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ACADEMIC MEDICAL CENTRE

Breast Centre

Your Breast Health

MAKING INFORMED CHOICES

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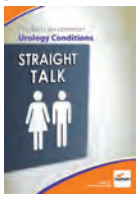
5 

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1. **Heart to Heart:** All you need to know for better heart health
2. **Bones and Joints:** What you need to know
3. **Eye Check:** A look at common eye conditions
4. **Up Close:** Get the answers to common Ear, Nose and Throat conditions
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The SingHealth Healthy Living Series is published by SingHealth Marketing Communications.

About SingHealth

SingHealth

1,000
Internationally-qualified Specialists

40
Medical Specialties

150
Sub-specialties

SingHealth provides tertiary medical care across a comprehensive spectrum of over 40 medical specialties with the in-depth expertise of 150 sub-specialties.

Supported by a faculty of over 1,000 internationally-qualified medical specialists and well-equipped with medical diagnostic and treatment technology to provide the most optimal level of care for our patients, the group is recognised in the region for charting new breakthroughs in treatments.

As an Academic Medical Centre, we seek to transform patient care by integrating clinical services, teaching and research. Patients at SingHealth enjoy the benefit of leading-edge medical care with a focus on quality and holistic treatment in an integrated and multidisciplinary setting.

SingHealth DukeNUS
ACADEMIC MEDICAL CENTRE

- Singapore General Hospital
- Changi General Hospital
- Sengkang General Hospital
- KK Women's and Children's Hospital
- National Cancer Centre Singapore
- National Dental Centre Singapore
- National Heart Centre Singapore
- National Neuroscience Institute
- Singapore National Eye Centre
- SingHealth Community Hospitals
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PATIENTS. AT THE HEART OF ALL WE DO.®

SingHealth DukeNUS
ACADEMIC MEDICAL CENTRE

Breast Centre

The **SingHealth Duke-NUS Breast Centre** is a cluster-wide centre treating the full spectrum of breast conditions, with a comprehensive range of treatment options, delivered in a holistic manner and individualised for each patient. The Centre serves its patients at 5 key SingHealth institutions, namely, National Cancer Centre Singapore (NCCS), Singapore General Hospital (SGH), Changi General Hospital (CGH), Sengkang General Hospital (SKH) and KK Women's and Children's Hospital (KKH). Annually, the Centre handles about 25,000 outpatient visits and manages over 1,200 breast cancer patients.

We offer treatment options using the most current surgical techniques and equipment, including oncoplastic breast surgery, sentinel node biopsy and intraoperative radiotherapy.

Treatment is individualised at the SingHealth Duke-NUS Breast Centre — every case of breast cancer is discussed at a weekly multidisciplinary conference to ensure the best treatment options are recommended.

Patients have full access to warm, supportive care from the team of experts focused on breast cancer throughout their duration of treatment; working together in unison to achieve seamless and the best outcome for patients.

For enquiries, contact SingHealth Duke-NUS Breast Centre at:

- National Cancer Centre Singapore Tel: 6436 8088
- Singapore General Hospital Tel: 6321 4377
- Changi General Hospital Tel: 6850 3333
- Sengkang General Hospital Tel: 6930 6000
- KK Women's and Children's Hospital Tel: 6294 4050

Find out more about our specialists at SingHealth Duke-NUS Breast Centre at
www.singhealth.com.sg/breastcentre

OUR SERVICES

Our dedicated breast surgeons work closely in a multidisciplinary team to provide a full range of integrated services for the assessment and management of benign and malignant breast conditions in a caring and friendly environment.

Each case of breast cancer is different, and will be reviewed in detail by our multidisciplinary team to come up with the best treatment plan suited for each patient.

The personal treatment team for each breast cancer patient includes a radiologist, pathologist, medical and radiation oncologist, surgeons and specially-trained support staff.

- Expert clinical assessment
- Radiological evaluation (digital mammography, 3D-breast tomosynthesis, ultrasonography, computed tomography and MRI)
- Minimally invasive breast biopsy (Stereotactic, ultrasound or MRI-guided) core biopsy and vacuum-assisted breast biopsy (VAB)
- Wire and radiocolloid (ROLL) localisation of occult lesions for surgical biopsy
- Breast cancer surgery: All forms of mastectomies and breast-conserving surgery (BCS)
- Oncoplastic and reconstructive breast surgery
- Sentinel lymph node biopsy and axillary clearance
- Intraoperative radiotherapy (IORT) for breast-conserving surgery (only available in NCCS)
- Specialist breast care nurse support for peri-operative and post-operative care
- Post-operative physiotherapy and lymphoedema care
- Multidisciplinary care: Breast tumour board and radio-pathological meeting
- Pre-operative (neoadjuvant) therapy programme
- Genetic counselling and testing, fertility counselling and preservation for young and/or high-risk patients

Foreword

Breast symptoms are very common, and many women present to their GPs with breast-related concerns. While the fear of breast cancer is often foremost in their minds, the vast majority of symptoms are benign (not cancer). That said, women who notice new changes in their breast, even painless lesions, should always seek a consult with her doctor.

Breast cancer remains the most common cancer among women in Singapore, with 1 in 11 women diagnosed in their lifetimes. Thankfully, the number of women who die from breast cancer continues to fall. In part due to the diagnosis of earlier stage breast cancer by screening mammography, and largely due to the very effective treatments currently available. Treatment strategies are tailored to the individual patient, and usually involve various medical specialties. No longer is it true that a diagnosis of breast cancer mandates removal of a woman's breast. It is our hope that this resource provides information on the various tests and treatments, such that women are able to make sense of the information provided by their care providers. By providing knowledge, more women and their families may explore options, know their risk profile, and take charge of their breast health.

We received wonderful feedback from patients and GPs on this book "Your Breast Health – Making Informed Choices". Many expressed appreciation of the concise and informative paragraphs on the common benign breast conditions. Others have found the well-illustrated descriptions of biopsy and surgical techniques invaluable. 10,000 copies of this book have been distributed within a year, and we are delighted to embark on a re-print of this compact resource.

Sincere thanks to all who have made this book possible. The contributors have been most generous with their time. Yeo Jian Long illustrated descriptions of surgical techniques with precision. Adeline Cheong and her team converted the authors' words and many illustrations into the book you now read. Our patients are our inspiration and the reason we do what we do. We hope you benefit from this resource. It has been a great privilege co-editing this book with Dr. Benita Tan.

Dr. Veronique KM Tan
Head, SingHealth Duke-NUS Breast Centre
Senior Consultant, Division of Surgical Oncology
National Cancer Centre Singapore

Contents

The Normal *Female Breast*

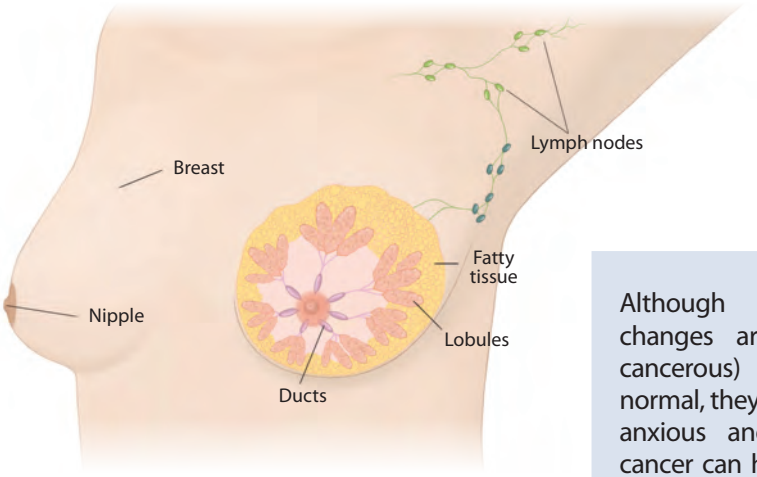
Female breasts are designed to produce milk. Each breast has many milk-producing glands arranged in 15 to 20 sections called lobes.

These glands and lobes are linked by milk ducts that lead to the nipple located in the centre of a dark area of skin called the areola. Fibrous tissue and fat surround these lobes and help give the breasts their structure and shape.

Each breast also contains blood vessels, lymph vessels, lymph nodes and nerves. The lymph vessels carry colourless fluid called lymph, a fluid formed in the body's tissues, and drain to small bean-shaped glands called lymph nodes.

Axillary Lymph Nodes

Groups of lymph nodes are found in the armpit, above the collarbone and in the chest. These lymph vessels and lymph nodes are part of the lymphatic system. The lymph nodes house white blood cells called lymphocytes, which are able to remove bacteria, viruses and other foreign particles in the lymph before it is returned to the blood. They also produce antibodies to help the body fight infection.



▲ *Anatomy of the breast*

Our breasts go through many changes during our lives. Most of these changes are quite normal and are due to the fluctuating levels of reproductive hormones in our breasts. These may include pain and/or swelling, a lump or general 'lumpiness', nipple discomfort or fluid from the nipple.

Although most of these changes are benign (non-cancerous) and considered normal, they can make us very anxious and concerned as cancer can have some similar symptoms such as a lump.

New changes should be assessed by a doctor to exclude the presence of breast cancer.

Early Detection & Screening

When breast cancer is found at an early stage, more treatment choices may be available and the chance of a complete recovery is higher. Hence there are benefits to detect breast cancer as early as possible through regular breast screening.

Screening simply means performing a procedure or test to detect an abnormality before symptoms appear. This allows problems to be detected earlier, investigated and treated early.

Breast screening methods include:

A. Breast Self-Examination

Breast Self-Examination (BSE) is recommended ***once a month about 1 week from the first day of menses***. For women who no longer menstruate, choosing a date each month is an easy way to remember. Report to the doctor any breast changes such as redness, swelling, presence of a lump, skin changes or discharge from the nipple.

Self-awareness of breast changes through regular BSE and being familiar with what is normal and stable is useful to detect abnormalities.

HOW TO PERFORM BREAST SELF-EXAMINATION

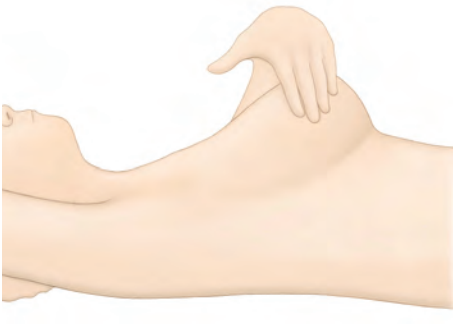
1. **Look for changes in front of a mirror**
   - First, with arms at your sides
   - Next, with arms raised above your head
   - Finally, with hands pressed firmly on hips and chest muscles contracted

In each position, turn slowly from side to side and look for:

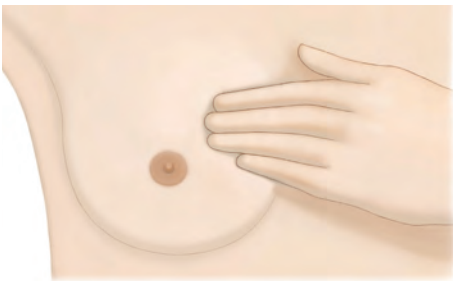
- Change in size or shape of your breasts
- Dimpling of the skin
- Change in nipples

2. Feel for the changes lying down

- Put a small pillow under your right shoulder
- Place your right hand under your head



- Use the pulp of your left fingers to feel for any lumps or thickening in your right breast
- Feel for the changes lying down
- First, feel the armpit
- Then start on the outside edge of your breast and feel round the whole breast in smaller and smaller circles
- Finally, feel behind the nipples itself



3. Look for bleeding or discharge from the nipple

- Squeeze the nipple gently to see if there is bleeding or any discharge

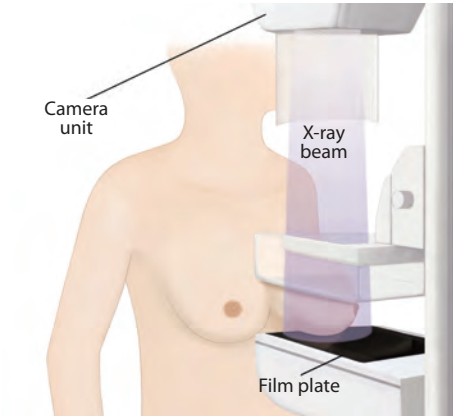
4. Repeat step 2 and step 3 for the left breast.

