"Traditional and Modern Treatment for Breast Cancer"

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Abstract:
Breast cancer remains one of the most prevalent malignancies affecting women globally. While modern medicine has m ade significant advancements in diagnosis and treatment—such as Breast-Conserving Therapy (BCT), radiation therapy, and Oncoplastic Breast-Conserving Surgery (OBCS)—traditional systems of medicine continue to offer valuable comple mentary approaches. This article explores an integrative perspective on breast cancer management, highlighting both con ventional and herbal strategies.Traditional treatments rooted in herbal medicine have long played a role in cancer care, o ffering potential anti-cancer, immunomodulatory, and anti-inflammatory effects. Key botanicals with evidence of therap eutic value include green tea (Camellia sinensis), known for its polyphenols; ginseng (Panax ginseng), which enhances i mmune response; black cohosh (Actaea racemosa), used for hormone-related symptom relief; garlic (Allium sativum), w ith its sulfur-containing compounds; and turmeric (Curcuma longa), widely recognized for curcumin's anti-tumor proper ties. Additionally, burdock seeds, flaxseed, and black cumin (Nigella sativa) are noted for their antioxidant and anti-proli ferative activities.Modern treatment modalities focus on tumor removal and the preservation of breast aesthetics and fun ction. Techniques such as Breast-Conserving Therapy(BCT) and Oncoplastic Breast-Conserving Surgery (OBCS) aim to achieve oncological safety with optimal cosmetic outcomes. Radiation therapy remains a cornerstone in local control pos t-surgery. The integration of traditional herbal approaches with modern oncology could enhance patient outcomes, reduc e side effects, and provide holistic care.This review underscores the importance of traditional and modern therapies, emp hasizing the need for further clinical studies to validate the efficacy and safety of herbal treatments in breast cancer care.

Keywords- Breast cancer, Herbal medicine, Traditional treatment, Modern oncology, Green tea (Camellia sinensis), Gin seng , Garlic (Allium sativum), Breast-Conserving Therapy (BCT).

Introduction

Breast cancer (BC) is a type of cancer where tumors originate as a result of aberrant cells growing and dividing out of control. It can affect both males and females, but females are more likely to have it. In 2022, there will be around 2.3 million women with breast cancer. Nowadays, it is the most frequent cancer, and the number of patients is steadily increasing, with a 3% annual increase. Breast cancer can be cured or treated using a variety of methods, including both conventional and contemporary therapies. Although the epidemiological association of being overweight with unhealthy habits (e.g., tobacco use, alcohol consumption, and lethargic behavior) and many forms of cancer is evident, the molecular connection among tumorigenesis as well as those warning signs remains uncertain.[1] With pharmaceutical therapies that have had remarkable outcomes in both early and advanced settings, the therapy landscape for BC is continuously changing. Biological features may dictate which regimens as well as combinations of target treatment, anti-hormonal treatment, vaccinations, and/or chemotherapeutic treatment are administered to patients. The development of new medications inevitably produced different toxicity profiles, indicating the urgent need for a well-organized network of qualified healthcare professionals to assist patients in their treatment. Furthermore, significant improvements in survival rates have led to a focus on quality of life (QoL). [2]

Causes of breast cancer:

1) An experience with BC for a woman who have already experienced it, the risk of having BC in the opposite breast is increased due to this experience.(3)
2) Significance of genetic and family history: If a number of relatives have had a particular cancer, the patient may be more susceptible to breast cancer. Women with the BRCA1 gene have a higher risk of developing breast cancer early in life.(3)

3) Hormonal factors- A shift in hormonol concentration may lead to the development of BC. The cycle of menses, which is the beginning and end of menstruation, before conception, therapy to replace hormones, and the usage of oral drugs are some ways to deal with it. [1] Furthermore, a number of environmental contaminants (such as BBA and cadmium) discharged from industrial operations and absorbed by particular trees and groundwater are now recognized as extra risk variables for a number of distinct hormonally responsive malignancies. In fact, It has shown that cadmium may change the response of breast cancer in vitro, leading to in the hormone tumorigenesis and therapeutic plan. [3]
4) Causes of nutrition and lifestyle- An Obesity, especially in postmenopausal women, and a sedentary lifestyle can lead to breast cancer. Another cause of breast cancer is alcohol consumption. The more alcohol a person drinks, the greater the risk. Women that consume more than two bottles of alcohol daily have near about 1.5 times more likely to develop breast cancer than those who don't [1]. In various tumor types, including BC, Overweight is connected with malignancy related mortality and it encourages the occurrence of cancer [3].
5) Environmental cause Women who labor for extended periods of time with low doses of radiation are known to be slightly more at risk, such as X-ray technicians.[3]

