recurrence occurred within the 2nd and 3rd years of surgery, in agreement with the literature (5). The patient who had benign PT and developed local recurrence had a positive surgical margin after the initial operation. However, re-excision for positive margin was not performed the patient was unwilling to undergo surgery. The other two patients who developed local recurrence had undergone appropriate initial surgery with total removal of tumor and negative surgical margins. All three patients were premenopausal, aged under 50 years, and also had unifocal tumors of similar size. Re-excision with adequate surrounding tissue was performed for recurrent tumors of all patients. No further recurrence was observed in these three patients after re-excision during their mean follow-up periods of 1 year. Consequently, sufficient surgical margin is of great importance to minimize the risk of local recurrence. Distant metastasis can be seen in 10% of cases, which most often affects the lungs and bones (17). In our case series, distant metastasis was detected in only one patient with malignant PT, 16 months after surgery.

There is no global consensus on the role of adjuvant radiotherapy and chemotherapy in the management of PT (3, 24). However, application of radiotherapy to the breast after surgery for borderline and malignant PTs was shown to reduce the risk of local recurrence, without any significant survival benefit (27, 28). Therefore, adjuvant radiotherapy should be considered in patients with borderline and malignant PT on an individualized basis (4, 5). Although there have been no randomized clinical trials on the role of systemic therapy in malignant PTs, various chemotherapy regimens containing doxorubicin, dacarbazine, cisplatin, iphosphamide, and etoposide are generally recommended for patients with malignant and/or metastatic disease. Adjuvant chemotherapy has no beneficial effect on patient survival (1).

The 5-year overall-survival rates for benign and malignant PTs were reported to be approximately 90% and 80%, respectively (1). However, some authors reported lower survival rates for malignant tumors (29). In our study, no patients died during the mean follow-up period of 30 months.

In conclusion, PT has non-specific clinical and radiologic findings, and can easily be confused with other similar breast masses, particularly FA. Total excision with adequate clear margins is of great importance to reduce the risk of local recurrence. However, it should be always kept in mind that local recurrence can develop even after appropriate surgery for all histologic subtypes of PT. Therefore, these patients should be closely followed up at regular intervals after surgery.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects", (amended in October 2013).

Informed Consent: Written informed consent was not received due to the retrospective nature of this study.

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The Management and Outcomes of Male Breast Cancer

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ABSTRACT

Objective: Due to a lack of sufficient data, the treatment protocols for male breast cancer are usually the same as those used for female breast cancer. The aim of the current study was to present our clinical experience with male breast cancer.

Materials and Methods: The records of 37 patients who were treated for male breast cancer in our hospital between 2004 and 2014 were reviewed retrospectively. The data of patients were recorded and analyzed.

Results: The mean age of the patients was 63.03 ± 12.36 years. Thirty-three patients (89.2%) had invasive ductal carcinoma, two (5.4%) had ductal carcinoma in situ, and two had invasive lobular carcinoma (5.4%). The most common molecular subtype was luminal A (17 cases, 45.9%). Twenty-nine patients with male breast cancer underwent mastectomy and two underwent breast conserving surgery. Axillary lymph node dissection was performed in 25 patients. The most common surgical procedure was modified radical mastectomy. Distant metastases were present in 17 (45.9%) patients. Overall, the 5-year survival was 60%. The 5-year survival was 100% for those with stage 0-I disease, 87% for stage II, and 42% for stage III. The 3-year survival was 14% for stage IV.

Conclusion: Patients with male breast cancer presented at an older age, a later stage, and with earlier metastasis. Early metastasis and death increases with increasing stage. Poor prognosis correlates with late admission. Data from different centers should be compiled and reviewed in order to determine a specific treatment protocol for male breast cancer; each paper published reveals new data.

Keywords: Breast cancer, male, diagnosis, disease management

Introduction

In contrast to female breast cancer (FBC), male breast cancer (MBC) is a rare disease that is not well characterized. MBC accounts for <1% of breast cancer incidence and less than 1% of all male cancer cases (1-4).

MBC can arise from anywhere in breast tissue and can include rare forms, such as invasive papillomas and medullary lesions. Invasive ductal carcinoma accounts for 90% of all MBC cases, and 80% of all FBC cases. Invasive lobular carcinoma (ILC) accounts for 1% of MBC cases; it occurs predominantly in men with Klinefelter syndrome (5, 6). Ductal carcinoma in situ (DCIS) constitutes about 10% of MBC cases (7).

It has been reported that there are significant differences between MBC and FBC with respect to the expression of a variety of biologic factors, including estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2) (8). MBC tumors tend to express estrogen receptor (ER) and progesterone receptor (PR) at higher levels than do FBC tumors. In addition, MBC tumors have different cellular origins and are affected differently by various environmental risk factors. Further, patients with MBC have a lower overall-survival rate (9, 10).

Due to the lack of sufficient data in males, treatment regimens for MBC are based on the assumption that MBC is very similar to FBC; therefore, the prognostic features and therapeutic aims of FBC are extrapolated to MBC. Although there are similarities between MBC and FBC, there is also mounting evidence that they are quite different biologically. There is little proof that the prognostic features found in FBC are also valid for MBC (11-13).

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In the current study, we aimed to present our clinical experience with MBC in order to expand the data pool such that specific management protocols can be developed for MBC; therefore, we will no longer have to depend on management protocols intended for patients with FBC.

Materials and Methods

A total of 41 patients with MBC were admitted to the Oncology Department of our Hospital between 2004 and 2014. Thirty-seven patients were included in the study; 4 were excluded because their data were missing. All procedures adhered to the ethical principles of the Helsinki Declaration. The demographic characteristics, symptoms, treatment methods, stage, tumor histopathologic features, tumor size, and lymph node status for each patient were retrospectively recorded from the hospital database. Tumor size was recorded as the greatest dimension of the tumor. Immunohistochemical staining was used to classify the breast cancer cases into four different subtypes as follows: luminal A, luminal B, HER2-overexpressing, and triple-negative.

Statistical analysis

Survival rates were estimated using life-table method in SPSS version 18 (SPSS Inc.; Chicago, IL, USA).

Results

We retrospectively reviewed the medical records of 37 patients with MBC between 2004 and 2014. Of the 37 patients, 21 (57%) had left breast cancer and 16 (43%) had right breast cancer. The mean age of the patients was 63.03 ± 12.36 years (range, 32-79 years). All patients presented with a palpable mass. Associated findings included axillary lymphadenopathy (1 patient) and skin involvement (7 patients, 3 of which had ulcerated skin lesion). Thirty-three (89.2%) patients had invasive ductal carcinoma, of which three were mucinous subtype. Two patients (5.4%) had DCIS and 2 (5.4%) had invasive lobular carcinoma. The general characteristics of the patients are summarized in Table 1.

The mean tumor size was 35.5 ± 16.2 mm, the mean metastatic lymph node was 3.5 (range, 0-22), the mean number of totally removed lymph nodes (TLN) was 16.4 (range, 3-31), and the mean follow-up period was 40.6 months (range, 9-123 months).

