



Microbiology

INCIDENCE, PREVALENCE AND RISK FACTOR OF BREAST CANCER MAY PRIDICT THROUGH THE PROSTATE SPECIFIC ANTIGEN

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ABSTRACT

Background: Breast cancer is a malignant proliferation of epithelial cells lining the ducts or lobules of the breast.

Material and Methods: We collected the data from (2000-2018) from literature and shared our experience overcome this problem and related risk we clearly emphasized this study through Prostate specific antigen (PSA) Test.

Results: The breast cancer is the most common invasive cancer in women. Breast cancer comprises 22.9% of invasive cancers in women and 16% of all female cancers. In the year 2018, about 180,000 cases of invasive breast cancer were detected and 40,000 deaths occurred in the United States alone due to breast cancer in the worldwide disease burden.

Conclusion: The incidence of breast cancer varies greatly around the world. It is lowest in less developed countries like India and highest in the more-developed countries like USA. PSA test may helps to guide overcome this problem globally with 95% accuracy.

KEYWORDS : Incidence, Prevalence, Breast cancer, Risk factors, Education and training

Introduction:

Breast cancer is a malignant proliferation of epithelial cells lining the ducts or lobules of the breast. Worldwide, breast cancer is the most common invasive cancer in women. The incidence of breast cancer varies greatly around the world. It is lowest in less developed countries like India and highest in the more-developed countries like USA.¹⁻³ The primary risk factors for breast cancer are female sex and older age.⁴ Other potential risk factors are delayed childbearing, no breastfeeding, higher hormone levels, obesity and diet.⁵⁻⁷ There is a relationship between diet and breast cancer, an increased risk with a high fat diet and alcohol intake.^{8,9} Dietary iodine deficiency may also play a role in its causation.¹⁰ A lack of physical activity has been linked to approximately 10% of cases of breast cancer.¹¹ Tobacco smokers appear to be at increased risk of breast cancer. The greater the amount of smoke inhaled and more the duration of smoking, greater the risk. In long term smokers the risk is increased 35% to 50%.¹² Other risk factors include shift-work, a number of chemicals like polychlorinated biphenyls, polycyclic aromatic hydrocarbons, and organic solvents, and radiation. Although the radiation from mammography is of low dose, it is estimated that yearly screening of females from 50 to 80 years of age will cause approximately 225 new cases of fatal breast cancer per million women screened.¹³⁻¹⁵ Genetic susceptibility also plays a role in causation of this cancer. It includes those who carry the BRCA1 and BRCA2 gene mutation, which accounts upto 90% of the total genetic influence with increased risk of breast cancer in 60–80% in those affected.¹⁶⁻¹⁷

Material and Methods: We collected the data from (2000-2018) from literature and shared our experience overcome this problem and related risk we clearly emphasized this study. Breast cancer screening refers to testing otherwise-healthy women for breast cancer in an attempt to achieve for early diagnosis. Early detection improves the outcome. Tests like clinical and self breast examination, mammography, genetic screening, ultrasound, and magnetic resonance imaging and most types of breast cancer are easily diagnosed by clinical breast examination, mammography and biopsy. These tests indicate that a lump is cancer.¹⁸ When the tests are inconclusive fine needle aspiration cytology (FNAC) may be used as it is a confirmatory test. Clear fluid from the site makes the lump highly unlikely to be cancerous, but hemorrhagic fluid may be sent for inspection under a microscope for cancerous cells. Together, these three tools can be used to diagnose breast cancer with a great degree of accuracy.¹⁹ More recently, it was concluded that early detection due to mammograms reduce mortality from breast cancer by 15%.²⁰

Results: The breast cancer is the most common invasive cancer in

women. Breast cancer comprises 22.9% of invasive cancers in women and 16% of all female cancers. In the year 2018, about 180,000 cases of invasive breast cancer were detected and 40,000 deaths occurred in the United States alone due to breast cancer in the worldwide disease burden. It occurs more commonly in the developed countries, accounting for 3-5% of deaths while its incidence is 1-3% in developing countries. Carcinoma of breast is extremely rare below 20 years of age but thereafter the incidence steadily rises. At the age of 30 years the incidence is 1:622 females, at the age of 60 it is 1:24 females and by the age of 90, the incidence is 1:8 females.³¹ According to Breast Cancer India, globally the incidence and mortality of breast cancer risin from 13,84,000 cases and 4,58,000 deaths(2008) to 16,77,000 cases and 5,22,000 deaths(2018). Incidence of breast cancer in India also increased from 1,34,420 cases (2008) to 1,44,937 cases(2018) more than this figure. Breast cancer is most common cancer, 27.0% (2012) among all diagnosed cancer in females. High incidence of death cancer occurred in India due to breast cancer among all diagnosed cancers in females.³³ Breast cancer is usually treated by surgery and followed by chemotherapy or radiotherapy or both. A multidisciplinary approach is preferable. Hormone sensitive cancers are treated with long term hormone blocking therapy. Prophylactic bilateral mastectomy may be considered in people with BRCA1 and BRCA2 mutations²¹⁻²³ with dysplastic, metaplastic and anaplastic breast epithelial cells produce PSA.²⁴ Prostate-specific antigen is a 34 kD glycoprotein containing 7% carbohydrate in a single chain produced almost exclusively by the prostate gland. It is now clear that the term prostate-specific antigen is a misnomer. It is an antigen but is not specific to the prostate gland. Although present in large amounts in prostatic tissue and semen, it has been detected in other body fluids and tissues.²⁵