Signs and Indications of BC -
The more prevalent physical indications of BC is a lump mass; even before the primary breast neoplasm grows to a size that can be felt, BC can diffuse into the lymph nodes(LN) down the arm while causing a mass. Breast cancer frequently has no symptoms when it is small and most treatable, which is why screening is essential for early identification.
Less common signs and symptoms include breast pain or heaviness, chronic nipple changes such as automatic layoff (especially if bleeding), scaliness, or retraction. Any persistent breast changes should be examined by a physician.[4]
A bump mass in underarm is a frequent indication of BC. A monthly breast self-exam (BSE) can help you become more aware of your breast form, periodic modifications, measurement, and cutaneous issues.
BC early indications involve edema and bump mass in the breast, Underarm inflammation, fluid from the nipple (clearly visible or reddish), nipple discomfort, a reversed dry or damaged skin on the nipple, and chronic breast pain.[1]
Many symptoms depend on the area of malignancy and indicates advanced BC, with particularly prevalent, and usually come with weariness, melancholy, sleeplessness, and discomfort. Fatigue, difficulty sleeping, and depression are some general symptoms. Bone conditions include discomfort, excessive calcium intake, and chronic fractures, and Loss of movement. CNS (cerebral, leptomeningeal infection, vertebral column) symptoms include migraines, disorientation, sickness, discomfort, and convulsions, and speaking disability . Cutaneous conditions include Sensation in cutaneous layer, disease, and hemorrhage. Gastrointestinal symptoms include discomfort, feeling sick, throwing up, bowel movements, rapid fullness, diminished hunger, breathlessness (due to swelling), yellowing of the skin and hemorrhage. Pulmonary symptoms include pain, dyspnea, hemoptysis, and coughing. Lymph nodes cause brachial plexopathies and discomfort.[5]

- A lump in your breast or underarm.
- Modifications in breast size, shape, or appearance.
- Unknown soreness in the breasts or nipples.
- Non-breast milk nipple discharge.[5]

Prevention of breast cancer
1) Chemoprotection: The usual application of tamoxifen(TMF) has been for the treatment of BC rather than its prevention. The rate of malignancies in the opposite breast, however, declined in a number of therapeutic studies (i.e., newer main tumors were avoided).20 to 22 It is noteworthy that the National Surgical Adjuvant Breast and Bowel Project (NSABP), which included more than 2500 patients with BC in the study, found that TMF reduced the incidence of new BC.[6]
2) Prophylactic mastectomy and prophylasalpingo-oophorectomy are surgical treatments for women who have been assessed as having a significantly higher possibility of BC. Women who are at a significantly increased risk because of identified or suspected gene mutations (the BRCA mutation1 and 2, the protein p53) and/or family records of BC and/or cancer of the ovaries within initial and second-degree family members are exclusively eligible for this procedure. Bilateral cancer-reduction mastectomy can lower BC risk in women.[6]
3) Lifestyle- The World Cancer Research Fund/American Institute for Cancer Research (WCRF/AICR) said that minimize alcohol consumption, reduced body weight that inactivity could prevent around 40% of after menopause BC. These estimates range from those proposed by others, as stated above, but they all trend in the same direction, emphasizing the importance of lifestyle throughout the lifespan and the issue of finding solutions to help women achieve healthy lifestyles.[7]
4) Diet- Previous research suggested that dietary factors account for approximately 30% of all malignancies in industrialized countries and 20% in developing countries. It is well acknowledged that the diets of Western industrialized countries are heavy in animal products, fat, and sugar. In contrast, developing countries' diets are more "healthy" because they are based on starchy staple foods and contain less animal products, fat, and sugar.[8]
5) Alcohol and tobacco consumption- Studies assessing a possible relationship of tobacco use with breast cancer have produced inconsistent results. This may be due to the confounding of alcohol use. Most reports indicate that alcohol usage raises breast cancer risk[9]
6) For most people with breast cancer, exercise is harmless and enhances their physical and mental well-being. The benefits of exercise in avoiding BC are sometimes muddled with the consequences of concurrent weight loss or gain.[10]

Diagnosis-

In the long run, breast cancer death rates could be significantly reduced by early cancer identification. Finding the best prognosis requires first identifying cancer cells in their early stages. Numerous methods for diagnosing breast cancer have been studied, such as computerized tomography (CT), positron emission tomography (PET), ultrasound scans, (MRI), mammography, and dissection.[11]

