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THE PREVALENCE OF MALE BREAST CANCER AT PRINCE SULTAN MEDICAL MILITARY CITY

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Abstract:

Introduction: *Male breast cancer may become more common, emphasizing the importance of early detection. The diagnosing male breast cancer is more challenging due to the lack of sufficient information on screening guidelines in men, limited awareness, and education, as well as a general inclination among men to delay care. The diagnosis of male breast cancer can be made in most cases by triple assessment: clinical evaluation, radiologic assessment (mammography and ultrasound examination), and tissue biopsy (fine-needle aspiration cytology or core biopsy).*

Main aim: *To assess the prevalence of male breast cancer as well as the correlation between the radiological finding and BIRAD classification which was given with the pathological biopsy result.*

Methodology: *Retrospective cohort study of 315 male patients, who underwent mammography and ultrasound to diagnose different breast symptoms in radiology department at Prince Sultan Medical Military City- Riyadh, Saudi Arabia between January 2016, and December 2020. Evaluated variables include age, symptoms, site of complain, radiological findings, and biopsy result. All ultrasound and mammographic images accessed via picture archiving and communication system (PACS). The collected data was statistically analyzed using SPSS version 20. Chi-square tests and Logistic regression models was used. Associations were considered statistically significant at P value < 0.05.*

Main Results: *The result described all of sample men 275 (87%) presented with the new onset of breast Mass, 3% of them complained mainly of pain, and 4% presented with nipple discharge. Only 6% of the 315 subjects came for screening due to positive family history.*

The correlation between the BIRAD classification and the final pathological diagnosis was significant (p-value < 0.001), as the biopsy results of 15 (5%) patients who were classified radiologically as BIRAD 4 or BIRAD 5 were found to be malignant. The remaining 300 (95%) was benign, including one patient, who was classified radiologically as BIRAD 4.

Conclusion: *Breast carcinoma in the male population, is a rare disease. Despite this, there has been a surge in incidence over the past few years. The diagnosis is usually delayed until the disease has progressed and reached later stage. Public awareness should, therefore, be increased and breast cancer should be considered in the differential diagnosis of a male patient that presents with breast swelling. The majority of sampled patient found to have of benign pathology, commonly gynecomastia, while most of the malignant cases are invasive ductal carcinoma.*

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INTRODUCTION:

Male breast cancer (MBC) accounts for around 1% of all breast cancer cases (Huang et al., 2020). Men are not routinely screened for breast cancer, and the male breast is frequently overlooked because, it is non-functional, resulting in a poor prognosis for malignant lesions (Huang et al., 2020).

Breast cancer is frequently thought to be a female disease (Co et al., 2020; Ottini et al., 2010). Breast cancer in men, on the other hand, is not as uncommon as it is assumed to be, and the prevalence is increasing (Co et al., 2020; Ottini et al., 2010) . Male breast cancer is generally detected late, with lymph node involvement and advanced staging at the time of diagnosis, resulting in a poor prognosis (Ottini et al., 2010). The behavior of breast cancer in men, is identical to that of their female counterparts (Co et al., 2020).

Since screening is not frequently performed, male breast cancer is primarily discovered after clinical features (Gao et al., 2018). As a result, breast imaging has a limited role in the identification of male breast cancer, and research on this issue is limited (Gao et al., 2018). Even though general screening has no effect in detecting male breast cancer due to the disease's low overall prevalence in males, the efficacy of selective screening in those with recognized risk factors is unknown (Gao et al., 2018). In the absence of guidelines, men with a high risk of breast cancer have irregular and inconsistent screening procedures (Gao et al., 2018; Niell et al., 2018).

It is currently unknown how and to what extent breast imaging is used in male patients, we expected that risk-based screening would help men discover cancer earlier and that such screening has recently increased (Gao et al., 2019).

In most situations, a triple assessment is used to diagnose male breast cancer: clinical examination, radiologic examination (mammography and ultrasound examination), and tissue biopsy (fine-needle aspiration cytology or core biopsy), much as it is for female breast cancer (Nofal & Yousef, 2019). Most male patients with breast complaints have symptoms and physical examination findings that are identical to those of their female counterparts (Sarıca et al., 2018). The majority of male breast issues are benign (Günhan-Bilgen et al., 2002; Sarıca et al., 2018).

Usually, MBC is detected in more advanced stages because of delayed diagnosis compared with that of women, and about 50% of men have axillary nodal metastasis at the time of diagnosis (Cutuli et al., 2010; jafari et al., 2017). Therefore, early detection of MBC could improve the survival rate and prognosis of the disease (Erhan et al., 2006; jafari et al., 2017). The current study aimed to review the manifestations, imaging, and pathologic features of breast cancer in men (jafari et al., 2017).

1.2 Type of Benign Diseases of the Male Breast:

Gynecomastia:

The most prevalent abnormality affecting the male breast is gynecomastia (Chesebro et al., 2019). Gynecomastia is a benign proliferation of the male breast's ductal and stromal parts that can be unilateral, bilaterally symmetric, or bilaterally asymmetric (Chesebro et al., 2019). There are three types of gynecomastia based on their appearance on mammography: nodular, dendritic, and diffuse (Gao et al., 2018). Nodular gynecomastia is a type of gynecomastia that manifests as a subareolar mass and might be mistaken for malignancy (fig1A). The typical flame- or fan-shaped form of dendritic gynecomastia is diagnostic on mammography (fig1B). Diffuse gynecomastia resembles dense fibro glandular tissue in the female breast and is most commonly seen in patients, who have been exposed to exogenous estrogen (fig1C). Gynecomastia can be caused by a variety of factors, including physiologic, hormonal, systemic, neoplastic, pharmacologic, and idiopathic factors (Chesebro et al., 2019). Breast enlargement, pain, a palpable mass, or swelling are common symptoms of gynecomastia (Gao et al., 2018).