While ER was positive in 31 (83.8%) cases, PR was positive in 30 (81.1%) cases. HER2 analysis results were available in 33 (89.2%) cases; 20 of these were negative (54.1%), 13 were positive (35.1%), and 4 were unknown (10.8%). There were 17 (45.9%) cases with luminal A molecular subtype, 12 (32.4%) with luminal B, 3 (8.1%) with triple-negative, 1 (2.7%) with HER-2—overexpressing subtypes, and there were 4 (10.8%) cases where the molecular subtypes were not defined. Seven patients underwent sentinel lymph node biopsy (SLNB). Four of these patients were node negative at histopathologic assessment and 3 were positive. The 3 patients who were node positive underwent axillary lymph node dissection (ALND), six of which had no metastatic lymph node. Eight patients did not undergo any axillary procedure; 5 were inoperable, 1 underwent salvage mastectomy, 1 underwent BCS for DCIS, and 1 refused surgery. The most common surgical procedure was MRM (24 patients, 64.9%). The treatment options are summarized in Table 2.

Distant metastases were present in 17 (45.9%) of the 37 patients with MBC. The most frequent involvements were bone (n=12; 70.6%),

Table 1. Histopathologic characteristics of the patients with MBC

	n	%
Histopathologic type		
Invasive ductal carcinoma	33	89.2
Invasive lobular carcinoma	2	5.4
DCIS	2	5.4
ER status		
Positive	31	83.8
Negative	6	16.2
PR status		
Positive	30	81.1
Negative	7	18.9
Her-2 status		
Positive	13	35.1
Negative	20	54.1
Unknown	4	10.8
Molecular type		
Luminal A	17	45.9
Luminal B	12	32.4
Triple-negative	3	8.1
Her-2 overexpressing	1	2.7
Unknown	4	10.8
ER: estrogen receptor; PR: progesterone receptor; DCIS: ductal carcinoma in situ; MBC: male breast cancer		

lung (n=6; 35.3%), cranial field (n=3; 17.6%), brain (n=2; 11.8%), liver (n=2; 11.8%), pleura (n=1; 5.9%), and mesenteric (n=1; 5.9%).

The 5-year survival was 100% for stage 0-I disease, 87% for stage II, and 42% for stage III. Three-year survival was 14% for stage IV. Early metastasis and death increases as the stage of MBC increases.

Discussion and Conclusion

Male breast cancer has been reported between the ages of 5 and 93 years, with a median age of 68 years (14-16). In our current study, the ages of the patients with MBC ranged between 32 and 79 years (mean age: 63 years).

MBC usually presents as a painless subareolar lump that is usually identified by palpation (17-20). Pain is associated with the lump in only 5% of cases (21). Nipple involvement is quite an early event; 9% of cases are reported to have nipple retraction, 6% have discharge, and 6% have ulceration, though ulceration was separate from the nipple in half of these cases (3). In the current study, all of the patients presented with a palpable mass, and the mean tumor size (36 mm) was much larger than that reported in the literature (24 mm) (22). Associated findings included axillary lymphadenopathy in one patient, and skin involvement in seven patients (3 of whom had ulcerated skin lesions). MBC are generally identified in physical examination and usually have associated sonographic and/or mammographic findings. At mammography, microcalcification is more rarely seen in males than in females, and there are typically high-density irregular masses with well-defined

Table 2. General characteristics of the patients with MBC

	n	%
Site of cancer		
Left	21	56.8
Right	16	43.2
Stage		
In situ	2	5.4
I	4	10.8
II	12	32.4
III	12	32.4
IV	7	18.9
Treatment		
MRM*	24	64.9
Inoperable	5	13.5
Mastectomy+SLNB	4	10.8
BCS**	1	2.7
BCS+ALND	1	2.7
Salvage mastectomy	1	2.7
Refused surgery	1	2.7
Metastasis		
Absent	20	54.1
Present	17	45.9
Bone	12	70.6
Lung	6	35.3
Cranial Field	3	17.6
Brain	2	11.8
Liver	2	11.8
Pleura	1	5.9
Mesentery	1	5.9
Survey		
Survivor	26	70.3
Dead	11	29.7

SLNB: sentinel lymph node biopsy; MRM: modified radical mastectomy; BCS: breast-conserving surgery; ALND: axillary lymph node dissection; MBC: male breast cancer.

*Three patients with positive SLNB underwent modified radical mastectomy.

**This patient's histopathologic examination revealed DCIS, and therefore, this patient did not undergo axillary intervention.

contours (Figure 1a, b). MBC has similar ultrasound (US) features as in FBC. The margins are angulated, microlobulated, or speculated (Figure 2) (23).

Hormone receptor-positive expression has been reported more commonly among men than women (22). In large studies of MBC, more than 90% of tumors were reported to be positive for estrogen receptor, and 92-96% were positive for progesterone-receptor (24, 25). However, the positivity rates were similar in men when

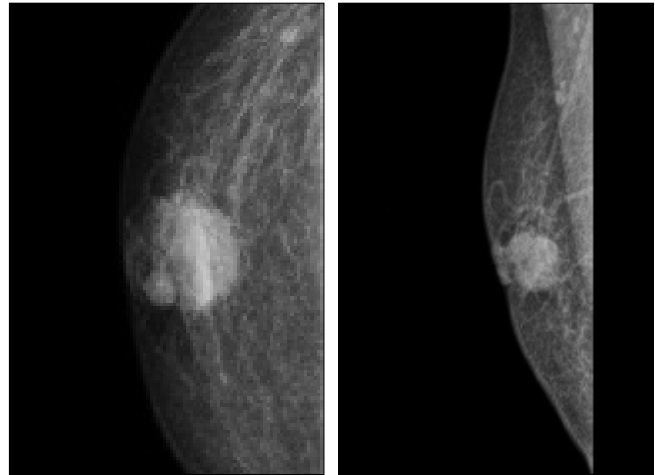


Figure 1. a, b. Invasive ductal carcinoma in a man with a palpable mass of the right breast (a, b). Craniocaudal and mediolateral oblique mammograms of the right breast show high density mass with well-defined in the retroareolar region

