

Rehabilitation Nursing Certification Examination: Web Cast Study Session

Oncology Rehabilitation

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Learning Objectives

- Review pathophysiology of cancer
- Describe common side effects of cancer treatments
- Describe rehabilitation nursing interventions which assist people with cancer to optimize their functional abilities

Survivorship and rehabilitation

- Despite relatively stable age-standardized rises in rates of cancer, the total numbers of people living with cancer are increasing related to our aging population
- As the population continues to grow and age, the numbers of new cases of cancer will grow each year, 145,000 new cases in 2004
- 1 in 3 Canadians are expected to be diagnosed with cancer in their lifetime

(Canadian Cancer Society, 2004)

Survivorship and rehabilitation

- 1 in 42 men, and 1 in 38 women living in 2004 have had a diagnosis of cancer within the past 15 years
- The cancer experience presents many physical, emotional and spiritual challenges, often persisting beyond the point of physical recovery
- Cancer survivors are at risk of recurrence

(Canadian Cancer Society, 2004)

Is there a need for rehabilitation for people with cancer?

- A large volume of cases
- Surveys of people with cancer show that their functional needs are significant.
- Inpatient rehabilitation for patients with cancer accepted since 1982

● YES

Definitions of survivorship

- the experience of living through, or beyond the illness
- movement through phases
- different than “cure”
- “cure” vs control

Survivorship as a continuum

- the “seasons” of cancer
 - acute stage begins at diagnosis
 - extended stage, treatment is finished, remission, adjuvant therapies
 - permanent stage, chances of return are slim, late effects of treatment
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Pathophysiology of cancer

- normal cells have various rates of growth
 - uncontrolled cell growth resulting in an abnormal mass of cells is called a neoplasm
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Pathophysiology of cancer

- cancer cells are not subject to the usual restrictions placed by the host on cell proliferation
- cancer is not a disorderly growth of immature cells; it is a logical, coordinated process in which normal cells change, and take on special capabilities

(Otto, 2001)

Pathophysiology of Cancer

- Proliferative growth patterns
- not all proliferative growth patterns are cancerous
- 4 common non-cancerous (benign) types are: hypertrophy, hyperplasia, metaplasia and dysplasia
- these conditions may precede cancer

(Otto, 2001)

Pathophysiology of Cancer

Benign

- slow growing
- can become quite large
- well organized, differentiated
- rarely cause death

Malignant

- programmed to proliferate
- unorganized, undifferentiated
- ability to metastasize
- invade, destroy, can cause death

Pathophysiology of cancer

- “cancer” is the common term for all malignant neoplasms
- anaplastic growth patterns are those that have mature cells, regressing to more immature forms
- the capacity to specialize is lost

(Otto, 2001)

Pathophysiology of cancer

- Neoplastic growth patterns are when an abnormal tissue mass extends beyond the boundaries of normal tissue
 - uncontrolled functioning, unregulated cell division, abnormal mobility
 - benign neoplasms (warts, papillomas) or malignant (solid tumors, leukemia)
 - Malignant neoplasms can destroy the host
- (Otto, 2001)

How cancer cells grow

- proliferative control is lost
 - the capacity to differentiate is lost
 - biochemical properties are altered
 - chromosomes are unstable
 - cancer cells can spread or metastasize
- (Otto, 2001)

Pathophysiology of cancer

- cancer can invade one location, or spread to other areas (metastasize)
- 30% of people with solid tumor have metastases at diagnosis
- cells are released from the primary tumor, spread via circulatory and lymphatic systems
- may appear many years after initial diagnosis

(Otto, 2001)

Carcinogenesis: the transformation from normal to cancer cell

- varying theories: exact cause still unknown
- initiating agent
- promoting agent
- progression
- oncogenes
- heterogeneity
- transformation

● (Otto, 2001)

Theories of carcinogenesis

- hormonal
- chemical
- viral
- radiation
- immune system
- heredity

Grading and staging of cancer

- diagnosis of cancer is confirmed by tissue pathology
- staging classifies cancer based on the apparent anatomical extent of the malignancy
- used for deciding treatment plan and prognosis, comparing results of research and statistics

(Otto, 2001)

Staging of cancer

- the TNM system
- T = size of primary **tumor**
- N = regional lymph **nodes**
- M = presence/absence of **metastases**
- **example: T1, N 0, M 0 breast cancer is one with a tumor of 3 cm or less, no lymph node involvement and no metastases**

(Otto, 2001)

Treating cancer

- Radical (curative)
- Adjuvant
- Neo-adjuvant
- Prophylactic
- Palliative
- Non-Malignant

Treating Cancer

- Main treatment methods for cancer:
 - Surgery.
 - Chemotherapy.
 - Radiation.
 - Immunotherapy.
 - Bone marrow transplants.
 - Stem cell transplants.