Figure 1: Radiologic patterns in gynecomastia. **a** Nodular. **b** Dendritic. **c** Diffuse.
(Del Riego et al., 2020)

Pseudo gynecomastia:

Pseudogynecomastia refers to breast enlargement in men (Sarıca et al., 2018). Breast enlargement is generally caused by adipose tissue excess rather than by the growth of the glandular tissue (Sarıca et al., 2018) (fig 2). Clinically, it may seem identical to gynecomastia (Sarıca et al., 2018). These two entities can be easily differentiated by mammography which enables determination of fatty tissue (Sarıca et al., 2018). Subareolar densities, which are not apparent in pseudo gynecomastia, are also easily recognized in gynecomastia (Sarıca et al., 2018).

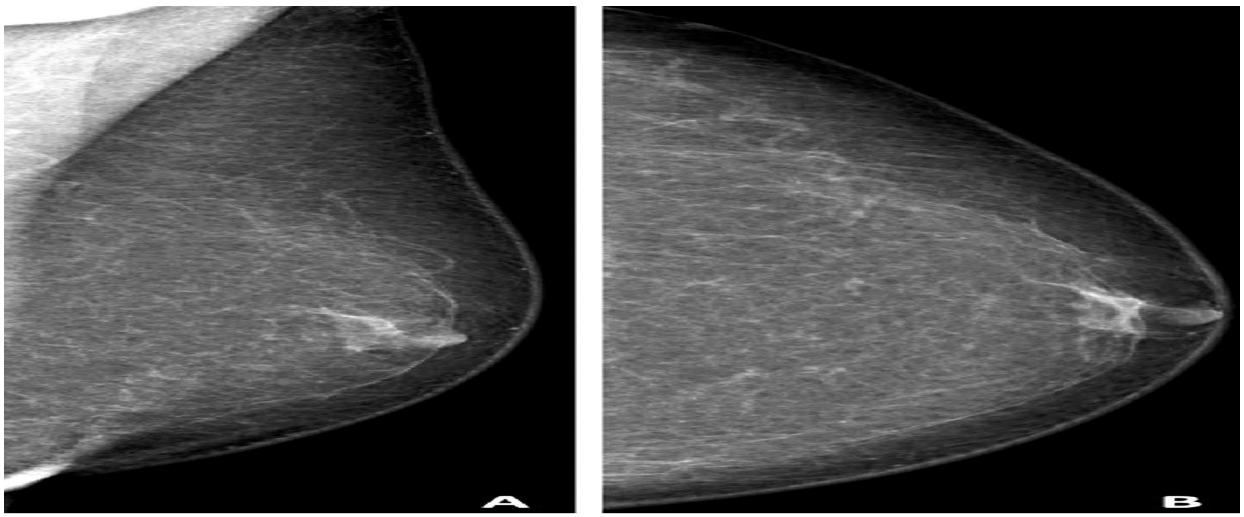

Figure 2: Pseudogynecomastia(Capasso et al., 2016).

Lipoma

Lipoma is the second most common benign male breast lesion after gynecomastia (AlSharif et al., 2021; Draghi et al., 2011). In histologic examination, it is composed of encapsulated lipocytes or mature fat cells. It is typically asymptomatic, and if it is symptomatic, it manifests clinically as a small, subcutaneous, palpable, soft mass or sometimes a hard mass if associated with calcifications and can show bilateral distribution (Draghi et al., 2011; Lattin et al., 2013; Nguyen et al., 2013). Mammographically, lipoma appears as a circumscribed, fat-density mass with a thin isodense capsule (Lattin et al., 2013). In ultrasound it has the appearance of an oval, circumscribed, homogenous, isoechoic or mildly hyperechoic, avascular mass with a possible echogenic capsule (Draghi et al., 2011;

Lattin et al., 2013; Nguyen et al., 2013). Surgical excision is unnecessary (Nguyen et al., 2013).

1.3 Type of Malignant Diseases **of the Male Breast:**

Ductal carcinoma in situ (DCIS):

Ductal carcinoma in situ is considered a precursor that might develop into invasive cancer (Del Riego et al., 2020). It is a noninvasive malignant cellular proliferation contained within a duct by the basement membrane (Del Riego et al., 2020; Tavassoli, 1999). Generally, ductal carcinoma in situ is detected on screening mammograms in asymptomatic patients; these lesions can involve the nipple-areolar complex, in most cases by intraductal extension (Del Riego et al., 2020). On mammography, the most characteristic findings are microcalcifications of variable morphology, although they can also be present as a solid mass or even as architectural distortion (Barreau et al., 2005; Hofvind et al., 2011). On ultrasound, ductal carcinoma in situ is usually not seen, though it can manifest as a slightly hypoechogenic solid mass within a duct or within the parenchyma, extending to and dilating an adjacent duct in the retro areolar region (Del Riego et al., 2020; Greenwood et al., 2013).

Invasive ductal carcinoma (IDC):

It is the most common primary malignant neoplastic lesion of the male breast, and almost 80% of all cases belong to IDC, "not otherwise specified type" (Önder et al., 2020) .On physical examination, these lesions are seen as hard, painless, palpable masses with secondary features such as nipple retraction, skin thickening, and palpable axillary (Önder et al., 2020). IDC is seen as radiodense, irregular, retroareolar masses with spiculated, lobulated or microlobulated margins (Chau et al., 2016; Önder et al., 2020). The incidence of microcalcifications is lower than that of female breast cancer (Önder et al., 2020). Retro areolar, non-parallel, hypoechoic masses with irregular borders and variable vascularity are well-known US findings (Charlot et al., 2013; Chau et al., 2016; Önder et al., 2020).

