Basics of Cancer Care Workshop

“Treatment Modalities”

Nursing Division,

Ministry of Health, Malaysia

Learning Outcome

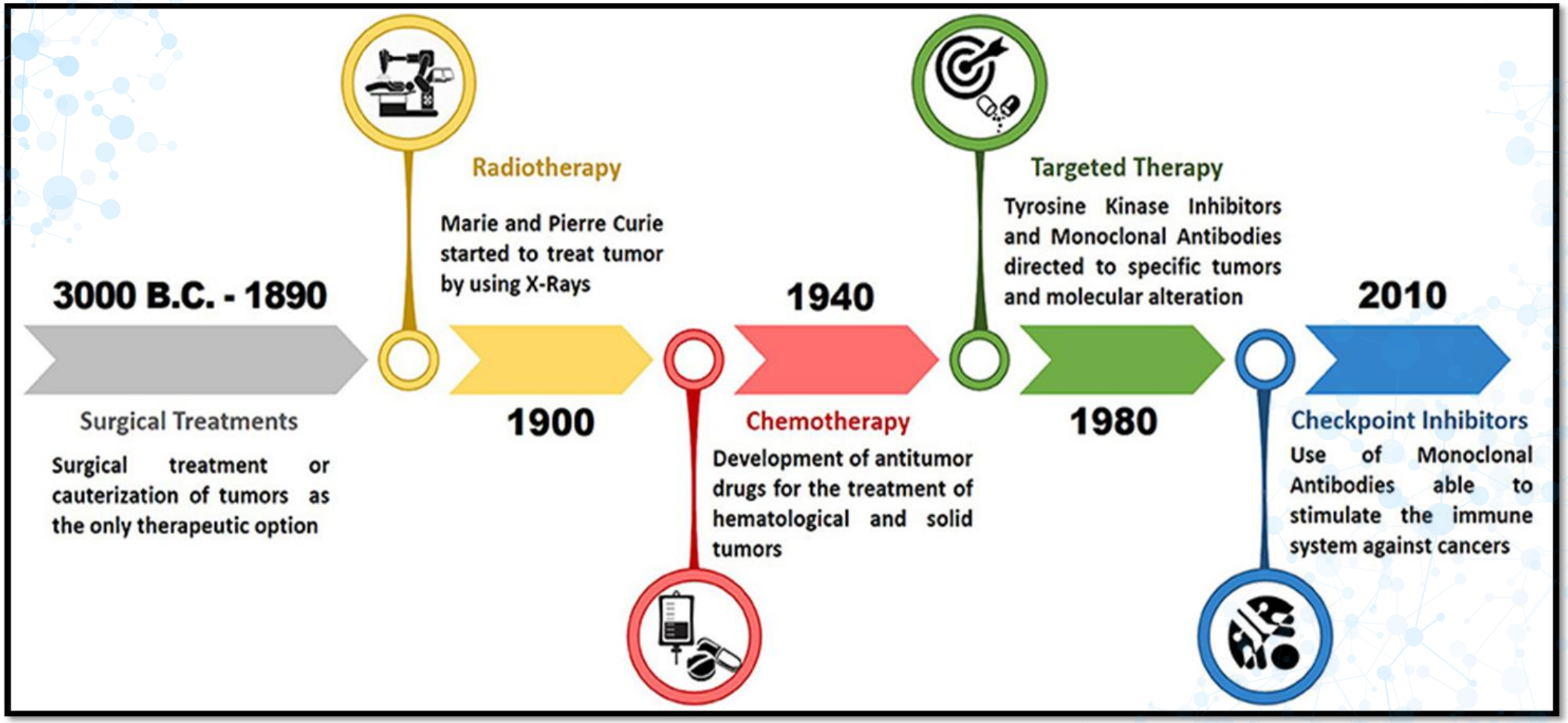
By the end of this lesson, learners will be able to:

- Outline cancer treatment modalities.

Treatment Modalities

- Surgery
- Radiotherapy
- Chemotherapy,
- Hormone therapy
- Targeted therapy
- Immunotherapy
- Stem cell transplant
- Palliative and supportive care.

Historical Perspectives



MODERN CANCER TREATMENT OPTIONS

1. SURGERY



Removing tumors or affected tissues from the body.

"Targeted Removal."

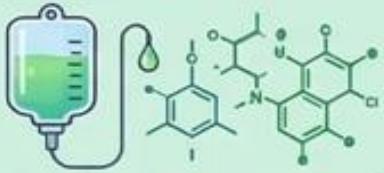
2. RADIATION THERAPY



Using high-energy beams to destroy cancer cells and shrink tumors.

"Targeted Beam."

3. CHEMOTHERAPY



Using drugs (often systemic) to kill rapidly dividing cancer cells throughout the body.

"Systemic Therapy."

4. IMMUNOTHERAPY



Stimulating or augmenting the body's immune system to recognize and fight cancer.

"Boosting Immune System."

5. TARGETED THERAPY



Blocking specific molecules or signals involved in cancer growth and spread.

"Precision Medicine."

6. HORMONE THERAPY



Removing or blocking hormones that fuel certain types of cancer (e.g., breast, prostate).

"Hormonal Management."

7. STEM CELL TRANSPLANT



Replacing diseased or damaged bone marrow with healthy stem cells.

"Restoring Bone Marrow."

Introduction

- Treatment choice depends on tumour site, histology, grade, stage, biomarkers, treatment intent, performance status, comorbidities and patient preference.

Treatment Modalities

“Role of Surgery in Cancer Treatment”

1. Diagnosis

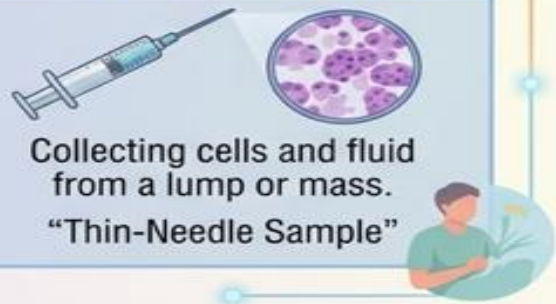
- Remove all or part of a tumor that allowing the tumor to be studied under a microscope and to determine whether the growth is cancerous (malignant) or noncancerous (benign).

- Surgical techniques used to obtain a tissue sample include :
  - Incisional biopsy
  - Excisional biopsy
  - Needle biopsy
  - Endoscopy

Types of Biopsy

MODERN BIOPSY TYPES

1. FINE-NEEDLE ASPIRATION (FNA)



Collecting cells and fluid from a lump or mass.

"Thin-Needle Sample"

2. CORE NEEDLE BIOPSY



Removing a small cylinder of tissue for detailed analysis.

"Tissue Core Sample"

3. SURGICAL (INCISIONAL) BIOPSY



Making an incision to remove a portion of a larger mass.

"Sample Tissue Cut"

4. EXCISIONAL BIOPSY



Removing the entire abnormal area or organ.

"Full Growth Removal"

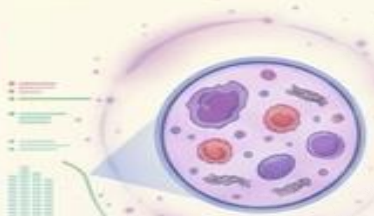
5. ENDOSCOPIC BIOPSY



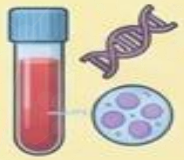
Using an endoscope to view inside and take small tissue samples.

"Internal Direct Sampling"





6. LIQUID BIOPSY



Analyzing a simple blood sample to find tumor cells or DNA fragments.

"Blood-Based Detection"

DIAGNOSTIC GUIDANCE | MINIMALLY INVASIVE METHODS

2. Disease Treatment

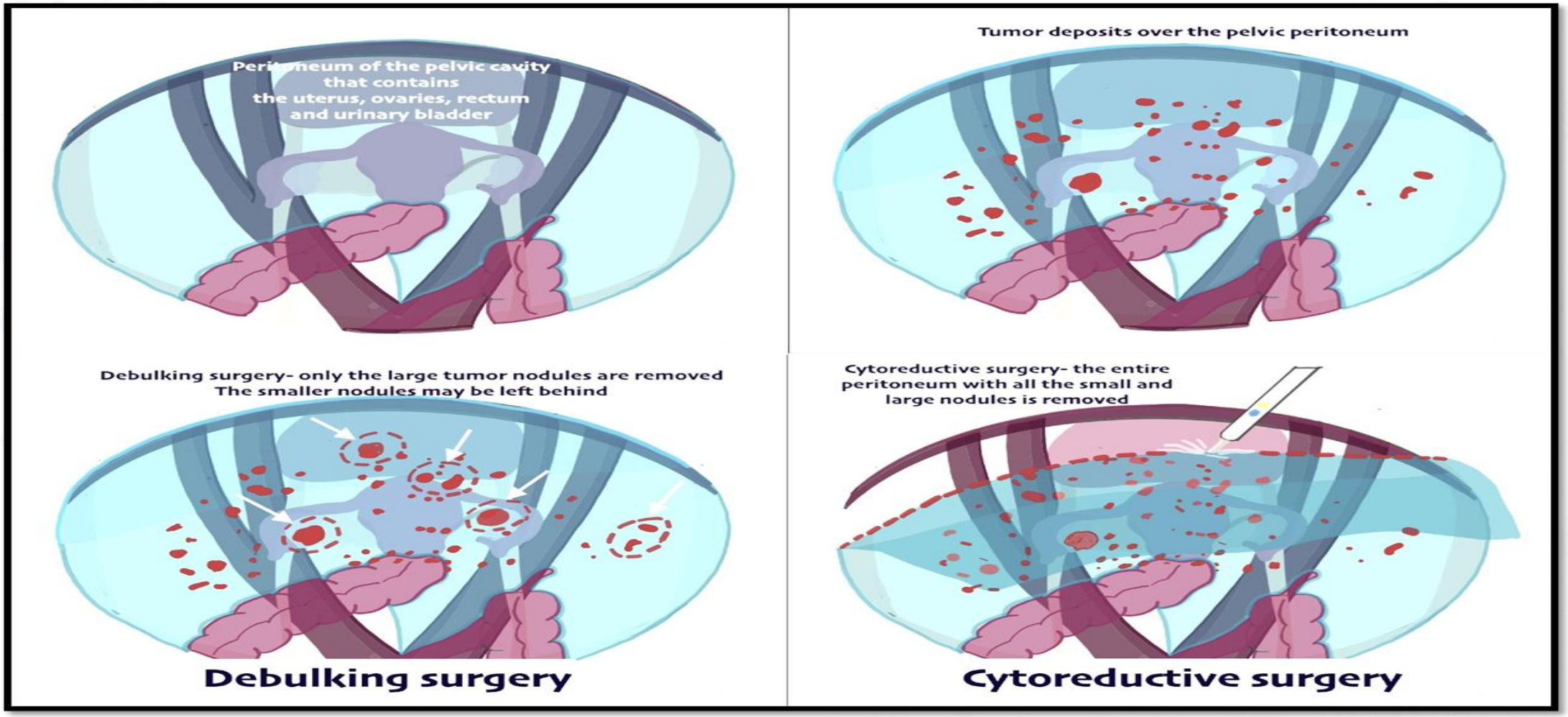
5 principles:-

- Primary treatment
- Adjuvant treatment
- Salvage treatment
- Palliative treatment
- Combination treatment

Treatment

PRIMARY TREATMENT	ADJUVANT TREATMENT
Removal of the malignant tumor and a margin of adjacent normal tissue The goal is to achieve a cure by reducing the patient's total body tumor burden. E.g. local excision and wide excision	• Removal of tissue to decrease the risk of cancer incidence, progression or recurrence. • Adjuvant treatment includes:- ▪ Adjuvant chemotherapy after surgery ▪ Adjuvant radiotherapy after breast-conserving surgery ▪ Hormone (Endocrine) Therapy ▪ Targeted Therapy ▪ Immunotherapy ▪ Bone-Modifying Agents ▪ **Stem Cell Transplantation** *(selected hematologic malignancies)*

Types Of Surgery



Prophylactic / Risk-reducing Surgery

- Removal of non vital organs that have an extremely high risk of subsequent cancer

- E.g., Colectomy for ulcerative colitis patient.



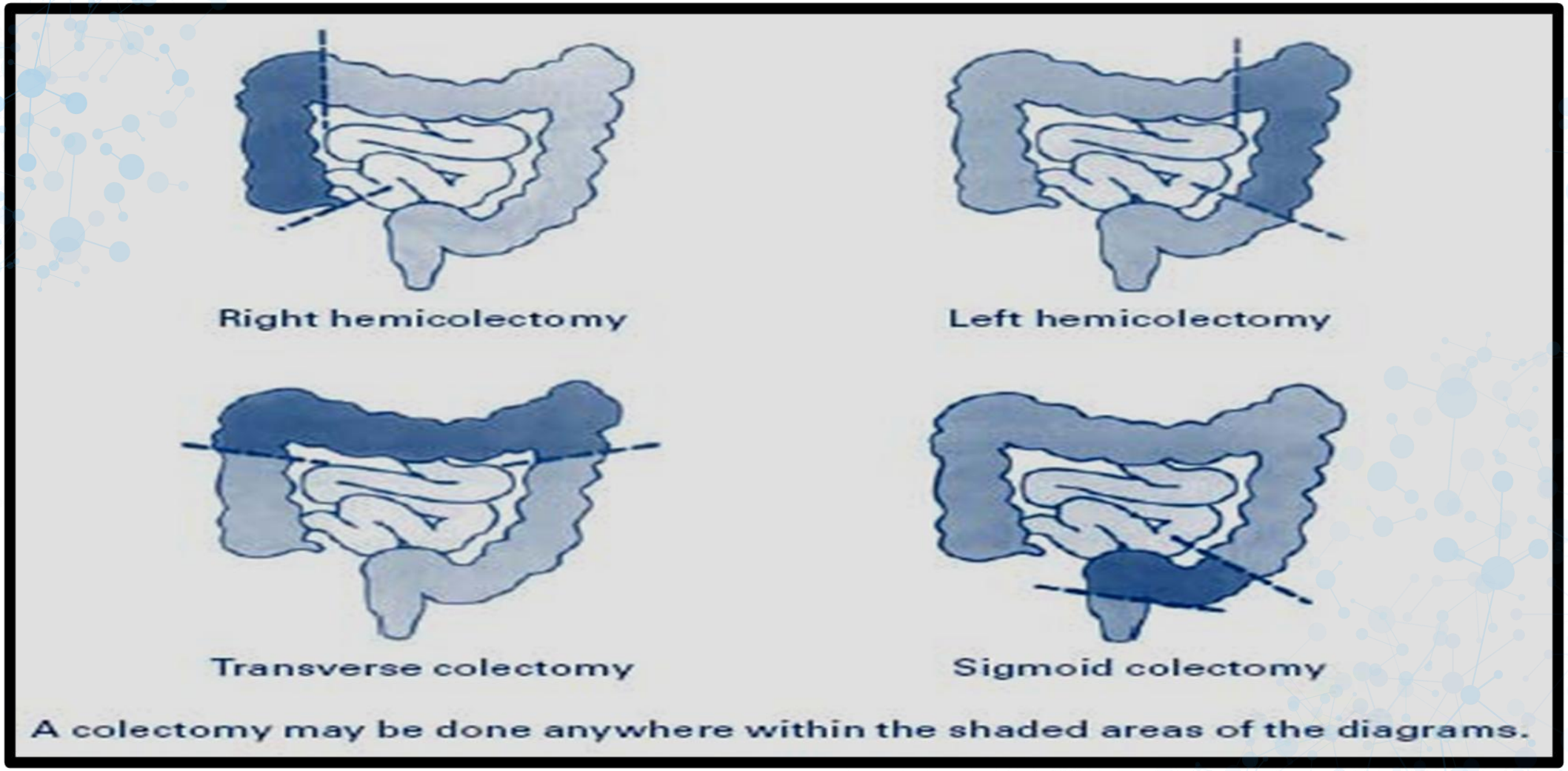
https://www.shutterstock.com/image-illustration/colectomy-colon-surgery-medical-procedure-removing-769826827

Prophylactic / Risk-reducing Surgery

The decision to perform prophylactic surgery is based on:

- The statistical risk of cancer based on the medical and family history.
- The presence or absence of symptoms.
- The degree of difficulty in diagnosing a cancer early should it develop.
- The patient's expected postoperative appearance and function.

Adjuvant-Prophylactic Surgery



Salvage

- Use of an extensive surgical approach to treat local disease recurrence after the use of a less extensive primary approach.

- E.g. lumpectomy and radiation therapy as primary approach to treat breast cancer and if local recurrence occurs, mastectomy will be the salvage approach.

TYPES OF BREAST CANCER SURGERIES

1. BREAST-CONSERVING SURGERY (LUMPECTOMY)



Removing the tumor and a surrounding margin of healthy preserving breast appearance. Often followed by radiation.

"Targeted Removal."

2. QUADRANTECTOMY



Removing a larger section (about one-quarter) of the breast and skin, still preserving most of the breast.

"Segmental Mastectomy."

3. TOTAL (SIMPLE) MASTECTOMY



Removing the entire breast, including nipple, areola, and skin. Does not involve lymph node removal. Lymph nodes are removed.

"Complete Breast Removal."

4. SKIN-SPARING MASTECTOMY



Removing all breast tissue, including nipple and areola, but preserving most of the skin for immediate reconstruction.

"Preserving Skin Envelope."

5. NIPPLE-SPARING MASTECTOMY



Removing all breast tissue while leaving the nipple and areola intact. Ideal for certain early-stage cancers.

"Surgical Preservation."

6. MODIFIED RADICAL MASTECTOMY



Removing entire breast plus underarm (axillary) lymph nodes, leaving the chest wall muscles intact.

"Cancer & Node Removal."

7. SENTINEL LYMPH NODE BIOPSY



Injecting a tracer (dye or radioactive) to identify and remove the first few lymph nodes the cancer would spread to.

"First Node Assessment."

8. AXILLARY LYMPH NODE DISSECTION



Removing a large group (all or most) of the underarm lymph nodes when sentinel node is positive or extensive spread is known.

"Node Cluster Removal."

Palliative Treatment

- Palliative treatment aims to improve quality of life, relieve symptoms and support comfort. It may also include cancer-directed treatment when appropriate.

- E.g., to relieve pain caused by a tumour that is compressing on a nerve (neurectomy) or bone or to remove a tumor that's blocking the intestine.

Combination Treatment

- Use of surgery with other treatment modalities to improve tumor resectability, decrease the extent of tissue removed, limit the change in physical appearance and functional ability, and improve treatment outcomes:-

- E.g., pre-operative / post op chemotherapy, radiation therapy, immunotherapy, targeted therapy, endocrine therapy or other systemic anticancer therapy.