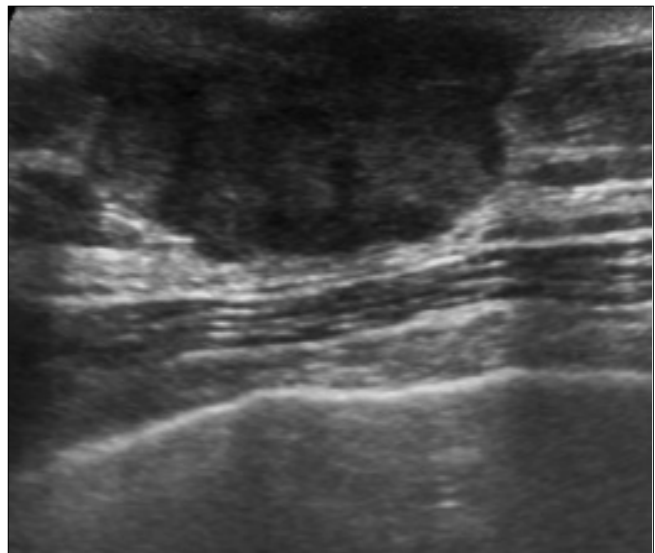


Figure 2. US image shows the hypoechoic mass with irregular margins in the retroareolar region

compared with postmenopausal women (25, 26). Many studies have reported different rates of HER2 overexpression in MBC (27-30). In our study, ER results were positive in 31 (83.8%) cases, PR results were positive in 30 (81.1%) cases, and HER2 results were positive in 13 (35.1%) cases. The literature reveals that luminal A is the most common MBC subtype (1). In the current study, the molecular subtype was luminal A in 17 (46%) cases, luminal B in 12 (32%) cases, triple-negative in 3 cases, and HER-2 overexpressing in 1 case; there were no data regarding molecular subtypes in four cases. The antiestrogen drug, tamoxifen, is usually accepted as the standard of care for hormonal therapy in MBC because it is hormone-receptor positive in about 90% of cases (3). In our study, hormonal therapy was performed in 18 (48.7%) patients. The treatment protocols of chemotherapy and radiotherapy were performed based on the management protocols for FBC.

With regards to invasive carcinomas, female and male tumors are morphologically indistinguishable. A number of studies on MBC frequently reported that the major histologic subtypes were nonlobular

breast carcinomas such as ductal carcinoma (92%) (4, 31-33). Despite the absence of mammography screening, the incidence of in situ carcinoma is rising in men (34). DCIS constitutes approximately 5-10% of all male breast carcinomas (22, 34, 35). An especially rare type of MBC is ILC, which constitutes about 1% of all MBC cases. ILC is unusual in men because male breast tissue lacks lobules (36). In the current study, primary mucinous carcinoma was seen in 2 (5.4%) patients, DCIS was seen in 2 (5.4%), and ILC was seen in 2 (5.4%) patients.

Twenty-nine (78.4%) of the patients with MBC in the present study underwent mastectomy, and 2 (5.4%) underwent BCS. Studies published in the 1990s reported that 87% to 100% of males with breast cancer underwent mastectomy, and that only a small subset were treated with a breast-conserving approach (37-39).

Axillary lymph node involvement is the strongest predictor of both metastatic and local recurrence risk; it is present in about 50% MBCs (4, 14, 40). It has been reported that there are more than three nodes involved in approximately 40% of patients with nodal involvement (4, 41). In our study, the mean metastatic lymph node was 3.5 (range, 0-22), and 10 of the patients who underwent ALND did not have lymph node metastasis. Recently, SLNB was used in MBC cases with similarly encouraging results (42). The Memorial Sloan-Kettering Cancer Center recently reviewed their experience, and indicated that 49% of patients with MBC had a positive sentinel lymph node compared with 31% of patients with FBC (43). In the current study, 7 patients underwent SLNB; ALND was performed in 3 of these because they had positive SLNB.

General public awareness regarding MBC is minimal, and this leads to possible delays in diagnosis; therefore, men with breast cancer have a worse prognosis than women with breast cancer because of the extent of the disease at the time of diagnosis. In the literature, more than 40% of patients with MBC present with stage III or IV disease (44, 45). In our study, the overall 5-year survival was 60%. The 5-year survival was 100% for stage 0-I disease, 87% for stage II, and 42% for stage III. Three-year survival was 14% for stage IV. Seven patients initially presented with metastatic disease, and 10 (7 patients who were stage III and 3 patients who were stage II) developed metastatic disease during follow-up.

Databases show that up to 93% of MBC cases are of advanced disease, and that distant metastases are observed in approximately 30% of these patients at the time of diagnosis (19, 46). In the current study, the most frequent involvements were bone (n=12, 70.6%), lung (n=6, 35.3%), cranial field (n=3, 17.6%), brain (n=2, 11.8%), liver (n=2, 11.8%), pleura (n=1, 5.9%), and mesentery (n=1, 5.9%). There are other case series that reported different metastatic sites, among which were bones (48.78%), lungs (29.26%), liver (17.07%), spine (up to 30%), skin, and pleura (19, 46).

One recently published study suggested that they were the first to report brain metastasis in a patient with MBC; to the best of their knowledge, there are no other cases in the literature that prove the existence of brain metastasis from MBC (19). We also found no other reports of brain metastasis due to MBC in the literature. In our study, we reported two brain metastases due to MBC.

Overall prognosis is poor in MBC, but two studies proposed that the prognoses of MBC and FBC appeared similar when adjusted for stage and age (4, 47). Other studies reported that when matched by stage and

age, men with breast cancer appeared to have a comparable or better prognosis than women (48). However, perhaps due to poor awareness of the disease and diagnostic delays, several studies argued that MBC with higher stage tumors and had a poorer overall prognosis (49).

Estimates for overall 5-year survival range between 40-65% (37, 50). The 5-year survival for patients with MBC grouped by stage at presentation are as follows: 75-100% for stage I disease, 50-80% for stage II disease, and 30-60% for stage III disease (50). In the current study, the overall 5-year survival was 60%. The 5-year survival was 100% for stage 0-I disease, 87% for stage II, and 42% for stage III. Three-year survival was 14% for stage IV. Early metastasis and death increases as the stage of MBC increases.

Although it is a rare disease, MBC is accompanied by significant morbidity and mortality. Men generally present with higher stage and older age than females with breast cancer. Early metastasis and mortality rates increase with advanced stages of MBC. Therefore, in order to obtain earlier detection, education of both patients and health care providers is needed to increase awareness of MBC. In our study, we saw patients with MBC who had rare histopathologic types, including ILC and mucinous cancer. In addition, 2 patients had brain metastases. The most widely used surgical procedure was MRM. SLNB can be performed successfully in MBC. More studies from different centers are essential in order to define a specific treatment regimen because the rarity of MBC precludes large clinical trials. Collection of data from different centers will also address essential questions in the treatment of MBC.

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Informed Consent: Written informed consent was not received due to the retrospective nature of this study.