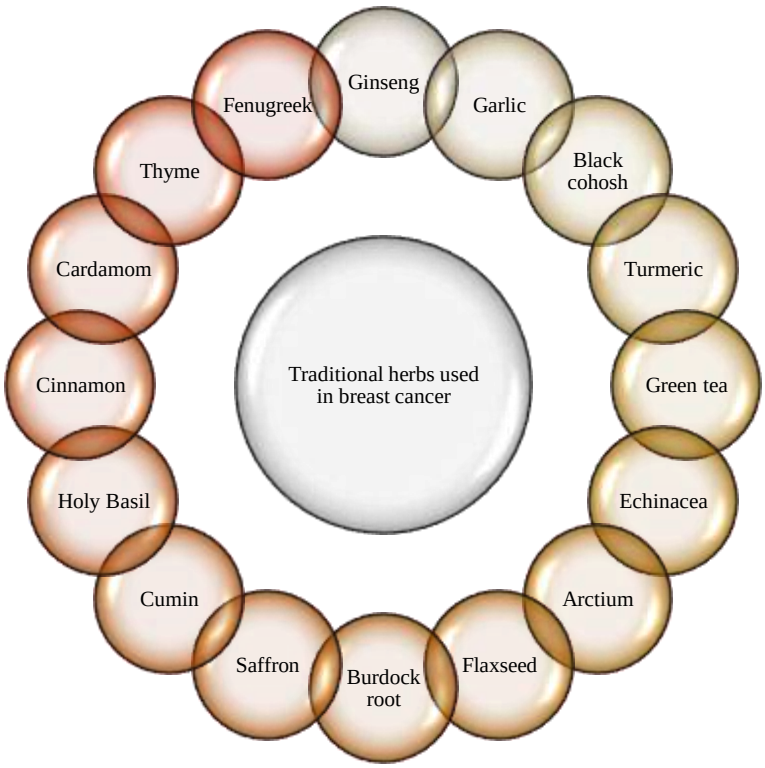
Types or stages of Breast cancer-

Stages	Classification	Description
Stage 0	In situ carcinoma Lobular carcinoma and ductal carcinoma	The tumor often only affects a milk tube or gland that produces milk; it hasn't migrated to the breast tissue around it.[3]
Stage 1	Breast cancer that penetrates	In this stage there is two types type A and Type B . A tumor up to 2 cm in size and free of lymphocytes is referred to as type A, whereas a small cluster of carcinoma cells larger than 0.2 mm found in a node of the lymph system is referred to as Type B.[12]
Stage 2	Breast cancer that penetrates	Two Types, A and B, are also included in Stage 2. A malignancy detected in the median or axillary lymph glands but not in the region of the breast is referred to as Type A. This tumor cannot be more than 5 cm, however it can be less or greater than 2 cm. Type 2, however, shows that even if the tumor may be more than 5 cm in size, it is unable to reach the lymph nodes in the axillary tract.[13]
Stage 3	Locally advanced	Chronic breast cancer, tumors larger than 5 cm, significant involvement of local lymph nodes, immediate invasion of the epidermis or the chest cavity and tumors that not cure but do not spread to other areas are all examples of locally advanced breast cancer.[13]
Stage 4	metastatic Initial or recurrent	Over the last few decades, breakthroughs in breast cancer therapy have increased the median survival rate for individuals with metastatic breast cancer. Despite the fact that metastatic breast cancer is rarely cured, the average survival time is now 24 to 40 months.[14]

There are mainly two types of treatment first one is Traditional treatments which use from ancient time and second one are modern treatment.

Traditional treatment of breast cancer-

Traditional treatments must contain traditional herbs that are effective for breast cancer. The traditional herbs are largely derived from Chinese remedies, often known as Traditional Chinese remedies (TCM) and Traditional Ayurvedic Medicines. Traditional herbs used to cure breast cancer include green tea, the herb ginseng black cohosh , garlic (Allium sativum), the spice turmeric (Curcuma longa), (burdock seeds), flaxseed, black cumin (Nigella sativa), and others.[15]