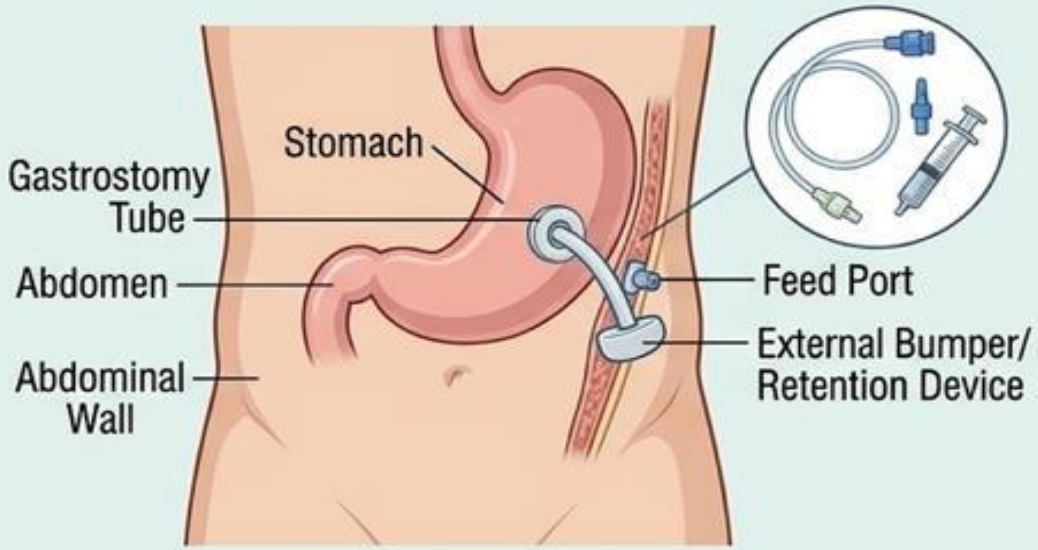
Insertion of Supportive Devices

- To improve the patient's comfort and to ease delivery of treatment such as:

  - A gastrostomy tube
  - Ventricular reservoir
  - Central venous catheter
  - Implantable vascular access device

GASTROSTOMY TUBE AND VENTRICULAR RESERVOIR PLACEMENT

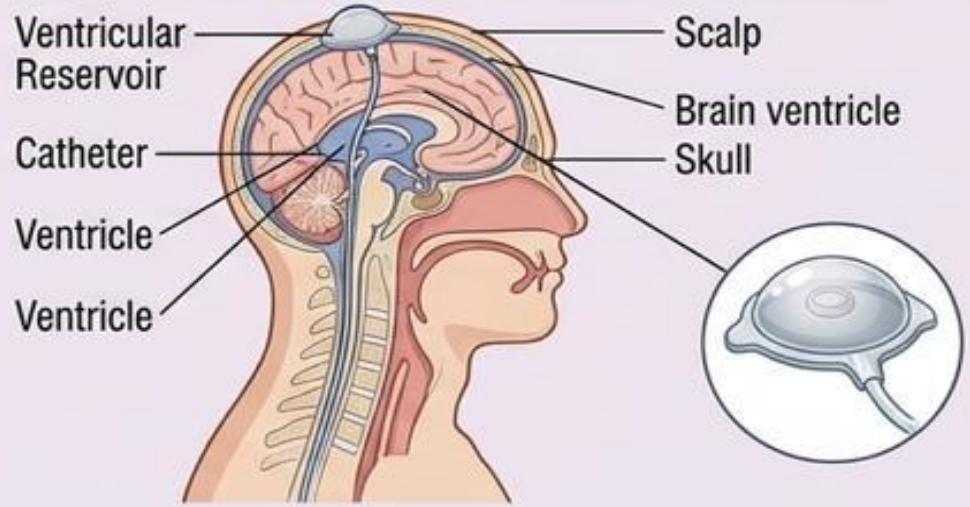
1. GASTROSTOMY TUBE (G-TUBE)



A tube inserted directly through the abdominal wall into the stomach for feeding or drainage.

Abdominal Access & Nutritional Support

2. VENTRICULAR RESERVOIR (e.g., Ommaya Reservoir)

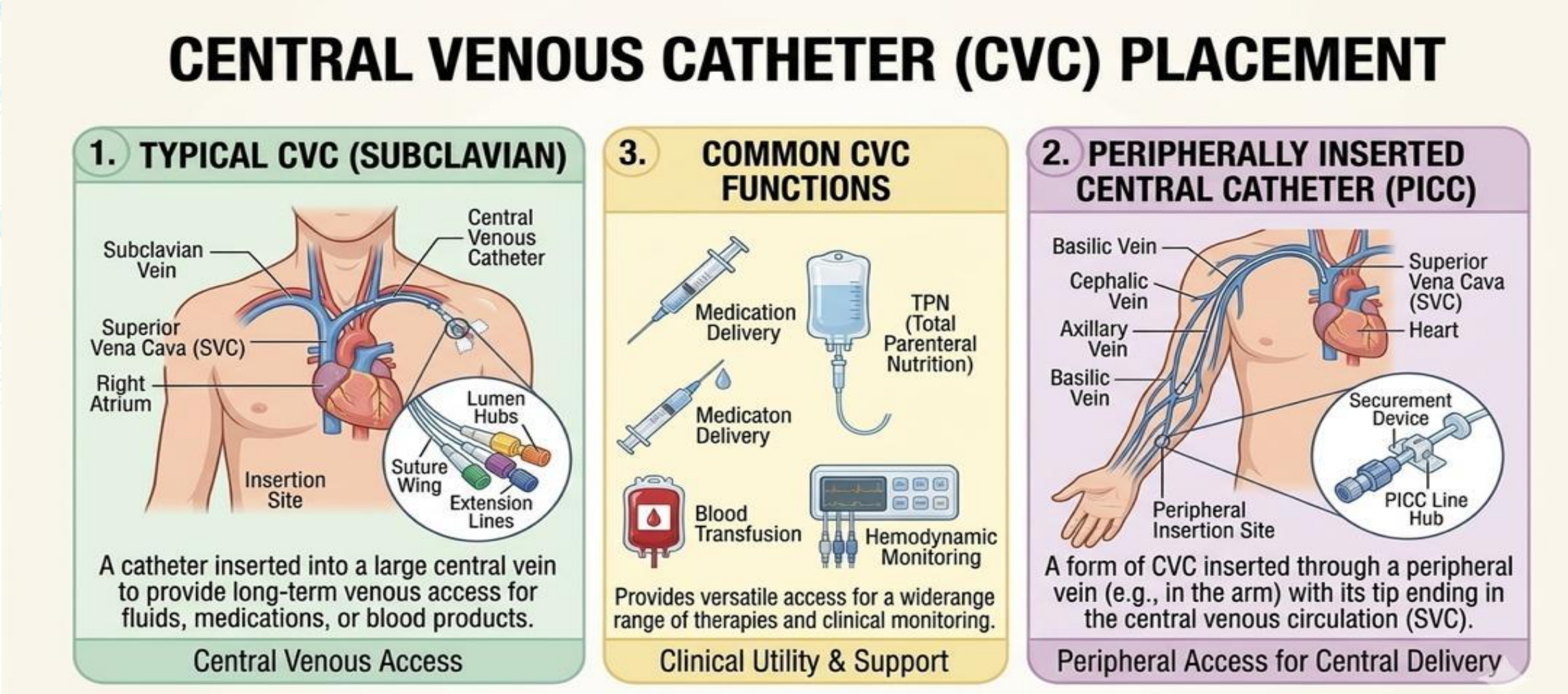


A small, dome-shaped device surgically placed under the scalp with a catheter going to the ventricles. Used for accessing cerebrospinal fluid or delivering treatments.

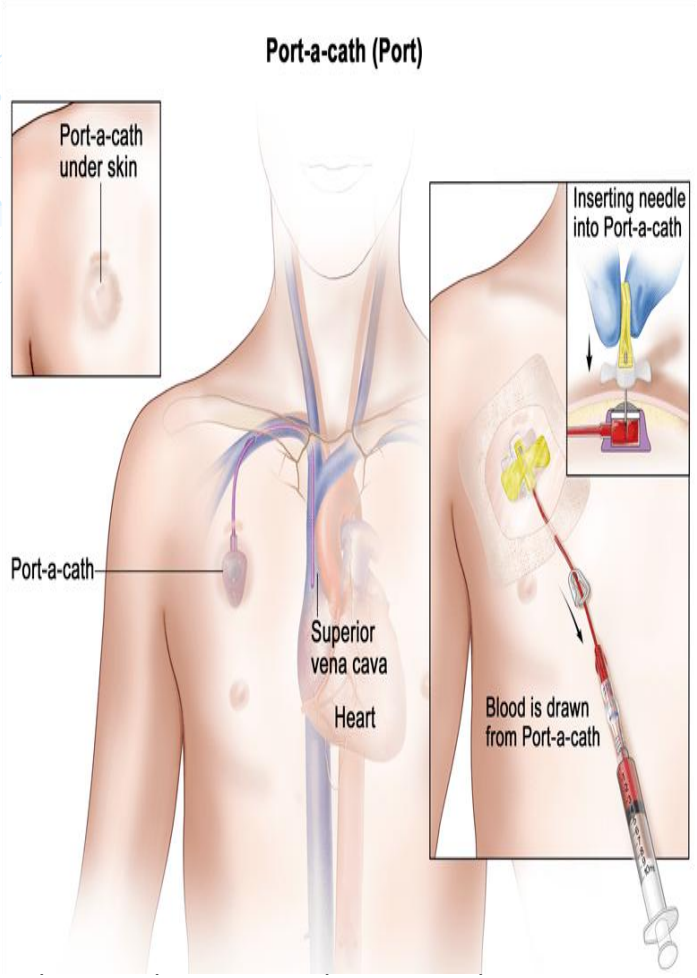
Intracranial Access & CSF Sampling

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Central Venous Catheter



Implantable Vascular Access Device





https://vygon.co.uk/intravascular-therapies-hub/implantable-ports/



https://vygon.co.uk/intravascular-therapies-hub/implantable-ports/

POST-OP GUIDE: COMMON CANCER SURGERY CARE

1. MASTECTOMY (Breast Cancer Surgery)

KEY FOCUS: ARM CARE & LYMPHEDEMA PREVENTION



DO:

- **Arm exercises:** Start pendulum and wall-walk exercises 48 hrs post-op (as shown by PT) to prevent stiffness.
- **Protect that arm:** NO BP checks, blood draws, IVs, or heavy lifting >5 lbs on the surgery side. Ever.
- **Watch for lymphedema:** Report arm swelling, heaviness, tight jewelry/clothes, or skin changes early.
- **Scar care:** Once healed, massage gently with lotion. Avoid sun exposure.

AVOID:

- Sleeping directly on surgery side for 2-4 weeks.
- Tight bras/straps. Use soft post-op bra.
- Driving until you can reach across body without pain and are off opioids.

RED FLAGS: Fever, red streaking, increasing breast/chest swelling, sudden arm swelling.

2. COLECTOMY (Colon/Rectal Cancer Surgery)

KEY FOCUS: BOWEL FUNCTION & NUTRITION



DO:

- **Diet progression:** Clear liquids → low residue diet. Avoid nuts, seeds, popcorn, high fiber for 4-6 weeks. Add fiber slowly.
- **Ostomy care:** If you have a stoma, empty pouch when 1/3 full. Skin around stoma should look like normal skin. Call WOC nurse if irritated.
- **Gas management:** Walk to pass gas. Avoid straws, gum, carbonated drinks.
- **Hydration:** 2-3L/day. Diarrhea dehydrates you fast.

AVOID:

- Heavy lifting >10 lbs for 6 weeks - risk of hernia.
- **Constipating foods** if prone to blockage: cheese, bananas, rice.

RED FLAGS: No gas/stool for 48 hrs + abdominal distension, vomiting, fever, wound redness, stoma that turns dark purple/black.

3. PROSTATECTOMY (Prostate Cancer Surgery)

KEY FOCUS: BLADDER CONTROL & CATHETER CARE



DO:

- **Catheter care:** Keep bag below bladder level. Secure tubing to leg. Drink 2-3L/day to keep urine light yellow.
- **Pelvic floor exercises:** Start Kegels once catheter is out. Squeeze as if stopping urine flow. 10 reps, 3x/day. Takes 3-6 months.
- **Activity:** Walk daily. Avoid sitting >30 min at a time for first 2 weeks.
- **Erection rehab:** Ask urologist about timing for PDE5 inhibitors or devices. Nerve-sparing surgery improves recovery chances.

AVOID:

- Heavy lifting, straining, constipation for 6 weeks.
- Alcohol and caffeine initially - they irritate bladder.

RED FLAGS: Unable to urinate after catheter removal, **fever, urine leaking around catheter, foul-smelling urine, blood clots blocking catheter.**

COMMON TO ALL 3:

1. **WALK DAILY** starting day 1
2. **WATCH FOR:** Fever >38°C, increasing pain, wound changes
3. **PROTEIN + FLUIDS = HEALING**
4. **FOLLOW-UP** in 1-2 weeks for pathology results and next steps

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Treatment Modalities

Radiation Therapy

Radiation Therapy

- Radiation therapy uses high-energy radiation to shrink tumors and kill cancer cells.
- X-rays, gamma rays, and charged particles are types of radiation used for cancer treatment.
- Radiotherapy damages DNA and aims to maximize tumour-cell kill while minimizing dose to surrounding normal tissues.

Radiotherapy may be used alone or with surgery, chemotherapy, immunotherapy or targeted therapy depending on tumour type, stage and treatment intent.



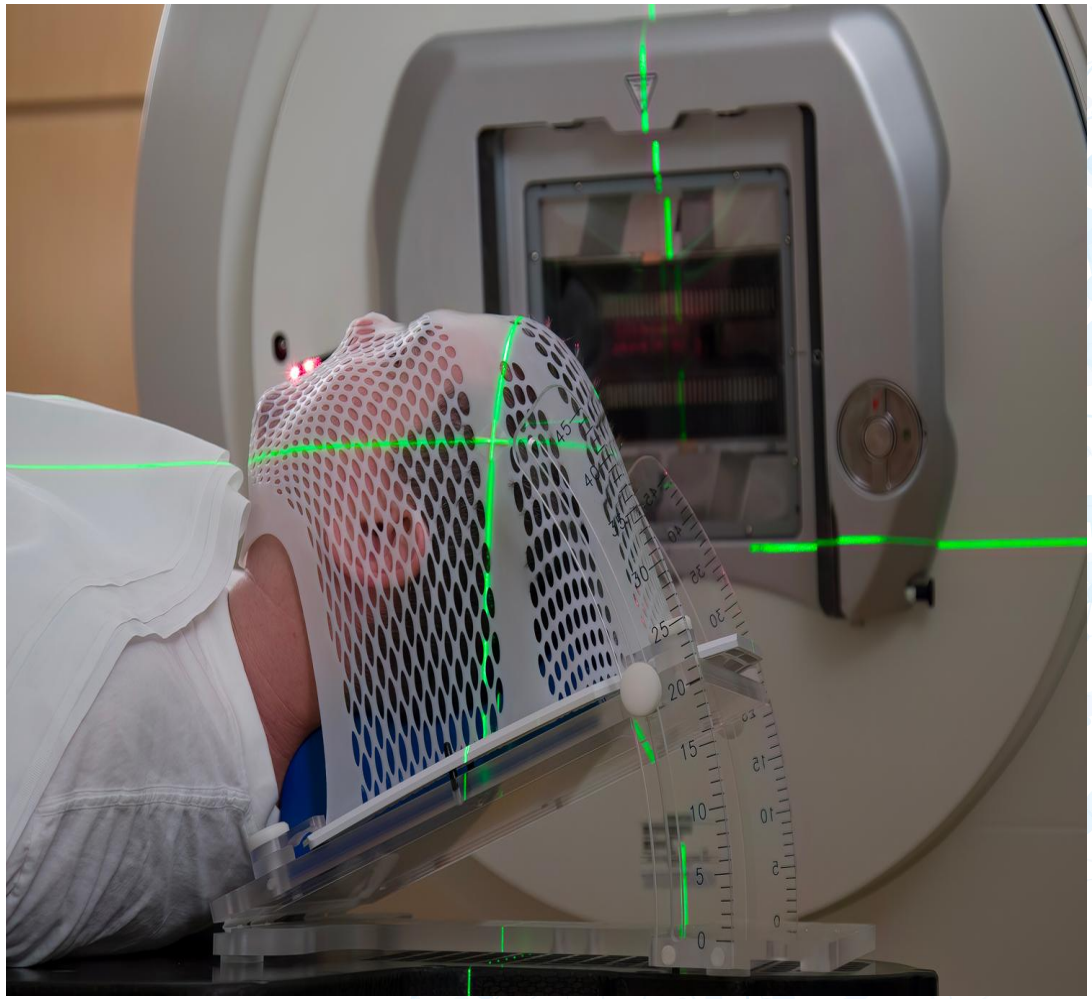
Basic Principles of Radiation

- The gray (Gy) has replaced the rad (radiation absorbed dose) as the accepted term for radiation dosage.

  - Gray (Gy) is the SI unit of absorbed radiation dose. Fractionation describes how the total dose is divided, e.g., 40 Gy in 15 fractions, therefore 1 # = 2.67 Grays.

- The daily dose usually is called a fraction

  Example: Breast cancer (40 Gy in 15 fractions).



Purpose of Radiation Therapy

Curative (Primary Treatment)	Used to eliminate the cancer completely, either alone or combined with chemotherapy “concurrent chemoradiotherapy).
Adjuvant Therapy	Given after surgery or chemotherapy to destroy any small cancer cells that might have been left behind, reducing the risk of recurrence.
Neoadjuvant Therapy	Given before surgery to shrink a large tumour, making it easier and safer to remove.
Palliative Therapy	Used to relieve symptoms, such as pain caused by cancer that has spread to the bone, when a cure is not possible.