B. Clinical Breast Examination

Have a doctor or breast specialist nurse examine your breasts ***once every year if you are 40 years and above***. This includes a visual examination and a manual check of the entire breast and underarm area for changes. Changes in the breast may not be due to cancer and diagnostic tests may be performed to assess these changes.

C. Mammogram Screening

Mammography is a low-powered X-ray technique that gives an image of the internal structure of the breast. Usual screening mammograms involve taking X-ray images with the breast compressed between two plates with two views taken — cranial caudal or horizontal and mediolateral oblique or diagonal.



▲ *Mammograms take an image of the internal structure of the breast and can help detect abnormalities.*

Additional angles and magnified views may be taken if there are areas of concern. It can detect the presence and position of abnormalities and help in the diagnosis of breast problems, including cancer.

The risk of developing breast cancer increases with age. Women with risk factors such as a family history of breast cancer should discuss with their doctors when to go for and the interval of regular screening.

There are other tests such as breast ultrasound, tomosynthesis and MRI, available for assessment of the breasts. These are not used for regular screening in well women and are used for further evaluation after initial screening mammogram, but may be considered for women with high risk of breast cancer.

Recommendations for Breast Screening

BREAST SCREENING

Age	Breast Self-Examination	Mammogram
40-49	Once a month (a week from Day 1 of menses)	Speak to your doctor on the benefits and limitations of a mammogram. If screening is decided, it is annual.
50 and above		Once every 2 years

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Singapore General Hospital Tel: 6321 4377
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Fibrocystic Change

Fibrocystic change (FCC) of the breasts is the most common benign breast condition. These changes are normal and are not a disease.

More than 60 percent of women may experience fibrocystic changes. It occurs more frequently in women aged 30 to 50 years and resolves most often after menopause.

Causes

Although the exact cause is not clear, hormonal imbalance, particularly oestrogen predominance over progesterone, seems to play an important role in its development. As hormonal levels may fluctuate during the menstrual cycle, the symptoms of fibrocystic changes may also fluctuate with breasts becoming lumpier, tender and sore just prior to menses.

Symptoms

Breast pain and tender lumpiness are the commonest symptoms. The size of the breast lump or lumpiness may fluctuate especially from mid-cycle to just before the period.

Risk Factors

The risks may increase with:

- Menstruation starting at an early age
- Having your first child at age 30 and older
- Never had a baby
- Infections

▲ *Having a first child after 30 may increase the risk of fibrocystic change.*

Diagnosis

Careful assessment of the history of the symptoms with a clinical breast examination, followed by mammograms and breast ultrasound may be indicated in some women. Occasionally, a biopsy of the breast tissue may be needed to ensure the symptoms are not due to a malignant condition.

Treatment

Management includes:

- Using a supportive bra
- Taking analgesics e.g. Panadol, NSAIDs
- Some women have found avoiding caffeine and reducing salt intake helpful in relieving symptoms but studies have not shown any significant impact
- For women with painful breast cysts, this may be relieved by a fine needle aspiration to remove the cyst contents, otherwise management is largely expectant
- Vitamins and dietary supplements such as evening primrose oil and Vitamin E

Cancer Risk

Fibrocystic breasts without atypical proliferations (abnormal growth of cells) do not increase the risk of breast cancer.

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Fibroadenoma

Fibroadenoma is the most common tumour of the breast. It occurs in 25 percent of asymptomatic women, usually with a peak incidence in early reproductive life between the ages of 15 and 35.

It is conventionally regarded as a benign tumour of the breast, and is thought to represent a harmless overgrowth of breast tissue. It is hormone-dependent and may enlarge during pregnancy, and involutes (shrinks) with the rest of the breast after menopause.

Causes

Fibroadenoma has no known risk factors and is thought to be caused by female hormones.

Symptoms

Fibroadenoma often presents as a painless, highly mobile, firm nodule within the breast.

They may also be detected upon routine breast imaging i.e. mammography or ultrasound examination.

Diagnosis

Clinical breast examination often reveals the characteristic 'breast mouse' which is a nodule that is very mobile within the breast. Mammograms and breast ultrasound are often used depending on the risks, and diagnosis can be confirmed by core needle biopsy or excision biopsy.

Treatment

A fibroadenoma may be monitored for long-term stability or they may be removed by vacuum-assisted needle biopsy (VAB) or surgery.

It may be difficult to differentiate a large fibroadenoma from the phyllodes tumour, another type of breast tumour, based on ultrasound or even core needle biopsy. If the latter is suspected, surgical excision with a margin to completely remove the tumour is recommended.

Cancer Risk

Simple fibroadenomas do not increase the risk of breast cancer.

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Mastitis

Mastitis is usually an infection of the breast tissues. It is common in breastfeeding women.

It can occur anytime during lactation but is more common in the first 3 months of lactation. About up to 10 percent of women who breastfeed may be affected.

Causes

This may be from a blocked milk duct, or bacteria that enters the breast tissue through cracks or breaks in the skin or nipple.

Symptoms

Symptoms include:

- Breast pain
- Swelling
- Redness and warmth
- Development of a breast lump
- Fever, chills and tiredness

Risk Factors

Mastitis is most often related to:

- Breastfeeding
- Sore or cracked nipples
- Using only one position to feed
- Wearing a tight bra that may restrict milk flow
- Mastitis not related to breastfeeding may be seen in women with diabetes mellitus

Prevention

Women are encouraged to breastfeed frequently, especially when breasts feel engorged. Try to ensure that your baby latches on properly during feeding and allow the baby to finish feeding.

Avoid pressure on the breasts e.g. tight bra/clothing and adjust breastfeeding techniques to avoid breast engorgement.

Diagnosis

Diagnosis is made on assessment of history and by clinical physical examination. Breast imaging such as breast ultrasound may be needed to assess for abscess formation (collection of pus material within the breast).

Mammograms are usually not needed and can be uncomfortable. A biopsy may be indicated if symptoms persist after a course of antibiotics.

Treatment

Antibiotics and pain relief are the main courses of treatment. Usually a course of oral antibiotics is sufficient. However, if the condition persists or worsens, intravenous antibiotics may be required. If it is not treated adequately, an abscess may form and this may require surgical drainage.

Cancer Risk

Mastitis does not increase the risk of breast cancer.

Idiopathic Granulomatous Mastitis (IGM)

Women not lactating or breastfeeding can also get mastitis. In some of these women, the cause is unknown. This may be resolved with a course of antibiotics, but if IGM persists, it may become complicated and abscesses may result. Surgery to drain the infection and to obtain tissue for biopsy may be needed.

In some severe cases, steroid therapy may be considered if an infective cause is excluded.

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Duct Ectasia

In duct ectasia, there is a swelling of the milk ducts beneath the nipple and thickening of the walls of the milk ducts. The ducts are filled with fluid. It occurs mainly in perimenopausal women aged 40 to 50 years.

Causes

It is speculated that this may be caused by changes due to ageing, smoking and nipple inversion.

Symptoms

Symptoms include:

- Dirty white, greenish or blackish nipple discharge
- Tenderness and redness in the nipple and surrounding breast tissue
- Thickening near the clogged duct
- Inverted nipple
- Breast discomfort

Diagnosis

Diagnosis is based on clinical breast examination with ultrasound of the nipple and areola, and mammograms.

Treatment

Treatment is largely symptomatic but antibiotics and analgesics may be needed. Supportive management includes:

- Warm compresses to soothe the painful breast
- Breast pads to absorb the nipple discharge
- A good support bra to help minimise breast discomfort
- Sleeping on the opposite side to help prevent swelling and discomfort to the affected breast
- Stopping smoking
- Surgery, which may be considered to excise the affected duct

Cancer Risk

Duct ectasia does not increase the risk of breast cancer.

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Intraductal Papillomas

Intraductal papillomas are small, tiny wart-like growths in the breast's milk ducts and are non-cancerous. They are common between the ages of 35 to 55 years.

There are 3 types of papillomata:

1. **Solitary intraductal papilloma** which can present as a single lump near the nipple and can cause nipple discharge.
2. **Multiple papillomas** may present as groups or clusters of small growths, farther away from the nipple and may not cause nipple discharge.
3. **Multiple papillomatosis** are very small groups of cells inside the ducts and they are more scattered.

Risk Factors

There are no known risk factors.

Symptoms

It may cause a nipple discharge. If it is near or beside the nipple a small lump may be felt.

Diagnosis

Diagnosis is made on clinical breast examination and breast imaging, including mammograms and breast ultrasound. Biopsy is usually recommended to confirm the diagnosis.

Treatment

Surgery may be necessary to remove the papilloma and affected part of the milk duct. This is usually curative and presents a good outlook. Vacuum-assisted core needle biopsy (VAB) is an alternative option used for these lesions.

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Atypical Hyperplasia

Atypical hyperplasia is an accumulation of abnormal cells in the breast and it is a risk factor for developing breast cancer.

Atypical ductal hyperplasia is caused by the accumulation of abnormal cells that are similar to the breast duct cells.

Atypical lobular hyperplasia is caused by abnormal cells similar to the breast lobule cells.

Causes

There are no known causes.

Symptoms

Atypical hyperplasia is usually asymptomatic and may present as an abnormal finding, such as microcalcifications on mammograms, but it is most often discovered incidentally when biopsies are done for other findings.

Diagnosis

A biopsy of the abnormal area seen on mammogram may be recommended. This may be done using a needle biopsy or by open biopsy. An open biopsy allows more tissue to be examined and in about 25 percent of cases, an early cancer may be found.

Treatment

The main form of treatment is surgery and the removal of the abnormal area.

Cancer Risk

There is an increased risk of developing breast cancer in the future. It is about four times the lifetime risk.

At 5 years after the diagnosis of atypical hyperplasia, 7 percent of the women may develop breast cancer. At 10 years after the diagnosis, 13 percent may develop breast cancer and at 25 years after the diagnosis, about 30 percent may develop breast cancer.

The risk of cancer may be decreased by taking oral medications like Tamoxifen, Raloxifene, aromatase inhibitors and avoiding hormonal replacement therapy.

Follow-up Care

Women with atypical hyperplasia should continue with monthly breast self-examinations in order to detect any early breast changes as well as consider annual mammograms, in view of the increased risk.

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Lobular Carcinoma in Situ

Lobular carcinoma in situ (LCIS) is caused by abnormal cells forming within the milk glands (lobules) in the breast. It is most common in women between the ages of 40 and 50. LCIS is not a cancer but it does increase the risk of developing breast cancer.

Causes

There are no known causes.

Symptoms

LCIS by itself does not usually cause symptoms but it is usually diagnosed after a biopsy is done for some other reason. In more than 50 percent of cases, LCIS may be multifocal, that is multiple lobules may have areas of abnormal cell growth.

Risk Factors

Risk factors include:

- A family history of breast cancer
- Taking hormonal replacement therapy (HRT) for menopause

▲ *A family history of breast cancer increases the risk of lobular carcinoma in situ.*

Diagnosis

LCIS is commonly an incidental finding on biopsy of the breast for another reason.

Treatment

Management of LCIS includes:

- Close observation e.g. clinical breast examinations, annual mammograms or MRI of the breasts.
- Chemoprevention, which is taking medication to reduce the risk of cancer. These drugs may include Tamoxifen or Raloxifene for 5 years.
- Surgery, where preventive or prophylactic mastectomy may be considered if there is a high risk based on a strong family history of breast cancer or if there is a *BRCA* gene mutation.