Myofibroblastoma

Myofibroblastoma is an uncommon benign mesenchymal neoplastic lesion of the breast (Önder et al., 2020) . It is more frequent in males than females and affects mostly the adult male population (Önder et al., 2020). On physical examination, myofibroblastoma is seen as a mobile, well-defined, solid lump (Mele et al., 2011; Önder et al., 2020; Yen et al., 2015). Imaging findings identified in mammography are well-defined, encapsulated, heterogeneous tumors without microcalcifications (Mele et al., 2011; Önder et al., 2020; Yen et al., 2015). Sonographic findings are well-demarcated tumor, mixed echo pattern, and acoustic attenuation, probably, due to fat component (Mele et al., 2011; Önder et al., 2020; Yen et al., 2015).

Lymphoma:

Breast lymphoma is an extremely rare mass that can be primary where the breast is the only affected organ or secondary where association with extra-mammary lymphoma is present (AlSharif et al., 2021).

Secondary cases are mostly related to non-Hodgkin's B-cell lymphoma involvement (Chau et al., 2016; Iuanow et al., 2011; Önder et al., 2020). Physical examination findings include enlarged axillary lymph nodes, single or multiple palpable breast masses (Chau et al., 2016; Önder et al., 2020) . Mammographic imaging findings are "single or multiple, circumscribed or ill-defined lesions" and "multiple, enlarged, circumscribed, oval or lobular, radiodense axillary lymph nodes without apparent radiolucent fatty hilus" (Chau et al., 2016; Iuanow et al., 2011; Önder et al., 2020). Findings in US imaging are "circumscribed or irregular, hypoechoic, solid mass" or "masses accompanied by enlarged axillary lymph nodes with irregularly thickened cortex and without normal echogenic fatty hilus structure" (Chau et al., 2016; Iuanow et al., 2011; Önder et al., 2020).

Metastasis:

Extra mammary metastasis to the male breast is rare (Kalli et al., 2016) . The most common sources are melanoma and lung cancer (Sippo et al., 2016). Metastases which may occur via either hematogenous or lymphatic spread to the breast (Chesebro et al., 2019). Hematogenous spread metastases present as multiple, bilateral, oval, or round masses, while lymphangitic spread presents as diffuse edema and skin and trabecular thickening (Kalli et al., 2016; Lattin et al., 2013). Biopsy is necessary for diagnosis, as extramammary metastasis can mimic primary breast malignancy (Chesebro et al., 2019). Treatment will depend on the primary malignancy (Chesebro et al., 2019).

1.4Anatomy:

The normal male breast is very simple (Adibelli et al., 2010) . The male breast comprises a small nipple, a small areola, and subcutaneous fat (Adibelli et al., 2010). Male breasts lack Cooper's ligaments, which are found in the female breasts (Adibelli et al., 2010; Kopans, 2007). No fibro glandular tissue is visible under the nipple of the normal male breasts (Adibelli et al., 2010) . Histologically, the normal male breast

contains subareolar ducts like those found in prepubertal girls (Adibelli et al., 2010). These ducts in a male may elongate and branch, when stimulated by hormones or a variety of drugs (Adibelli et al., 2010; Kopans, 2007). The male breast is located between the 2nd–6th ribs craniocaudally and the midaxillary line–sternum lateromedially, like a female breast, although they share similar locations, and there are several differences between them, which concern the developmental process and histo-anatomical structures (Iuanow et al., 2011).

At birth, the mammary glands of both sexes are identical. During the peripubertal period, in the female breast, ductal proliferation, branching, and growth are stimulated due to estrogen (Omene & Tiersten, 2010; Önder et al., 2020). As for stromal development and terminal ductal-lobular unit (TDLU) maturation, they are seen due to progesterone (Omene & Tiersten, 2010; Önder et al., 2020). However, involution and ductal atrophy occur in the male breast due to a significant increase in testosterone levels (Omene & Tiersten, 2010; Önder et al., 2020).

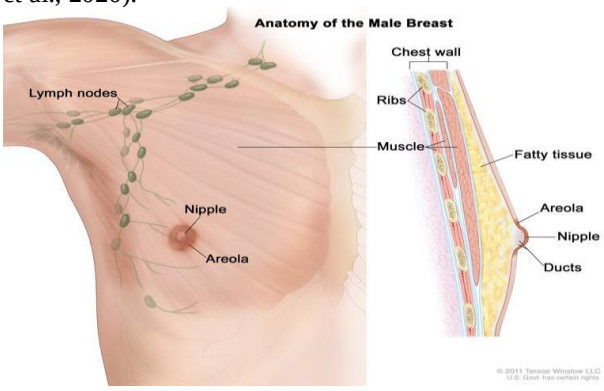

Figure 3: Anatomy of the male breast. (Board, 2021)

1.5 Risk factors of male breast cancer:

Family History:

Family history is important for both sexes; in males, a positive family history confers a relative risk of 2·5 while population-based studies have shown that about 15–20% of all males with a diagnosis of breast cancer have a history of breast cancer in a first-degree female relative (Ottini et al., 2009). A positive family history of either female or male breast cancer among first-degree relatives confers a 2–3-fold increase in male breast cancer risk, and the risk increases with increasing numbers of affected first-degree relatives and with early onset (age <35 years) in affected relatives (Abdelwahab Yousef, 2017; Rosenblatt et al., 1991).