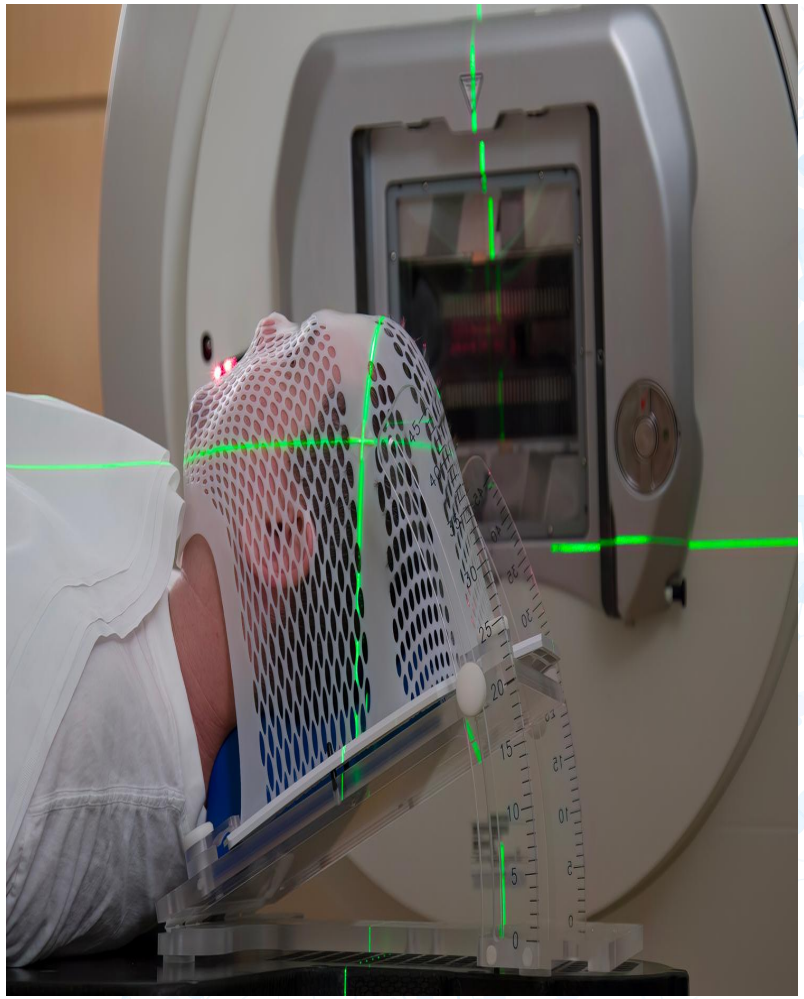
Types of Radiation Therapy

Three types of radiotherapy :

1. External Beam Radiotherapy (EBRT)

2. Internal Beam Radiotherapy / Brachytherapy –
   Sealed Source Radiotherapy

3. Systemic radionuclide therapy



External Beam Radiation Therapy (EBRT)

- EBRT refers to radiation delivered from a source placed at a distance from the patient.
- The source is emitted from equipment such as **linear accelerator (Linac)** that delivers radiation to the depth appropriate for each tumour.
- The number of treatments is determined by the **size and location** of the tumour and the total dose required.

LINAC (LINEAR ACCELERATOR)







LINAC (LINEAR ACCELERATOR)

EBRT is commonly delivered using a linear accelerator (LINAC), which produces photon and electron beams.

THE PROCESS OF MODERN RADIOTHERAPY

PLANNING & PREPARATION

1 INITIAL CONSULTATION



- Medical history
- Discuss treatment goals

- Medical history
- Discuss treatment goals

2 IMAGING & SIMULATION





- Create custom immobilizers
- Take reference scans

3 TREATMENT PLANNING



- Define tumor target
- Calculate precise beam angles
- Minimize dose to healthy tissue

2 DAILY TREATMENT DELIVERY

4 TREATMENT SESSIONS



Linear Accelerator (LINAC)

- Typically 5 days a week, painless, brief (20-30 min per session)

5 PRECISION & MONITORING



- Real-time imaging to ensure accuracy, breathing control techniques

6 ONGOING SUPPORT



- Manage side effects, emotional support

3 RECOVERY & FOLLOW-UP

7 POST-TREATMENT CHECK-UPS



- Monitor response, watch for long-term effects



Immobilization Devices

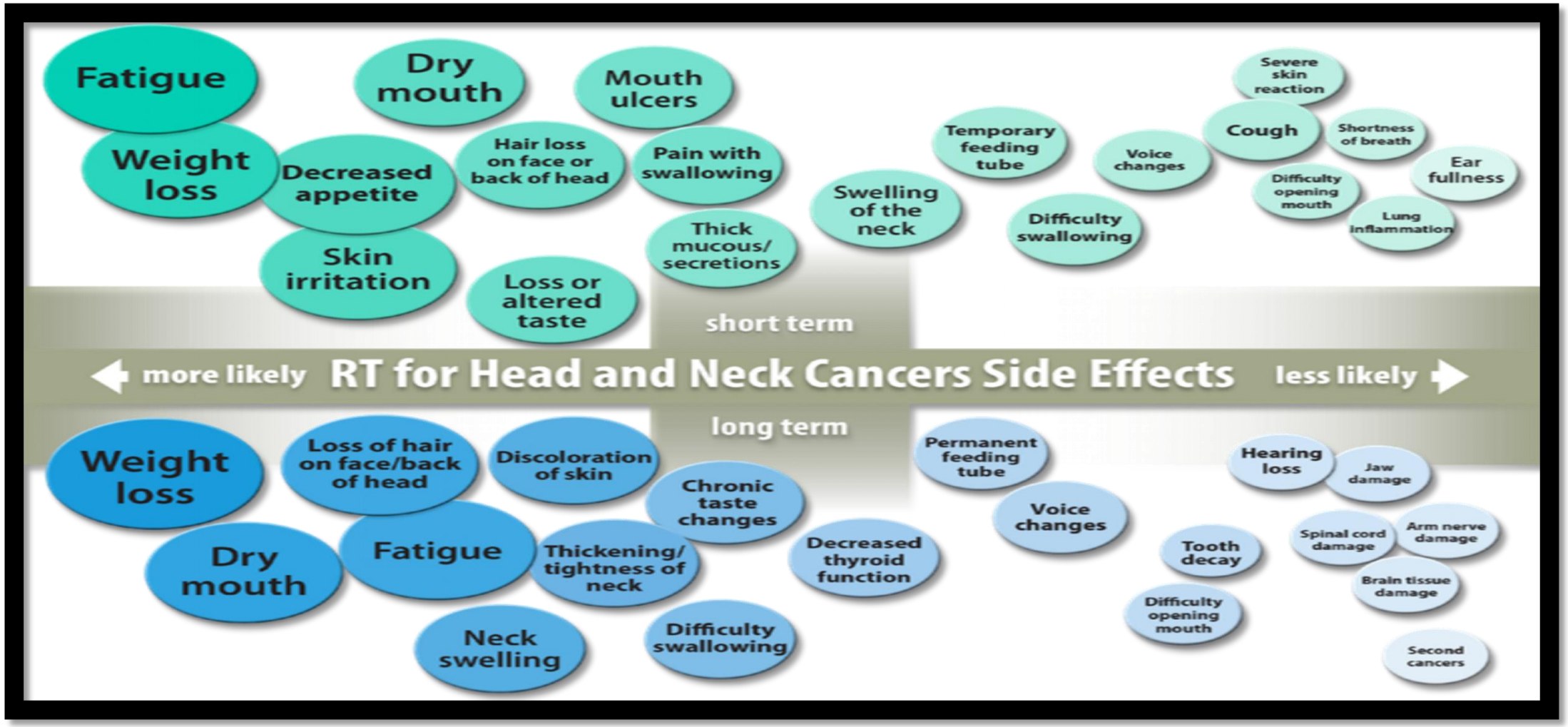
- Help maintain a reproducible treatment position and reduce patient movement during treatment.



Immobilization Devices

- Breast and thorax board.
- Leg support used in prostate.
- Prone breast board.
- BDS mask / thermoplastic mask for head and neck” if BDS is intended (thermoplastic mask)
- Vac-lok cushion fixation
- Solid aquaplast device for pelvic immobilization.

Radiotherapy Side Effects



SIDE EFFECTS OF RADIATION THERAPY FOR HEAD & NECK CANCER

1. COMMON & LOCAL EFFECTS









Xerostomia (Dry Mouth)

- Reduced saliva production
- Difficulty swallowing & talking
- Risk of tooth decay

Mucositis (Sore Throat/Mouth)

- Inflamed mucous membranes
- Painful mouth sores
- Difficulty eating



Taste Changes

- Altered or complete taste

2. SYSTEMIC & LONG-TERM EFFECTS



Fatigue

- Generalized weakness & low energy
- Can affect quality of life



Skin Reactions

- Redness (Erythema), dryness, peeling
- Must maintain proper skin care





Swallowing/Speech Difficulty (Late Effects)

- Scarring (Fibrosis) of muscles
- Long-term dysphagia (swallowing) & voice changes

MANAGING SIDE EFFECTS



Dental Care



Saliva substitutes



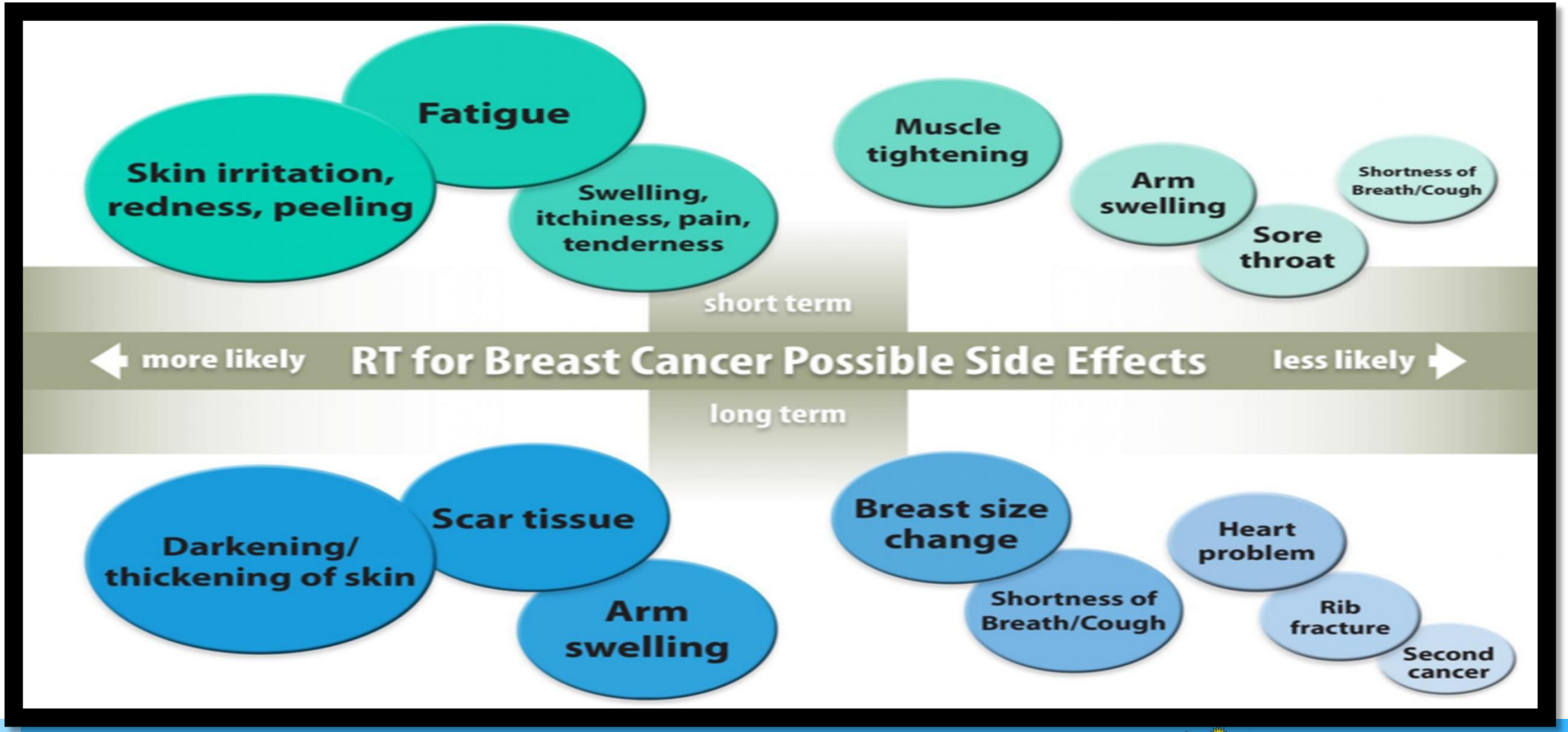
Nutritional Support



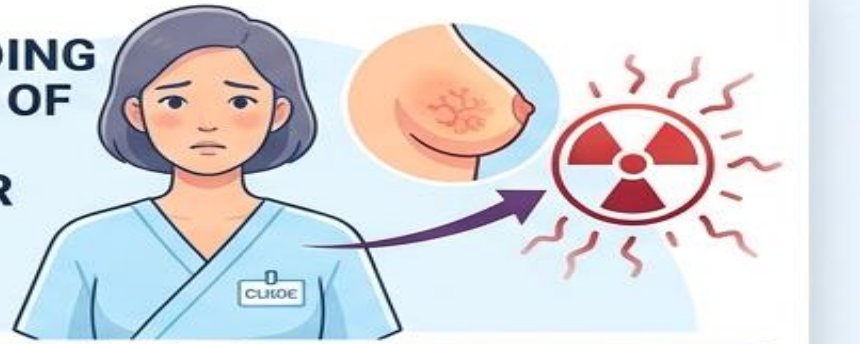
Skin Care

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Radiotherapy Side Effects



'UNDERSTANDING SIDE EFFECTS OF RADIATION THERAPY FOR BREAST CANCER'



SHORT-TERM (ACUTE) SIDE EFFECTS



Skin Changes
REDNESS, IRRITATION, DRYNESS, PEELING



Fatigue
TIREDNESS, LACK OF ENERGY



Breast Swelling & Tenderness
SWELLING, TIGHTNESS, PAIN IN BREAST



Aches & Discomfort
DISCOMFORT IN CHEST, SHOULDER, OR ARM

LONG-TERM (LATE) SIDE EFFECTS



Breast Shape & Texture Changes
CHANGED SIZE OR FIRMNESS (FIBROSIS)



Skin Discoloration
PERMANENT SKIN DARKENING, SPIDER VEINS (TELANGIECTASIA)



Lymphedema
CHRONIC ARM OR BREAST SWELLING

COPING TIPS



DAILY SKIN CARE

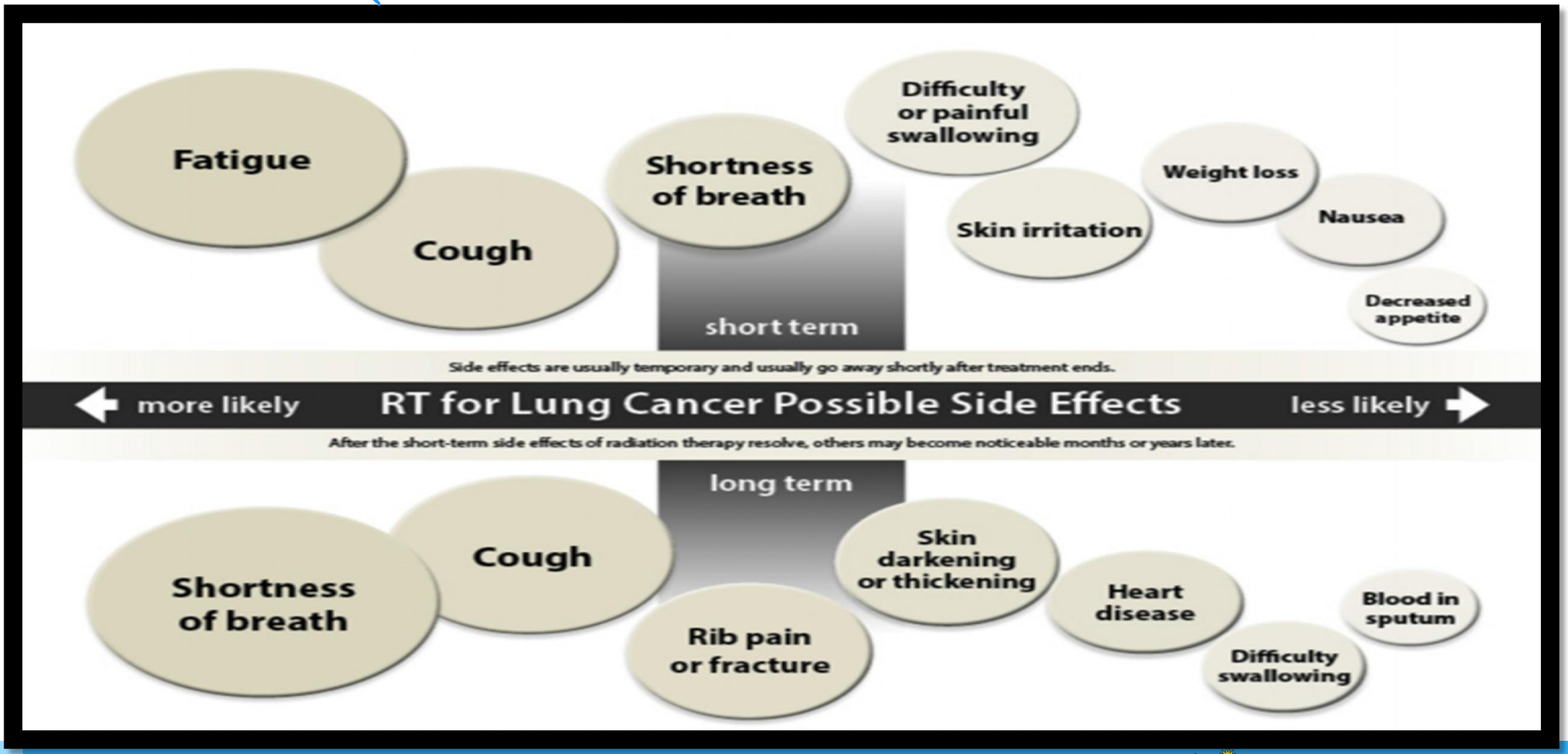


STAY ACTIVE & REST



REPORT SYMPTOMS EARLY

Radiotherapy Side Effects





'UNDERSTANDING SIDE EFFECTS OF RADIATION THERAPY FOR LUNG CANCER'



SHORT-TERM (ACUTE) SIDE EFFECTS



Esophagitis (Inflammation)
Painful swallowing, sore throat, feeling of food stuck



Fatigue
Tiredness, lack of energy, weakness



Dry Cough
Persistent, non-productive dry cough



Shortness of Breath (Pneumonitis)
Difficulty breathing, especially with exertion

LONG-TERM (LATE) SIDE EFFECTS



Radiation Pneumonitis
Inflammation of lung tissue, breathlessness, cough



Lung Fibrosis
Scarring of lung tissue, reduced lung function, persistent breathlessness



Heart Conditions
Damage to the heart or heart valves, palpitations

Weakened ribs, increased risk of fractures

COPING TIPS



BREATHING EXERCISES

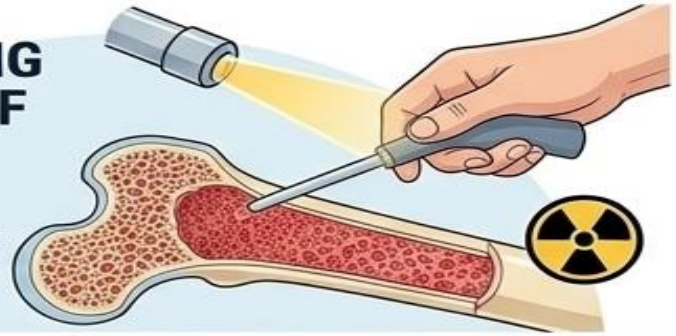


STAY ACTIVE & REST



REPORT SYMPTOMS EARLY

‘UNDERSTANDING SIDE EFFECTS OF RADIATION THERAPY FOR BONE MARROW’