Cancer Risk

There is an increase of 20 percent cancer risk over 15 years at the point of diagnosis.

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Gynaecomastia

Gynaecomastia is the enlargement of male breast tissue. It is common in newborns, at puberty, as well as in older men.

There is growth of the male breast glands and not just the fat. It may occur in one or both breasts and it is a benign condition.

Causes

Gynaecomastia can be due to the imbalance of the sex hormones, testosterone and oestrogen.

Oestrogen is a feminine hormone that causes the breast tissue to grow. Men do produce some oestrogen but they usually have more testosterone which prevents the effects of oestrogen.

- **Hormone imbalance** in men can cause the breasts to grow.
- **Obesity** increases levels of oestrogen and is also a common cause for gynaecomastia.
- **In newborn baby boys**, oestrogen can pass through the placenta from the mother, but this is temporary and will disappear in a few weeks after birth.
- **During puberty**, hormone levels change and if the amount of testosterone drops, teenage boys can develop gynaecomastia. This usually clears up after their hormone levels stabilise and is uncommon beyond the age of 17 years.
- **As men get older**, they produce less testosterone and tend to have more fat and these can lead to excess breast tissue growth.
- **Medications** may sometimes cause gynaecomastia due to their side effects on the hormonal pathways.

  Common examples include:

  - Some heart medications such as spironolactone, verapamil, nifedipine, enalapril, digoxin and amiodarone
  - Antibiotics/antifungals like ketoconazole, isoniazid and metronidazole
  - Chemotherapy drugs like methotrexate and steroids
  - Psychiatric medications like haloperidol, diazepam and tricyclic antidepressants
  - Recreational drugs including alcohol, amphetamines and heroin

- **Rarer conditions** include tumours such as pituitary tumours in the brain, testicular tumours, lung, liver and kidney cancers, kidney, liver or thyroid disease or genetic causes such as Klinefelter syndrome.
- **Sometimes the cause is unknown.**

Symptoms

This may present as a rubbery or firm mass that starts from underneath the nipple and then spreads outwards over the breast area. There may be discomfort or tenderness. It may occur in one or both breasts.

Diagnosis

A careful examination of your history including the use of medications is important in the diagnosis.

Blood tests to exclude the rarer causes may be performed, and investigations may include mammograms and breast ultrasound if is there is a suspicion of and to exclude breast cancer.

Treatment

In general, treatment is not needed for most cases. If there is an underlying cause, treating the cause will decrease the breast enlargement.

For men with gynaecomastia of unknown cause or have residual gynaecomastia after treatment of the cause, medical or surgical treatment may be considered.

Medical treatment includes drugs such as Clomiphene and Tamoxifen, which oppose the action of oestrogens. Up to 50 to 80 percent of patients have been reported to achieve partial reduction in breast size with these pharmacologic therapies.

Surgery can remove the amount of breast tissue and the various techniques include reduction mammoplasty, subcutaneous mastectomies with or without liposuction and micro-debridement.

In these surgeries, the breast is either partially or totally removed with the preservation of the nipple and overlying skin.

Cancer risk

There is no increased risk of breast cancer development in men with gynaecomastia, but the diagnosis of cancer needs to be excluded in their management.

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Breast Cancer

Breast cancer is the most common type of cancer among women in Singapore today. 1 out of every 16 women in Singapore is likely to be afflicted by breast cancer, with more than 1,300 new cases diagnosed every year.

Normal cells divide and reproduce in an orderly manner. Your body relies on this orderly activity to repair injuries and replace worn-out tissue. Sometimes this orderly process is disrupted. Cells grow and divide out of control, producing extra tissue to form a mass or lump called a tumour. A tumour can be benign or malignant.

Benign tumours are not cancers. They may grow slowly but do not spread to other parts of the body.

Malignant tumours are cancerous growths and have the potential to spread to other parts of the body.

Breast cancer is a malignant tumour which occurs when breast cells become abnormal and divide without control or order.

The majority of breast cancers start in the milk ducts. A small number start in the milk sacs or lobules. Within these two groups, some grow very slowly while others develop more rapidly.

Breast cancer can spread to the lymph nodes and to other parts of the body such as the bones, liver, lung and sometimes to the brain.

Breast Cancer
Causes & Risk Factors

The causes of breast cancer are not exactly known but there are risk factors that increase the chance of developing breast cancer. Having risk factors do not mean a woman will definitely develop breast cancer, as many women who have had breast cancer did not have any apparent risk factors.

Some risk factors such as gender and age, or those related to our environment cannot be changed (non-modifiable), while others are modifiable as they are related to our lifestyle choices.

▲ *Exercise will help reduce your risk of breast cancer.*

Non-modifiable Risk Factors

- Age and gender
- Early menarche, late menopause
- Family history and genetic factors
- Previous breast cancer
- Certain breast changes in biopsies (such as atypical ductal hyperplasia and LCIS – *see pg 20 & 21*)
- Radiation exposure for medical reasons

Being a woman is a risk factor for developing breast cancer. Women have a much higher chance of developing breast cancer than men due to the female hormones oestrogen and progesterone.

This risk is increased with longer hormonal exposure in women with early menarche (onset of menstruation) before the age of 12 and late menopause (after the age of 55).

Other hormonal-related factors include never having children, late childbearing (after the age of 30), and obesity, especially excessive weight gain in post-menopausal women. This risk also increases with age.

Genetic factors and family history of breast cancer, especially in a first-degree relative (mother, sister or daughter), or two or more close relatives such as cousins and the presence of genetic alterations in certain genes such as *BRCA1* and *BRCA2* which are associated with significant lifetime risks of breast cancer.

A past history of breast cancer, radiation exposure for medical reasons and certain benign conditions such as atypical ductal hyperplasia, atypical lobular hyperplasia or lobular carcinoma in-situ diagnosed on breast biopsy also increase the risk.

Modifiable Risk Factors

- Lack of exercise
- Excessive alcohol consumption over a long period of time
- Smoking
- Use of oral contraceptive pills (OCP) and combined hormonal replacement therapy (HRT) over a long period of time

However, most women who have breast cancer have none of the above risk factors. Likewise, not possessing any of these risk factors does not mean that one will not get breast cancer. There is ongoing research to learn more about these factors, as well as ways to prevent breast cancer.

▲ *Usage of oral contraceptive pills and combined hormonal replacement therapy is a modifiable risk factor for breast cancer.*

Reducing the Risk of Breast Cancer

There is no sure way to prevent breast cancer, but the risks can be lowered.

These include **modifying the risk factors which we have control over** such as:

- Exercise and increasing physical activity
- Limiting alcohol intake
- Keeping a healthy diet to prevent obesity, especially post-menopause
- Cease smoking. Smoking increases the risk of many other cancers and is bad for overall health. There are suggestions of links between smoking and breast cancer
- Have more children if one is able to
- Breastfeeding is also protective
- Limit the use of HRT and OCP
- Limit your exposure to environmental pollution and radiation such as the use of medical imaging like computerised tomography (CT) scans unless really necessary

In high-risk women, such as those with a very strong family history or have genetic mutations such as the *BRCA*, risk-reducing options include taking drugs or having surgery that can reduce their risk. Risk-reducing surgeries include removal of the breast (mastectomy) and removal of the ovaries.

▲ *Risk-reducing options are available for women with high genetic risk.*

An alternative management strategy to risk-reduction methods is close surveillance. While this does not reduce the risk of cancer development, it does improve outcome by discovering the cancers in earlier stages, allowing earlier treatment and hence better outcomes.

Specialist services available at the SingHealth Duke-NUS Breast Centre located at:

National Cancer Centre Singapore	Tel: 6436 8088	**Sengkang General Hospital**	Tel : 6930 6000
Singapore General Hospital	Tel: 6321 4377	**KK Women's and Children's Hospital**	Tel: 6294 4050
Changi General Hospital	Tel: 6850 3333		

Genetic Risk Assessment
for Hereditary Breast Cancer & Implications

What is Hereditary Breast and Ovarian Cancer (HBOC) syndrome?

About 5 to 10 percent of breast cancers can be attributed to hereditary breast and ovarian cancer (HBOC) syndrome. Genetic change (mutation) in the *BRCA1* or *BRCA2* gene is the most common cause of HBOC.

Individuals with *BRCA1* or *BRCA2* mutation tend to develop cancer at an earlier age than the general population and have higher risk for bilateral breast cancer, a second primary tumour in a different tissue, and cancer recurrence.

Mutations in other less common genes have also been found to increase the risk of developing breast and other cancers.

Who might be at risk?

HBOC is an adult-onset, cancer predisposition syndrome which can be passed down through generations.

The history of cancer in your close relatives is a clue about the chance of HBOC syndrome in your family. It is more likely if one or more of the following features can be confirmed in your family:

- Young age of onset
- Bilateral breast cancer or personal history of multiple cancers
- Family history of ovarian, peritoneal, fallopian tube, pancreatic cancers and/or melanoma
- History of male breast cancer in the family

How is HBOC syndrome diagnosed?

Genetic testing for HBOC syndrome is a blood test that is available at the Cancer Genetics Service at NCCS when specific criteria are met. Genetic testing is complex, thus it does not take place without genetic counselling and the process of informed consent.

What does genetic counselling involve?

Cancer genetic counselling is a process to assess a person's risk of having an inherited susceptibility to cancer. It is usually provided by a genetic counsellor and/or cancer geneticist to help people understand and adapt to the medical, psychological and familial implications of genetic contributions to cancer.

Genetic counselling can help you better understand the outcomes and impacts of genetic testing and the possible implications when finding a genetic mutation of HBOC syndrome.

What can I do to reduce my risk of developing breast or ovarian cancer if I have a *BRCA* gene mutation?

Increased surveillance (clinical breast exam, mammogram and MRI) and consideration of risk-reducing interventions (such as chemoprevention and preventive mastectomy or oophorectomy) are recommended.

What should I do if I am concerned?

If your family history of cancer suggests HBOC syndrome, please talk to your doctor regarding your concerns and they will make the necessary arrangements if a genetic risk assessment is needed.

▲ *If you have a family history of breast cancer, speak to your doctor about genetic risk assessment.*

Implications

Finding a genetic mutation of HBOC syndrome may help to:

- Inform family members about their own cancer risk
- Direct appropriate cancer screening and risk-reduction options for affected patients and family, and avoid unnecessary testing in those who do not require increased surveillance
- Explain the history of cancer in a family

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Types of Breast Cancer

Breast cancer can be classified by the *stage* of cancer at diagnosis and their *biological* characteristics. These will determine treatment recommendations as it has prognostic (most likely outcome of the disease) implications and treatment implications.

Staging

Understanding the stage of the cancer is important to understand the prognosis and the treatment recommendation.

Cancers treated in earlier stages have better outcomes, more advanced cancers will need more aggressive treatment.

Cancer stage is based on:

- Whether the cancer is non-invasive or invasive
- The size of the invasive cancer
- Whether the cancer has spread to the lymph nodes
- Whether the cancer has spread to other parts of the body

The TNM staging system is based on:

T: Size of the tumour

N: Lymph node involvement

M: Metastasis when cancer has spread to other organs like the lung, liver and bones.

Different T, N and M in combination will determine the stage of the cancer.

Stage 0 or Ductal Carcinoma in Situ (DCIS) is a common non-invasive breast cancer, where cancer cells are still within the ducts and have not grown out to breach the duct linings into the surrounding normal breast tissue.

DCIS, also known as Stage 0 breast cancer, unlike invasive breast cancer, is not life-threatening, but it can increase the risk of developing an invasive breast cancer.

Invasive breast cancer occurs when cancer cells spread beyond the ducts or lobules resulting in invasive ductal and invasive lobular breast cancer, the two most common subtypes of breast cancer.