Sr.no.	Name of herb	Herb Biology	Description
1.	Echinacea	Family-Asteraceae Other names include black Sampson, purple coneflower, and Kansas snakeroot. Echinacea pallida, purpurea, and angustifolia However, E. purpurea is most commonly used for research and treatment.[16]	Researchers discovered that Echinacea purpurea boosts the number of natural killing cells in mice. Echinacea purpurea may one day be used as an oncology medication. Echinacea has phytochemicals. This flavonoid increases lymphoid action, which enhances natural killing cell activity, antiviral construction, and cell ingestion. It also lessens the side effects of chemotherapy and radiotherapy. This assists patients in extending their survival span in the advanced stages of cancer.Echinacea flavonoid inhibits CYP, activates phase 1 enzymes, and prevents cancer.[17]
2.	Garlic	Allium sativum produces secondary metabolites including allin, allinase, and allicin. Ajoene, a sulfur-containing substance, is also present in garlic oil. Ajoene prevents cancer from growing, whilst selenium works as an antioxidant. Bioflavonoids having antioxidant properties, like quercetin and cyanidin, are also found in garlic.Garlic's anticancer effect is attributed to its enormous amount of organic sulfides and polysulfides.[18]	Studies have shown that garlic increases the number of suppressor T cells and changes lymphocytes into cytotoxic cancer cells. By altering the adhesion and adherence of cancerous cells that move via blood arteries, metastases can be avoided. Garlic has free radical scavenging and anti-cancer properties against human breast cancer cell lines.[19]
3.	Turmeric	Turmeric (Curcuma longa) adds a deep yellow color to meals. Its active phenolic components suppress cancer and provide antimutagenic action.[20]	By modifying protein kinase C, telomerase, NF-kB, and histone deacetylase (HDAC), curcumin and its active metabolites can directly bind to DNA and RNA, increasing the effectiveness of chemotherapy. In cell lines of antiestrogen-resistant breast cancer, curcumin kills cells and makes them sensitive to tamoxifen again[21]
4.	Burdock root	The root of Arctium lappa, an asteraceae plant, contains mucilage, sulfurous acetylene chemicals, polyacetylenes, and bitter guaianolide-type components. Are found in burdock root. [22]	It relieves pain, reduces tumor size, and enhances survival time. Tumor cells can persist in low-nutrient environments, but the active element arctigenin found in burdock seeds has the ability to remove tumor cells from low-nutrient environments. Another phenolic compound found in burdock is tannin, which stimulates macrophages and stops the growth of cancer.[23]
5.	Green Tea	Camellia sinensis, commonly known as green tea, is a member of the Theaceae family. Green tea includes high levels of flavonoids, polyphenols, and epigallocatechin-3-gallate (EGCG).[24]	ECGC, an ingredient in green tea, lowers the possibility of BC. Utilizing a human BC MDA-MB-231 Athymic nude mice given xenograft, EGCG was able to delay tumor onset and reduce tumor burden in vivo. These findings imply that Green tea components may have an effect on breast cancer cells at the cellular level.[25]
6.	Ginseng	This herb is a member of the Panax genus and family, Araliaceae. Producing ginsenosides	By blocking MAP kinase, American ginseng extract inhibited the proliferation of cancerous breast cell strains, according to another lab study. According to a different study on cultivated cells of estrogen

		and gintonin, ginseng is a perennial plant with thick roots.[18]	receptor (ER)-positive BC, American ginseng inhibited cell growth by combining with 5-FU, doxorubicin, cyclophosphamide, and methotrexate.[26]
7.	Saffron	Saffron, a spice made from the flower of Crocus sativus, is high in carotenoids. The color of saffron is due to two main natural carotenoids, crocin and crocetin. Preclinical investigations have demonstrated that consuming certain carotenoids has powerful anti-tumor properties both in vitro and in vivo.[27]	Decreased incidence of BC was more closely associated with blood levels of total carotenoids, specifically b-carotene, a-carotene, and lutein.. Carotenoids might have operate as antioxidants by scavenging free radicals and preventing DNA damage. B-carotene may inhibit cell growth, induce apoptosis, and interfere with estrogen signaling in breast cancer cells.[28]
8.	Black cohosh	Actea racemosa and Cimicifuga racemosa are other names for it in the Ranunculaceae family. [29]	Triterpene glycosides are a key component of black cohosh, and there are questions concerning its estrogenic and anti-estrogenic properties. Black cohosh has been shown in the literature to work in concert with other chemotherapy medications for people with breast cancer.[30]
9.	cumin	The family Apiaceae includes cumin (Cuminum cyminum L.).[31]	E2-mediated breast carcinogenesis is inhibited by cuminum cyminum, or cumin, which is obtained through consumption in the form of spice powder and dry ethanol-based extracts, which is used in BC chemopreventives and treatments. [32]
10.	Holy Basil (Tulsi)	Ocimum sanctum is a plant that belongs to the Lamiaceae family and is often known as holy basil or tulsi. [33]	The most recent cancer therapies aim to prevent cancer cell multiplication. Ocimum sanctum essential oil (OSEO) shown substantial anti-proliferative action.[34]
11.	Cinnamon	Cinnamon, the dried bark of Cinnamomum cassia.[35]	Cinnamaldehyde is key ingredient from cinnamon show an anti-proliferation effect on breast cancer cells. [36]
12.	Cardamom	Black cardamom (Amomum subulatum) from family Zingiberaceae.[37]	A naturally occurring chalcone found in large black cardamom, cardamonin (CD), has been connected to the development of breast cancer in humans. [37]
13.	Flax Seed	Another name for flaxseed (Linum usitatissimum) is linseed. Linaceae Family.[38]	Flax seeds include a lot of nutritious fiber, omega-3 fatty acids, and lignans, which are converted in the digestive tract into enterodiol and enterolactone and have estrogenic qualities. In order to create tumors, human breast cancer cells were injected into mice in one study. The animals were then fed a normal diet for eight weeks. While one group continued to follow the basal diet, the other group was given 10% flax seeds. The development of cancer was 45% prevented by flax seeds. After carcinogens are injected into the glands that produce milk, a comparatively small incidence of BC has been observed in females.[38]
14.	Thyme	Thymus vulgaris L. This everlasting herb has medicinal and decorative purposes.[39]	When dried T. vulgaris (as haulm) was constantly added to meals at 0.1% and 1% levels in a chemically created rat mammary carcinoma model, the tumor frequency was reduced by 53%. [40]