SHORT-TERM (ACUTE) SIDE EFFECTS



Fatigue
Tiredness, low energy (Anemia-related)



Low Blood Cell Counts (Pancytopenia)
Reduced red, white, and platelets



Nausea & Appetite Loss
Gastrointestinal distress



Mouth Sores (Mucositis)
Soreness, difficulty eating

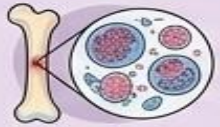
LONG-TERM (LATE) SIDE EFFECTS



Persistent Fatigue
Long-term low red cell counts



Infection Susceptibility
Due to low white cell counts



Risk of Secondary Malignancies
E.g., Secondary Leukemia



Bone Structure Changes
Osteoporosis or Necrosis (Avascular)

COPING & MANAGEMENT TIPS



REGULAR BLOOD TESTS
Monitor cell counts frequently



REST & CONSERVE ENERGY
Listen to your body



BALANCED NUTRITION & HYDRATION
Support cell production



PREVENT INFECTION
Practice good hygiene



REPORT SYMPTOMS TO DOCTOR
Report fever, bleeding, excessive fatigue

YOUR GUIDE TO EXTERNAL BEAM RADIATION THERAPY (EBRT): PROCESS & CARE

1. BEFORE EBRT STARTS: Preparation

Simulation Visit


CT scanner


Technician applying marks


Small ink and/tattoo dots

Skin Prep



- Lotion & lotion
- Deodorant
- Dedical licning


Anti deodorant

Clothing



- Loose shict shirt
- Comfortable pants
- Rewcontam in the turns



Dental Check (Head/Neck)



- Dental beatomt
- Toothnishro and focus/ X-ray stenons



Nutrition Baseline



- Protein food! &
- Fealt food


Protein shake


Water

Plan for Fatigue

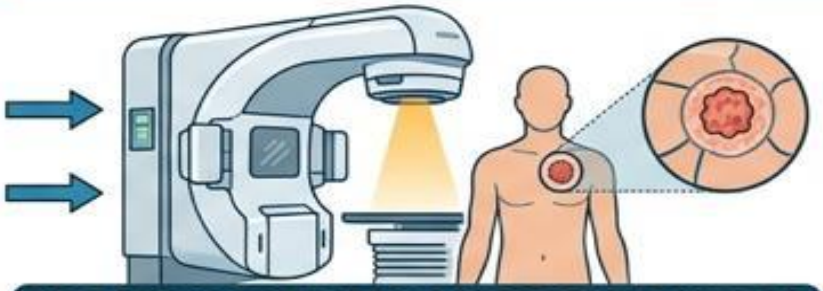


- Calendar
- People getting in snew a car


In a car


Help at home

2. DURING EBRT: Daily Care & Management



NOT RADIOACTIVE | NO ISOLATION NEEDED

Skin Care — MOST IMPORTANT!




ONO Mild soap








Sun protection

Fatigue Management







Eat to Tolerate Treatment



Pelvis
Peals
(Low Residue)

Head/Neck
Head/Neck
(Soft Food)



Chest
(No Heavy Meals Before Treatment)

Show Up Daily

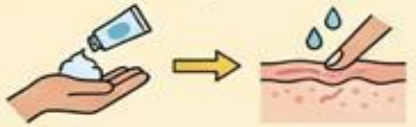
- Daily day 1fi, ti** and tomor monttly denessity
- Each checklist posing to istion on aid times





3. AFTER EBRT ENDS: Recovery & Long-Term

Skin Healing



Fatigue



- Resting
- Gradually starting activity



Watch for Late Effects

Pelvis



Head/Neck



Chest





Follow-Up

- Appointment book surves on your appointment book

RED FLAGS: CALL YOUR ONCOLOGY TEAM


Fever >38°C


Severe Pain / Bleeding


Trouble Swallowing or Breathing


Skin Breakdown

Key difference for Brachytherapy/Radioiodine: EBRT vs. Brachytherapy/Radioiodine or external conceuries.
EBRT vs. Brachytherapy/Radioiodine iives. Brachytherapy and rennedioin.

Medical disclaimer: This process l:mx•nteratment edter an eptici may prompotlnily apposed; miologues to beuxling eratiurated'radiation or at difference is remcal menthormos. Entr-cvapore may make imanaxe enomulees non of rnnious medipiine, and aquire screonthal medical, nonserad-ra depeninarvary of any risex to apuse medical tust or bohnmation of clinic environment.

SLIDE NO.

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Advanced Radiotherapy Techniques

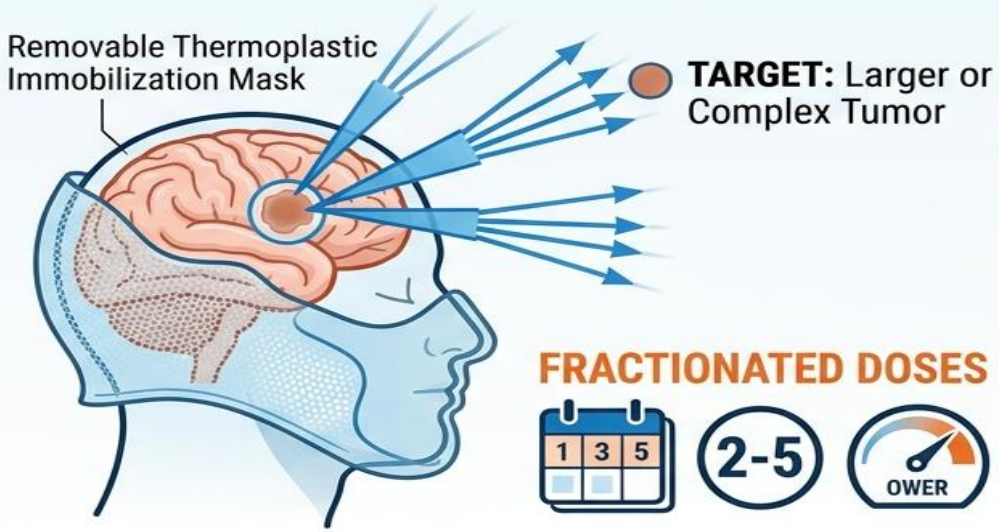
COMPARATIVE OVERVIEW: SRS vs. SRT

SRS: STEREOTACTIC RADIOSURGERY (1 Session)



- One treatment session
- Highly concentrated dose
- **Used for:** Small, well-defined tumors

SRT: STEREOTACTIC RADIOTHERAPY (2-5 Sessions)



- Multiple treatment sessions
- Dose spread out over days
- **Used for:** Larger masses, or near sensitive structures

MODERN RADIOTHERAPY: TREATMENT TECHNIQUES

1 2D TECHNIQUES



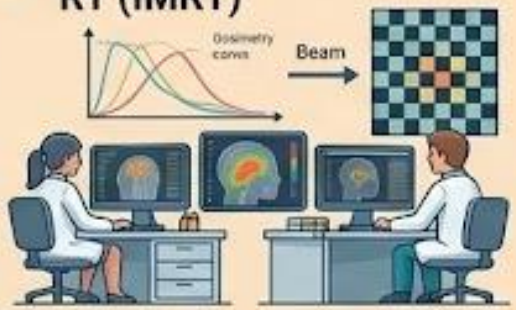
- Define target using simple 2D imaging.
- Direct beam delivery, minimal shaping.

2 3D CONFORMAL (3D-CRT)



- CT-based anatomy for true 3D planning
- Conform dose to tumor shape with multiple fields.

3 INTENSITY-MODULATED RT (IMRT)



- Optimize individual beamlet intensities.
- Sculpt dose around complex critical structures.

4 VOLUMETI-MODULATED RT (VMAT)



- Simultaneous gantry rotation, MLC shape, and dose rate modulation. short time.

4 VOLUMETRIC-MODULATED RT (VMAT)



- Simultaneous gantry rotation, MLC shape, and dose rate modulation.
- Highly complex treatment in a short time.

5 STEREOTACTIC RADIOSURGERY (SRS)



- Single, high-dose fraction for cranial targets.
- Non-coplanar beams, sub-millimeter precision.

6 STEREOTACTIC RT (SRT)



- Fractionated SRS for larger cranial targets.
- Maintain high precision over multiple sessions.

7 STEREOTACTIC BODY RT (SBRT)



- High-dose, few fractions (1-5) for extracranial targets.
- Integrated motion management for tumor tracking.

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Internal Beam Radiation Therapy (IBRT / Brachytherapy)

- Brachy means ‘short’ or ‘near’, referring to treatment delivered close to or within the tumour.
- Brachytherapy delivers radiation by placing a radioactive source in or near the tumour; dose rate and treatment duration depend on whether LDR, HDR or permanent implant is used.
- Brachytherapy is performed by placing radioactive materials **directly into or very near to the tumour**.

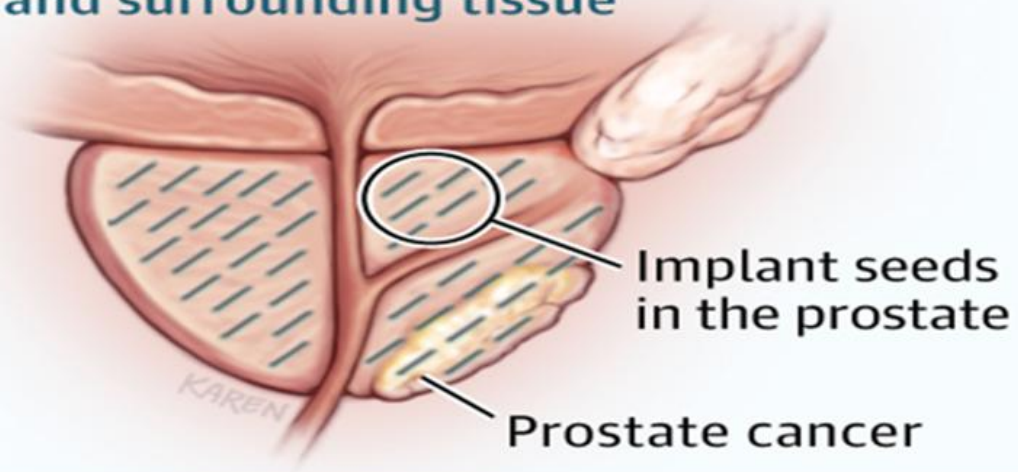


MICRO SELECTRON MACHINE

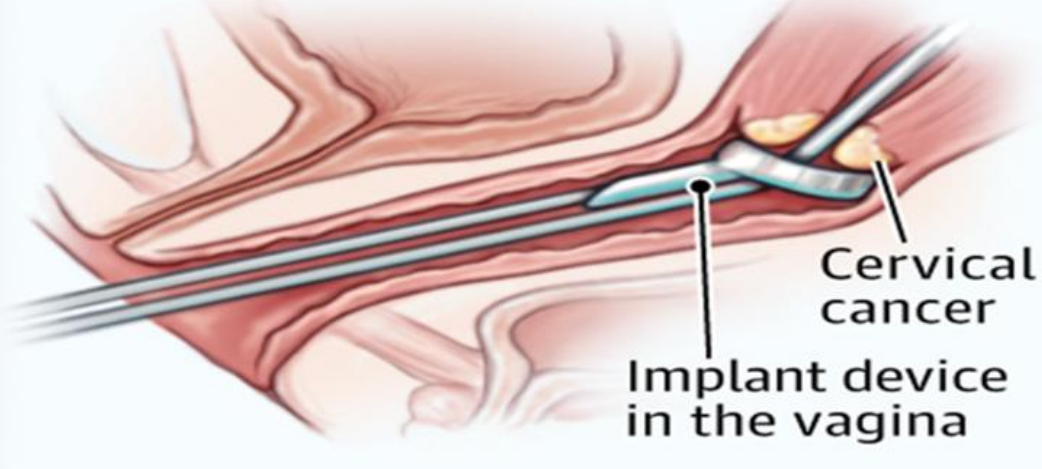
Brachytherapy is the internal delivery of radiation as cancer therapy.

Radioactive implants are placed very near or within a tumor and deliver high doses of radiation with less damage to other organs than external radiation.

Implant directly placed in tumor and surrounding tissue



Implant placed in body cavity



Brachytherapy may be permanent or temporary

Permanent brachytherapy

- Permanent implant
- Single procedure
- Low dose of radiation

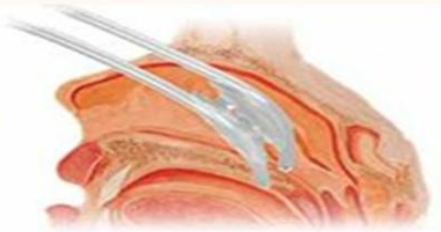
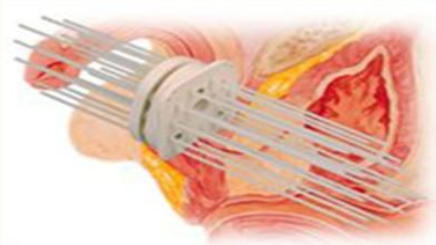
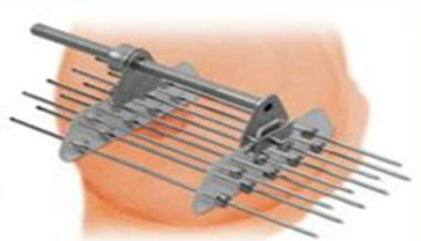
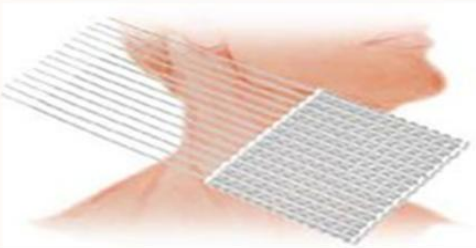
Temporary brachytherapy

- Temporary implant lasting minutes or days
- Single or multiple procedures
- Higher dose of radiation

Treatments by Location

- Intracavitary techniques
  (i.e. Vaginal, Rectum)
- Intraluminal techniques
  (i.e. Lung)
- Interstitial techniques
  (i.e. Breast, Prostate)
- Surface applications
  (i.e. Skin)




Brachytherapy Procedure



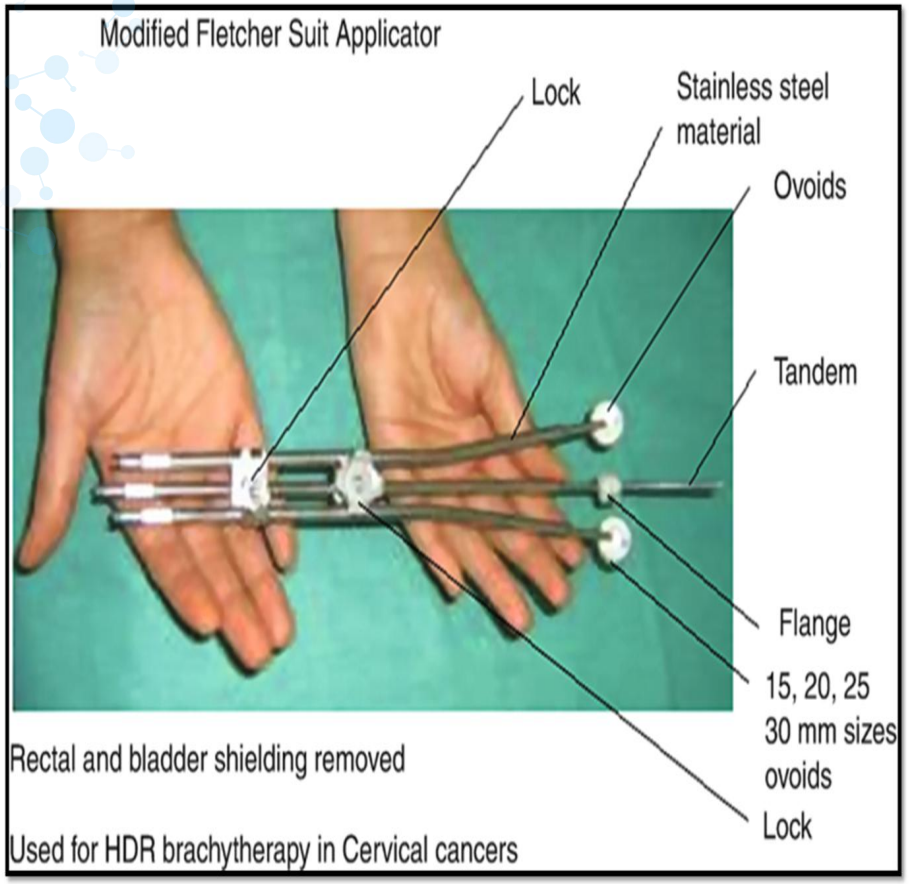


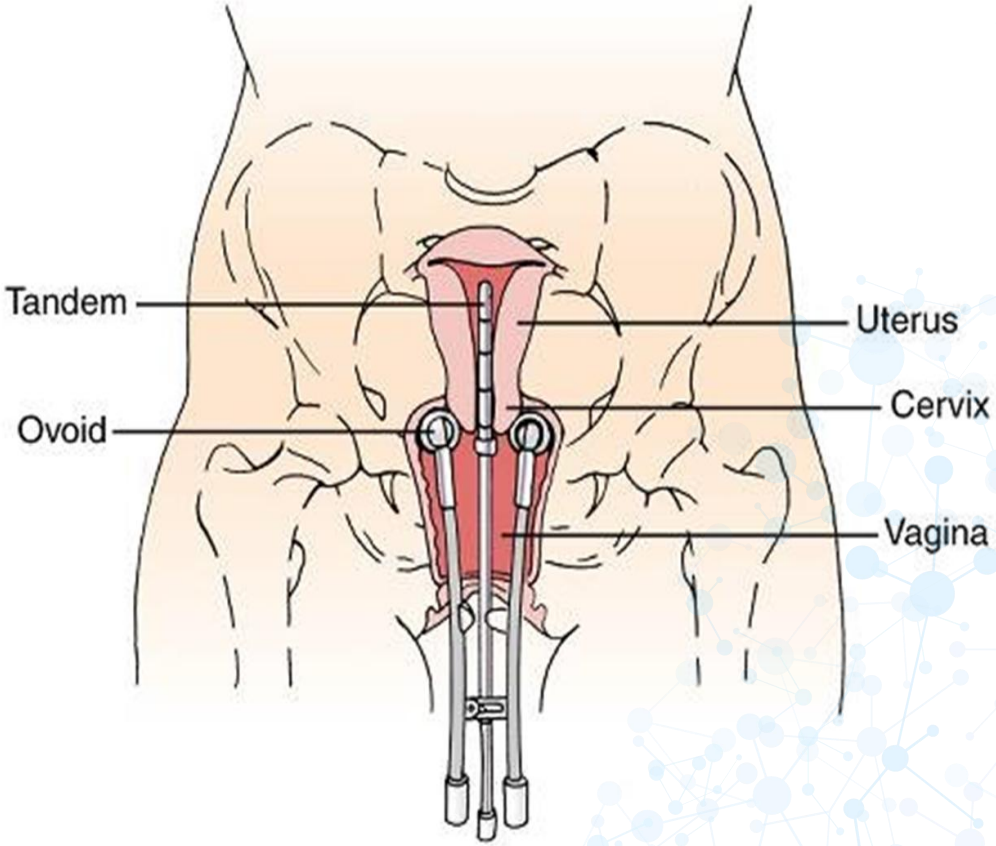
Brachytherapy OT



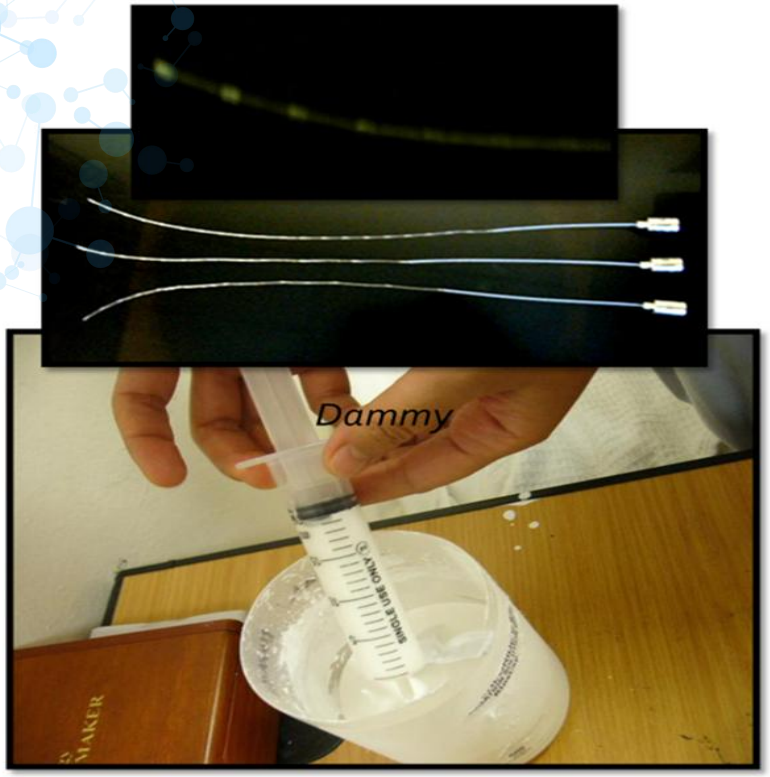
Fletcher set used for full insertion brachytherapy