Metastatic breast cancer refers to the stage when the cancer has spread beyond the breast to distant organs such as the lungs, liver or bones.

TNM Classification of Breast Cancer

Stage	
0	Tumour is a non-invasive, ductal carcinoma in-situ
IA	Tumour is up to 2 cm and has not spread outside the breast
IB	Tumour is up to 2 cm and small areas of breast cancer cells in the lymph nodes
IIA	Tumour is up to 2 cm with cancer in 1-3 lymph nodes; OR Tumour 2-5 cm and no cancer in the lymph nodes
IIB	Tumour is 2-5 cm with cancer cells in up to 3 lymph nodes; OR Tumour is more than 5 cm with no cancer in the lymph nodes
IIIA	Any Tumour size with cancer in 4-9 lymph nodes; OR Tumour more than 5 cm and up to 3 lymph nodes
IIIB	Tumour that has spread to the skin or chest wall and up to 9 lymph nodes
IIIC	Tumour that has spread to the skin or chest wall and 10 or more lymph nodes; OR Tumour that has spread to the skin or chest wall and lymph nodes below and above the collar bone; OR Tumour that has spread to the skin or chest wall and lymph nodes in the armpit AND near the breastbone
IV	Cancer has spread to other parts of the body such as the bones, lungs, liver or brain

Skin involvement includes inflammatory breast cancer.

Tumour Biology

Breast cancers are also differentiated by the presence of special receptors on the surface of the cancer cells, such as the:

- Oestrogen receptor
- Progesterone receptor
- HER2 (Human Epidermal Growth Factor 2) receptor

This is associated with the aggressiveness of the cancer and affects the prognosis of the patient.

More importantly, there are drugs to target these changes, and hence directed treatment for them will improve the outcome.

The histopathological (microscopic appearance) subtype of the cancer also helps to determine the prognosis, and nature of breast cancer overall.

The grade (assessment of how abnormal the cancer cells look) also determines the aggressiveness and hence, treatment recommendations.

The most common subtype is the invasive carcinoma of no special type (NST). Specific subtypes include invasive lobular, tubular, cribriform, metaplastic, apocrine, mucinous, papillary and micropapillary carcinoma, as well as carcinoma with medullary and neuroendocrine (WHO classification 2012).

▲ *Cancers treated in earlier stages have better outcomes.*

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Breast Cancer
Signs and Symptoms

Ductal carcinoma in situ (DCIS) generally does not cause symptoms, and is most commonly discovered in screening mammograms. Occasionally, women with DCIS may present with a breast lump or bloody nipple discharge.

Breast cancer is otherwise usually painless and there may be no symptoms in the early phase when breast cancer first develops.

When the cancer grows, signs and symptoms may develop and they can include:

- A persistent lump or thickening in the breast or in the axilla
- A change in the size or shape of the breast
- A change in the colour or appearance of the skin of the breast such as redness, puckering or dimpling
- Bloody discharge from the nipple
- A change in the nipple or areola, such as a persistent rash or nipple retraction (nipple pulled into the breast)

▲ *There are often no symptoms when breast cancer first develops.*

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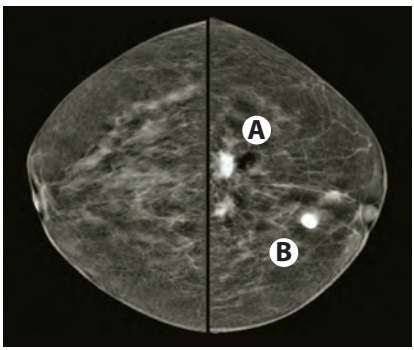
Breast Cancer *Diagnosis*

If there is an unusual lump or changes in the breasts, seek medical attention. Try to pinpoint the area accurately as this will assist the doctor with the examination. Tests will be recommended to obtain a definite diagnosis.

1. Imaging

a. Mammogram

Mammography is a low-powered X-ray technique that gives a picture of the internal structure of the breast. Usual screening mammograms involve taking X-ray images of the breast compressed between two plates with two views taken — cranial caudal or horizontal and mediolateral oblique or diagonal.



▲ *Mammograms of the right and left breast in the cranial-caudal view showing (A) a cancer in the left breast and (B) a benign calcification.*

Additional angles and magnified views may be taken if there are areas of concern. It can detect the presence and position of the abnormalities and help in the diagnosis of breast problems, including cancer.

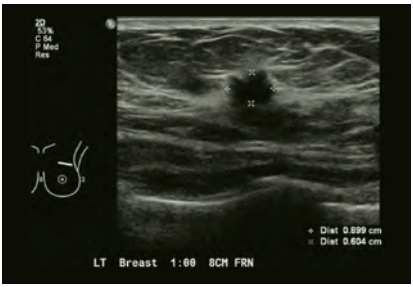
Any previous mammograms (and reports if available) should be brought along when seeing a doctor.

Sometimes a lump that can be felt is not seen on a mammogram. Other tests may be necessary to determine if the lump is cancerous.

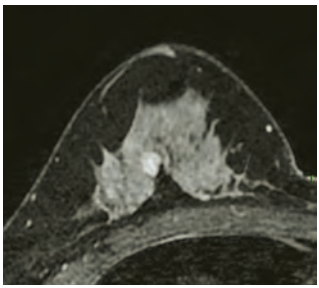
b. Ultrasound

Breast ultrasound is the use of high-frequency sound waves to produce an image of breast tissue.

The sound waves are transmitted from the probe through the gel into the body. The transducer collects the sounds that bounce back and a computer then uses those sound waves to create an image.



▲ *Ultrasound image of a cancer in the upper outer quadrant of the left breast.*



▲ *Magnetic Resonance Image (MRI) of a cancer in the right breast.*

c. Magnetic Resonance Imaging (MRI)

This uses a combination of magnetism and radio waves to build up a picture consisting of detailed cross-sections of pictures of the breasts.

The test involves lying on the stomach on a padded platform, with cushioned openings for the breasts, that passes through a tunnel-like structure (which forms a very large magnet). It may take up to one hour to complete, but is completely painless.

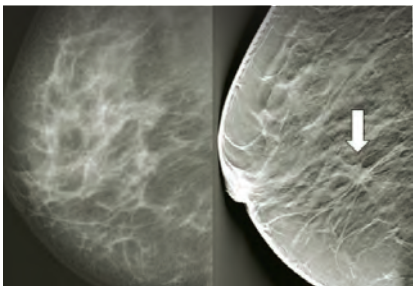
MRI is useful when mammograms are not suitable, e.g. in young women with dense breast tissue or when findings on mammograms and ultrasound are not conclusive to achieve a diagnosis.

It is used as a screening tool for young women with high-risk factors like BRCA gene carriers or those with a very strong family history of breast cancer.

d. Tomosynthesis

This involves taking multiple X-rays of each breast from many angles. The breast is positioned the same way as in a conventional mammogram, but only a little pressure is applied, just enough to keep the breast in a stable position during the procedure.

An X-ray tube moves in an arc around the breast while images are taken. Information is sent to a computer, where it is assembled to produce clear, highly-focussed 3-dimensional images throughout the breast.



▲ *Tomosynthesis identifies an area of abnormality compared to the regular mammogram on the left which does not.*

2. Biopsy

a. Fine Needle Aspiration (FNA)

A syringe with a very fine needle is used to withdraw fluid or cells from a breast lump. This is a simple procedure and can be uncomfortable but is usually tolerable enough for it to be done in the clinic.

If the lump is just a cyst, withdrawing fluid in this manner will usually make the cyst disappear.

However, if the lump is solid, your doctor may use this procedure to withdraw some cells from it. The cells will then be sent to a laboratory for examination.

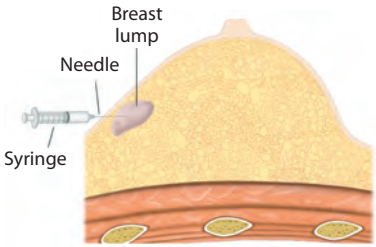
b. Core Needle Biopsy

This is a minimally invasive method that obtains a few tiny strips of tissue from an area of abnormality with a wide bore needle. Local anaesthetic is injected to numb the breast area, followed by a small incision in the skin to allow easy insertion of the needle.

If the abnormality is non-palpable (not detectable by clinical examination) and visible on the ultrasound, ultrasound guidance is used to obtain the tissue. Usually 2 to 6 cores of tissue will be obtained for examination.

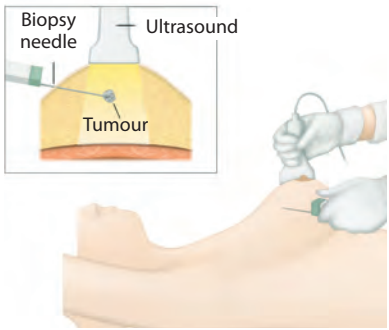
A nurse will apply compression to the breast to stop any bleeding. The wound is closed by a steristrip and the dressing applied. Strenuous activity is to be avoided for 2 days after the biopsy.

Fine Needle Aspiration (FNA)



▲ *Fine needle aspiration: A fine needle will withdraw fluid or cells from the breast lump.*

Core Biopsy



▲ *Core needle biopsy is performed under local anaesthesia, with or without ultrasound guidance.*

c. Vacuum-assisted Core Needle Breast Biopsy

Vacuum-assisted biopsy (VAB) devices use a larger bore needle with a vacuum component to obtain tissue samples from non-palpable lesions.

Like the usual core biopsy, this minimally invasive procedure is also performed under local anaesthesia, which is injected to numb the breast area, followed by a small incision in the skin to allow easy insertion of the needle. It is used for lesions seen by mammography (stereotactic-guided biopsy), ultrasound or MRI.

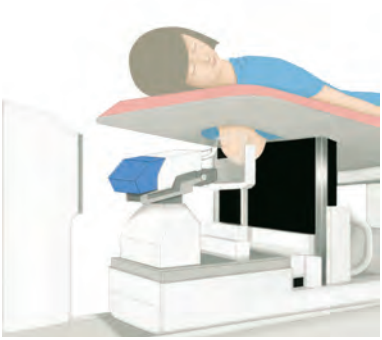
The surgeon or radiologist places the probe into the suspicious area of the breast accurately. A vacuum then draws the tissue into the probe, a cutting device removes the tissue sample and then carries it through the probe into a collection area.

More tissue is usually obtained using the VAB than the usual core needle biopsy and the number of strips removed is dependent on the area that needs to be examined.

A small titanium clip (microclip) may be placed at the biopsy site as a location marker for future treatment. This clip is very small (2 mm), is harmless, and will not cause any problems when left inside the breast. An X-ray is taken post-biopsy to ensure proper clip placement. New biodegradable markers are also available now.

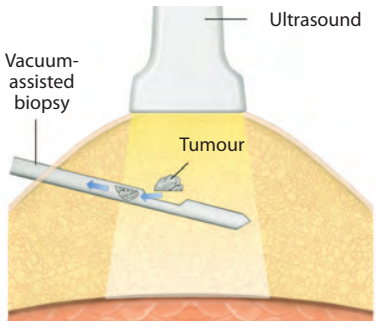
Vacuum-assisted Core Needle Breast Biopsy

Stereotactic-guided VAB



▲ *Stereotactic (mammographic)-guided for mammographic lesions are performed under local anaesthesia by radiologists.*

Ultrasound-guided VAB



▲ *Ultrasound-guided for lesions visible with ultrasound is performed under local anaesthesia by radiologists and surgeons.*

A nurse will apply compression to the breast to stop any bleeding, the wound is closed by a steristrip and the dressing applied. Strenuous activity is to be avoided for 2 days after the biopsy.

This procedure is minimally invasive as compared to an open surgical biopsy. It is performed as a day surgery procedure. It has the ability to sample tiny abnormalities called microcalcifications, making early diagnosis of breast cancer possible.