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Inflammatory Myofibroblastic Tumor of the Breast Coexisting with Pseudoangiomatous Stromal Hyperplasia

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ABSTRACT

Inflammatory myofibroblastic tumors (IMTs) are uncommon breast lesions that consist of spindle cells accompanied by plasma cell-rich inflammatory infiltration, which may mimic breast cancer clinico-radiologically. A woman aged 38 years with a breast mass was referred to our general surgery clinic. The physical examination revealed a mass with irregular borders in the upper outer quadrant of the left breast. In mammography, the lesion was 15 mm in diameter with a spheric form and high density. Ultrasonographically, the mass was solid, heterogeneous, and hypoechoic with posterior enhancement. Histopathologic examination of a core needle biopsy revealed a proliferation of spindle cells with eosinophilic cytoplasm and mild nuclear atypia, which showed negative immunostaining for pancytokeratin, HMWCK, CAM5.2, p63, CD34, β -catenin, and ALK but diffuse positivity for smooth muscle alpha (SMA). The lesion was reported as a "spindle cell lesion" and excision with clear margins was recommended. In the lumpectomy specimen, the lesion consisted of spindle cells that formed fascicles and infiltrated the surrounding breast parenchyma. Lymphocytes and plasmocytes scattered among spindle cells were noted. Necrosis, increased mitotic activity, nuclear pleomorphism and hyperchromasia were not detected. Immunohistochemical findings were the same in the core needle biopsy. The Ki-67 proliferation index was below 5%. With these findings, differential diagnoses were ruled out and the tumor was reported as IMT. In close proximity to this lesion, areas of columnar cell lesion with atypia and surrounding pseudoangiomatous stromal hyperplasia were seen. Patient has a follow-up of 16 months without recurrence.

Keywords: Inflammatory myofibroblastic tumor, PASH, spindle cell, breast

Introduction

Inflammatory myofibroblastic tumors (IMTs) are commonly seen in the lungs, respiratory tract, gastrointestinal system, urinary system, and deep soft tissues in children and young adults. Local recurrence is not uncommon (1). Histopathologically, the lesions consist of bundles formed by benign- looking spindle cells, accompanied by plasma cell-rich inflammatory infiltration. Depending on the density of the components forming the lesion, variants such as fasciitis-like, compact-spindle cell, and hypocellular-fibrous IMT have been described (2). IMTs were formerly thought to be reactive lesions; however, currently there is a tendency to accept them as borderline neoplasia, owing to the detection of repetitive anaplastic lymphoma kinase (ALK) gene rearrangements (1). IMT of the breast is very rare in the literature. To date, 27 cases have been reported in the literature. This lesion is especially important for ruling out differential diagnoses in breast (1, 3). Pseudoangiomatous stromal hyperplasia (PASH) is usually an incidental microscopic lesion characterized by anastomosing slit-like, non-endothelialized spaces in breast stroma (4). The common feature of IMT and PASH is that they both comprise myofibroblastic cells.

Case Presentation

A woman aged 38 years with a mass in her left breast was referred to our general surgery clinic. No features were determined either in her past medical history or family history. A physical examination revealed a 15-mm spherical mass with indistinct borders and high density. Ultrasonographically, the mass was solid, heterogeneous, hypoechoic, peripherally vasculated, and showed posterior enhancement (Figure 1).

The core needle biopsy specimen demonstrated spindle cell proliferation with bundle formation, in which cells showing eosinophilic cytoplasm with mild nuclear atypia were seen (Figure 2a). Immunohistochemically, spindle cells were positive for SMA, negative for pancyto-

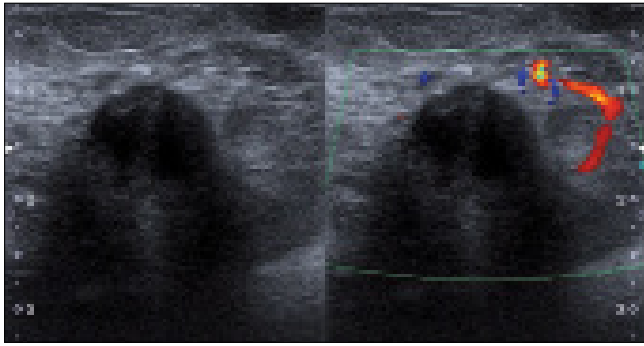


Figure 1. Ultrasonographically-solid, heterogeneous, hypoechoic, peripherally-vascularized mass with posterior enhancement

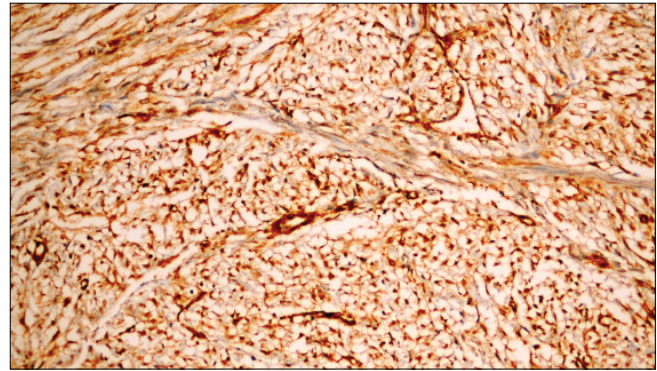


Figure 3. Smooth muscle alpha positivity in tumor cells

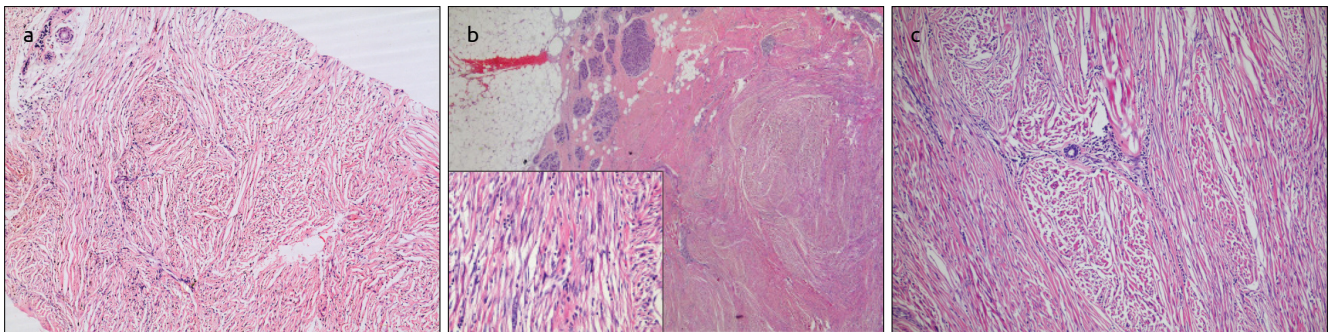


Figure 2. a-c. Core needle biopsy specimen showing spindle cell proliferation with eosinophilic cytoplasm and mild nuclear atypia (a) Spindle cell proliferation with eosinophilic cytoplasm and low-grade nuclear features in the lumpectomy specimen (b) Inflammatory infiltration scattered among the spindle cells, primarily composed of lymphocytes and plasmacytes (c)

keratin, CK5/6, CK14, CAM5.2, p63, CD34, desmin, and β -catenin. The tumor was reported as 'spindle cell lesion' and excision with clear margins was recommended for a definitive diagnosis.