15.	Fenugreek	This herb is from the Fabaceae family, specifically the Trigonella genus. Graecum Trigonella is the species. It is possible to utilize fenugreek as a vegetable, herb, or spice.[41]	Mammary enlargement caused by DMBA was successfully avoided and its incidence was decreased by fenugreek seed extract. The death of cells may be a mechanism mediating fenugreek's antibreast cancer preventative effects, according to epidemiological investigation.[42]

SUITABLE NATURAL MEDICATIONS FOR CANCER [21]:-

1. Gerson Treatment: The greatest biological need of the patient is the focus of this treatment. In order to benefit from this therapy, the patient needs follow the Gerson dietary habits, which consists of consuming fresh juice made from raw components and consuming natural fruit, veggies, and seeds. Medication, alcohol, and food all encourage the body's defenses to attack and destroy tumor cells.

2. The Budwig Protocol: Cells renew and replenish when unhealthy manufactured oils and fats are swapped out for essential saturated and unsaturated fatty acids. The body absorbs nutrients more readily and rapidly when the ingredients cottage cheese and flaxseed are combined.

3. Therapy using Proteolytic Enzymes: Among the main causes for tumors is believed to be the activity of the parasympathetic and sympathetic NS, which make up the ANS. While cholinergic function is inhibited by a meat-free diet, sympath activity is inhibited by an vegeterian one.

4. Chelation of vitamin C: To remove hazardous elements from the human body, this treatment mainly involves synthetic or organic compounds. By stimulating spontaneous antioxidant mechanisms in healthy tissue, a pro-oxidant effect appears an hour after the therapy, which is the main cause of the death of cancer cells. Meals high in vit. C can help protect and fight cancer.

5. Therapeutic Use of Frankincense Essential Oils: The procedure is mostly used to treat cancers of the mind, the gut, the part of the pancraes, prostate, and abdomen. Applying this oil to the the individual's neck thrice times a day and consuming a few drops in eight oz. of drinking water thrice times a day are the main ways it works.

6. Meals and supplements that include probiotics: They have been bacteria that support the normal balance of intestinal flora. By eating dairy products that are raw like mozzarella, kefir, and the yogurt, you can get these in their original state.

7. Vitamin D types: These are primarily necessary to avoid breast cancer. One important factor in preventing cancer is fat dissolved in vit. D3. The body needs at least 40–60 ng per milliliter of vitamin D3 and maximum 80 ng per mililiter. At least twenty minutes of sunlight per day is necessary to achieve this.

8. Curcumin with Turmeric:- It stops the growth of cells of cancer and destroys it. It works effectively on cancer cells in the breast, colon, stomach, and skin. Turmeric effectively treats skin, breast, and colon cancers and stops the spread of cancer in its tracks.

9. Hyperbaric Chambers and Oxygen Treatment:- Without oxygen, cancer cells are able to survive. Cancer is mostly caused by the body becoming acidic due to a lack of oxygen. When there is too much oxygen present, cancer cells cannot live. The blood carries more oxygen to different parts of the body because the air pressure inside a hyperbaric oxygen treatment chamber is around 2.5 times higher than the ambient pressure.

10. Praying and Creating Peace:- The prevention and treatment of cancer depend more on preserving mental calm and optimism. There need to be stress-free, joyful, and peaceful lifestyles.