Under local anaesthesia, it takes about 30 to 45 minutes to complete. The procedure is usually not painful but you may experience some discomfort.

d. Excision Biopsy

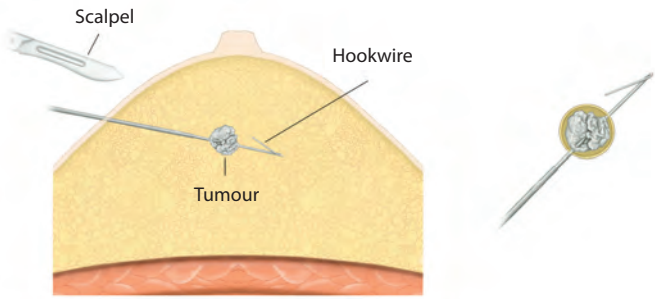
An excision biopsy is the removal of a lump or sample of suspicious tissue by surgery for examination under a microscope to give a definite diagnosis.

For lesions that are small or not palpable, accurate marking of the area for surgery is necessary. These include using ultrasound during surgery, or with procedures done just before surgery to mark the area to be operated.

Ultrasound, mammogram or MRI can be used to insert a small thin wire to the abnormal spot in the breast.

This wire is used to guide the surgeon to remove the area accurately. This technique is known as ***Hook Wire Localisation (HWL) Biopsy.***

Hook Wire Localisation (HWL) and Excision Biopsy

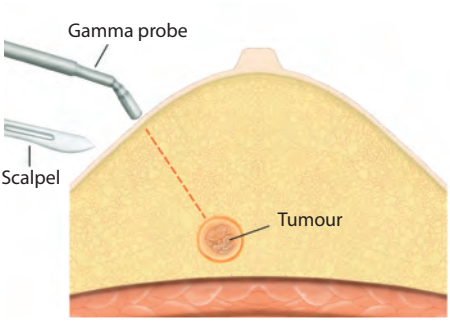


▲ *This is used for small lesions that need localisation using imaging such as ultrasound, mammograms or MRI before surgery.*

An alternative method known as ***Radioisotope Occult Lesion Localisation (ROLL)*** uses a small amount of radioactive substance injected into the lesion. This area is detected with a radioactive sensor used during surgery that allows the lesion to be accurately removed.

This technique does not have the discomfort of the hookwire and the need to perform mammograms after the wire placement to check their positions.

Radioisotope Occult Lesion Localisation (ROLL) and Excision Biopsy



▲ *This is an alternative to HWL for small lesions that need localisation using ultrasound or mammogram.*

Excision biopsies are often performed under general anaesthesia, depending on the size and position of the lump, but local anaesthesia may be used for small lesions close to the skin.

As a minor day surgery procedure, patients can return home after surgery. Strenuous activity is to be avoided for the first few days; immediate ability for usual light activities of daily living is expected.

Post-operative advice may differ between individuals depending on their needs and circumstances. In general, most will be able to return to work in a week.

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Breast Cancer Treatment

Treatment of breast cancer often involves more than one therapy, and may be a combination of therapies.

Treatment recommendations depend on factors such as the cancer type, stage of the cancer, size of the tumour in relation to the breast size, whether breast preservation is desired and the patient's general health.

Personal preferences determine certain choices, if the option is available, such as the options for the type of surgery. Being diagnosed with breast cancer and having to decide on the treatment options may be difficult. The support of friends and family during the consult and discussion on the results of tests and treatment is recommended.

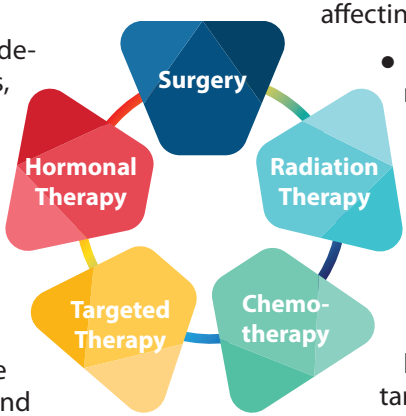
Local and Systemic Therapy

- ***Local therapy*** includes surgery and radiotherapy.

  It treats the cancer at the site e.g. the breast and axilla (armpit) without affecting the rest of the body.

- ***Systemic therapy*** refers to the use of drugs which enter the bloodstream to reach the rest of the body, targeting cancer cells anywhere in the body.

  Chemotherapy, hormone therapy, and targeted therapy are systemic therapies.



▲ *Treatment types for breast cancer.*

In early breast cancer, surgery is the first treatment of choice. Chemotherapy, targeted and hormonal therapy may be used before surgery (neoadjuvant therapy), or after surgery (adjuvant therapy). Radiotherapy is usually given after surgery.

In stage IV cancer, the goal is to stabilise the disease with systemic therapy. However, local treatment of tumours with radiation therapy or surgery may be recommended when symptoms need to be alleviated.

LOCAL THERAPY

Surgery

Surgery for breast cancer is considered in two parts: breast and axillary lymph nodes.

I. Breast Surgery

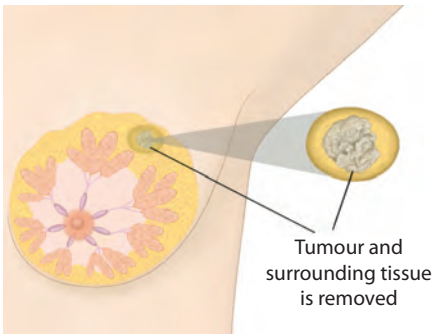
The two broad options are **breast-conserving surgery (BCS)** or **mastectomy**.

1. Breast-Conserving Surgery (BCS)

- **Wide Excision Breast-Conserving Surgery**

  In this surgery, the breast cancer and a rim of normal surrounding breast tissue are removed. The breast will remain; a scar and some changes in shape and size of the breast are expected. Patients can go home on the same day or the next day.

  After recovering from breast-conserving surgery, radiation therapy to the breast (Mon to Fri) for 3 to 6 weeks is recommended. It helps to reduce the risk of recurrence.



▲ *In breast-conserving surgery (wide excision), the breast remains with some change in the shape and size of the breast.*

A second operation is needed if cancer cells are noted at the edge in the histological (microscopic) assessment of the removed portion. This occurs in 10 to 15 percent of patients.

- **Oncoplastic Breast-Conserving Surgery**

  In some patients undergoing breast-conserving surgery, additional procedures may be recommended to prevent severe deformities of the breast.

  - ***Breast-Conserving Surgery with Mammoplasty (Reshaping with Breast Uplift / Breast Reduction)***

    To avoid significant breast deformity after breast-conserving surgery (wide excision), breast re-shaping (mammoplasty) may be performed. This is possible if the patient has sufficient remaining breast volume, and often takes the form of a breast uplift or breast reduction. Excess skin may need to be removed, and the exact scar depends on the size of cancer removed and the patient's existing breast shape.

    The most common scars are illustrated (right). If a large reduction is needed, and significant asymmetry in breast volume is anticipated, surgery to the opposite breast may be performed to improve final breast symmetry. This may be performed at the same surgery or as a delayed procedure after cancer treatment.

Common Incisions and Scars for Mammoplasty

A. Periareolar Incision. When only a small breast uplift is needed to reshape the breast, a scar solely around the areolar is preferred.

B. Vertical Scar Incision. For moderate amounts of breast uplift, the scar is often shaped like a 'lollipop' where there is a scar around the areolar with a vertical extension beneath.

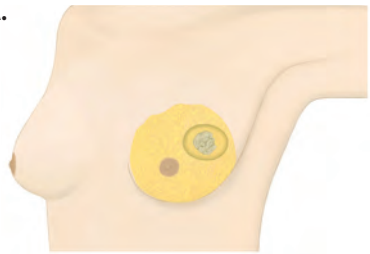
C. Wise Pattern Incision. Typical scar of breast reduction surgery, shaped like an 'anchor'. The bottom curved scars are often well-hidden beneath the breast.

- ***Partial Breast Reconstruction – Volume replacement with a local perforator flap***

  Fatty tissue next to (or below) the breast is used to fill the space in the breast as a result of cancer removal. This maintains breast volume and contour, maintains the nipple position and greatly reduces breast deformity.

I. Lateral Intercostal Artery Perforator (LICAP) Flap for Partial Breast Reconstruction

A.



Cancers located in the outer part of the breast are suitable for such surgery.

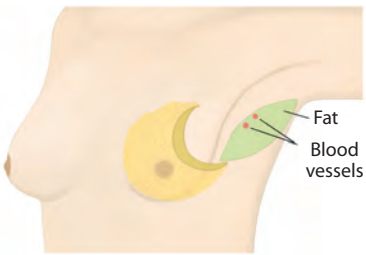
B.

Removal of the cancer with a rim of normal tissue (wide excision) leaves a space. If the space is not filled and is left alone, it will collapse and scarring will occur.

C.

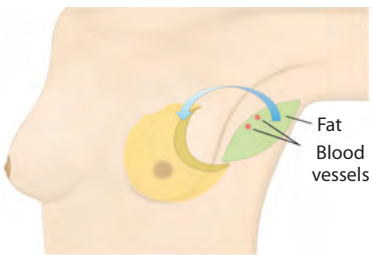
The typical deformity from such surgery is loss of breast contour, pulling of the nipple towards the armpit, and a loss of breast volume.

D.



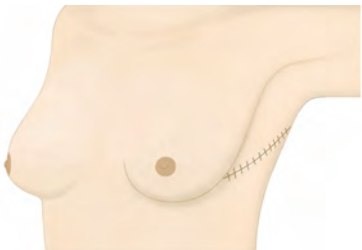
Fatty tissue (green) from beside the breast may be used to fill the space. This fat is kept alive by small blood vessels (red dots).

E.



The fatty tissue is flipped into the breast to fill the space.

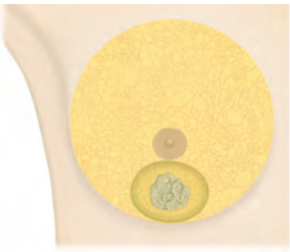
F.



The result is a normal breast shape with a scar along the side of the chest wall that is seldom visible from the front.

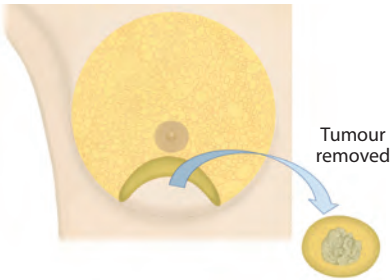
II. Anterior Intercostal Artery Perforator Flap (AICAP) for Partial Breast Reconstruction

A.



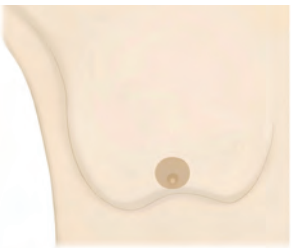
Cancers located in the lower part of the breast are suitable for such surgery.

B.



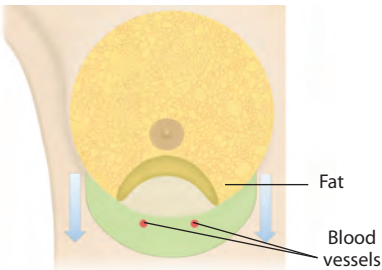
Removal of the cancer with a rim of normal tissue (wide excision) leaves a space. If the space is not filled and is left alone, it will collapse and scarring will occur.

C.



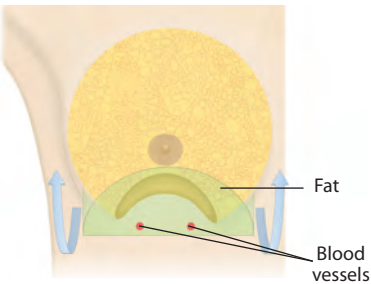
The typical deformity from such surgery is loss of breast volume and contour, deep indentation and pulling of the nipple downwards.