Brachytherapy Procedure





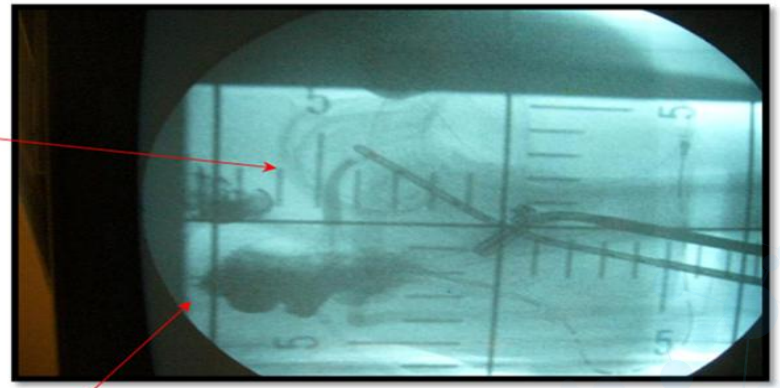
Brachytherapy Procedure



Barium Contras

Radiographic Simulator Image

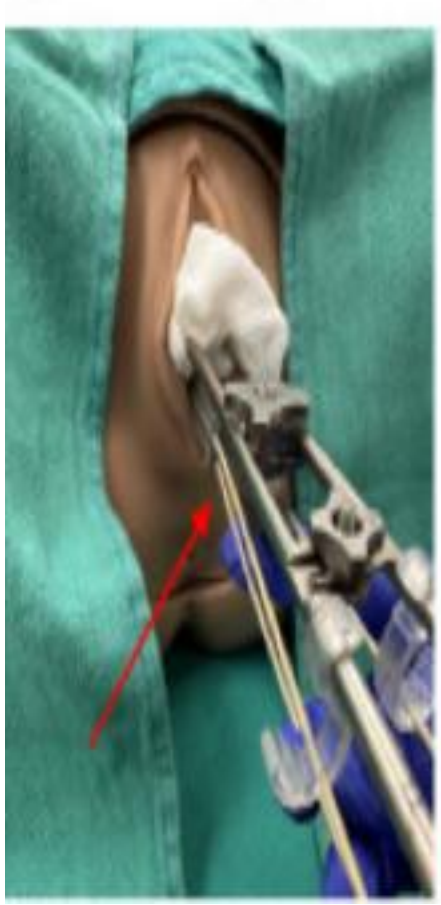
Radio-opaque(*dammy*) marker

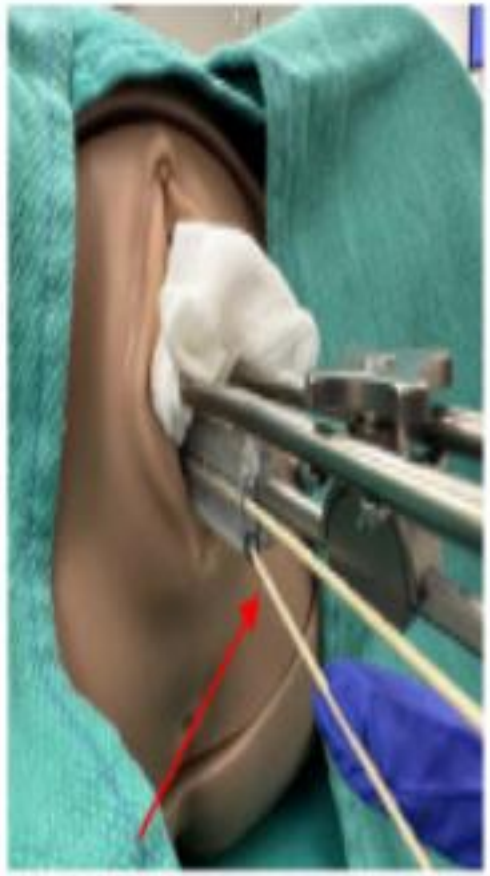


Rectum Contras-anus tube



Brachytherapy Procedure





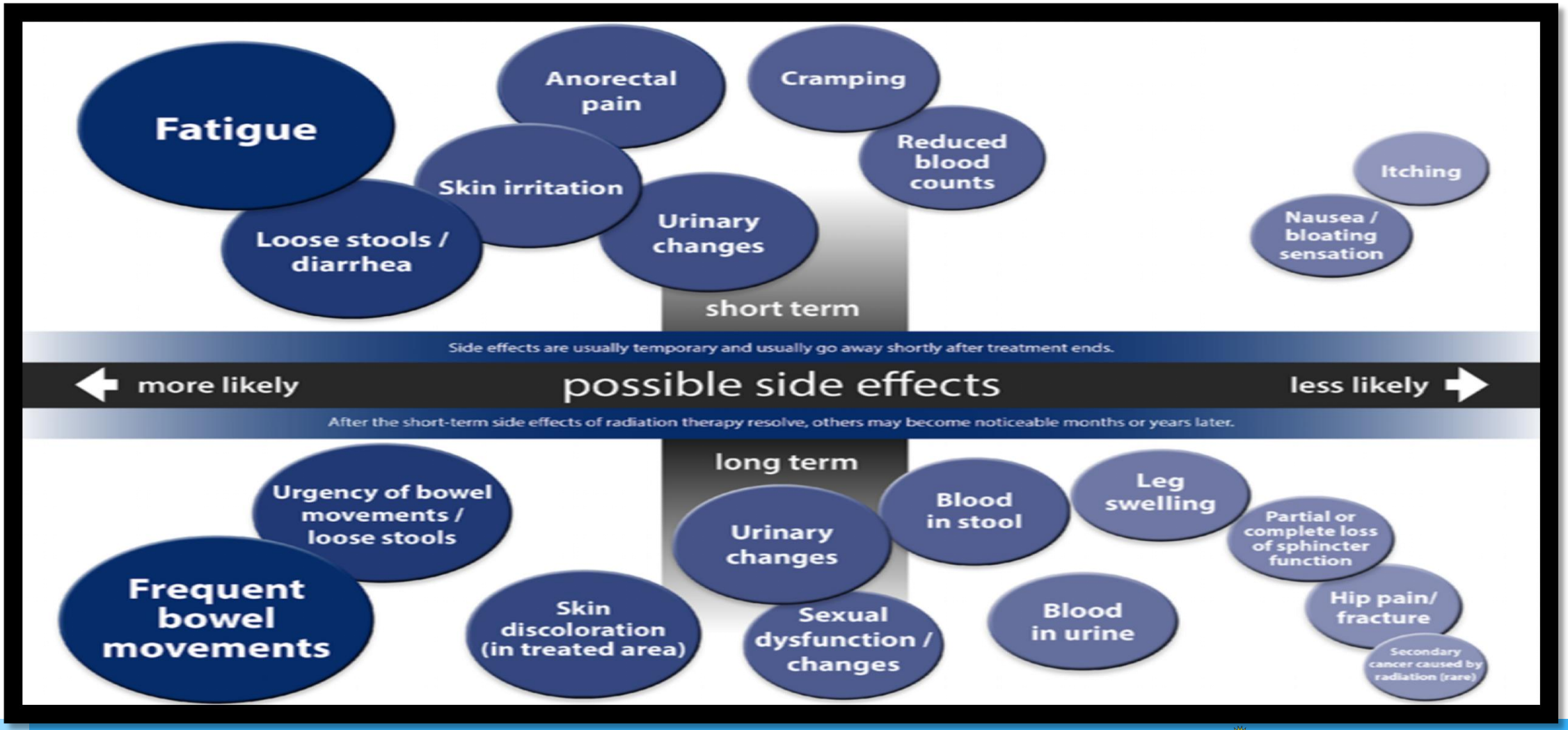




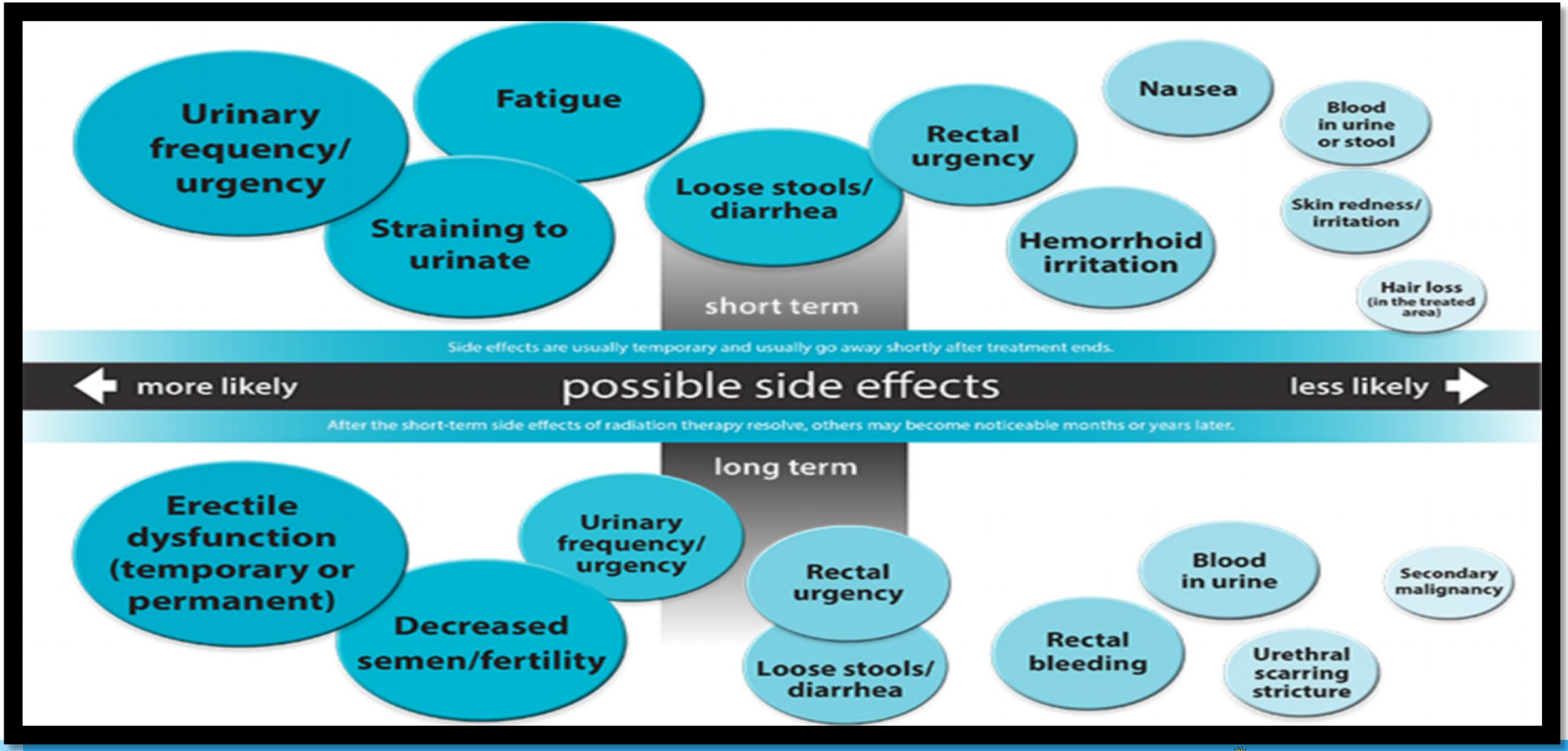


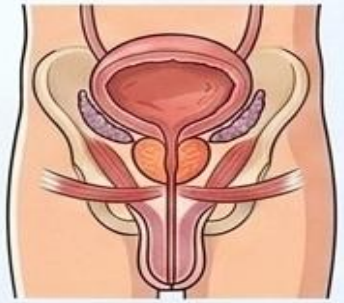


Radiotherapy Side Effects to Female Pelvis



Radiotherapy Side Effects to Male Pelvis





‘UNDERSTANDING SIDE EFFECTS OF RADIATION THERAPY FOR PROSTATE CANCER’



SHORT-TERM (ACUTE) SIDE EFFECTS



Frequent Urination & Bladder Urgency
Frequent urination & Bladder urgency



Burning During Urination (Dysuria)
Burning during urination (Dysuria)



Temporary Bowel Changes
(e.g., loose stools)



Fatigue
Tiredness, lack of energy

LONG-TERM (LATE) SIDE EFFECTS



Erectile Dysfunction
Erectile dysfunction, potential for [rectille incontinence



Incontinence & Bladder Changes

Rectal Bleeding or Narrowing
Rectal bleeding or narrowing



Urethral Stricture
Potential changes in renal function or local blood vessel damage.

COPING TIPS



DIETARY ADJUSTMENTS



PELVIC FLOOR EXERCISES



HYDRATION & BLADDER CARE TIPS



REPORT CHANGES TO DOCTOR

Nursing Division,
Ministry of Health Malaysia



‘UNDERSTANDING SIDE EFFECTS OF RADIATION THERAPY FOR CERVICAL CANCER’



SHORT-TERM (ACUTE) SIDE EFFECTS



Frequent Urination & Bladder Urgency
Frequent urination & Bladder urgency



Burning During Urination (Dysuria)
Burning during urination (Dysuria)



Temporary Bowel Changes
(e.g., loose stools or diarrhea)



Fatigue
Tiredness, lack of energy

LONG-TERM (LATE) SIDE EFFECTS



Vaginal Changes & Dryness
Vaginal narrowing, dryness, and discomfort.



Incontinence & Bladder Changes

Rectal Bleeding or Narrowing
Rectal bleeding or narrowing



Urethral Narrowing or Fistula
Potential for urinary flow issues, fistula formation

COPING TIPS



DIETARY ADJUSTMENTS



PELVIC FLOOR EXERCISES

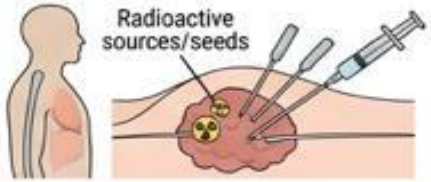


HYDRATION & BLADDER CARE TIPS



REPORT CHANGES TO DOCTOR

UNDERSTANDING IBRT:
INTERNAL BEAM RADIATION THERAPY



WHAT IS IBRT?
Also known as **BRACHYTHERAPY**. Education covers:
RADIATION SAFETY + CATHETER/SITE CARE
Uses: Prostate, Breast, GYN, Sarcoma, Head/Neck Cancers.

1. BEFORE IBRT
GOAL: Prep for procedure & radiation safety

PRE-OP PREP:
- **STOP** blood thinners/ NSAIDs 5-7 days before
- **Bowel/Bladder prep for pelvic sites:**
  - enema
  - empty/full bladder instructions
- **NPO after midnight** if under anesthesia
- **Arrange ride home & help** 24-48 hrs

RADIATION SAFETY PLANNING:
- **Permanent Seeds rules**
  - Limit close contact with kids <18, pregnant people 1-2 months
- **Private Room/Bathroom arrangements**

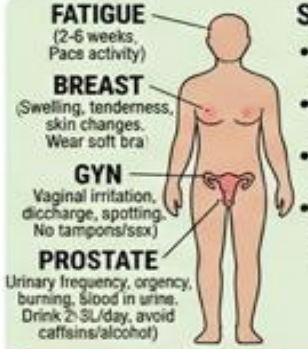
ASK YOUR TEAM:
Will I have permanent seeds or temporary catheters?
How long follow precautions?