Obesity:

Obesity, which increases the estrogen-testosterone ratio, is a risk factor for MBC (Johansen Taber et al., 2010). Men with a body-mass index of greater than 30 have an almost doubled risk (Brinton et al., 2008; Johansen Taber et al., 2010).

Radiation exposure:

Radiation-requiring medical procedures include radiography, fluoroscopy, computed tomography scans, interventional radiology, and bone densitometry (Johansen Taber et al., 2010). Radiation doses from single exposures are low, but for those who receive repeated examinations over time, or who are treated with therapeutic doses, cumulative radiation exposure can reach levels beyond what is considered safe (Johansen Taber et al., 2010).

Exposure to therapeutic ionizing radiation is associated with an increased risk of breast cancer in women, and a small number of studies suggest a similar situation for men (Agrawal et al., 2007; I. S. Fentiman et al., 2006). Accidental exposure to radiation has also been linked to male cancers (Johansen Taber et al., 2010).

Other lifestyle factors.

Lifestyle factors such as alcohol intake, smoking, and physical activity level have been investigated as risk factors for MBC; none has consistently been associated with higher risk (Johansen Taber et al., 2010). Although one small study reported that excessive alcohol consumption was linked to MBC, other studies have failed to demonstrate the same (Brinton et al., 2010; Brinton et al., 2008). The link between smoking and MBC has also not been clearly demonstrated (Brinton et al., 2008; Ewertz et al., 2001). Others have investigated the level of exercise and physical activity as a risk factor, but again, no clear association has been established (Brinton et al., 2008; Ewertz et al., 2001).

1.6 The various imaging techniques that help for better diagnosis:

Mammography:

It is recommended as a screening tool for the early detection of breast cancer by various internationally recognized guidelines (jafari et al., 2017). Bilateral craniocaudal and (MLO) mediolateral oblique view mammograms are the initial modalities for imaging of men with clinical breast findings, despite the relatively small size of the male breast (jafari et al., 2017). Sometimes, supplemental views such as reverse CC or magnification, spot compression, or tangential view could be helpful (jafari et al., 2017).

The goal of screening mammography is to detect small malignant tumors before they grow large enough to cause symptoms (Yuan et al., 2018). Effective screening should therefore lead to the detection of a greater number of small tumors, followed by fewer large tumors over time (Yuan et al., 2018). Mammography can detect a suspicious mass, suspicious calcifications, and architectural distortion of the breasts of both sexes, and can evaluate gynecomastia in male breasts. A non-calcified mass is the most common mammographic finding in MBC (Yuan et al., 2018).

Ultrasonography:

It is recommended for the evaluation of male breast lesions because it is a convenient, non-invasive, and low-cost tool that does not require exposure to ionizing radiation (Yuan et al., 2018). Ultrasound with a high-frequency transducer is more sensitive to assessing deep portions not accessible on mammograms (Yuan et al., 2018). Because breast lesions in men are much less commonly seen than in women, the ultrasound features of lesions in the male breast are not well established (Yuan et al., 2018).

Image-guided biopsy:

A core biopsy is preferred over a fine-needle biopsy, because it enables a definitive diagnosis of invasive breast cancer (Nofal & Yousef, 2019). In addition, core biopsy yields a tissue sample like that of an open biopsy without the need for a formal surgical procedure (Nofal & Yousef, 2019). Mammography-guided biopsy could not be performed due to the small size of the male breast (jafari et al., 2017). Ultrasound guided biopsy is completely preferable (jafari et al., 2017).

1.7 Male breast cancer manifestations:

Due to the low overall incidence of male breast cancer, no breast cancer-screening program exists for men (Chesebro et al., 2019). Men most often present with a painless palpable lump, which is the most common symptom/sign (jafari et al., 2017). Bloody nipple discharge, nipple ulceration, nipple inversion or retraction, skin thickening, and palpable axillary lymph nodes are among the other symptoms (Mainiero et al., 2015; Ruddy & Winer, 2013). In some clinical sites, gynecomastia is the most common clinical differential diagnosis for male breast cancer, which can help in diagnosis (Nguyen et al., 2013). Men are more likely to be diagnosed with late-stage node-positive disease than women (Mainiero et al., 2015; Ruddy & Winer, 2013). Approximately 50% of men have axillary nodal disease at presentation (jafari et al., 2017; Mainiero et al., 2015).

1.8 Male Breast Cancer Clinical Diagnostic Challenges:

Male breast cancer diagnosis is challenging because of not only the lack of screening, but also limited awareness and education, as well as a general inclination among men to delay care (Gao et al., 2018; Smith et al., 2006). Frequently, the diagnosis of already advanced manifestations of the breast cancer is further delayed among men because of a lack of or inappropriate clinical care (Gao et al., 2018). Indeed, researchers have discovered that men with breast cancer often seek medical care and evaluation after a long period of time, which is consistent with the fact that more than 40% of male breast cancers are diagnosed at stage III or stage IV (Donegan et al., 1998; Gao et al., 2018). This delay is due largely to a lack of knowledge and awareness about male breast cancer (Gao et al., 2018).

1.9 Treatment options for male breast cancer:

Treatment for early-stage male BC includes four main treatment modalities: surgery, radiation therapy, chemotherapy, and endocrine therapy (Bagley et al., 1987; Darkeh & Azavedo, 2014; I. S. Fentiman et al., 2006; Korde et al., 2010). Typically, men with BC are treated with modified radical mastectomy, with axillary lymph node dissection or sentinel node biopsy (Scott-Conner et al., 1999). In addition, breast conservation or nipple-sparing or skin-sparing mastectomies may also be performed in selected cases; oncoplastic techniques should be used in view of the significant psychological and emotional impact of the physical consequences of locoregional therapies in male patients (Gucalp et al., 2019). Men are more likely than women to undergo mastectomy and to receive adjuvant radiotherapy as they are often diagnosed at a later stage and have nipple or skin involvement at diagnosis (Rudlowski, 2008). While there is limited data on chemotherapy use for male BC, clinicians choosing to use chemotherapy typically assess similar clinicopathologic risk factors (including tumor size, nodal involvement, hormone receptor status, HER2 status, and the underlying biology of the cancer) in male BC patients as they do in female BC patients with early-stage disease (Gucalp et al., 2019).