In the macroscopic examination of the lumpectomy specimen, the lesion was solid and white-tan colored with irregular borders (1.3 x 1.3 x 1 cm). Microscopically, the lesion comprised spindle cells that formed fascicles and infiltrated the surrounding breast parenchyma. The spindle cells had eosinophilic cytoplasm with low-grade nuclear features (Figure 2b). There was also inflammatory infiltration scattered among spindle cells, primarily composed of lymphocytes and plasmacytes (Figure 2c). Necrosis, increased mitotic activity (0/10 HPF), nuclear pleomorphism and hyperchromasia were not detected. Immunohistochemically, tumor cells stained positive for vimentin and smooth muscle alpha (SMA) (Figure 3), and negative for pancytokeratin, HMWCK, CAM5.2, p63, CD34, β -catenin, ALK, and estrogen (ER) and progesterone receptors (PR). The Ki-67 proliferation index was found below 5%. With these histopathologic and immunohistochemical findings, lesions in the differential diagnosis were ruled out and the tumor was reported as IMT. In close proximity to the lesion, areas of columnar cell change (CCC) with atypia (flat epithelial atypia) and surrounding PASH were seen. The patient has a follow-up of 16 months without recurrence. Written consent was taken from the patient for this case report.

Discussion and Conclusion

It is important to recognize low-grade spindle cell lesions of the breast and distinguish one from another, because of the differences in treatment. Definitive diagnosis requires histopathologic examination, and the differential diagnosis consists of a spectrum of lesions, including reactive lesions as well as benign and malignant neoplasms.

The differential diagnosis includes: fibromatosis, nodular fasciitis, reactive spindle cell nodule, leiomyoma/leiomyosarcoma, myofibroblastoma, dermatofibrosarcoma protuberans (DFSP), phyllodes tumor, low-grade fibromatosis-like metaplastic carcinoma (LGFLMC), low-grade myofibroblastic sarcoma (LGMFS), and spindle cell sarcoma (primary or metastatic) (1, 2, 5-9). In our case, the excision specimen demonstrated spindle cell proliferation with mild nuclear atypia, bundle formation, and irregular-infiltrative borders; therefore, fibromatosis, LGFLMC, and LGMFS primarily considered in the differential diagnosis.

Fibromatosis (desmoid-type) usually arises from the pectoral fascia and extends into the breast. Most cases (80%) show nuclear β -catenin expression and lymphocytes, if there are any, at the periphery of the lesion (5). In this case, the lesion was localized in breast parenchyma, distant from the pectoral fascia. Additionally, the presence of lymphoplasmocytic infiltration scattered among spindle cells and β -catenin negativity helped to eliminate fibromatosis. The lesion consisted of monotonous-spindle cells with low-grade nuclear features, had no epitheloid areas dispersed among spindle cells, and did not show positive staining with any of the high- and low-molecular-weight cytokeratins. LGFLMC was excluded owing to these features (6). LGMFS is a cellular malignant neoplasia that consists of myofibroblasts. It has rarely been reported in breast. The gold standard in the diagnosis of LGMFS is to show fibronexus junctions and fibronectin fibrils that connect myofibroblasts to extracellular matrix using electron-microscopy (7). ALK protein expression and gene rearrangement have not been reported in LGMFS. In this current case, ALK was found immunohistochemically negative. However; the presence of lymphoplasmocytic infiltration dispersed throughout the lesion and absence of high cellularity, nuclear hyperchromasia, and high mitotic activity were more

consistent with IMT than LGMFS. ALK gene rearrangement can be detected in half of IMT cases, especially in older patients (1). Nodular fasciitis presents as a rapidly enlarging, painful or tender subcutaneous nodule, usually in the upper extremities and trunk (2). It consists of spindle cell proliferation and collagen fibrils, set in a loose-myxoid stroma that contains capillaries, and extravasated erythrocytes and inflammatory cells. The spindle cells have prominent nucleoli and high mitotic activity; however, most cases are well-demarcated and do not infiltrate the surrounding breast parenchyma.

Phylloides tumor has biphasic component consisting of clefts lined by epithelial cells and cellular stromal proliferation (2). Primary breast sarcoma is extremely rare; it is good practice to exclude phylloides tumor first. Patient history and clinical information are important for the diagnosis of metastatic breast sarcoma. DFSPs form well-demarcated nodules located superficially in the dermis and subcutaneous tissue. Microscopically, DFSPs consist of CD34-positive innocent-looking spindle cells with a storiform pattern. Myofibroblastoma and nodular PASH present as well-circumscribed masses, similar to fibroadenoma (4, 8). Leiomyoma and leiomyosarcoma of the breast are usually seen as well-demarcated nodular masses in the nipple-areolar complex (2, 9). History of former biopsy is crucial in the diagnosis of reactive spindle cell nodules. These lesions demonstrate hemosiderin-laden macrophages and chronic inflammatory cells, which reflect the former procedure.

The etiology of PASH is still controversial. It is usually seen in premenopausal period, has high frequency in gynecomastia materials, and can have hormone receptor positivity. Hormone-dependent etiology is mostly considered because of these characteristics (4). PASH is not a true vascular proliferation (CD31 negative). The myofibroblast-lined spaces among collagen fibers in the stroma give the lesion its characteristic appearance. PASH is encountered frequently in the stroma surrounding CCC areas, which are accepted as preneoplastic lesions for low-grade breast carcinomas. Dabbs et al. stated that the coexistence of CCC and PASH could be an example of epithelial-stromal interaction (10). In this current case, the vicinity of the tumor demonstrated flat epithelial atypia in lobular units and PASH in the surrounding stroma. There are only a few case reports in the literature with ER and PR receptor expression in IMT (11, 12). Banet et al. (11) reported 2 IMT cases within the placenta, one of which showed patchy expression for PR receptor without ALK immunoreactivity, as well as gene rearrangement (11). Satomi *et al.* (12) reported an IMT of the mandible in a 14-year-old girl. No immunopositivity for ER, PR or ALK-1 was shown in that tumor. Similarly, we could not demonstrate positivity for either ER or PR in the current case.

In this case, both IMT and PASH areas were observed in close proximity to the lesion. Marked flat epithelial atypia was detected in PASH areas in the stroma. The vicinity of these two lesions, PASH areas mainly surrounding flat epithelial atypia, and young age of the patient made us consider whether a special group of IMT cases, such as ALK-negative IMT, could in fact be reactive proliferative lesions resulting from endocrine stimulation, or that the coexistence of these lesions was just a coincidence. However, we could not determine ER or PR nuclear expression either in IMT or PASH areas to support our hypotheses in this case.

As a result, we aimed to present a rare breast lesion, IMT, which can also mimic malignancy, and discuss the differential diagnosis. With this case, IMT with stromal PASH in close proximity, which also originates from myofibroblastic cells, has been described for the first time in the literature.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - C.K.T., Y.C., E.H., C.L.; Design - C.K.T., Y.C., E.H., C.L., S.A., M.A.N.; Supervision - C.K.T., Y.C., E.H., C.L., S.A., M.A.N.; Funding - C.K.T., S.A., M.A.N.; Materials - S.A., M.A.N.; Data Collection and/or Processing - C.K.T., Y.C., E.H.; Analysis and/or Interpretation - C.K.T., Y.C., E.H.; Literature Review - Y.C., E.H.; Writing - C.K.T., Y.C., E.H.; Critical Review - C.K.T., C.L.