2. DURING IBRT
GOAL: Stay safe, comfortable, and still during treatment

IF TEMPORARY CATHETERS IN PLACE:
- **Strict Bed Rest**
  Don't bend, twist, walk, sit up without staff approval
- **Pain management**
  Cramping/Pressure are common
- Keep catheter site **clean/ dry** (Don't touch/pull)
- **Report pain, bleeding, inability to urinate,** displacement immediately

IF OUTPATIENT WITH PERMANENT SEEDS:
- Procedure 1-2 hrs under anesthesia
- Sore afterward
- Radioactive but low dose
- **Discharge instructions & Radiation Card** provided

3. AFTER IBRT
GOAL: Heal, manage side effects, follow radiation precautions



SITE CARE:
- Keep clean/dry
- Don't remove dressings
- No baths, swimming
- Heavy lifting >5-10 lbs 1-2 weeks

RADIATION PRECAUTIONS (for Permanent Seeds):
- **Distance:** separate bed
  - stay 6 ft from kids/pregnant people 1-2 months
- **Hygiene:** Flush twice
  - Don't touch seed if it comes out, call clinic
- **Sexual Activity:**
  - Use condom 1-2 months if seeds in prostate/pelvis
  - Avoid pregnancy 6-12 months
- **Carry Radiation Card** 3-6 months

RED FLAGS: CALL IMMEDIATELY
- **Fever** >38°C/100.4°F
- **Heavy bleeding/Severe pain**
- **Unable to urinate**
- **Catheter falls out**

- **Fever** >38°C/100.4°F
- **Heavy bleeding/Severe pain**
- **Unable to urinate**
- **Catheter falls out**
- **Seed found** (Don't touch, put in container, call clinic)

4. FOLLOW-UP

First visit 1-2 weeks post-procedure
- Wound check, verify seed position

Long-term follow-up
- Cancer surveillance, manage late effects like fibrosis, incontinence, erectile dysfunction

KEY POINT IBRT combines surgery-level recovery with radiation safety rules. Precautions depend on whether you have temporary catheters or permanent seeds.

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Ministry of Health Malaysia

Radiotherapy Side Effects





'UNDERSTANDING SIDE EFFECTS OF RADIATION THERAPY FOR SKIN CANCER'



SHORT-TERM (ACUTE) SIDE EFFECTS



Skin Redness & Swelling
Redness & Swelling (Erythema/Edema)



Skin Dryness & Itching (Pruritus)
Blistering & Peeling (Desquamation)



Hair Loss in Treated Area
Patin-bearing area (Alopecia)



Fatigue
Tiredness, lack of energy

LONG-TERM (LATE) SIDE EFFECTS

Changes in Skin Texture



Skin Thinning



Skin Thickening/ Firmness (Fibrosis)



Vessel Dilation (Telangiectasia)



Hypepigmentation

Pigment Changes Scarring or Non-healing Ulcers
Chronic skin ulcer that doesn't heal



Risk of Secondary Skin Cancers
Lymphoedema (if nodes treated)



COPING & SKIN CARE TIPS



GENTLE CLEANSING
Use lukewarm water and a mild, unscented cleanser.



MOISTURIZE OFTEN
Apply fragrance-free, bland moisturizer regularly.



SUN PROTECTION
Avoid direct sun; wear protective clothing and sunscreen (SPF 30+) daily.



REPORT CHANGES TO DOCTOR
Contact your medical team if you notice signs

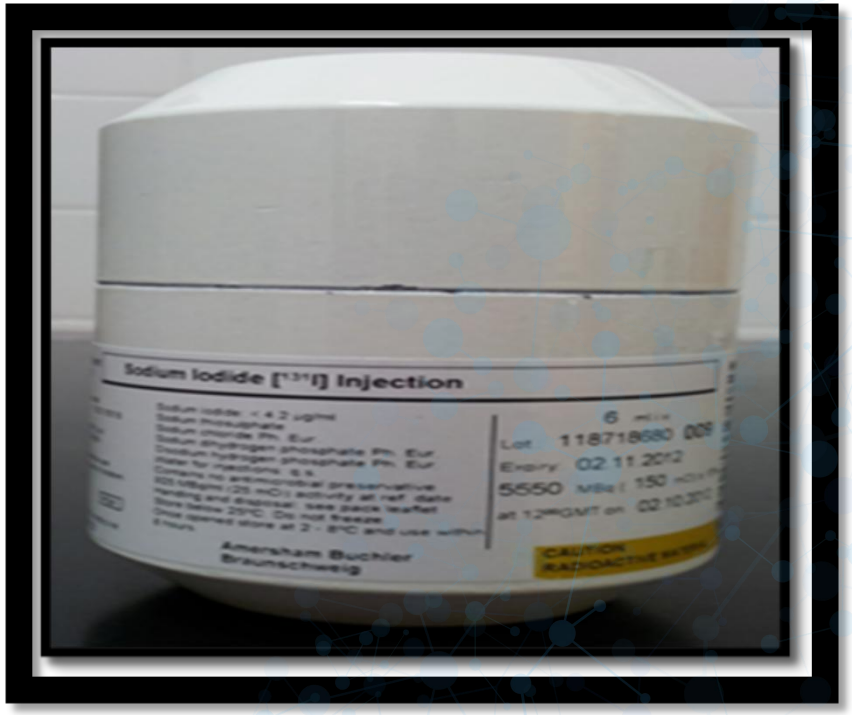
Treatment Modalities

Systemic radionuclide therapy / radiopharmaceutical therapy

Radioiodine Ablation Therapy



- Radioactive iodine-131 (I-131) is used for selected differentiated thyroid cancers.
- Strontium-89 is used for palliation of painful bone metastases.
- Timing of radioiodine ablation varies by indication, patient preparation, TSH stimulation method and institutional protocol.



There are several different dose levels of radioactive iodine use:

- Low scanning doses for diagnostic tests (I-123).
- Higher ablative (thyroid removing) doses for the treatment of thyroid cancer.



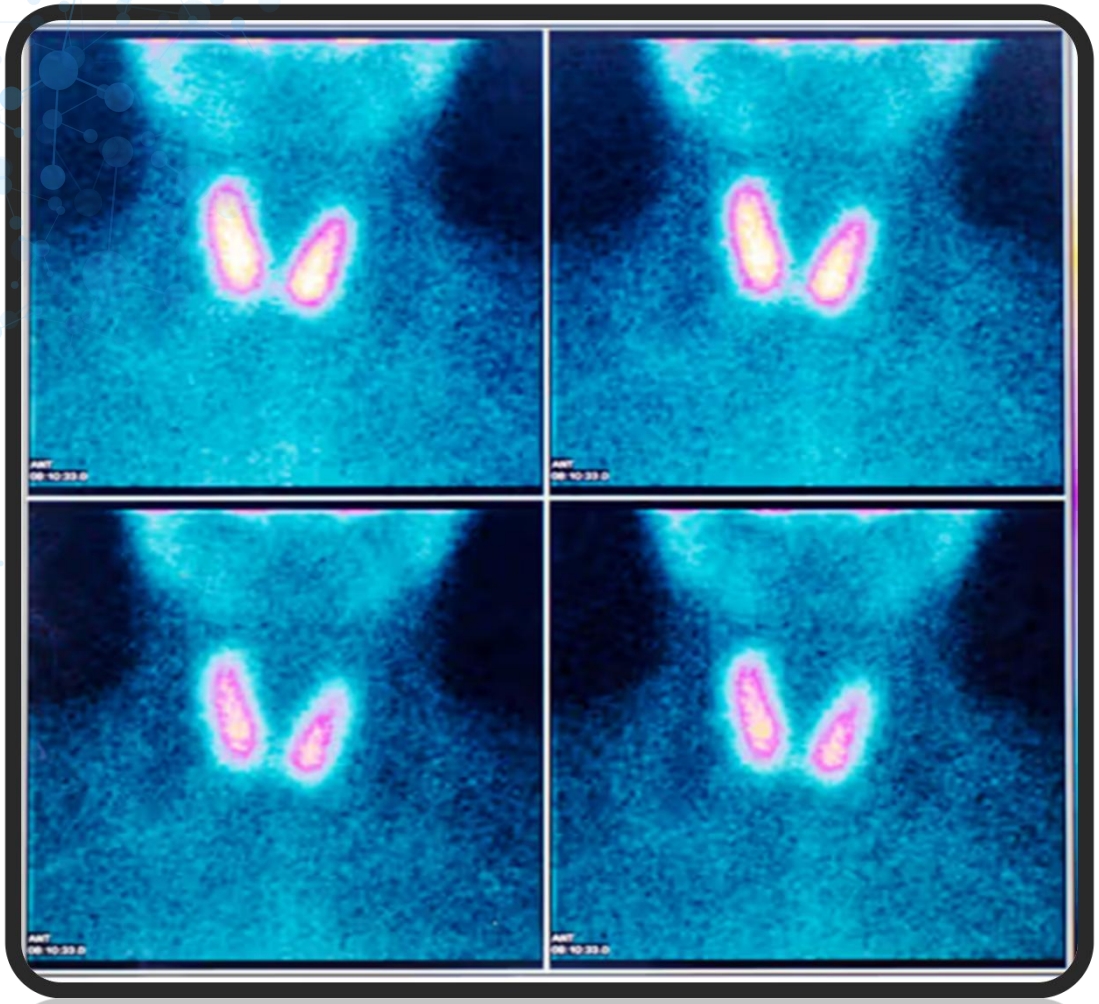
Process of Radioiodine Treatment

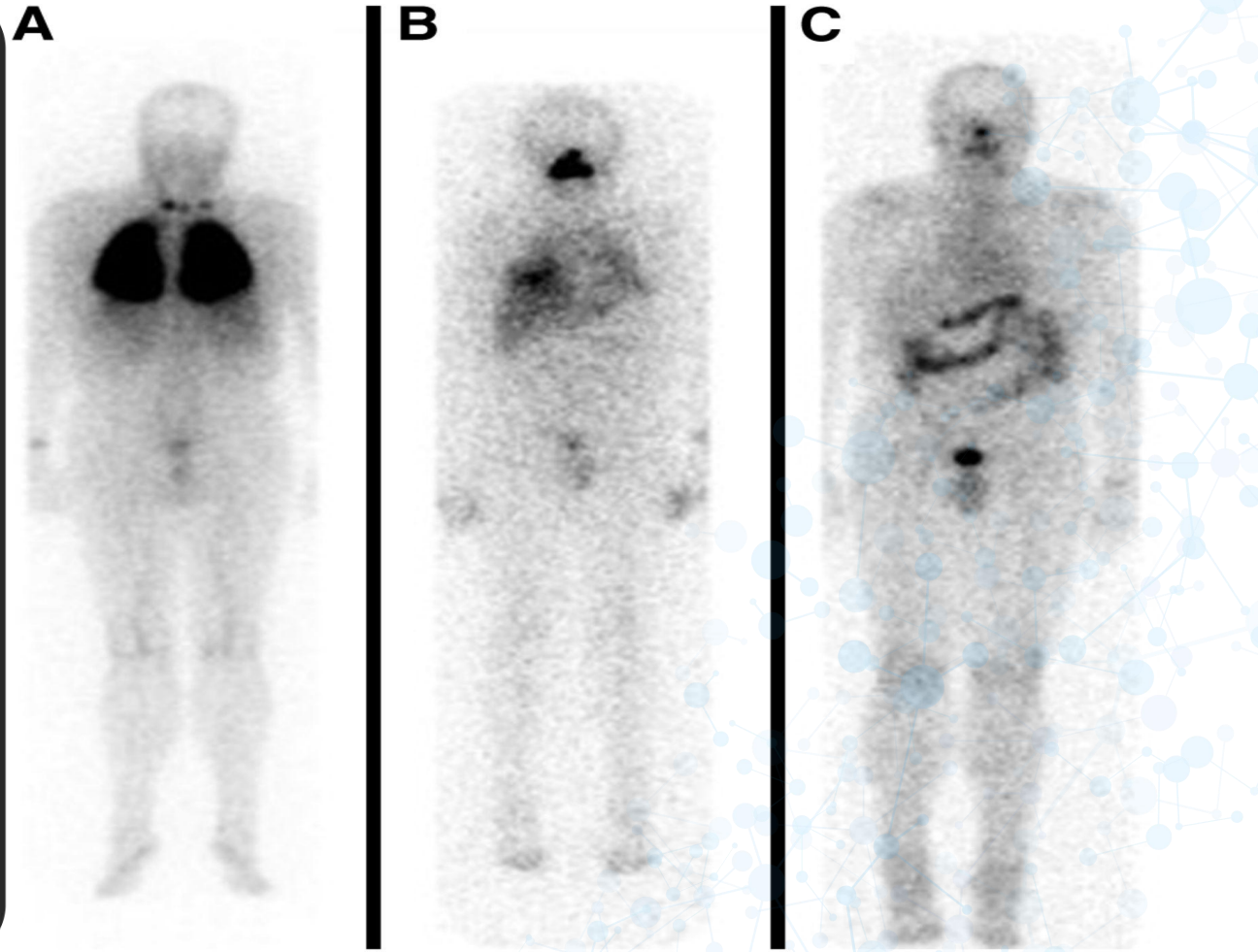


Radioactive Iodine 131 Treatment With IM Thyrogen



Thyroid scan and Whole Body Scan





COMMON SIDE EFFECTS OF RADIOACTIVE IODINE (RAI) THERAPY ☢

1. SHORT-TERM SIDE EFFECTS
(Days to Weeks)



SALIVARY GLAND SWELLING & PAIN
Tenderness under the jaw; cheek swelling.



DRY MOUTH & TASTE CHANGES
Metallic taste; difficulty swallowing; temporary loss of taste.



NECK DISCOMFORT
Mild pain or tenderness in the throat and neck.



NAUSEA & FATIGUE
Mild nausea in the first 48 hours; physical exhaustion.

TIME PROGRESSION



TIME PROGRESSION

2. LONG-TERM & PERSISTENT EFFECTS
(Months to Years)



HYPOTHYROIDISM (UNDERACTIVE THYROID)
Destruction of thyroid cells requires lifelong replacement therapy.





CHRONIC DRY MOUTH (XEROSTOMIA)
Persistent lack of saliva; higher risk of dental cavities.



TEMPORARY FERTILITY & MENSTRUAL CHANGES
Irregular periods; reduced sperm count (typically temporary).



SLIGHTLY INCREASED CANCER RISK (Very Rare)
Very low risk of secondary leukemias or other cancers with high doses.

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GUIDE FOR PATIENT RECOVERY: RADIOIODINE TREATMENT

BEFORE RADIOIODINE TREATMENT

Goal: Prepare your body to absorb the iodine

Low-Iodine Diet
Avoid: Iodized salt, dairy, seafood, seaweed, red food dye #3, egg yolks

Hold Thyroid Meds
Stop levothyroxine 3-4 wks, liothyronine 2 wks

Hydration
Drink extra water 24 hrs before to help flush later

Pregnancy/Breastfeeding
Rule out pregnancy. Stop breastfeeding permanently

Arrange Isolation
Plan childcare, pet care, time off

DURING TREATMENT

Goal: Minimize exposure and side effects

Take Capsule
Empty stomach, 1-2 hrs before/after

Hydrate Aggressively
Drink 2-3L water/day, helps flush iodine

Sour Candy/Gum
Stimulates salivary glands to reduce dry mouth

Isolation Room
Follow rules, minimize exposure, private items

Nausea is Common
Anti-nausea meds available. Tell nurse if vomiting

AFTER TREATMENT: RADIATION SAFETY AT HOME

Goal: Protect family, kids, pregnant people

TIME & DISTANCE

Sleep Alone
Separate bed 3-7 days

Keep Distance
6 ft / 2 m from kids/pregnant people

Limit Contact
Close contact <30 min/day

HYGIENE

Flush Toilet (x2)
Flush 2x, men sit

Wash Hands
Wash well after bathroom

Separate Items
Shower daily, separate towels

Food Prep
Don't prepare food for others

OTHER

Radiation Card
Carry for 3 months - avoid airport delays

Public Transit
Avoid public spaces 3-5 days

No Close Contact
Infants/pregn 1-2 weeks

Contraception
Avoid pregnancy 6-12 months

SIDE EFFECTS TO EXPECT & MANAGE

Neck pain/swelling
Use ice, Tylenol/Ibuprofen

Dry mouth/taste changes
Sour candy, hydration

Nausea, fatigue
Resolves 1-2 weeks

Salivary gland swelling
Warm compresses, hydration

Low blood counts
Rare, checked later

CALL CLINIC FOR:

- Fever >38°C, severe neck pain
- inability to urinate
- vomiting >24 hrs
- breathing difficulty

COMMON TO POST-PROCEDURE CARE:

Walk Daily starting Day 1

Fever Watch Increasing pain, changes

Fluids + Hydration = Healing

Follow Radiation Safety Officer Instructions
Officer Instructions

Key message: *The radiation leaves your body mostly through urine. The more you drink and flush, the faster it's gone and the safer everyone is.*

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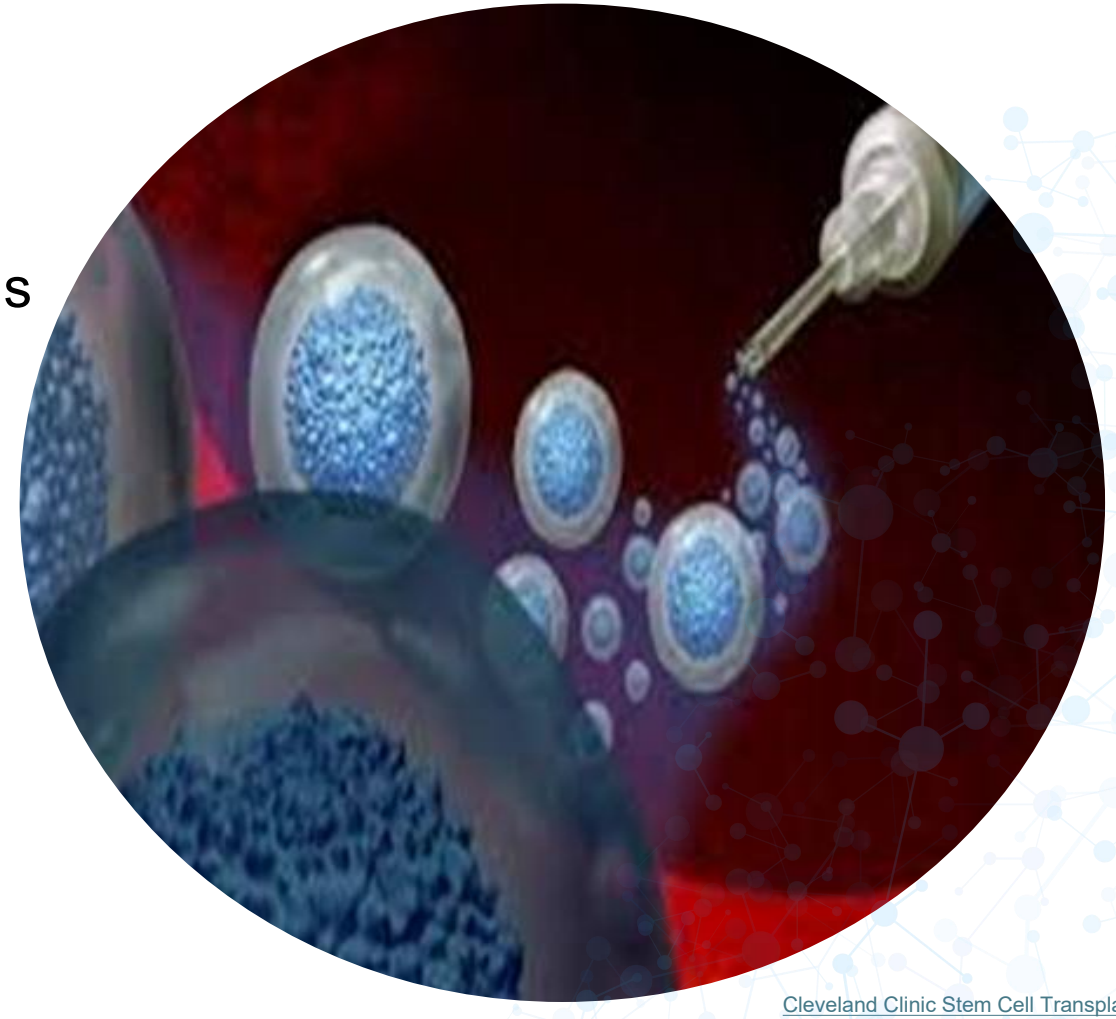
Treatment Modalities

“Haematopoietic stem cell transplantation”

Definition

- HSCT restores blood-forming stem cells after high-dose chemotherapy, radiotherapy or marrow failure; stem cells may come from the patient, a donor or cord blood.