D.



Fatty tissue (green) from below the breast may be used to fill the space. This fat is kept alive by small blood vessels (red dots).

E.



The fatty tissue is flipped upwards into the breast to fill the space.

F.

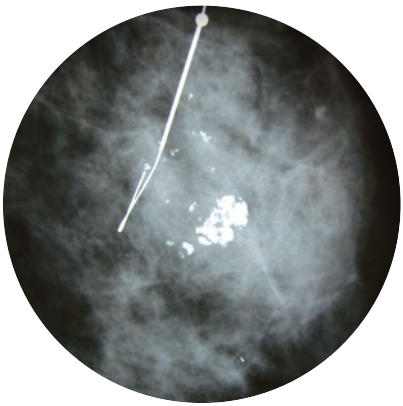
The result is a normal breast shape with a scar beneath the breast that is usually very well-hidden.

Image-Guided Localisation for Surgery

For non-palpable tumours that need to be removed with surgery, localisation with a hookwire or a localising substance under image guidance done prior to the surgery is needed.

This procedure is performed under local anaesthesia, prior to surgery. Mammogram, ultrasound or MRI guidance is used to accurately locate the site for surgery.

A fine wire (hookwire) is inserted or a radioactive substance is injected into the breast, within or in close proximity to the lesion of interest, which will be removed during the surgery.



▲ *Image-guided localisation for surgery.*

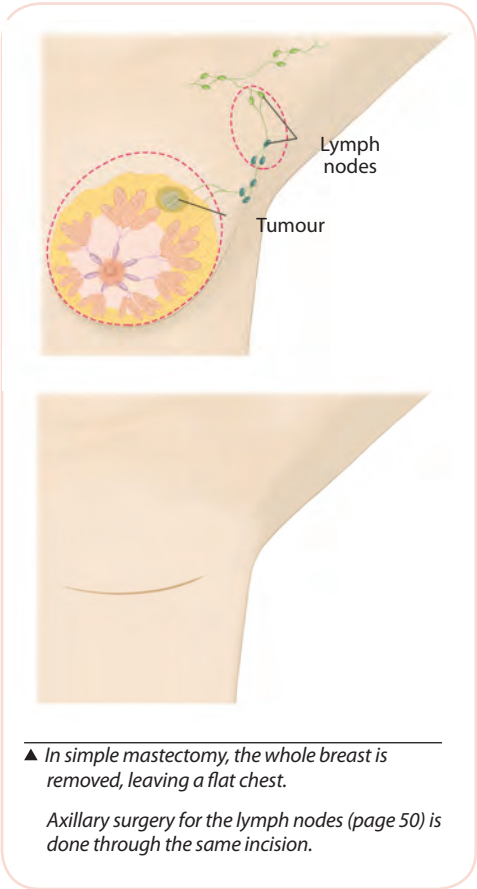
2. Mastectomy

Mastectomy is the removal of the whole breast (incorporating the breast tumour). In general, there are two types of mastectomy:

- **Simple Mastectomy**

  In a simple mastectomy, the breast, including the nipple-areola complex is removed. After surgery, the chest is flat, with a scar across it. A drain, which is a soft tube, is placed during surgery with the accompanying bottle to remove blood and tissue fluid accumulated at the operated site.

  The drain will be removed when the drainage is less than 30 ml a day after 1 to 2 weeks. Drain and wound care will be taught to patients and their caregivers before discharge and patients can go home the next day.



▲ *In simple mastectomy, the whole breast is removed, leaving a flat chest.*

Axillary surgery for the lymph nodes (page 50) is done through the same incision.

- **Mastectomy with Whole Breast Reconstruction**

  Breast reconstruction is surgery to 'recreate' a breast using one's own body tissue or implant after mastectomy. It provides the breast shape, but has no natural feeling.

  - ***Immediate breast reconstruction*** is when reconstruction is done at the time of mastectomy.
    - ***Skin-sparing mastectomy*** is where most of the skin of the breast will be preserved.
    - ***Nipple-sparing mastectomy*** is considered for suitable cases, where the nipple may be preserved if tissue from the base of the nipple shows no cancer cells when tested at the time of surgery. However, if the final histology results show cancer cells behind the nipple, a simple surgery to remove the nipple will be recommended.
  - ***Delayed breast reconstruction*** may also be done at a later stage, separate from the initial breast surgery.

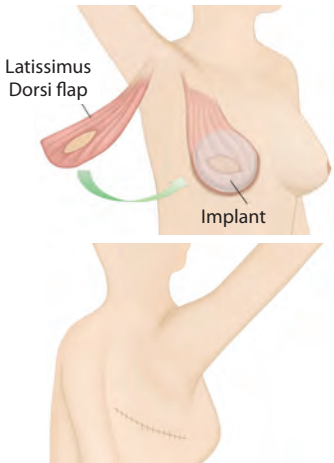
Types of Post-Mastectomy Reconstructions

i. Flap reconstructions

Skin, fat and sometimes muscle (a flap) from another part of your body may be used to make into a breast shape. This operation takes about 6 to 8 hours and requires a hospital stay of between 1 to 2 weeks. Several drains are used and removed after 1 to 2 weeks. Flaps may be from the following areas:

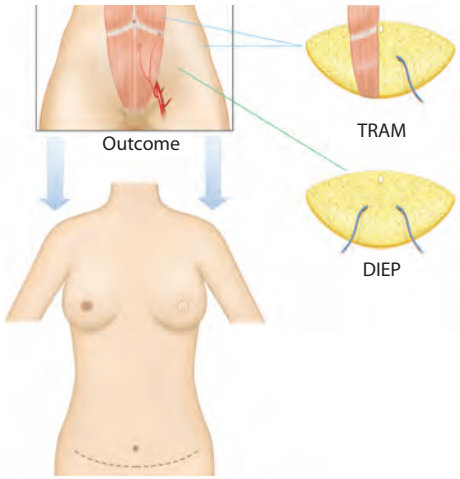
- Back (latissimus dorsi)
- Buttock
- Thigh
- Abdomen
  - TRAM (transverse rectus abdominis myocutaneous) flap
  - DIEP (deep inferior epigastric perforator) flap, taking skin and fat only

Latissimus Dorsi (LD) Flap from Back



▲ *Whole breast reconstruction using the LD muscle from the back. The muscle is transferred beneath the shoulder to the front to fill the mastectomy pocket and recreate a breast shape. An implant may be needed to provide additional volume. A scar along the back is seen.*

Abdomen Flap (DIEP or TRAM)



▲ *Fatty tissue alone (DIEP) or fatty tissue with muscle (TRAM) may be taken from the lower abdomen to recreate the breast shape after a mastectomy. A scar across the lower abdomen will result.*

Additional procedures to improve the look of the breast after the initial surgery may include adding a nipple, surgery to the opposite breast to create a good match, or refining the shape of the recreated breast.

ii. Breast implants

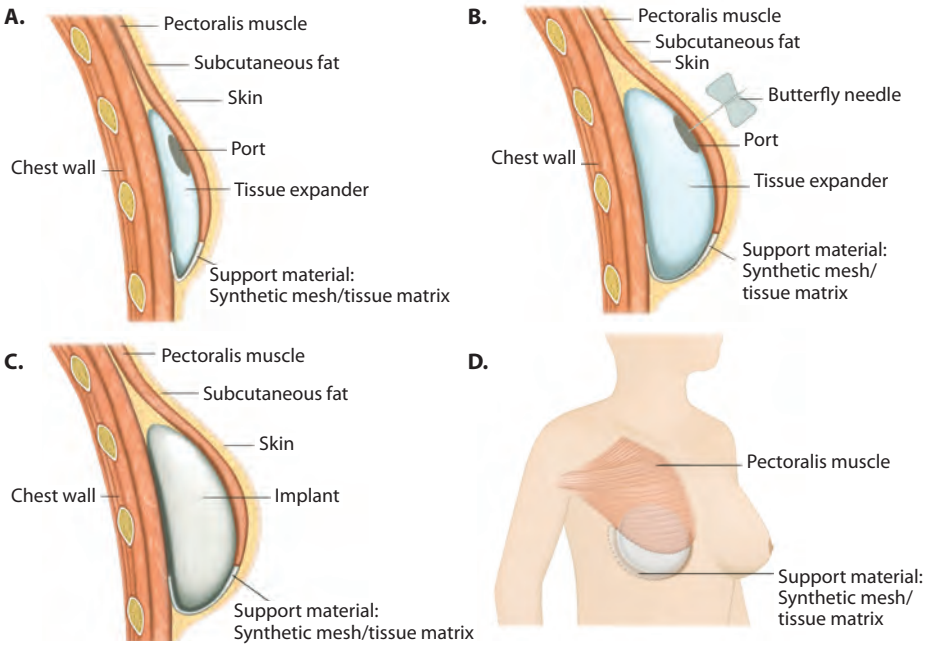
Silicone implants may be used to create a new breast and the operation takes about 4 to 5 hours. There are usually 2 to 3 drains inserted and the hospital stay is 2 to 5 days.

▲ *Silicone implants may be used to create a new breast.*

A ***1-stage*** procedure is when the permanent implant is inserted at the time of mastectomy. A ***2-stage*** procedure is when a temporary expander is placed at the time of mastectomy and gradually expanded to stretch the skin.

The expander will be exchanged for a permanent implant at a later surgery.

Breast Reconstruction Involving Tissue Expander And Implant



II. Axillary Surgery

- **Sentinel Lymph Node Biopsy (SLNB)** is recommended for early-stage breast cancer when the lymph nodes in the armpit do not appear to have cancer.

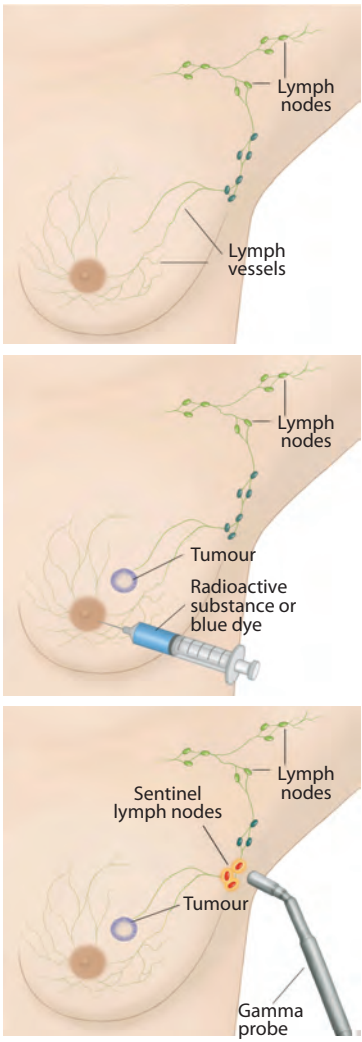
  Sentinel lymph nodes (SLN) are the first few lymph nodes in the armpit where the lymphatic vessels from the breast drain to. These will be removed during surgery and examined under the microscope (frozen section) to determine if cancer has spread to the SLN.

  This is done under general anaesthesia (GA). A blue dye or a radioactive substance is injected around the cancer site or at the nipple prior to surgery to locate the SLN. The radioactive substance will be injected before the operation. The blue dye will be injected during the operation.

  If cancer is detected in the SLN, lymph nodes in the axilla will be removed. If no cancer is detected in the SLN, no further surgery is needed.

  The final histology (microscopic assessment) will be reviewed about 1 week after surgery. In up to 5 percent of cases, the final assessment of the SLN may be different from the initial frozen section result and a second operation may be recommended.

  If the dye or radioactive substance is not able to identify the SLN, removal of all the lymph nodes (axillary clearance) will be done.



▲ *Sentinel lymph node biopsy is used to examine the lymph nodes for cancer.*

- **Axillary Clearance**

  Axillary clearance is the removal of all lymph nodes from the underarm when the lymph nodes are found to have cancer cells.