Modern Treatment of BC:-

It is not required to treat lobular cancer in situ. Breast- conserving Treatment and radiation therapy are used to treat ductal carcinoma in situ, but it can progress to invasive malignancy if no further lymphatic node examination or systemic therapy is performed. Breast cancers in stages I and II are usually treated with the use of radiation and surgery to preserve the breasts. Stage III breast cancer typically requires induction chemotherapy to shrink the tumor and allow for surgery to preserve the breasts. Even though it is categorized as stage III, aggressive inflammatory breast cancer requires mastectomy instead of surgery to preserve the breast, armpit lymph node surgery, chest cavity radiation, and induce chemotherapeutic treatment The prognosis for women with recurring or distant (stage IV) BC is poor, and available treatment options must balance the dangers of treatment with the advantages of reduced pain and increased life expectancy.[43]

1) Breast-conserving therapy (BCT)-

A simple wide removal or various types of oncoplastic surgery can be used to do BCT. BCT is considered the best surgical technique choice and is oncologically safe for a subset of patients with breast cancer[43]. English surgeon Sir Geoffrey Keynes, who worked at London's St. Bartholomew Hospital, was the first to describe breast conservation therapy (BCT) for cancer in 1924. One According to Keynes, who employed radium seeds as a surgical adjuvant, women with clinically negative lymph nodes had a 77% 5-year survival rate, whereas those with clinically enlarged lymph nodes had a 36% 5-year survival rate[44].

2) Radiation therapy

An essential component of breast conserving treatment (BCT) is postoperative radiation therapy (RT). It is estimated that radiation therapy will be the primary treatment of as many as 80 of patients with stage I–III BC.[45] Radiation therapy has, however, changed in recent years to treat breast cancer at all stages of the disease. RT encompasses a variety of therapy, including the following:-

- Irradiation of the entire breast,
- Split breast irradiation
- Radiation therapy administered intraoperatively
- Axillary management and regional nodal irradiation
- Radiation therapy following mastectomy
- External beam radiation
- Brachytherapy [46]

1. Whole breast irradiation:-

Hypofractionated whole breast radiotherapy (HWBI) has taken the place of the traditional 6- to 7-week course of WBI for the beginning BC. HWBI, which shortens the duration of WBI from five to three weeks, has been a popular substitute for normal WBI throughout the last 20 years.[47]

2. Partial breast irradiation:-

The PBI notion originated from research that shown that the primary benefit of postoperative treatment with radiation following breast preserving surgery was the prevention of occurrences around the initial tumor and that any cancer that remained was situated near the a lump removal bed. PBI can be administered using a variety of methods, such as external beam, intensity modulated radiation treatment (IMRT), , 3-D conformal radiation treatment (3D-CRT), proton treatment, And interstitial brachytherapy and applicator brachytherapy. The majority of the seven planned controlled studies that has been shown over the past 10 years to evaluate PBI have found low rates of local recurrence with it and not any detectable significant variance in areas of recurrence.[46]

3. Intraoperative radiation therapy

The procedure known as IORT has the potential to provide patients with the option of completing both surgery and adjuvant radiation therapy. There are other IORT methods, including as high dose rate brachytherapy, electrons, and low-energy x-rays.
[48]

4. Regional nodal irradiation/axillary management

British Columbia Randomized Trial's (BCRT) 20-Year Results are being studied. The purpose of the BCRT was to ascertain the effect of Locoregional treatment with radiation
on survival in individuals with lymphatic node-positive BC who are premenopausal
receiving adjuvant chemotherapy and a modified radical mastectomy. In patients undergoing chemotherapy for stage I–II BC that damaged armpit lymph nodes, this study showed that locoregional treatment with radiation dramatically reduced the risk of each locoregional and systemic regrowth. Our studies showed that radiation therapy improved the survival rates for those with a maximum of three positive axial lymph nodes and those with more than four in similar proportions, and this resulted in a significant improvement in both general and BC-specific remaining alive rates after a 20-year.[49]

5. Postmastectomy radiation therapy

Since mastectomy is the recommended surgical option for treating breast cancer, many women choose to have it done for personal reasons or because of tumor-related problems. It has been demonstrated that postmastectomy radiation therapy reduces the chance of local recurrence and, in certain situations, increases overall survival. According to recent research, if local management is beneficial enough, there may be an overall survival advantage. For this reason, postmastectomy radiation therapy guidelines are crucial in the treatment of breast cancer.[50]

6. External beam radiation:-

Beginning with brachytherapy and continuing alongside the most advanced external beam radiation treatments, the trip is full with events. The utilization of intriguing, highly advanced external beam radiation techniques is gradually gaining traction. Starting with surface X-rays in the previous century, external beam radiation gradually advanced towards higher intensity X-rays and photons, containing radioactive particles like Cs (cadmium) and Co (cobalt). It covers things like the treatment plan, positioning, radiation delivery, tumor targeting, monitoring and adjustments, managing side effects, and follow-up care, among other things.[51]

7. Brachytherapy

One highly versatile radiation treatment for BC which applied in many different settings is brachytherapy. This kind of radiation treatment involves implanting radioactive sources into or near the target tissue. Brachytherapy works because

the extremely powerful radiation dosage gets directly to the target volume by placing radiation emitting particles inside or close to the tumor mass or bed.[52]