Main aim:

To assess the prevalence of male breast cancer.

Objectives and aims:

The correlation between the radiological findings and the BIRAD classification, which was given with the pathological biopsy result.

METHOD and MATRIAL:

2.1 Study design:

The Research Ethics Review Board has approved the cohort retrospective study to carry out. The study was taken from the Prince Sultan Military Medical City (PSMMC) Institutional Review Board and Research Ethics Committee to gain access to relevant radiological findings and patients' medical records. The identities of the participants were kept anonymous over the period from January 2016 to December 2020.

2.2 Patient selection:

By using a standard picture archiving and communication system (PACS) at PSMMC to search Mammography scans were performed with standard film screen techniques integrated with computerized radiography, and ultrasound examinations were done by different radiologists. Department members with the same high-resolution ultrasound equipment. Inclusion criteria, male patient include age, symptoms, site of complain, radiological finding and biopsy result. As per the exclusion criteria, male patients without imaging and biopsy results or those labeled as BIRAD-6 were excluded. The study was conducted over a period of one year.

2.3 Method:

Retrospective cohort study of total 315 male patients with different breast symptoms who underwent mammography and ultrasound in the radiology department at Prince Sultan Medical Military City (PSMMC)-Riyadh, Saudi Arabia between January 2016 and December 2020. 15 (5%) were found to be malignant. The remaining 300 (95%) was benign.

Evaluated variables include age, symptoms, site of complaint, radiological findings, and biopsy results. The collected data was statistically analyzed using SPSS version 20. Chi-square tests and logistic regression models were used. Associations were considered statistically significant at a P value < 0.05.

2.4 Data collection:

We obtained the patient's number, age at the time of examination, mammogram, ultrasound, biopsy result, radiological finding clinical presentation and site of the mass.

2.5 Statistical analysis:

After performing quality checks on the dataset for missing and abnormal values using developed algorithms, descriptive statistics were calculated. Measures on continuous variables were provided as mean and for categorical variables as number and percentage. Chi square test or Fisher's exact test were used for analysis of association between the categorical variables. All statistical analysis was performed using IBM-SPSS (version 20.0). Threshold P value of less than 0.05 was considered as statistically significant.

2.6 Radiological imaging protocol of male breast screening:

1-Mammography

Male breast conventional CC& MLO and there are two standard mammographic projections: a mediolateral oblique (MLO) view and a cranio-caudal view.

The MLO view is taken with the X-ray beam directed from superomedial to inferolateral, usually at an angle of 30–60°, with compression applied obliquely across the chest wall, perpendicular to the long axis of the pectoralis major muscle.

The MLO projection is the only projection in which all the breast tissue can be demonstrated on a single image. A well-positioned MLO view should demonstrate the inframammary angle, the nipple in profile, and the nipple positioned at the level of the lower border of the pectoralis muscle, with the muscle across the posterior border of the film at an angle of 25°–30° to the vertical.

For the CC view, the X-ray beam travels from superior to inferior. Positioning is achieved by pulling the breast up and forward away from the chest wall, with compression applied from above. A well-positioned CC view should demonstrate the nipple in profile. It should demonstrate virtually all the medial tissue and most of the lateral tissue, except the axillary tail of the breast. The pectoralis major is demonstrated at the center of a CC film in approximately 30% of individuals and the depth of breast tissue demonstrated should be within 1 cm of the distance from the nipple to the pectoralis major on the MLO projection.

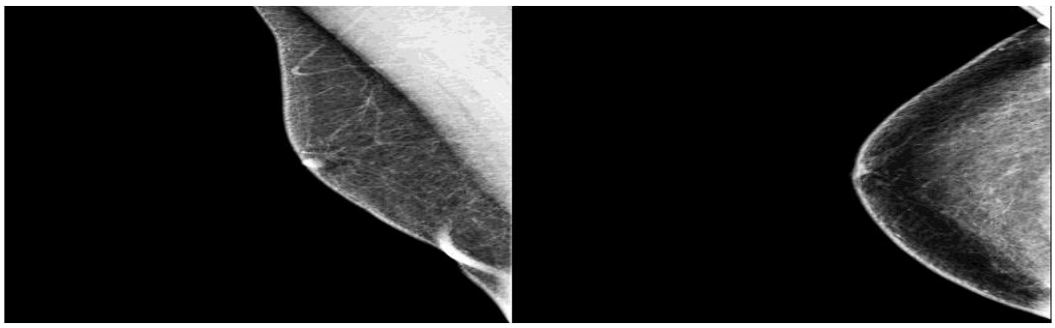

Figure4: CC and MLO projection.
(Suleimenova et al., 2018)

2- Ultrasound:

According to the standard procedure recommended for women, in describing the location of the pathological process in men, the breast is conventionally divided into four quadrants: upper (superior)–outer (lateral), upper (superior)–inner (medial), lower (inferior)–inner (medial), and lower (inferior)–outer (lateral). The subareolar area (central portion) and the nipple are described separately. The terminology of "clock positions" is appropriate as an additional subsite descriptor to indicate the exact location of an abnormality.