  Side effects of axillary clearance include shoulder stiffness and numbness of the inner part of your upper arm. Lymphoedema (swelling of the arm) may occur in 10 to 15 percent of women. This is because lymph nodes drain fluid from the arm and their removal may cause fluid to accumulate in the arm on the operated side.

A separate axillary incision is often needed for patients undergoing breast conserving surgery.

Complications from Surgery

As with all surgical procedures, complications can occur. Risks of general anaesthesia include allergy to anaesthetic agents, heart attack, stroke and deep vein thrombosis, especially for longer surgeries.

Our anaesthetists will assess all patients before surgery to ensure they are optimised and prepared for surgery to minimise these risks.

Surgical complications include:

- Intraoperative injury to blood vessels and nerves in the axilla
- Early post-operative complications of bleeding and wound-healing such as:
  - Skin and tissue necrosis and infection
  - Seroma formation (accumulation of tissue fluid in wounds)
- Long-term effects of:
  - Lymphoedema (swelling of the arm)
  - Shoulder stiffness
  - Numbness of the breast or chest wall and inner upper arm

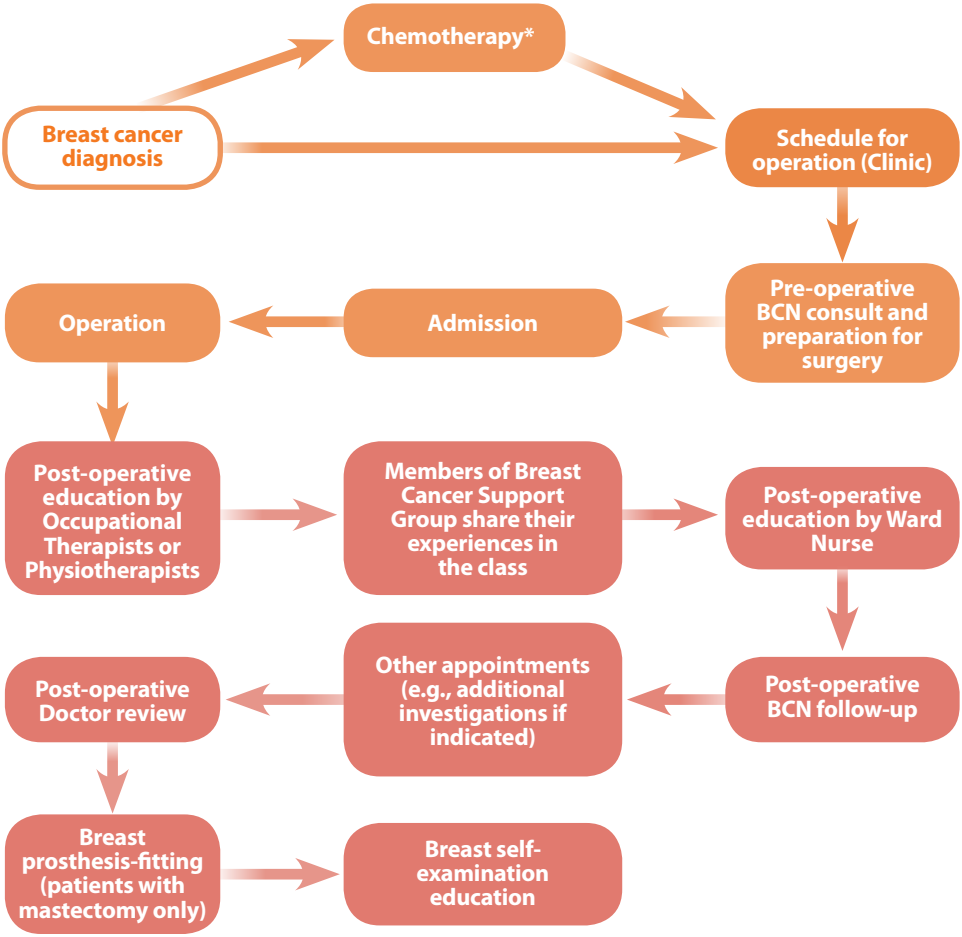
Breast Care

After surgery is planned, referral to the Breast Care Nurse (BCN) Service is necessary. Our Breast Specialist Nurse will explain and explore concerns and issues pertaining to breast cancer and the treatment options, and plan pre-operative, operative and post-operative management to ensure successful treatment and recovery.

Consult time for individual patients vary from 30 to 75 minutes. A personal contact number will be provided for convenience and the BCN will be a resource person for patients and their families in the coordination of the various appointments before and after surgery in the treatment journey.

Post-operative services include wound and drain care, rehabilitation, education programmes and prosthesis-fitting.

Our BCN will guide patients through their treatment journey:



* *Chemotherapy before surgery is recommended for some patients.*

Note: The treatment journey may vary amongst patients.

Radiation Therapy

High-energy rays are used to kill cancer cells or stop them from growing further.

▲ *In radiation therapy, high energy rays kill or stop cancer cells from growing.*

Although radiation therapy can affect both cancer cells as well as normal cells, the aim of radiation is to destroy more cancer cells and spare as many normal cells as possible. Radiation therapy is given to the affected breast after a lumpectomy.

In some circumstances, it may be given to the chest wall after a mastectomy, or to the lymph nodes. It is usually given 5 days a week on weekdays, over a period of 3 to 6 weeks.

Radiation therapy can cause some side effects which vary among individuals.

- ***Side Effects:***

  The most common side effect is 'sunburn' on the skin, with redness and dryness of the skin observed.

The degree and intensity of the skin reaction is greater in patients receiving a large standard dose and in patients who have fair skin. Skin texture also becomes darker and thicker.

The breast may swell, and increase or decrease in insensitivity. Usually, these effects are temporary and are manageable.

Specialist services available at the SingHealth Duke-NUS Breast Centre located at:

National Cancer Centre Singapore	Tel: 6436 8088	**Sengkang General Hospital**	Tel : 6930 6000
Singapore General Hospital	Tel: 6321 4377	**KK Women's and Children's Hospital**	Tel: 6294 4050
Changi General Hospital	Tel: 6850 3333		

SYSTEMIC THERAPY

1. Chemotherapy

This treatment uses anti-cancer drugs to prevent cancer cells from growing and reproducing themselves. These drugs are usually given by injection through veins into the blood stream to all parts of the body.

It is usually given over 3 to 6 months and may be used alone, before surgery (neoadjuvant) or after surgery (adjuvant) therapy, or together with targeted therapy to increase the effectiveness of the treatment, depending on the type and stage of cancer.

Chemotherapy is given in cycles. Each cycle consists of a treatment period followed by a resting (recovery) period. As cancer drugs also affect normal cells, the resting period is to allow the body to recover before the next treatment cycle starts.

- ***Side Effects:***

  There are side effects associated with chemotherapy such as hair loss, nausea and vomiting, loss of appetite, mouth ulcers and risk for infection. However, these are temporary and steps can be taken to prevent or reduce them.

2. Targeted Therapy

Breast cancers are also tested for special receptors. One such receptor is the Human Epidermal Growth Factor 2 (HER2) receptor. This receptor is over-expressed in about 25 percent of all breast cancers; the presence needs to be confirmed by laboratory tests performed on the biopsy specimen before the treatment is given.

The aim of the treatment is to reduce and hopefully eliminate existing cancer cells in the human body while minimising side effects on normal cells.

Trastuzumab, also known as Herceptin®, targets the HER2 (Human Epidermal Growth Factor 2) receptors on cancer cells to prevent cell growth and division.

Herceptin® has been shown to prolong survival in breast cancer patients with early and advanced disease (Stage IV) when used in combination with chemotherapy.

- ***Side Effects:***

  Patients who receive trastuzumab may complain of infusion-related reactions such as fever and chills. Rarely, weakening of the heart muscles (also known as cardiomyopathy) has been observed in some patients.

An increasing number of targeted drugs are becoming available for the treatment of breast cancer, including Lapatinib (which targets HER2 and EGFR) and Bevacizumab (which targets a factor associated with new blood vessel formation in tumours).

3. Hormonal Therapy

Breast cancers are tested for oestrogen receptors (ER) and progesterone receptors (PR) on their surfaces as such cancers can be stimulated by oestrogen or progesterone to grow.

Hormonal therapy is aimed at blocking this effect. The drug recommended is dependent on the menopausal status of the women.

Hormonal therapy can cause some side effects, and they are dependent on the type of drug taken and can vary from one patient to another.

▲ *Hormone therapy aims to stop or slow the growth of hormone-sensitive tumours.*

- **Tamoxifen**

This drug blocks the action of oestrogen on the body but does not stop oestrogen from being produced. Tamoxifen may cause hot flashes, depression or mood swings, vaginal discharge or irritation, irregular menstrual periods and sometimes menopause.

Any unusual bleeding should be reported to the doctor. It is recommended for pre-menopausal women, but can be used in post-menopausal women.

- ***Side Effects:***

  Serious side effects from Tamoxifen are rare but Tamoxifen can cause the formation of blood clots in the veins, especially in the legs. In a very small number of women, Tamoxifen can cause cancer in the lining of the uterus.

  You may be referred to a gynaecologist to evaluate any unusual bleeding.

- **Aromatase Inhibitors (AI)**

For post-menopausal women, another group of drugs called aromatase inhibitors (AIs) is also used in breast cancer hormonal treatment. Aromatase inhibitors work by blocking an enzyme called aromatase that the body uses to produce oestrogen.

The current AIs such as anastrozole, letrozole and exemastane, are well-tolerated and are used in the treatment of early stage and advanced breast cancer.

- ***Side Effects:***

  Side effects of AI include hot flashes, mood changes, nausea, vaginal dryness, joint pain/stiffness, tiredness, lethargy and osteoporosis (including a higher risk of fractures compared to Tamoxifen).

Follow-Up Care

Regular follow up by the doctor after treatment is recommended due to the risk of developing breast cancer again.

This will include physical examination of the chest, underarms, neck, and the other breast with periodic mammograms.

Changes to look out for include:

- Changes in the surgical scar and treated area
- Any unusual changes in the treated or other breast
- Swollen lymph glands
- Bone pain
- Persistent cough
- Difficulty in breathing
- Jaundice

Specialist services available at the SingHealth Duke-NUS Breast Centre located at:

National Cancer Centre Singapore	Tel: 6436 8088	**Sengkang General Hospital**	Tel : 6930 6000
Singapore General Hospital	Tel: 6321 4377	**KK Women's and Children's Hospital**	Tel: 6294 4050
Changi General Hospital	Tel: 6850 3333		

Breast Cancer
Post-operative Care

Wound and Drain Care

Wounds are often closed with absorbable stitches, hence stitch removal is not needed.

Wound care is simple and patients will be taught and given specific instructions in the management of various types of wound coverage.

Patients are recommended to shower 2 days after most surgeries such as breast-conserving surgery and simple mastectomies.

Soft flexible tube drains are placed under the skin at the time of surgery. These help to remove blood and other fluids that accumulate at the site of surgery. Patients without breast reconstruction surgery are usually discharged from the hospital with the tube drain on the day after surgery.

The nurse in the ward will teach the drain care and provide a chart to keep a record of the drainage, to be reported to the Breast Care Nurse (BCN) daily. The drain will be removed in the clinic when the drainage is minimal and this usually takes 1 to 2 weeks.

Patients are recommended to see a doctor if there is:

- Fever (temperature of 38°C and above)
- Redness/swelling around the operation site
- Discharge from the wound or around the drain site
- Increased pain at the operation site
- Wound breakdown i.e. the skin separates at the wound site

Medication and Diet

Routine medications prescribed by doctors are usually resumed immediately after surgery and there are no diet restrictions unless otherwise advised by the doctor.