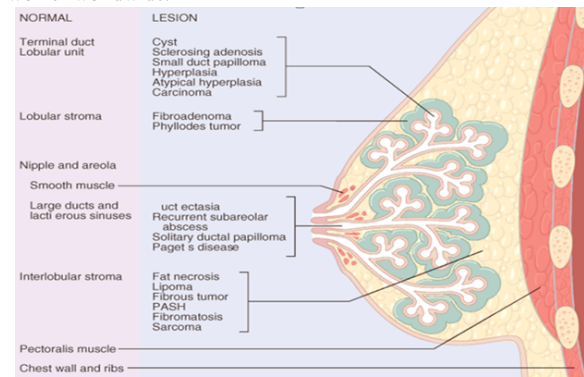
In women, PSA is found in female ejaculate at concentrations roughly equal to that found in male semen. PSA has been detected in some female tissues such as breast, ovarian and endometrial tissues, amniotic fluid and milk. PSA production seems to be associated with steroid hormones such as androgens, progesterin and glucocorticoids.^{26,27} PSA can be used as a marker alone or with other tests to increase screening and diagnostic sensitivity. Because clinical breast examination and mammography used for screening for breast cancer have low sensitivity along with radiation hazards. 30% of breast cancers contain immunoreactivity (IR-PSA). Presence of IR-PSA was associated with early disease stage, small tumor, and estrogen receptor-positive tumors. IR-PSA-positive tumors had a reduced risk for relapse and death. Study suggests that IR-PSA is an independent favorable prognostic marker for breast cancer.²⁸ Raised PSA was observed in breast diseases. Raised total PSA was more sensitive for

benign breast diseases, whereas breast cancer showed a predilection towards increase in free PSA levels. PSA levels decreased after surgery in benign disease and cancer.²⁹ So it can be used as a prognostic circulating marker.

The serum PSA levels high in breast cancer patients so we can use this as a circulating diagnostic marker at the place of FNAC because it is an invasive procedure requires highly qualified and trained staff and delayed reporting. Based on these observations, this study has been designed study the levels of PSA in breast cancer patients and controls.

Discussion:

Cancer is a group of diseases characterized by uncontrolled cell division leading to growth of abnormal tissue. Both genetic and environmental factors lead to aberrant growth regulation of stem cell population, or by the dedifferentiation of more mature cell types. The uncontrolled and often rapid proliferation of cells can lead to either a benign or malignant tumor (cancer). Benign tumor do not spread to other parts of body or invade other surrounding tissue, and they are rarely a threat to life. On the other hand, malignant tumor can invade adjacent structures, spread to distant location (metastasis) and become life threatening. Breast cancer refers to cancers originating from breast tissue, most commonly from the inner lining of the ducts or lobules. Cancer originating from the ducts are called ductal carcinomas and those arising from the lobules are called lobular carcinomas.³⁰ It is one of the most common cause of death among women worldwide.³¹



Anatomic Origin of Common Breast Lesion³²

Breast cancer is the commonest cancer in women. It accounts for 26.8% of all cancers in women. A few decades back, breast cancer was much more common after fifty years of age, almost 65% to 70% patients were above 50 years and only 30 to 35% women were below fifty years of age. However, presently, breast cancer is more common in the younger age group and 50% of all cases are in the 25 to 50 years of age.³⁴ The ratio of female to male breast cancer incidence is approximates 100:1.³¹ Incidences are higher in postmenopausal females than in pre-menopausal females. As the various biological factors associated with aging are likely to contribute to the increase (incidence and prevalence of cancer with age) increases the susceptibility of aging cells and tissues to environmental carcinogens and physiological alterations and the duration of carcinogenesis that favor tumor growth and metastasis (e.g. immune senescence and proliferative senescence). Breast cancer is generally less aggressive in the elderly patients with higher incidence and prevalence of well differentiated tumors, because of lower production of angiogenic growth factors, a lower proliferation rate, a less degree of lymph node involvement and lymphovascular invasion.³⁵

Distribution of Histologic Types of Breast Cancer³⁶

| Types of Cancer | Per Cent |
|--------------------------------------|--------------|
| In Situ Carcinoma | 15-30 |
| Ductal carcinoma in situ | 80 |
| Lobular carcinoma in situ | 20 |
| Invasive Carcinoma | 70-85 |
| No special type carcinoma ("ductal") | 79 |
| Lobular carcinoma | 10 |
| Tubular/cribiform carcinoma | 6 |
| Mucinous (colloid) carcinoma | 2 |
| Medullary carcinoma | 2 |
| Papillary carcinoma | 1 |
| Metaplastic carcinoma | <1 |

Most breast carcinomas are epithelial tumours that develop in ducts or lobules and less commonly are non-epithelial cancers of supporting stroma. 95% of all breast malignancies are adenocarcinoma and less than 5% are squamous cell carcinoma, phylloid's tumor, sarcoma and lymphoma. Carcinoma in situ accounts for 15-30% of all breast cancers whereas invasive breast cancer accounts for 70-85%, in which the incidence of ductal carcinoma is 79%.

Risk Factors:

The breast carcinoma is hormone dependent (estrogen and progesterone) and majority of them are estrogen receptor(ER) positive especially in the postmenopausal age. Common risk factors for woman identified by epidemiological studies have been combined into the Breast Cancer Risk Assessment Tool (BCRAT) which includes age, age of menarche and first live birth, history of close relative with breast cancer, repeated breast biopsies, race, estrogen exposure, radiation exposure, environmental factors like diet, lack of exercise, breast feeding and geographical influences.³⁷

Conclusion: The incidence of breast cancer varies greatly around the world. It is lowest in less developed countries like India and highest in the more-developed countries like USA. PSA test may helps to guide overcome this problem globally with 95% accuracy.

Limitations: Need more research on Indian patients.

Conflict of Interest: Nil

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