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Secretory Carcinoma of the Breast

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ABSTRACT

Secretory carcinoma is a very rare subtype of breast carcinoma. These tumors are generally associated with a favorable prognosis, although having triple-negative phenotype (estrogen receptor (ER), progesterone receptor (PR) negative and c-erbB2 (HER2) negative). In this presentation, a rare secretory carcinoma of the breast in a woman aged 24 years is discussed and the literature is reviewed.

Keywords: Secretory carcinoma, breast, immunohistochemistry

Introduction

Secretory carcinoma is a very rare histologic type of breast carcinoma that is seen in less than 1% of invasive breast cancers (1). It was first described by McDivitt and Stewart (2). This tumor is frequently seen in children and adolescents, which is why it is known as “juvenile carcinoma.” It is less frequently seen in the elderly population. It has typical histomorphologic features. In general, despite having triple-negative molecular phenotype, it has a favorable prognosis. Very rare cases have been shown to metastasize (3).

Case Presentation

A woman aged 24 years was evaluated in an external center. Breast ultrasonography (USG) and magnetic resonance imaging (MRI) revealed an 11-mm sized irregular-shaped solid mass with increased vascularization that suspicious for malignancy located at the 9 o'clock position. A biopsy was performed, which revealed secretory carcinoma of the breast. Further assessment in our center resulted in a segmental mastectomy with sentinel lymph node biopsy for right axilla.

Macroscopically, the specimen was 14 g in weight and 7x6x4-cm-sized lumpectomy material. Serial sections revealed the presence of a nodule measuring 2x2x1.5 cm. It was well-circumscribed, grayish-white, rounded, and lobulated. At the inferior of the lesion, there was another mass. It was fairly irregular, gray-white in color, and 0.9x0.8x0.8 cm in size.

Microscopic examination revealed a large nodule that was diagnosed as a fibroadenoma (Figure 1). The second lesion drew our attention because of its invasive nature. The tumor comprised microcysts and glandular structures that contained secretory material in their lumens (Figure 2). At high magnification, the tumor cells were mostly bland looking with round and oval nuclei. Immunohistochemistry with epithelial membrane antigen (EMA) and S-100 was performed, which resulted in strong positive staining of the tumor cells (Figure 3, 4). Immunostaining for ER was approximately 3% positive of the invasive tumor cells (Figure 5), whereas PR and HER2 were negative. The Ki67 proliferation index was found as 3%. Based on histomorphologic and immunohistochemical features, the diagnosis of secretory carcinoma was approved.

Discussion and Conclusion

Secretory carcinoma is a rare breast carcinoma and is generally seen in children and young adults (1, 2). Although it is seen in children and young adults, it has also been reported in elderly patients (4). Our patient was 24 years old. This carcinoma is also seen in males and has

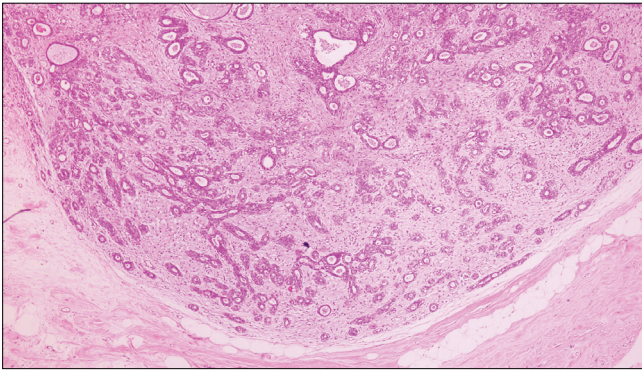


Figure 1. Microscopic view of the fibroadenoma (H&E, x100)

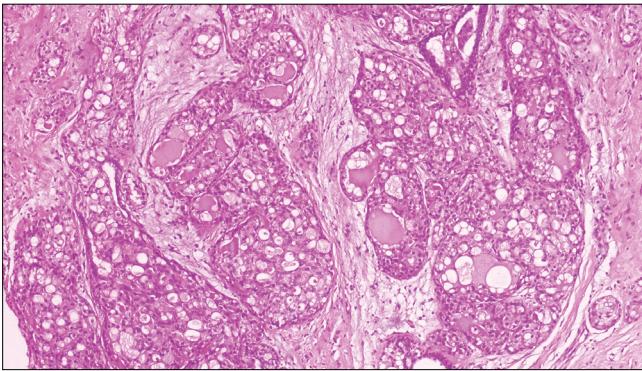


Figure 2. Microcystic and adenoid structures with eosinophilic secretion within the lumen comprising wide cytoplasm cells (H&E, x200)

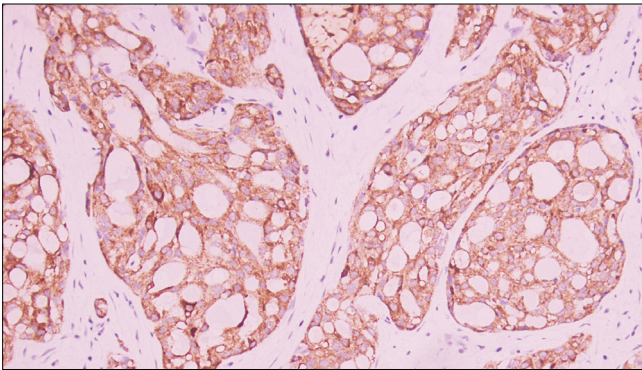


Figure 3. Epithelial membrane antigen positivity shown immunohistochemically in tumor cells

much poorer prognosis (5). Secretory carcinoma is usually a unifocal tumor but there are reports of multifocal cases (6).

Due to having a rather limited islet-like invasion pattern in microscopy, its cribriform-like adenoid structures and microcysts are easily confused with in situ carcinomas in needle biopsies.

Histochemical staining of the intraluminal material for PAS and immunohistochemical staining of tumor cells with S100 and EMA can be helpful in defining the diagnosis. The tumor is usually a triple-negative (ER, PR and HER2 negative) molecular subtype. Some portion of cases, including our case, can be weakly positive for ER. It is known that triple-negative phenotypes behave aggressively. In spite of having such features, the tumor's prognosis is highly favorable (1-3). In contrast to the tumor's molecular appearance, it has extremely good prognosis (1-3). The risk of developing systemic metastases is also extremely low (1, 2).