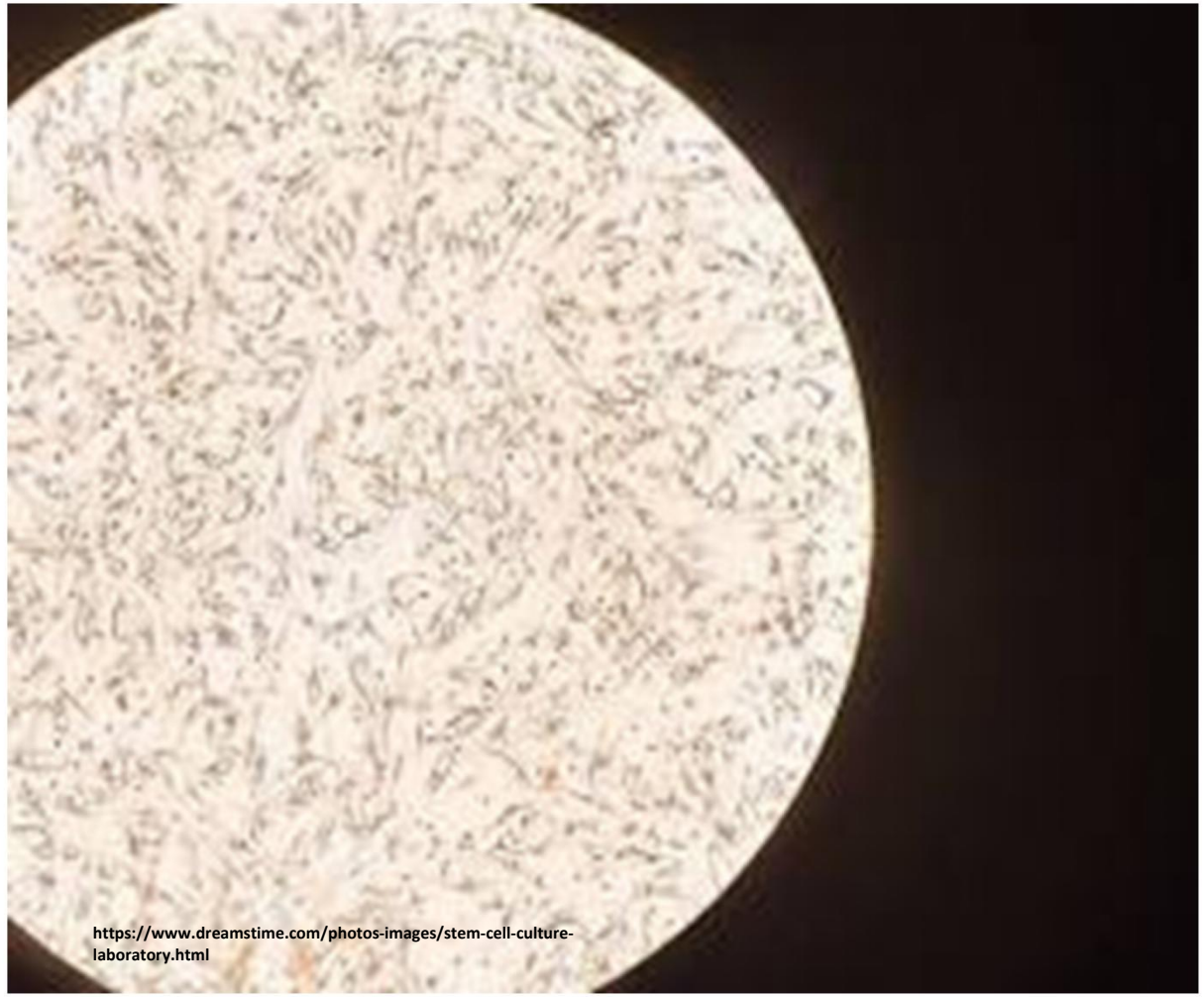
- It’s used in the treatment of a variety of diseases and offers.



Cleveland Clinic Stem Cell Transplant Overview.

Stem Cells

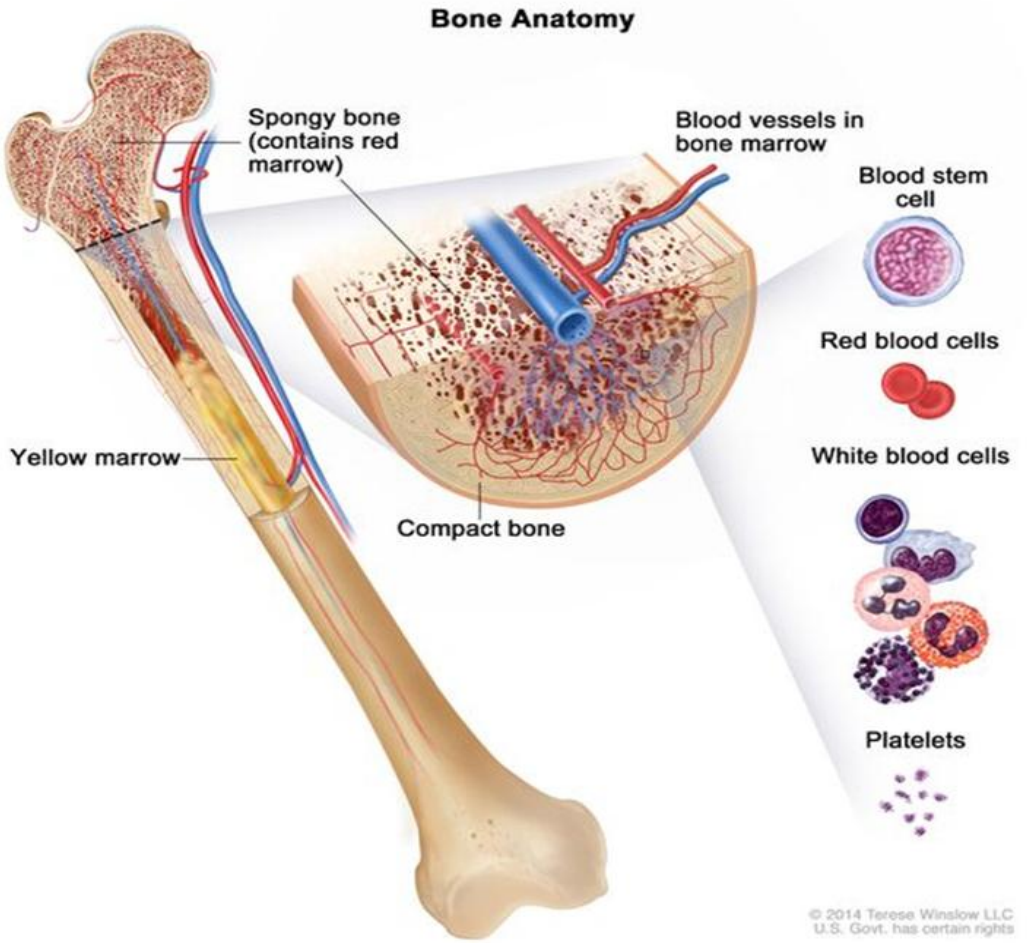
- Stem cells have been traditionally harvested from bone marrow cavities.
- Functional hematopoietic stem cells can be found circulating in peripheral blood as well.



https://www.dreamstime.com/photos-images/stem-cell-culture-laboratory.html

What Is Bone Marrow

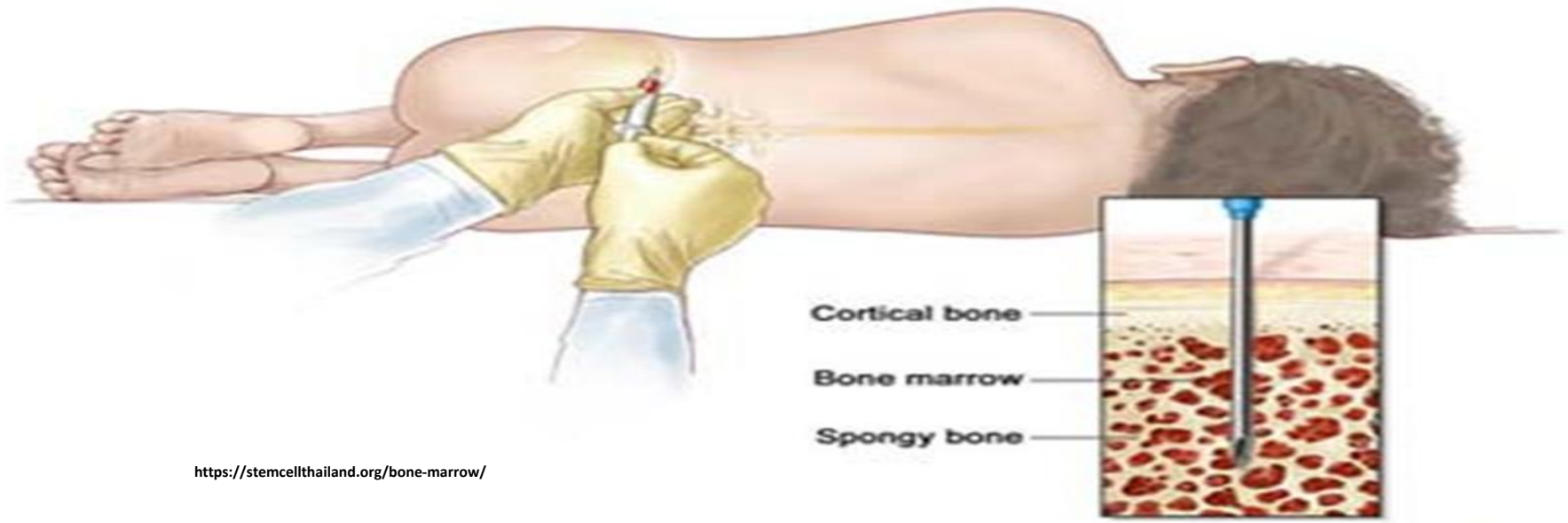
Bone marrow is the soft, spongy tissue found in the hollow center (medullary cavity) of most bones. It acts as the body's "blood cell factory," producing nearly all the components of your blood, including red blood cells, white blood cells, and platelets.



https://www.cancer.gov/publications/dictionaries/cancer-terms/def/bone-marrow

Sources of Stem Cells

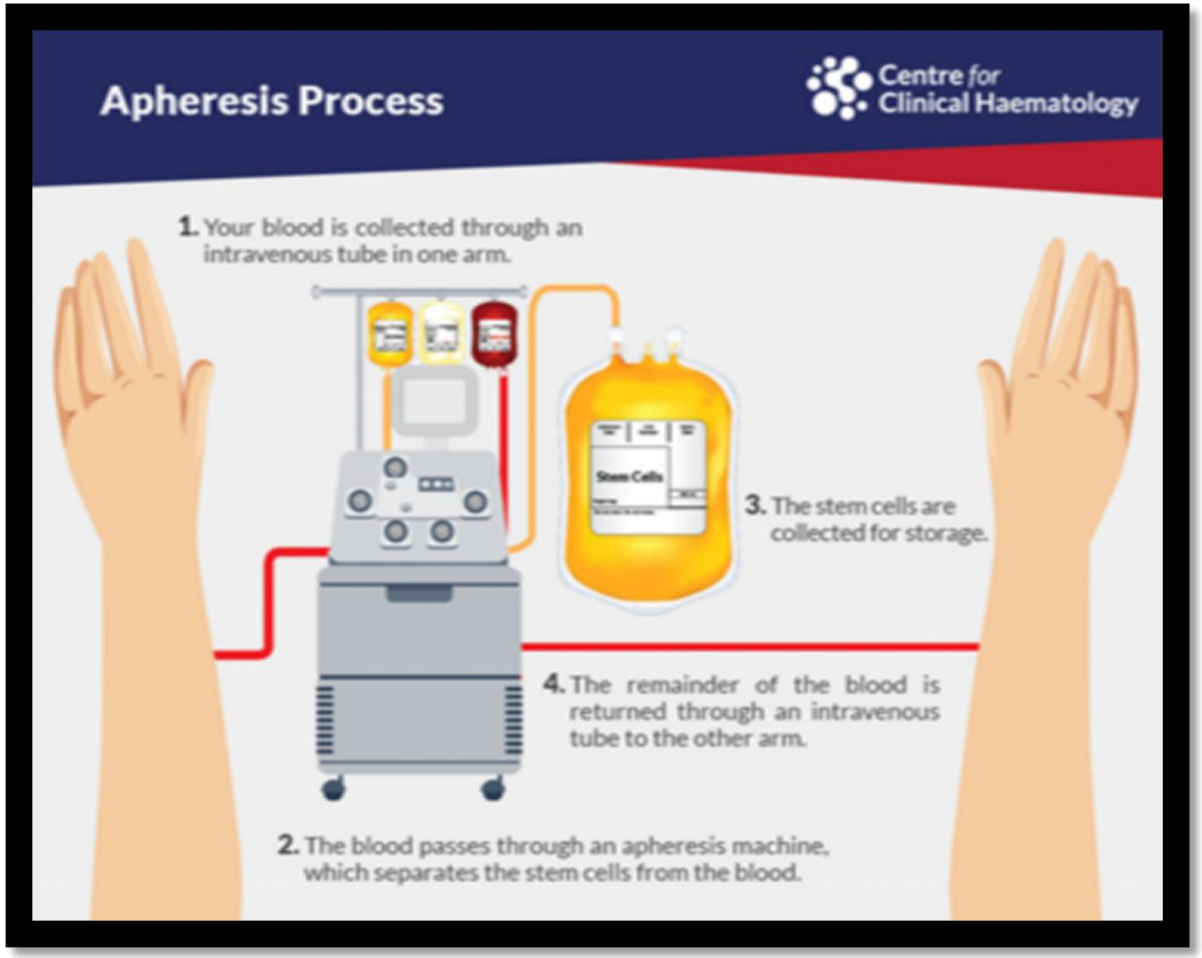
Bone Marrow: Bone marrow is a traditional source of haematopoietic stem cells; peripheral blood stem cells are now commonly used in many transplant settings.



https://stemcellthailand.org/bone-marrow/

Sources of Stem Cells

Peripheral Blood: Stem cells can be collected directly from the bloodstream. While normally present in low numbers, they can be "mobilized" (pushed from the bone marrow into the blood) for easier collection via a process called apheresis.



https://cfch.com.sg/matched-related-donors-undergoing-peripheral-blood-stem-cell-collection/

Sources of Stem Cells

Umbilical Cord Blood: Collected from a newborn's umbilical cord after birth, this is a rich source of young, potent stem cells often stored in cord blood banks for future use in transplants.



Public Cord Blood Banking

- Easy access
- Indefinite storage
- Speed of donor search
- Viral safety
- Available at Pusat Darah Negara (PDN)



3 TYPES OF TRANSPLANT

TRANSPLANT

AUTOLOGOUS (SELF)



- Patient's own stem cells
- Collected before treatment
- Used in high-dose chemo
- No risk of rejection

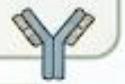


No donor

ALLOGENEIC (DONOR)



- Genetically matched donor
- Sibling, unrelated, or cord blood
- Source of new immune system
- Graft-versus-Tumor (GVT) effect
- Risk of GVHD



SYNGENEIC (IDENTICAL TWIN)



- Identical twin as donor
- Genetically identical
- Perfect match of HLA markers
- No immune response between donor/recipient
- Zero Graft-versus-Host Disease (GVHD)



KEY COMPARISON

KEY COMPARISON	SYNGENEIC	SYNGENEIC
	PROS: Zero GVHD; No immunosuppressants needed; Fast recovery; Healthy cells (no contamination)	CONS: Higher relapse risk (No GVT effect); Extremely rare (limited to identical twins)

COMMON USES

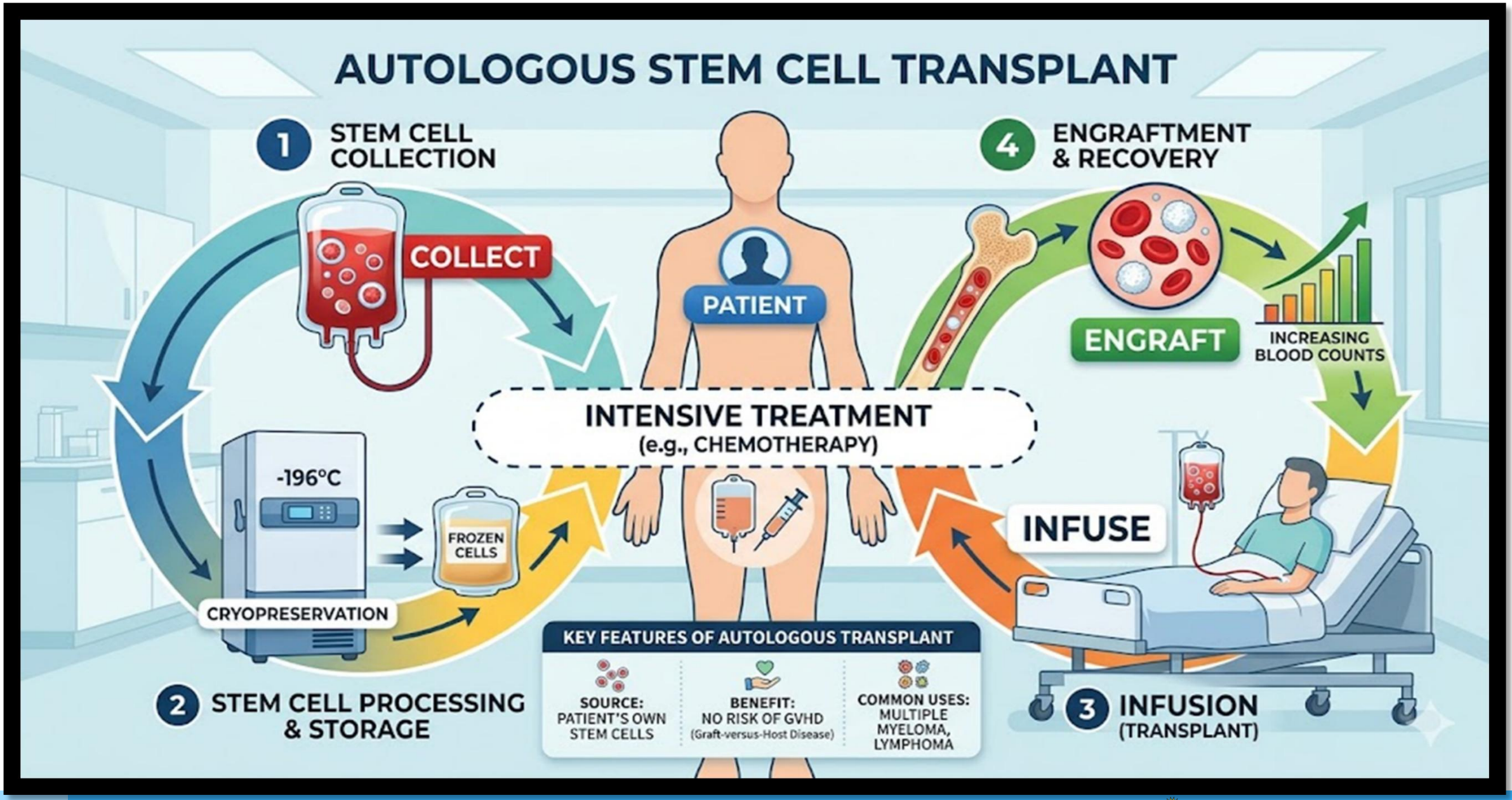


Treats bone marrow and blood disorders



EDUCATIONAL PURPOSE ONLY. CONSULT A MEDICAL PROFESSIONAL

AUTOLOGOUS STEM CELL TRANSPLANT



Nursing Division,
Ministry of Health Malaysia

ALLOGENEIC STEM CELL TRANSPLANT

A transplant using healthy stem cells from a matched donor (related or unrelated)