3) Oncoplastic BCS:-

After radiation therapy and breast-preserving treatment, oncoplastic breast surgery(OBCs) was first utilized to correct anomalies.[45] The literature defines oncoplastic breast surgery differently depending on the volume of specimen extracted or the amount of tissue manipulated. OBCS is defined by the American Society of Breast Surgeons (ASBrS) as a breast-preserving procedure that corrects asymmetrical defects using volume shift and replace techniques, together with contra symmetrical operations which are necessary. Volume displacing is the moving of tissues from the breast to seal the post-resection void, while volume replacement is the other category of OBCS that is classified by the ASBrS categorization approach. Level 1 was less than 20%, and level 2 was between 20% and 50%. It divided into two stages depending on the proportion of mammary area removed. Techniques for replacing volume in oncoplastic BCS involve using local or transplanted tissue from beyond the breast area to make up for volume losses. Alongside symmetrical enlargement or mastopexy, this could or might not give rise to a future breast reconstruction or reduction in volume from the initial volume.[45]

4. Surgery:-

a) Lumpectomy:-

In breast cancer, a lumpectomy is a surgical treatment that removes a tumor from the breast along with a small margin of good tissue. This procedure is a critical component of breast-conserving therapy, which seeks to eliminate cancer while maintaining as much breast tissue as feasible. It is usually followed by radiation therapy to kill any leftover cancer cells and lower the risk of recurrence. For those who prefer not to have a mastectomy and are aware that beneficial borders may occasionally require further surgery, a lumpectomy may nevertheless be carried out. The surgical procedure and therapeutic justification for a the removal of lumps in cases of multicentric BC are discussed in this article. The removal of lumps went well, and the most recent examination showed low margins. The following factors promote lumpectomy: fewer, monocentric growths, a younger age, therapy at specialized facilities, favorable physical characteristics, tumor localization using wire or radioactive seed, and patient compliance.[53]

b) Mastectomy:-

A mastectomy is a surgical surgery that removes all or part of the breast. For patients whose condition is having various multiple complications inside the breast because of its extent and spread, mastectomy is frequently advised. Those without a cancer diagnosis may choose mastectomy as a risk lowering or prevention measure. It is possible to execute a mastectomy with a blade or a pair of scissors. An additional alternative is to utilize a power device, such electric cauterization or one of the various ultrasonic devices, to release the posterior attachments from the chest wall and separate the breast from the superficial tissues. Typical general surgical tools like suction and retractors are frequently utilized.[44]
The Mastectomy surgical procedure performed as follows:-

- Incision:- Mastectomy surgery involves an incision on the breast, which varies in length and location based on the type of mastectomy performed.
- Tissue Removal:- The surgeon gently removes the breast tissue and, if necessary, the surrounding lymph nodes.
- Hemostasis is the process of cauterizing blood vessels to avoid bleeding.
- Closure: The incision is closed with sutures or staples and a sterile dressing is provided.

c) Sentinel node Biopsy

When nodal-borne tumor cells are received, the SLN is the initial LN. Straight lymph outflow of the primary lesion is received by SLNs, which are LN. The main goal of SLN biopsy (SLNB) and SLN mapping (SLNM) in patients with breast cancer is the armpit stage. In the treatment of BC, SLNB has become a common approach that aids in the creation and application of less invasive surgical method. In order to surgically remove the detected radioactive LNs, the approach for SLNM and SLNB typically consists of postoperative gamma tool localization, pretreatment scintigraphic scans, and intracellular tracer injection.[54]

5) Chemotherapy[55]:-

Adjuvant chemotherapy:- This chemotherapy includes the 1st, 2nd, and 3rd generations of medicines.
The two most successful different types of cytotoxic medications for both early and late BC, anthracyclines(AC) like doxorubicin(DXB), epirubicin (EPB) and/or taxanes like paclitaxel(PCT), docetaxel(DCT), were commonly included in the doses used in these investigations

a) Anthracyclines

Streptomyces peucetius, a mutation of the basic Streptomyces species found close to the Adriatic Sea, is the source of DXB. It was later named Adriamycin. When treating cancer that has spread, DXB was found to be the best medication for this stage. Because the sugar's C4 OH is positioned differently than DXB, EPB has a minimal side effect of cardiotoxic than DXB.

b) Taxanes

Its anticancer properties led to the first extraction of PCT from the outermost layer of the Pacific yew tree, Taxus brevifolia. A PCT preparations that was soluble in Cremophor EL was later developed, although it was associated with allergic reactions.

Docetaxel:- In vitro, docetaxel is a more powerful inhibitor of microtubules than paclitaxel.