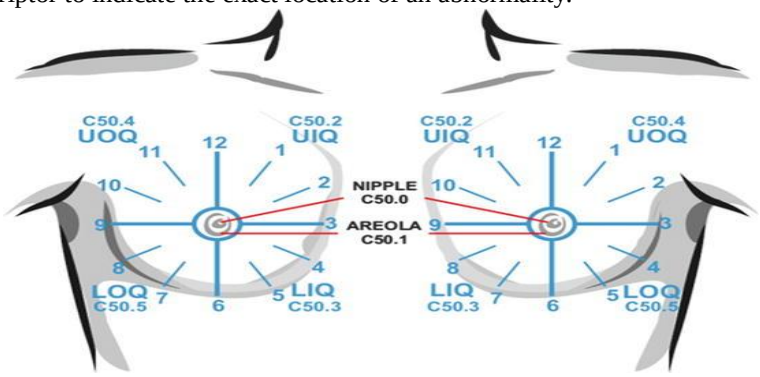

Figure5: Clock positions and quadrants of breasts
(Sencha, 2014)

3-Tissue Biopsy:

A core biopsy is preferred over a fine-needle biopsy, because it enables a definitive diagnosis of invasive breast cancer. In addition to the 15 cases that are malignant, 9 (62%) of theme were in IDC. The rest of the biopsy results were myofibroblastoma, lymphoma, ductal carcinoma in situ and mucinous colloid carcinoma.

Figure6: Local image for soft tissue

Figure7: Biopsy started image one (needle inserted) they always label it as number of fires

2.7 BI-RAD classification:

Breast Imaging-Reporting and Data System developed by the American College of Radiology, provides a standardized classification for mammographic and ultrasound studies. This system demonstrates good correlation with the likelihood of breast malignancy.

BI-RADS 0	Incomplete
BI-RADS 1	Negative (no cancer)
BI-RADS 2	Benign finding
BI-RADS 3	Abnormality probably benign
BI-RADS 4	Suspicious abnormality requiring biopsy
BI-RADS 5	highly suspicious of malignancy
BI-RADS 6	Malignancy proved by biopsy

3.1RESULTS:

Three hundred and fifteen men with different complaints were presented to the breast imaging department in Prince Sultan Military Medical City from 2016-2020 were included in this study. the mean age was 65.1. Of all the sampled men, 275 (87%) presented with the new onset of breast Mass 3% of them complained mainly of pain, and 4% presented with nipple discharge. Only 6% of the 315 subjects came for screening due to positive family history. (Figure 4).

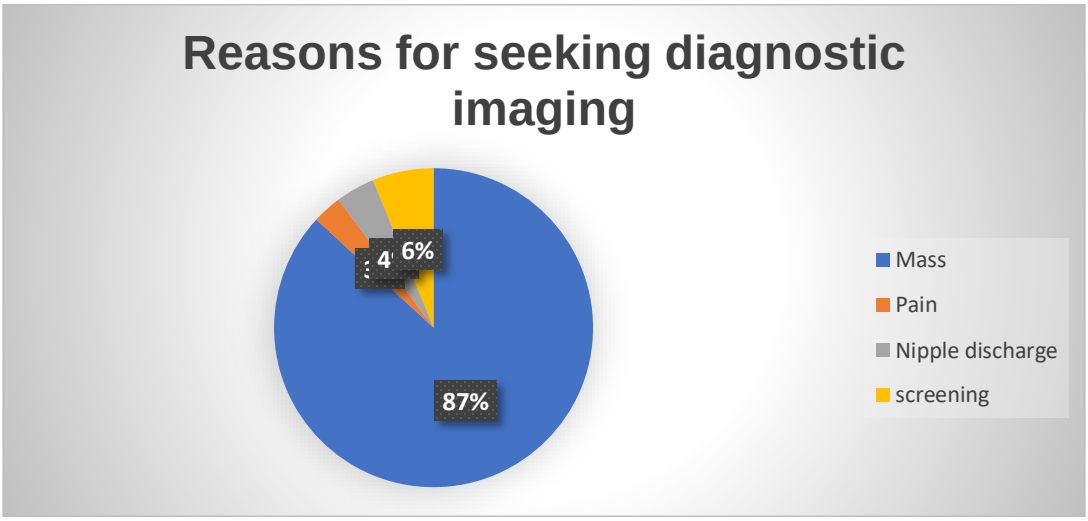

Figure 8: Reason for seeking diagnostic imaging

The most common site of mass was the retro-areolar region, representing 75% (236 patients) of all cases; however, the relationship was not significant (p-value 0.315), to the result reported by (Adibelli et al., 2010), were she concluded breast cancers in men usually occur in a subareolar location.

Among the sampled patients, and there was a significant correlation between the age at time of presentation and the site of the mass (p-value 0.046). The mean age at the time of diagnosis in men is 65 years, which is about 5 to 10 years older than that of women. Because the incidence of MBC is low, only 6% came for screening due to family history, and this is a very low percentage, which might indicate the need for public awareness. No screening program exists. Therefore, all male breast imaging is diagnostic and performed on the symptomatic patients. The prognosis of MBC is worse than that of female patients due to older age and advanced stage at diagnosis.

Most patients (95%) were finally diagnosed with gynecomastia, and only 5% of the sampled subjects were found to have malignancy. The correlation between the BIRAD classification and the final pathological diagnosis was significant (p-value < 0.001), as the biopsy results of 15 (5%) patients who were classified radiologically as BIRAD 4 or BIRAD 5 were found to be malignant. The remaining 300 (95%) was benign, including one patient, who was classified radiologically as BIRAD 4. (Table 1).