Activity and Rehabilitation

Patients are encouraged to resume normal mobility and function as soon as it is suitable after surgery.

Most patients with breast-conserving surgery (BCS) and simple mastectomies will be able to resume usual daily activities immediately after surgery, with special precautions for those with breast reconstruction surgery, where management will differ according to their surgeries.

Arm Exercise Programme

Our Arm Exercise Programme conducted by our Occupational Therapists or Physiotherapists on the day after surgery aims to prevent shoulder and arm stiffness. This will enable you to use the arm as you had before surgery in activities at home, work and in recreation.

The exercises also promote circulation of the lymphatic system, thus preventing swelling of the affected arm. Over-strenuous activities are to be avoided in the first few weeks after discharge.

These exercises are to be done once daily, and each set of exercises is to be repeated 5 times. Instructions from the Occupational Therapist or Breast Care Nurse on the limitations will be advised as needed.

A. Deep breathing exercise

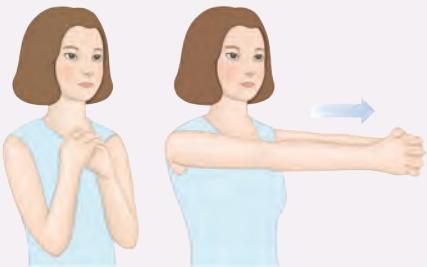
Take a deep breath in through your nose and gently breathe out through your mouth.

B. Shoulder shrug

Raise shoulders and hold for 5 seconds.

Relax shoulders.

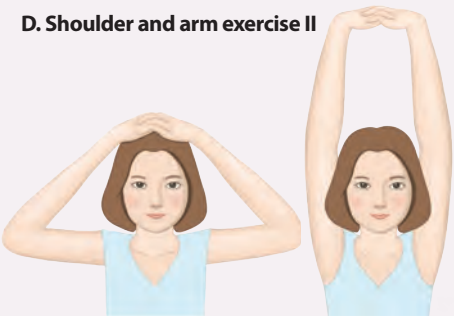
C. Shoulder and arm exercise I



Clasp both hands and bring to chest.

Bring both hands forward.

D. Shoulder and arm exercise II



Clasp both hands and place on the centre of your head.

Raise arms as high as you can.

Arm and Hand Care

Following axillary surgery, lymphoedema and increased risk of infection of the arm may occur as lymph nodes also contain cells which fight infection.

Therefore, extra care to protect the hand and arm on the operated side from injury is recommended.

Patients will be referred to a physiotherapist or occupational therapist specially-trained in treating lymphoedema. They will recommend programmes which include skin care, exercise, manual lymphatic drainage (a special massage technique), and compression garments to help reduce the swelling.

▲ *Extra care is needed to protect your hand and arm on the operated side.*

Arm care measures include:

- Skin care is important to prevent injury and infection. Use moisturisers to prevent the skin from drying and chapping, protective clothing against skin injury and insect bites, and gloves against cuts while working.
- Exercise care when carrying out home activities such as sewing, cooking, and personal care activities including nail care and shaving, and exercise sunburn prevention.
- Avoid blood-taking and injections on the affected side.
- Avoid activities that cause pooling of blood in the affected arm. These include the application of heat to the affected arm and prolonged exposure of the arm to hot temperatures like hot water when bathing or washing dishes or in hot tubs, spas or saunas.

- Avoid tight-fitting jewellery, watches and clothing, as well as the measuring of blood pressure on the affected arm as they may obstruct the flow of lymph. It is recommended that you reduce the load of your bag and carry it on the unaffected shoulder.

▲ *Reduce the load of your bag and carry it on your unaffected shoulder.*

- Care of cuts and burns is important to prevent infections. These need to be washed thoroughly with soap and water. Apply antibacterial cream on them and cover with a clean dressing (to be changed once or twice a day).

  Inspection of the skin for signs of increased warmth, redness and sudden increase in swelling, pain and fever is important. If the wound does not improve within 3 days, it is important to see a doctor or consult the BCN for treatment.

- Exercise and activities to maximise lymph flow is also as important. Exercise, even after surgery and radiation, until the return of normal shoulder and arm movements.

  Slowly build up the duration and intensity of exercise or strenuous activity and monitor the arm and hand during and after activity for signs of lymphoedema.

  Maintenance of an optimal weight through exercise and change in dietary habits as necessary is important. Arm exercise and the use of compression bandage or garments for the arm for long flights or where there are increased periods of inactivity is also recommended.

Self-arm massage may be recommended to encourage lymph drainage and minimise risk of arm lymphoedema. The following is a simple technique. The massage should be light and gentle without causing redness during and after the massage.

Self-Arm Massage

Step 1

The affected arm is placed at the shoulder level with the palm facing down. The other hand with the whole palm is placed on the side of the chest below the armpit, and is moved down past the waist. This is repeated 20 times.

A.

Position your other hand below the armpit of the affected side.

Ensure your palm has maximum surface area of contact with your body.

B.

Move your hand down the side of your body, past your waist level.

Repeat this step by placing your hand under the armpit again.

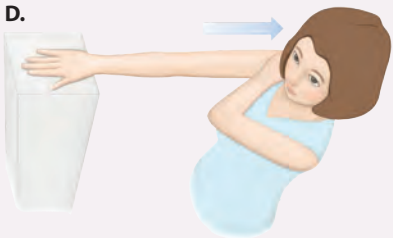
Step 2

This step involves sweeping the hand lightly from the wrist towards the shoulder, stopping at the groove above the collarbone. Repeat this 20 times.

C.

Position your other hand over the wrist of your affected arm.

D.



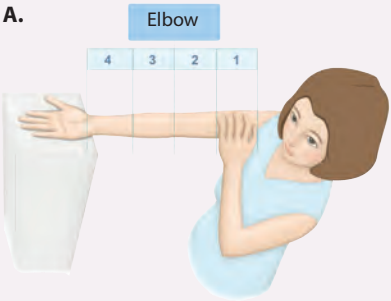
Sweep lightly over the top of your affected arm towards the shoulder and stop at the back of your shoulder.

Step 3

In this step, the arm is divided into 4 sections, starting from position 1.

Start with the palm facing upwards, and as the massaging hand sweeps from the inner arm to the outer part of the arm, turn the palm of the affected arm downwards. This is repeated 20 times at every position from 1 to 4.

A.

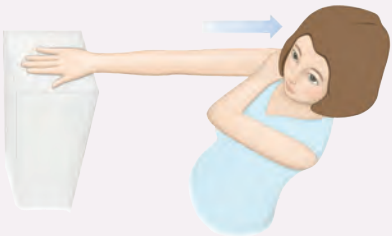


Start from position 1.

B.

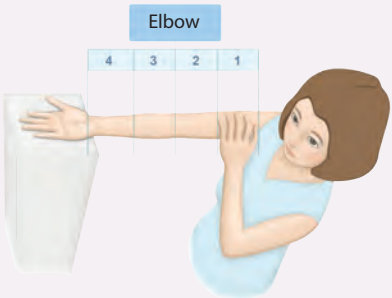
Using your other hand, sweep from the inner to outer part of your arm gently. Turn your affected palm downwards as you sweep from the inner to outer part of your arm.

C.



Continue sweeping up the shoulder and stop at the back of your shoulder.

D.



Repeat at position 1 for 20 times.

Repeat this step at positions 2, 3 and 4.

Physical Appearance

With a mastectomy, physical appearance can be maintained by wearing a prosthesis (called a breast form), or by undergoing breast reconstruction.

There are women who choose not to have breast reconstruction after mastectomy. Some make this decision because they want to avoid extra surgery. For others, it is because they are comfortable with their appearance and body image.

Breast forms or prostheses are used to maintain appearance and a sense of balance, as well as to relieve the strain on posture that may occur after a mastectomy. They are available in a variety of sizes, shapes and colours. Some are designed to fit into a special bra. Others can be attached securely to your chest using a special adhesive.

- Our BCN will give you an appointment for prosthesis-fitting about 6 weeks after the surgery. In the meantime, you may use soft padding underneath your bra while your wound heals.
- When choosing a breast form, it is important that it has the same size and weight as your other breast. This will help maintain your posture and prevent back strain.

▲ *Breast prostheses can be used to maintain appearance and a sense of balance after a mastectomy.*

Cancer Support Services

NCCS Psychosocial Oncology Department conducts the following programmes on coping with cancer:

- Living Your Best Programme (Support)
- STEER Programme

Tel: 6436 8117
Email: nsstbc@nccs.com.sg

NCCS Cancer Helpline provides information, emotional and psychological support to anyone affected by cancer through phone, email and face-to-face counselling. This service is free.

Tel: 6225 5655
Fax: 6324 5664
Email: cancerhelpline@nccs.com.sg

NCCS Breast Cancer Support Group

Tel: 6436 8668
Email: patientsupport@nccs.com.sg

KK Alpine Blossoms Breast Cancer Support Group

Tel: 6394 8074 / 6394 8075

SingHealth Blossoms Support Group

Tel: 8125 3517 / 6321 4474
Email: gsuns@sgh.com.sg

Breast Cancer Foundation

Address: 5 Stadium Walk
Kallang Leisure Park
#04-03/08
Singapore 397693

Office Tel: 6352 6560
Helpline: 6356 0123
E-mail: enquiries@bcf.org.sg
Website: www.bcf.org.sg

Singapore Cancer Society (SCS) conducts the following programmes:

- Reach to Recovery – for breast cancer support
- Oncology Support Group – for cancer patients undergoing treatment

Address: 15 Enggor Street
#04-01/04 Realty Centre
Singapore 079716

Tel: 6221 9578
Email: enquiry@singaporecancersociety.org.sg
Website: www.singaporecancersociety.org.sg

Changi General Hospital (CGH) conducts a monthly Breast Cancer Support Group for our patients. For enquiries, please call the Breast Centre.

Tel: 6850 3655 / 6550 3656
Ms Thai Wei Li

Pain Management and Palliative Care

Assisi Hospice

Address: 832 Thomson Road
Singapore 574623

Tel: 6832 2650
Email: assisi@lassisihospice.org.sg
Website: www.assisihospice.org.sg

Dover Park Hospice

Address: 10 Jalan Tan Tock Seng
Singapore 308436

Tel: 6500 7272
Fax: 6258 9007
Email: info@doverpark.org.sg
Website: www.doverpark.org.sg

HCA Hospice Care

Address: 12 Jalan Tan Tock Seng
Singapore 308437

Tel: 6251 2561
Fax: 6352 2030 (Home Care) /
6251 9318 (Day Care)
Email: info@hcahospicecare.org.sg
Website: www.hca.org.sg

Singapore Cancer Society

Address: 15 Enggor Street
#04-01 Realty Centre
Singapore 079716

Tel: 6221 9577
Fax: 6221 9575
Email: enquiry@singaporecancersociety.org.sg
Website: www.singaporecancersociety.org.sg

St Joseph's Home

Address: 36 Jurong West Street 2
Singapore 648141

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Breast Centre

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National Cancer Centre Singapore

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Sengkang General Hospital

Website: www.skh.com.sg
Tel: 6930 6000
Email: appointments@skh.com.sg

Singapore General Hospital

Website: www.sgh.com.sg
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SingHealth

www.singhealth.com.sg

For enquiries, consult your GP/Family Doctor or contact us at:

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www.sgh.com.sg

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www.cgh.com.sg

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Tel: (65) 6930 6000
www.skh.com.sg

KK Women's and Children's Hospital
Tel: (65) 6294 4050
www.kkh.com.sg

National Specialty Centres

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www.nccs.com.sg

National Heart Centre Singapore
Tel: (65) 6704 2000
www.nhcs.com.sg

Singapore National Eye Centre
Tel: (65) 6227 7266
www.snec.com.sg

National Dental Centre Singapore
Tel: (65) 6324 8802
www.ndcs.com.sg

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www.nni.com.sg

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