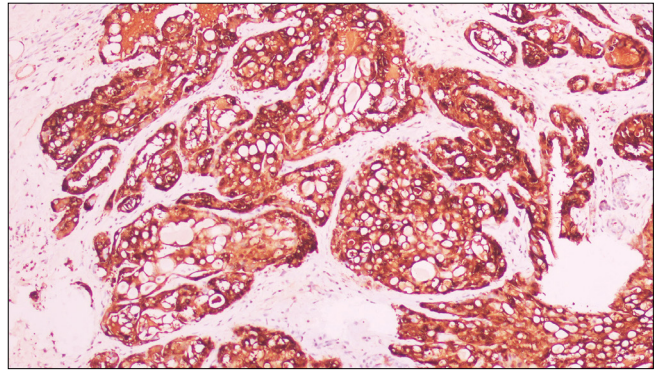


Figure 4. Immunohistochemical S100 protein positivity in tumor cells

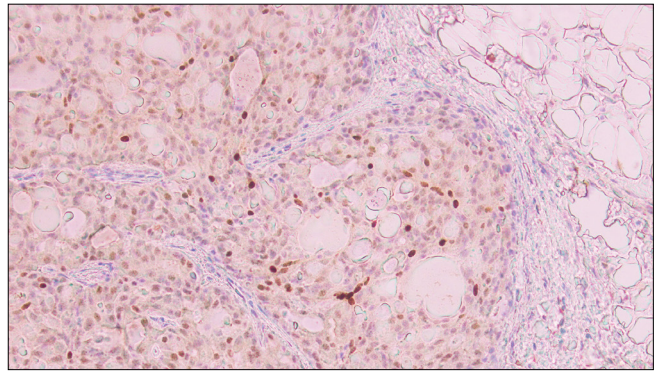


Figure 5. Positive nuclear staining for ER in tumor cells

It was recently demonstrated that these carcinomas develop due to $t(12,15)$ ETV6-NTRK3 gene translocation (7). Interestingly, salivary gland tumors have been reported that were genetically and morphologically similar, thus getting the name of “mammary-analogue secretory carcinoma of salivary glands” (8). This tumor also has a good prognosis until it undergoes high-grade transformation. Drilon et al. demonstrated that pan-Tk inhibitor entrectinib (Ingyta) treatment had a dramatic clinical response when used as a targeted treatment (8). Breast secretory carcinoma is likely to have same anti-target therapy.

There are no reports of the combination of secretory carcinoma with fibroadenoma in the literature. However, the knowledge that this type of tumor and fibroadenomas are mostly seen in young adults increases the possibility of such a combination.

The primary treatment option for secretory carcinoma is surgery. Sentinel lymph node biopsy is recommended because the incidence of axillary metastases has been reported as 30% in patients with tumors larger than 2 cm (6). Our patient had a tumor of approximately 1 cm and no metastases in axilla.

A good knowledge of secretory breast carcinoma histologic diagnosis is important, especially to avoid possible mistakes in the needle biopsy.

Informed Consent: Written informed consent was obtained from patient.

Peer-review: Externally peer-reviewed.

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Persistent Left Superior Vena Cava Incidentally Recognized Postoperatively After Venous Port Placement

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ABSTRACT

Persistent left superior vena cava is the most common congenital venous anomaly of the thoracic venous system, occurring in 0.3% to 0.5% of individuals in the general population. It may remain asymptomatic throughout life and be incidentally found in healthy individuals undergoing vascular procedures such as venous access device placements and endovascular cardiac interventions.

Here we present a case of persistent left superior vena cava incidentally realized during chemoport insertion in a patient with breast cancer.

Keywords: Persistent left superior vena cava, venous port placement, breast cancer, congenital

Introduction

The superior vena cava (SVC) in healthy adults is formed by fusion of right and left brachiocephalic trunks. Rare anomalies of the SVC mostly comprise left SVC and double SVC, which are reported to have an incidence of 0.3-4.0% (1). Embryology of the vascular system is mostly driven by the descent of the heart from its origin in the neck into the thoracic cavity with caudal rotation towards the left when the right aortic arc is reduced (1, 2). In this process, the left and right superior vena cava precursors tend to fuse via development of confluence of the left and right innominate veins (3). Persistent left superior vena cava (PLSVC) is a result of underdevelopment of the left innominate vein with failed regression of the left cardinal vein (1). In individuals without other cardiovascular anomalies, the risk of having double or isolated superior vena cava is low (1). Nevertheless, surgeons who undertake vascular interventions should be aware of such anomalies in order to be able to successfully manage possible technical difficulties or complications.

The aim of this case presentation was to present a patient with breast cancer whose persistent left superior vena cava was incidentally found during chemoport insertion.

Case Presentation

A woman aged 35 years who was diagnosed as having right breast carcinoma was admitted to our breast center. Right subcutaneous nipple-sparing mastectomy, axillary lymph node dissection, and expander placement were performed. She also required central venous catheterization for systemic chemotherapy. The patient was taken to the operating room, and a left subclavian guide was inserted. The guide and catheter were then seen on the left side of the mediastinum. A catheter angiography with water-soluble contrast medium was performed, which revealed a persistent left superior vena cava draining into the right atrium via coronary sinus (Figures 1-3).

On postoperative day 1, a routine morning chest X-ray performed for pneumothorax screening revealed that the catheter was unusually located. It was ascending by the left contour of the heart (Figure 4).

A quick test showed that port was functional and potent, which enabled blood sampling and injections at normal pressures. After necessary explanations to the patient, it was decided to further evaluate this probable vascular anomaly.

The patient was discharged without complications in order to have her chemotherapy in a routine manner.

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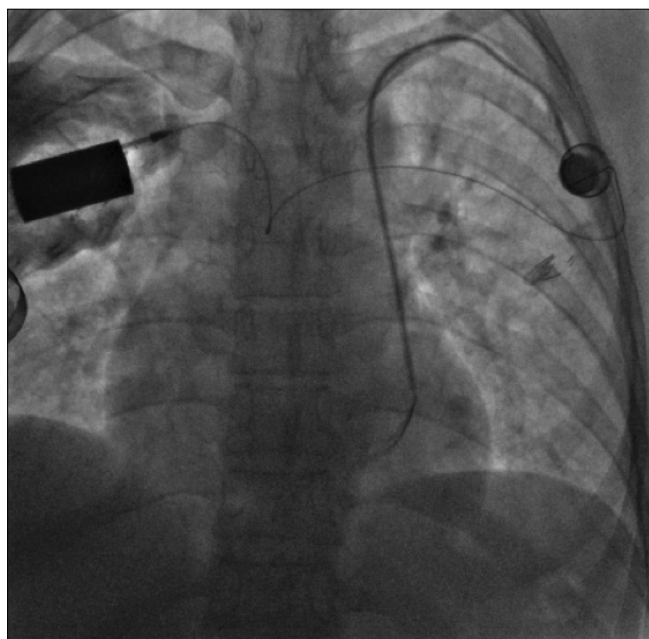


Figure 1. Subtraction image of the first image showing contrast spreading from the catheter end