Table1: the correlation between the BIRAD classification and the biopsy results

	Biopsy results	
BIRAD classification	**BENIGN**	**MALIGNANT**
BIRAD1	77 (24.0)	0 (0.0)
BIRAD2	212 (66.2)	0 (0.0)
BIRAD3	12 (3.75)	0 (0.0)
BIRAD4/5	1 (0.3)	15 (4.7)
normal	2 (0.6)	0 (0.0)
p-value	<0.0001	

Regarding the 15 cases that are malignant, 9 (62%) of them were invasive ductal carcinoma. The rest of the biopsy results were myofibroblastoma, lymphoma, ductal carcinoma in situ, and mucinous colloid carcinoma (Figure 2). Metastasis was absent in 10 (68.7%) cases and was present in the rest of 5 (31.3%) cases. Two (20%) of them were metastasized to axillary lymph nodes and another two (20%) were metastasized to the skin. Those with skin metastasis had invasive ductal carcinoma based on the biopsy result. The fifth case was metastasized to the bone and was a mucinous colloid carcinoma.

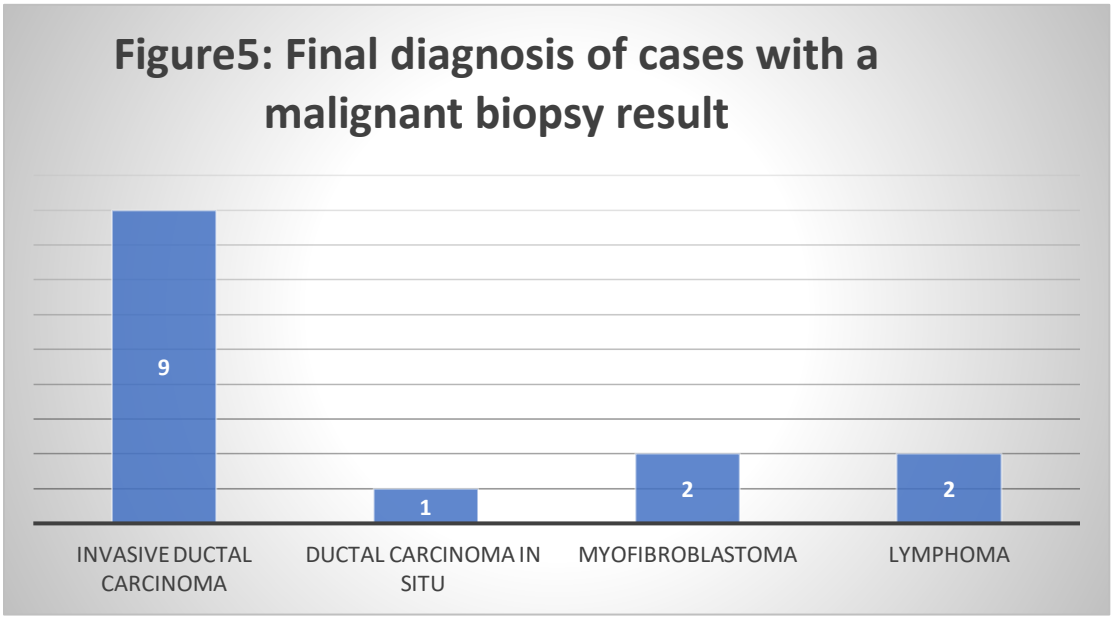

Figure 9: Final diagnostic of cases with malignant biopsy result

4.1DISCUSSION:

In our study, the most common complaints were swelling of the breast, followed by a non-healing wound on the nipple, bloody discharge, and redness. There were delays that ranged from 3 months to 2 years between the onset of the complaints and the first symptoms and admission to the hospital. The reason for the delay may be related to the fact that breast cancer is more commonly associated with women in the community.

The mean age at the time of diagnosis in men is 65 years, which is about 5 to 10 years older than that of women. Because the incidence of MBC is low, only 6% came for screening due to family history, and this is a very low percentage, which might indicate the need for public awareness. No screening program exists. Therefore, all male breast imaging is diagnostic and performed on the symptomatic patients. The prognosis of MBC is worse than that of female patients due to older age and advanced stage at diagnosis.

Most invasive breast cancers in women originate in the terminal ductolobular units peripherally and only secondarily involve the central ducts. Breast tissue is more commonly subareolar in men than in women, in whom it is found mainly in the upper quadrant. Therefore, breast cancers in men usually occur in a subareolar location. In our study, the location of the masses was retroareolar in 236 patients (75%). These findings are consistent with the previous reports. The location of the mass in respect of the nipple could be a determining factor (Adibelli et al., 2010).

Invasive ductal cancer and gynecomastia were the most common benign and malignant lesions, respectively, in our study, which is consistent with the studies (Adibelli et al., 2010; Sarıca et al., 2018).

Males are rarely diagnosed with breast cancer. As we elucidated in this study, the majority of males were diagnosed with gynecomastia (95%), and only (5%) were found to have breast cancer (Yalaza et al., 2016a). Are also claimed that the majority of lesions in the male breast are benign, with gynecomastia accounting for the majority of them. Primary breast cancer accounts for less than 1% of these cases, and pervious study showed 97% of male lesion were benign by (Muñoz Carrasco et al., 2010). 62% of the themes were invasive ductal carcinomas compared to other studies' 85% as invasive ductal carcinoma by (Sarıca et al., 2018). And Previous

studies showed 78.6% of invasive ductal carcinoma and 90% by (Nofal & Yousef, 2019).

In previous research done in 2006, the most common symptom was a lump or nipple inversion (Ian S Fentiman et al., 2006). Which is in consist with our study results. In addition to that, another study done in Turkey in 2016 showed that in about 75% of instances, painless palpable mass, skin ulceration, and nipple retraction or discharge are the most prevalent symptoms, identical to women (Yalaza et al., 2016b).