1 DONOR RECRUITMENT & HLA TYPING



DONOR RECRUITMENT & HLA TYPING
(not twins)

Finding a compatible matched donor (HLA Matching)

HLA-Matched

2 PRE-TRANSPLANT WORKUP



3 STEM CELL COLLECTION



STEM CELL COLLECTION
(from Donor)

A) Peripheral Blood Stem Cells Stem Cells (PBSC) or
B) Bone Marrow collection

4 PROCESSING & CRYOPRESERVATION



Cells are analyzed, quantified, and prepared

PREPARATIVE REGIMEN (CONDITIONING)



Patient receives chemotherapy and/or radiation to destroy diseased cells and suppress immune system

5 PREPARATIVE REGIMEN (CONDITIONING)



6 STEM CELL INFUSION



Healthy cells are infused into the patient's bloodstream

7 MONITORING FOR GvHD & INFECTION



Closely monitored for Graft-versus-Host Disease (GvHD) and other other complications

RISKS & BENEFITS OF ALLOGENEIC TRANSPLANT

POTENTIAL BENEFITS

- Lower relapse risk due to Graft-versus-Tumor effect

POTENTIAL RISKS

- Risk of Graft-versus-Host Disease (GvHD)
- Prolonged immune recovery
- Rejection Risk

DIFFERENCES FROM OTHER TRANSPLANTS

ALLOGENEIC:
Related/Unrelated Matched Donor

AUTOLOGOUS:
Patient's Own Cells

SYNGENEIC:
Identical Twin

SYNGENEIC STEM CELL TRANSPLANT

A specialized type of Allogeneic Stem Cell Transplant using genetically identical donors (twins).

1 IDENTICAL TWINS



IDENTICAL TWINS
identified as
Donor & Recipient

Donors must be monozygotic (identical) twins for a syngeneic transplant.

2 STEM CELL COLLECTION
(from Donor Twin)



STEM CELL COLLECTION
(from Donor Twin)

DONOR TWIN
collects cells via
(A) Peripheral Blood Stem Cells (PBSC) or
(B) Bone Marrow.



PROCESSING & STORAGE

Stem cells are separated, counted, and cryopreserved.



CONDITIONING
(Recipient Twin)

Recipient receives intensive chemotherapy and/or radiation to destroy diseased cells and suppress immune system.

4 CONDITIONING
(Recipient Twin)





STEM CELL INFUSION

Processed, healthy stem cells from donor twin are infused into the recipient's bloodstream like a blood transfusion.



ENGRAFTMENT

Infused stem cells migrate to bone marrow and begin to grow and produce healthy blood cells.

ADVANTAGES OF SYNGENEIC TRANSPLANT

- No risk of Graft-versus-Host Disease (GvHD)
- Faster immune system recovery
- Eliminates rejection risk

DIFFERENCES FROM OTHER TRANSPLANTS

SYNGENEIC:
Identical Twin

ALLOGENEIC:
Related/Unrelated Donor

AUTOLOGOUS:
Patient's Own Cells

Nursing Division,
Ministry of Health Malaysia

Events in Stem cell transplant (HSCT)

- Patient selection and timing
- Donor identification and HLA matching (if for allogenic SCT)
- Patient and donor counselling
- Mobilization and Collection of stem cells (autologous/allogenic)
- Admission for transplant

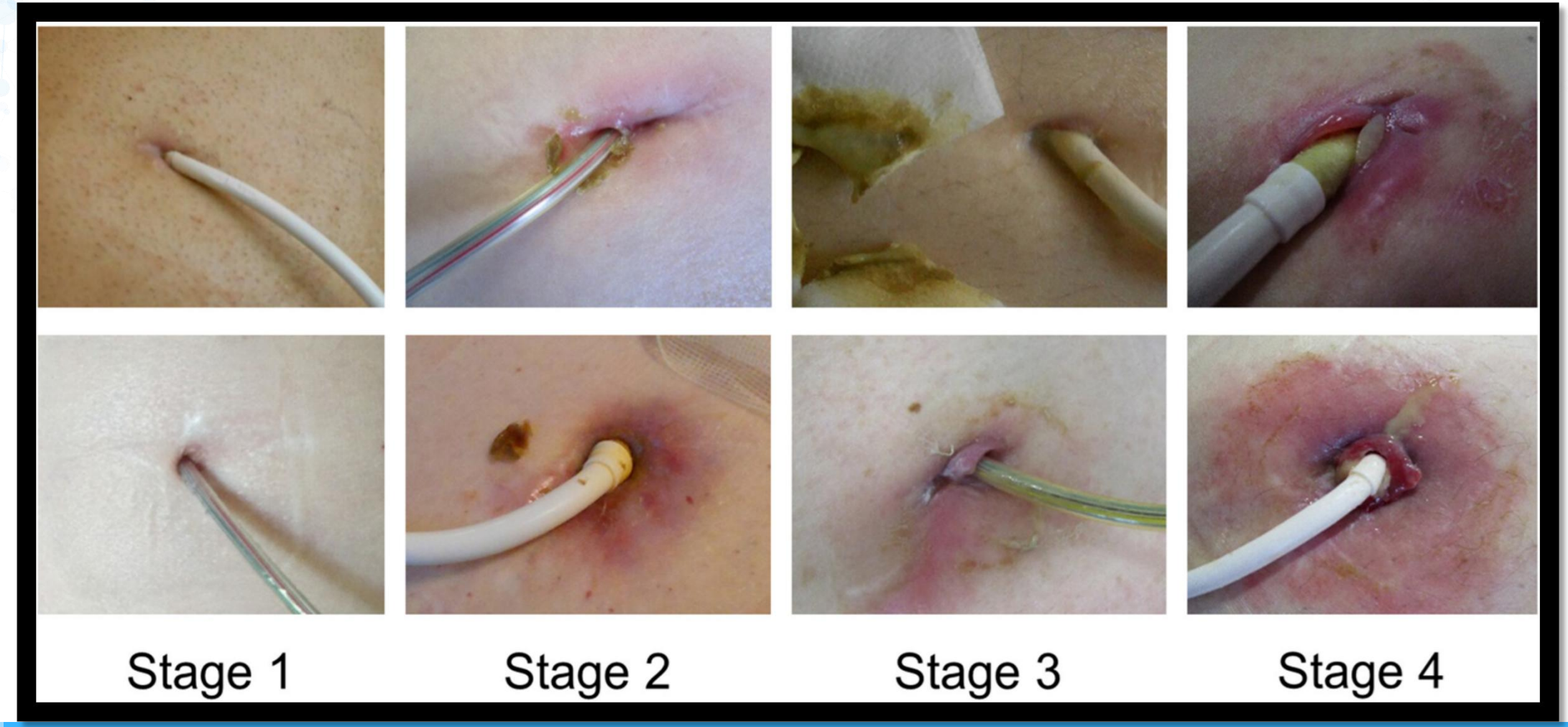
Process of Stem Cells Transplant

- Admission for transplant
- Venous access
- Conditioning regimen
- Stem cell infusion
- Neutropenic phase and awaiting engraftment
- Oral mucositis / Nutritional support
- Infection management and transfusion support

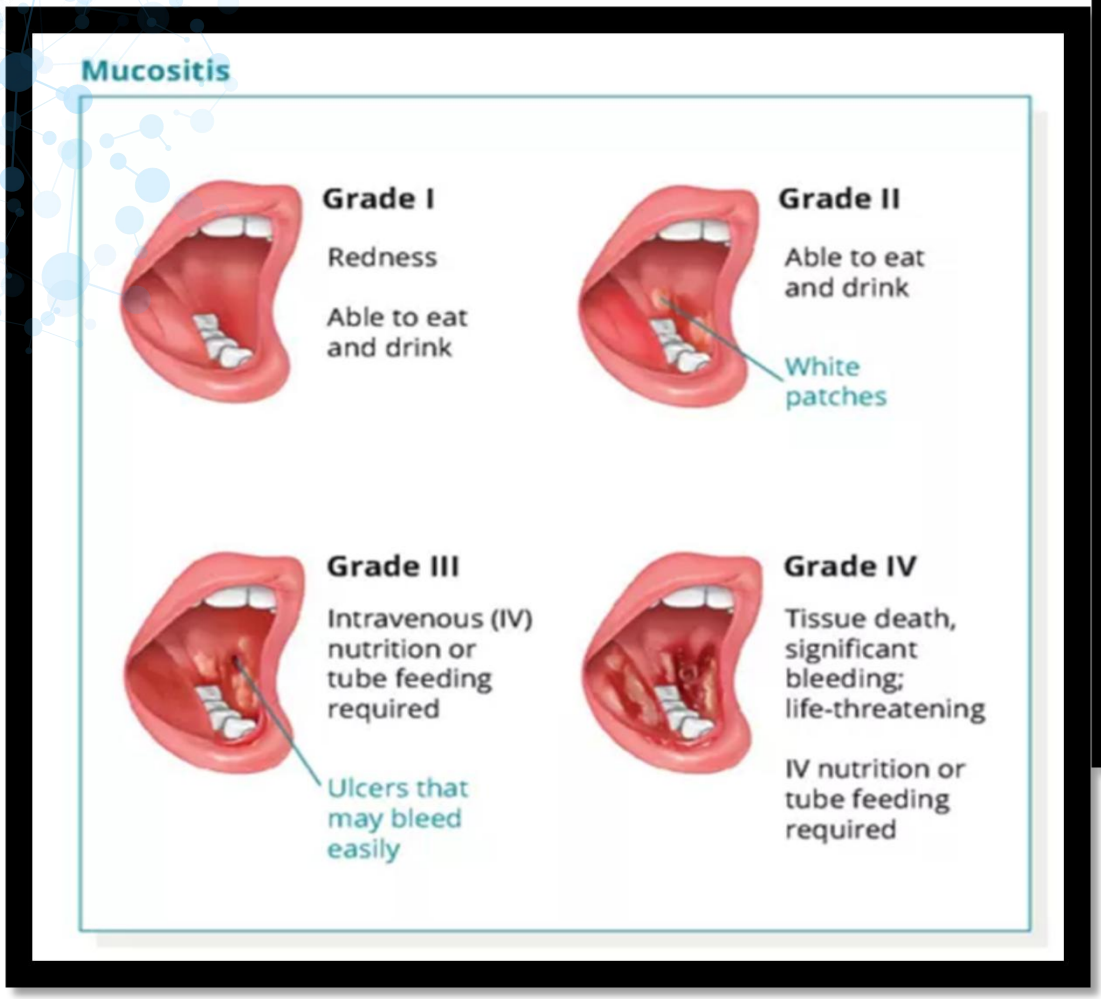
Viral Infections

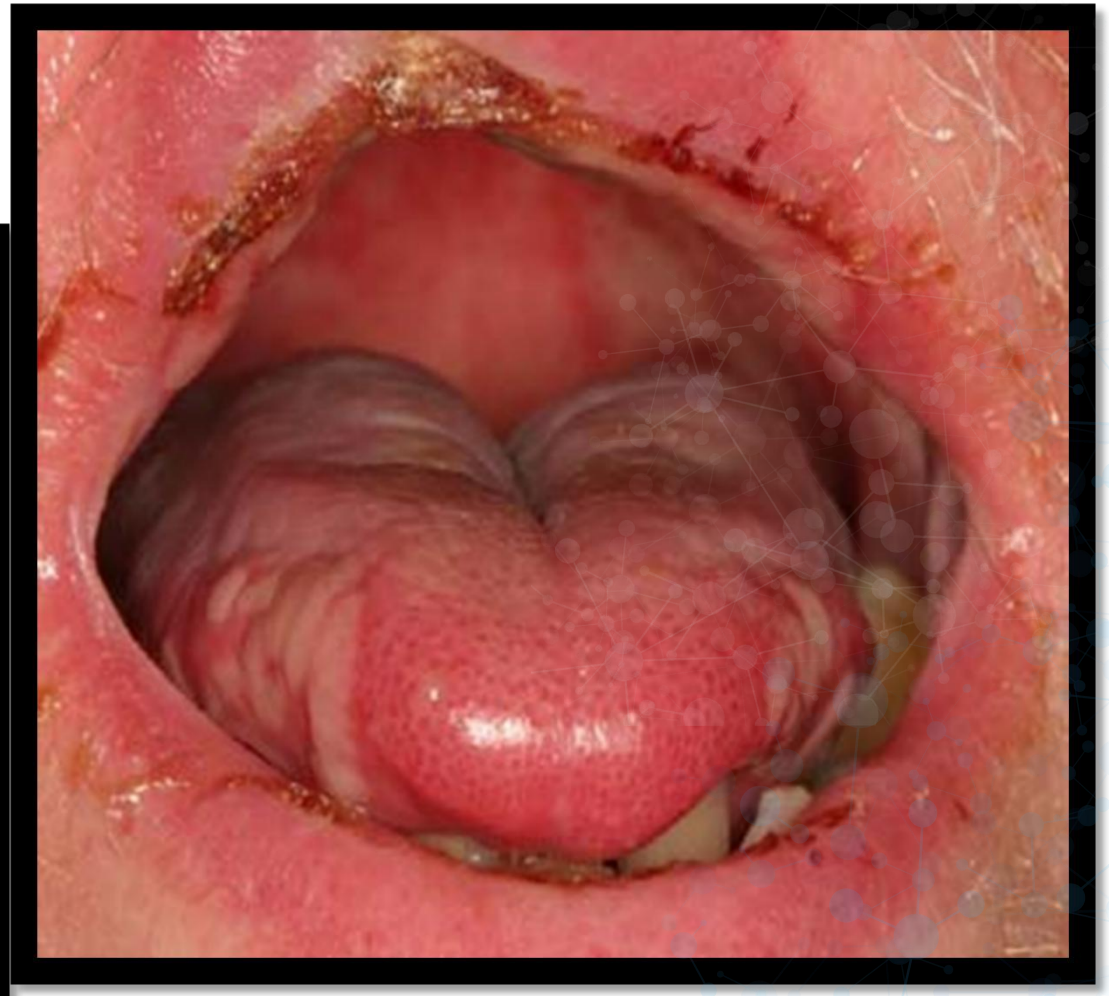


Bacterial infections



Oral mucositis





Events in Stem cell transplant

- Engraftment
- Acute graft-versus-host disease (acute GVHD)
- Discharge

Acute graft-versus-host disease (Acute GVHD)





Acute graft-versus-host disease (Acute GVHD)

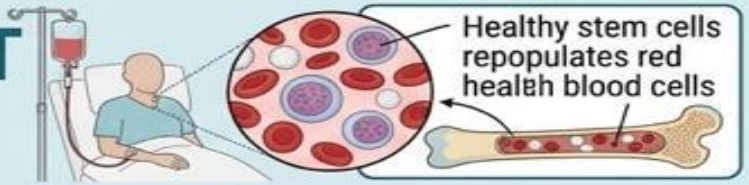




Health Education

UNDERSTANDING STEM CELL TRANSPLANT

= high-dose chemo to kill cancer, then stem cell infusion to rebuild bone marrow.
You'll have no immune system for weeks, so infection prevention is everything.



1. BEFORE STEM CELL TRANSPLANT

Goal: Get strong and infection-free

MEDICAL PREP:

- **Dental check/ cleaning** (2-4 weeks before, no work for 6+ months after)
- **Infection-busting icon**
- **Port-catheter**

HOME PREP:

- **24/7 caregiver**
- **30-min-from-hospital** allogeneic
- **Deep-clean** (removing plants, flowers, old carpets)

LIFESTYLE:

- **Stop smoking/ alcohol**
- **Castin & aralonis**
- **High-protein/ calorie meals** flowers, old carpets
- **Time off work/school** (3-6 months min)

2. DURING TRANSPLANT

Goal: Get through the low blood count period safely

PHASE 1 - CONDITIONING CHEMO/RADIATION: 5-7 days

Nausea | Mouth care | Soft brush | Fever & cherma

PHASE 2 - STEM CELL INFUSION: 30-90 min

Blood transfusion | Fever/chills symptoms

PHASE 3 - NEUTROPENIC PERIOD: 7-21 days (Highest risk)

Private room | Restricted diet (no raw/undercooked) | Hand-washing | Central line care

3. AFTER TRANSPLANT

Goal: Avoid infection and watch for complications

INFECTION PREVENTION (3-6 months)

- **Hand wash constant**
- **Diet** (no raw/ undercooked/ unpasteurized/ leftovers >24h)
- **Avoid crowds/mask** (no gardening, pet litter, diapers)

WATCH FOR GVHD (donor cells)



RECOVERY TIMELINE

- **0-30 days** daily clinic visits
- **30-100 days** immune slowly returns
- **Fatigue** lastss months

RED FLAGS: CALL IMMEDIATELY

- **Fever** >38°C/100.4°F
- Chills, cough, burning urination
- Severe diarrhea/vomiting/can't keep fluids down
- Rash, yellowing skin/eyes, bleeding
- Shortness of breath, chest pain

KEY MESSAGE For 3-6 months, a simple cold can be dangerous. When in doubt, call. We'd rather hear from you early.

Nursing Division,
Ministry of Health Malaysia

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THANK YOU