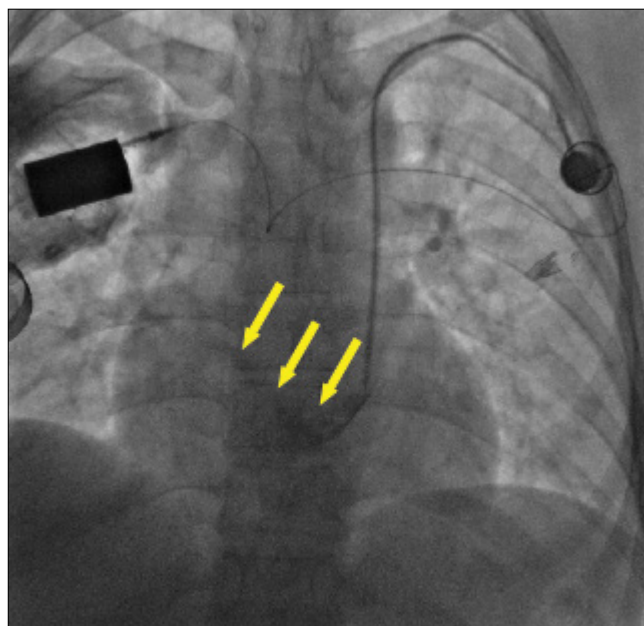


Figure 3. Further spread of the contrast medium marked with yellow arrows (it is more obvious on video sequence)

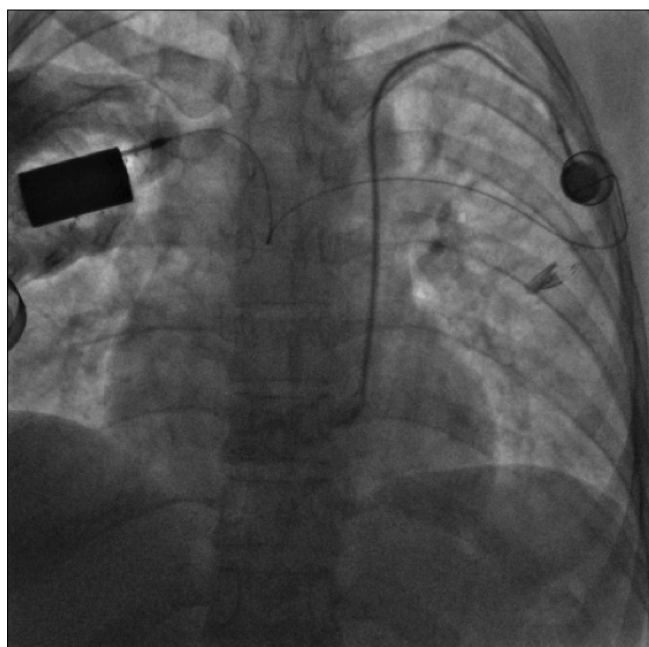


Figure 2. This image shows further spread of contrast to the coronary sinus. Note the catheter's visual displacement as PLSVC moves with heart's contraction

A retrospective evaluation of positron-emission tomography – computerized tomography (PET-CT) scan approved above findings (Figure 5).

Discussion and Conclusion

Persistent left superior vena cava is a rare anomaly that can be isolated or accompanied by other minor or major cardiovascular anomalies (1). Webb et al reported that PLSVC in most cases was associated with regress of the left innominate vein (3). Our patient demonstrated this type of vascular feature with PLSVC draining into the right atrium along with potent right SVC. Expectedly, the left

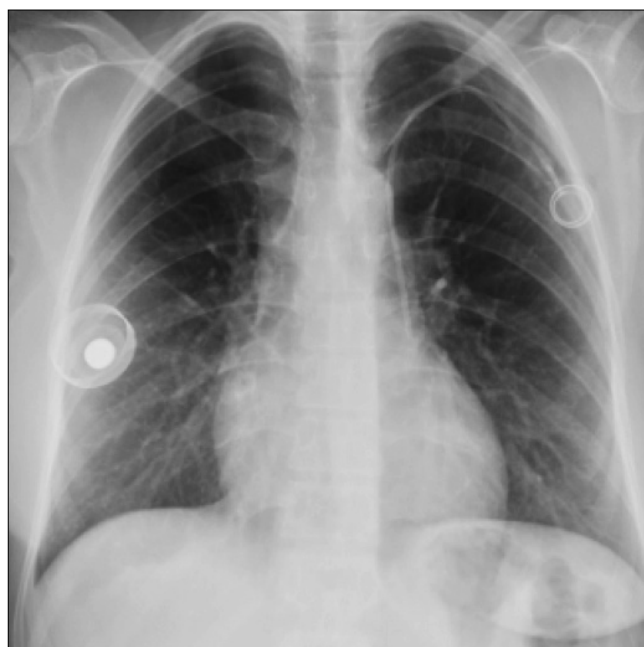


Figure 4. Left subclavian venous port is visualized with a catheter following the left cardiac edge

innominate vein was not found on CT scan images obtained pre-operatively before admission to our unit. More rarely, there is total regression of the right superior vena cava (2); in our case, both venae cavae were present.

Most PLSVC cases that were identified clinically already had a cardiac anomaly or symptoms, which led to invasive vascular interventions (2, 4-6). Some cases are detected when echocardiography reveals dilated coronary sinus, which could be an indicator of the presence of PLSVC (4). In our case, there was no previous medical record of this category, the patient had no cardiac comorbidities.



Figure 5. CT cross-sections showing right and left brachiocephalic veins following their own paths without connection between innominate veins. Note that even on the level of carina and further brachiocephalic veins are still apart

A significant portion of cases are revealed due to failed right heart catheterization attempts (1, 2, 4-8). Our case, being incidental, was revealed postoperatively in spite of having contradictory intraoperative imaging. The gold standard for imaging of PLSVC is thought to be invasive angiography (6). We also used angiography for verification, which allowed us to assess the dynamics of contrast spread through the cardiac chambers. In a case reported by Ucar et al. (8), 3D reconstruction of CT images was used for better visualization of the vasculature. However, in our case we preferred not to use too much contrast because we were only aiming to establish whether the catheter was placed into a major vein with high debit. The latter was perfectly

seen on angiography. CT scan exposes patients to a much higher dose of radiation but represents a more advanced technique that provides anatomic details rather than functional insights. In our case, location-based compromised functionality of the port was tested in the most cost effective and patient-friendly way.

Persistent left superior vena cava is a rare venous anomaly mostly seen in combination with other cardiovascular anomalies. However, it should not be neglected in high volume centers that deal with central venous access because this anomaly can be overlooked, leading to postponed excessive investigations. In similar situations, radiologic investigations should be undertaken with caution and consideration towards the best possible combination of patient safety and clinical value.

Informed Consent: Informed consent was obtained from patients.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - D.S., L.O.; Design - D.S.; Supervision - L.O., V.O.; Materials - L.O.; Data Collection and/or Processing - D.S.; Analysis and/or Interpretation - D.S., L.O.; Literature Review - D.S.; Writing - D.S., V.O.; Critical Review - L.O., V.O.

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