Our study reveals that that most common histopathological type was invasive ductal carcinoma. Similarly, a study conducted in Germany in 2008 found that Invasive ductal disease is the most common histological type of disease, accounting for more than 90% of all male breast tumors (Rudlowski, 2008).

We noticed that there is a significant correlation between the age at the time of presentation and the site of the mass. Conversely, we were not able to find similar results in other studies.

The distant metastasis rate was found to be 36%, while the local recurrence rate was 5%, as per (Yoney et al., 2009). Our study also found that metastasis was absent in 68.7% of cases and was present in 31.3% of cases. 20% of them were metastasized to axillary lymph nodes compared to other studies. 67.8 % had lymph node metastasized by (Co et al., 2020).

Male breast cancer is often treated similarly to female breast cancer, with treatment being dependent on the disease stage. Diseases in the male breast can affect the skin and subcutaneous tissues, stroma and glandular elements, and neurovascular and lymphatic structures. Although the most encountered disease entity is gynecomastia, men can develop many other benign and neoplastic diseases, including primary breast cancer.

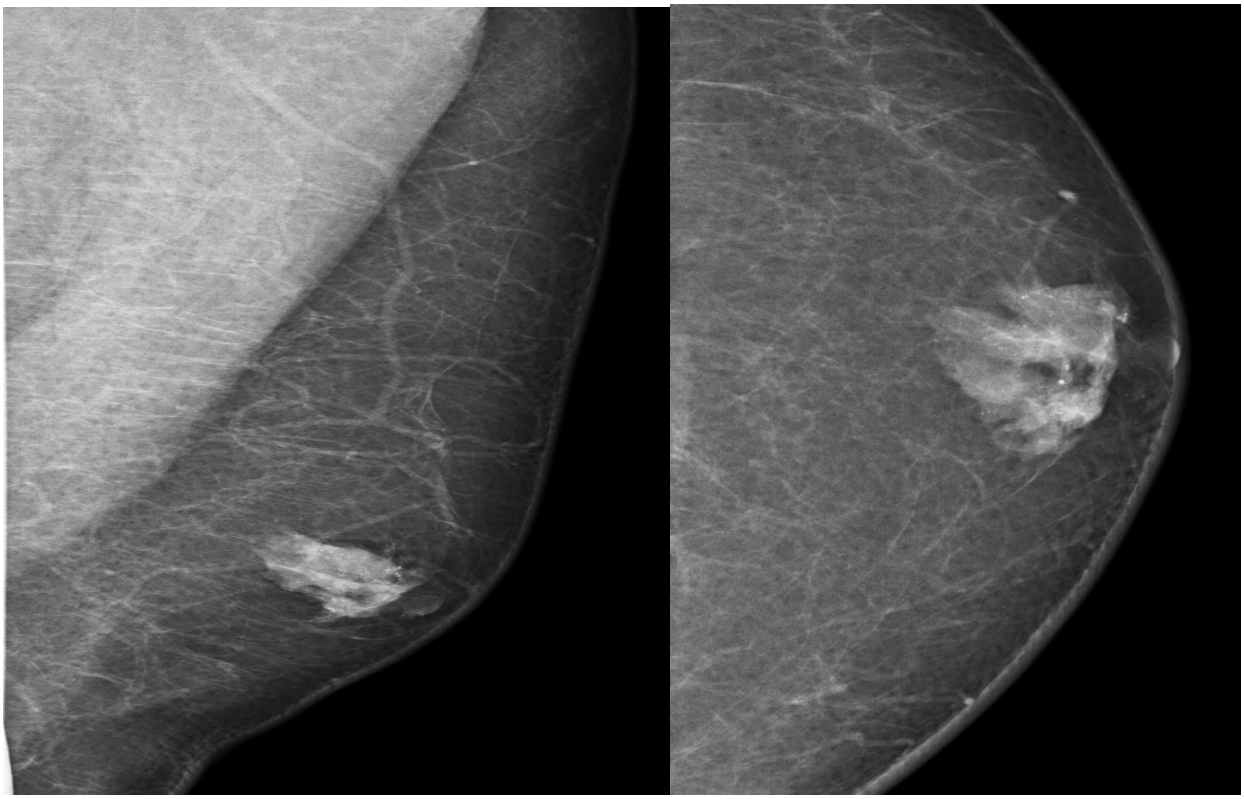

Figure10: 53years old with left nipple discharge mammogram show irregular mass with tubular- like projection noted in the left retroareolar region centrally located behind the nipple. Differential diagnosis includes ductal carcinoma versus intraductal papilloma associated gynecomastia

CONCLUSION:

Breast carcinoma in the male population, is a rare disease. Despite this, there has been a rise in incidents over the past few years. The diagnosis is usually delayed until the disease has progressed and reached later stages. Multiple factors contribute to the delay, such as lack of knowledge and stigmatization of male breast cancer. Public awareness should therefore be increased, and breast cancer should be considered in the differential diagnosis of a male patient that presents with swelling of the breast or complaints related to the skin overlying the breast.

Gynecomastia and invasive ductal cancer were the most common benign and malignant lesions Early detection and diagnosis of male breast disorders will lead to an improvement in the overall outcome. Most patients (95%) were finally diagnosed with gynecomastia, 15 (5%) patients who were classified radiologically as BIRAD 4 or BIRAD 5 were found to be malignant.

This study will utilize radiological and histopathological results of patients diagnosed in our institution to establish a recommendable diagnostic and treatment guideline for male breast carcinoma.

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