Following rigorous evaluation in clinical trials, each of these drugs have shown notable single agent activity in treating advanced BC.

Sr No.	1st generation chemotherapy treatment plan	2nd generation chemotherapy treatment plan	3rd generation chemotherapy treatment plan
1.	Cyclophosphamide, methotrexate, and 5-flurouracil or 5-FU(CMF)	5-FU, EPB (100 mg/m2), and cyclophosphamide (FEC100)	Docetaxel, DXB and cyclophosphamide (DAC)
2.	Doxorubicin and cyclophosphamide (AC)	Cyclophosphamide, DXB, and 5-FU (CAF or FAC)	Series of FEC-taxane therapy
3.	5-FU, EPB (50 mg/m^2), and cyclophosphamide (FEC 50)	Sequential doxorubicin/cyclophosphamide followed by paclitaxel (AC-T)	Dose dense series of DXB /cyclophosphamide PCT (AC-T)
4.	-	Serial dose of EPB with CMF combination	Series of AC- weekly PCT or afyer 21 days docetaxel
5.	-	Docetaxel plus cyclophosphamide	-

6) **Harmonal Therapy**[56]- It includes the following drugs which used in the harmonal therapy.

a) Tamoxifen as monotherapy- For the management of initial Bc in postmenopausal women with node-positive BC, the first was TMF initial drug of this type to be authorized as a single therapy in 1986. This prevents the activation of genes that promote tumor development and cell growth in an estrogen-dependent manner. Consequently, TMF inhibits the growth of BC cells that are ER-positive.

b) Aromatase inhibitors(ARI) - The enzyme aromatase is responsible for the conversion of androgens into estrogens. ARI lower total estrogen production. This lowers the body's levels of estrogen, which is particularly important for the development of positive ER in BC cells because estrogen is often the fuel for these tumors. These medications are included in it.

I] Anastrozole- Anastrozole is now approved by the FDA for both 1st and 2nd line advanced BC, also initial stage BC.

II] Letrozole- The latest letrozole article has led to a new method of treating individuals undergoing neoadjuvant hormonal treatment.

III] Exemestane- This used frequently as part of a regimen in which a patient begins tamoxifen treatment for a few years and then "switches" to exemestane to lower the chance of recurring and improve outcomes over the long term. Exemestane is a steroidal aromatase inhibitor that binds irreversibly to the enzyme, whereas anastrozole and letrozole are nonsteroidal inhibitors that bind reversibly.

7) **Targeted Therapy**[57]:- It mainly for the HER2$^+$ BC. it includes following medicines.

a) Trastuzumab- A modified monoclonal antibody (MA) called trastuzumab (Herceptin; Genentech) targets the cell outside region of HER2. It is authorized to treat HER2-positive BC for both adjuvantly and advanced treatment. Although investigations have shown that trastuzumab inhibits HER2 outer domain destruction, inhibits HER2 signaling through the PI3K and MAPK cascades, and causes antibody responsible cellular death, its exact MOA are still unknown.

b) Lapatinib- Lapatinib(LPT) is a small-molecule inhibitor that can be taken orally and works against both HER1 and HER2, but it has mostly only been used to treat HER2+ BC. TZM-resistant metastatic HER2+ BC can be effectively treated with a combination of LPT and Transtuzumab(TZM) for HER2 targeting.

c) Pertuzumab(PTZ)- An anti-HER2 humanized MA called pertuzumab attaches itself to subdomain II of the external area of HER2, while trastuzunmab attaches itself towards subdomain IV.

d) TZM emtansine (T-DM1)- Trastuzumab is combined with the microtubule-inhibitory substance mertansine to form an antibody-drug combination. T-DM1 was approved by the FDA in Feb 2013 to treat patients with HER2þ metastatic BC who had previously treated TZM and a taxane, both separately or together, depending on the results of the EMILIA study. [reference of targeted therapy is 'Targeted Therapy for Breast Cancer Ali Mohamed,* Kenneth Krajewski,* Burcu Cakar,y and Cynthia X. Ma'.]

8) Immunotherapy[58]-

a) Certain immunotherapy drugs, including MA, work in several ways to suppress cancer cells. They are sometimes referred to as targeted treatments since they stop a particular protein on a tumor cell from growing.

b) Immune checkpoint inhibitors for breast cancer

I]Pembrolizumab (Keytruda) PD-1 pathway inhibitor-[59]

PD-1, or a protein on immune system T cells that stops that tumor cell successfully to targeting the other cell , is the target of the drug pembrolizumab (Keytruda). Through PD-1 inhibition, these medications increase the body's immunity to BC cells. This often reduces tumor size. When treating triple-negative BC, it can be used in conjunction with chemotherapy.

This are the some modern treatment and drugs used in breast cancer.

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