Symptoms or side effects of treatment

Surgery

- Impaired wound healing
- Pain with movement
- Changes in body image
- Lymphedema
- *Extreme fatigue*

Symptoms or side effects of
treatment

Radiation- Early

- Acute and chronic skin reactions
- Alopecia
- Leukopenia
- Nausea, vomiting, anemia, diarrhea
- Esophagitis/Mucosistis
- Dehydration

Symptoms or side effects of treatment

Radiation- Early

- Edema
- Urinary frequency
- *Extreme fatigue*

Symptoms or side effects of treatment

Radiation- Late

- Cataracts
- Sterility, impotence
- Lymphedema
- Fibrosis/telangiectasi
- Transverse myelitis
- Secondary malignancy

Symptoms or side effects of
treatment

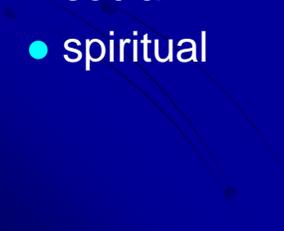
Chemotherapy

- Thrombocytopenia, Leukopenia, Anemia
- Nausea, vomiting, diarrhea
- Dehydration
- Drug effects on physiological parameters
- Central and peripheral nerve injuries
- Alopecia
- Extreme fatigue

Symptoms and side effects of treatment

- impaired functional abilities
 - increased fracture risk
 - alterations in body image
 - symptoms of depression
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Long term effects of cancer and cancer treatment

- Physiological
 - Psychological
 - Emotional
 - Functional
 - social
 - spiritual
- 

Physiological long term effects

- Months to years after treatment
- Mild-life threatening
- Clinically obvious, subtle, to sub-clinical
- Effects depend on age and developmental stage of person
- Effects may be cumulative

CNS Effects

- Neurophysiologic
- Children: decrease in intelligence potential and academic achievement
- Decrease in visual motor skills, memory, attention
- Expect CNS effects: 48% of children, younger, females higher risk
- These effects may be latent, eg 24-36 months after end of treatment

CNS Effects

- Also found with older pts
- Cranial radiation, expect long term effects
- Synergistic effect between radiation and chemo is hypothesized; increases toxicity and CNS effects
- “Chemo brain”

CNS Effects

- “Chemo brain”
“I have chemo brain. I can’t think, I can’t remember anything, and I often feel like I am going to fall.”
 - Effects include confusion, memory loss, seizures, altered sensation and proprioception
- (Schneider et al., 2003)

Vision and hearing

- Enucleation most serious (ocular tumors)
- Cataracts associate with cranial radiation and long term steroids
- Cisplatin associated with hearing loss

Endocrine system

- Can effect metabolism, growth, secondary sexual development and reproduction
- Damage to thyroid causes hypothyroidism
- Effects O₂ utilization, CNS and PNS, skeletal and cardiac muscle, metabolism, growth and development

Endocrine effects

- Higher doses of radiation greater risk
- Effects late, 3-4 years after treatment, as late as 7-14 years after
- Hormone deficiency with short stature one of most common effects for kids post CNS radiation (50-100%)

Endocrine Effects

- Chemotherapy, especially alkylating agents (eg cyclophosphamide) cause permanent damage to gonads
- Primary ovarian failure, amenorrhea, decreased estradiol, elevated leutenizing hormone and follicle-stimulating hormone, arrested pubertal development
- Absent sperm, but testosterone production, therefore pubertal development not effected
- Age at time of treatment, sex and total chemo use are factors
- Fertility of many women and most men effected

Immune system

- Long term immunosuppression
- B cells repopulate in 12 months, but T cells take much longer
- Suppressor T cells recover more quickly than helper T cells
- Inversion of helper to suppressor ratio can last 10 years
- Myelosuppression can leave patients highly susceptible to infections

Cardiovascular System

- Chemotherapies eg. Doxorubicin re: cardiac toxicity, cardiomyopathy, CHF
- Cumulative dose increases risk
- Radiation
- Coronary artery disease: MI, angina
- Pericardial damage: pericardial effusions

Pulmonary System

- May be acute or chronic, days, months to years after treatment
- Coughing, dyspnea, low grade fevers
- Pulmonary side effects contribute to SOB, fatigue, frequent infections, low functional capacity
- Long range pulmonary fibrosis
- Caused by chemo, radiation, repeated infections in immunosuppressed pts

(Schneider et al, 2003)

Gastrointestinal Effects

- Treatments may cause acute changes in intestinal mucosa
- Nausea, vomiting, diarrhea, constipation, abdominal pain
- Chronic changes include thickening of segments of bowel, ulceration, narrowing of the bowel

(Schneider et al., 2003)

Renal Effects

- Nephritis and cystitis are most common
- Damage to nephrons and bladder from chemo and pelvic radiation



MSK Effects

- Stature may be effected by age(children), height achieved and dose of radiation
- Rads to vertebra may result in scoliosis, or kyphosis or both
- May increase risk of fracture, poor healing of long bones
- Prolonged use of steroids can have degenerative effects
- Surgical treatments have functional and cosmetic effects
- Dental problems with head and neck rads and chemo

Secondary neoplasms

- Adults and children who have received chemo and rads are at risk for development
- For kids, risk is 10X greater than non-cancer kids
- Underlying risk factors, eg smoking, bladder and lung cancer
- Malignant transformation of normal cells due to non-lethal damage to DNA of chemo and rads

Secondary cancers after chemotherapy

- Acute nonlymphocytic leukemia (ANL) after alkylating agents most common
- Prolonged pancytopenia
- Can occur just over one year after start of treatment, peaks at 5 years and plateaus at 10 years following treatment
- ANL following rads is uncommon, but has been reported in kids and non-Hodgkins lymphoma, as well as women with breast cancer

Physiologic long term effects- Summary

- The consequences of permanent tissue damage across the lifespan are unknown
- Long term follow-up must include annual physical
- Evaluation of specific target systems/organs and surveillance for secondary malignancies depends on initial cancer, age, amount and type of treatment, and personal risk factors
- Some specific practice guidelines have been established eg kids
- Must strike a balance: reasonable monitoring vs needless anxiety for survivors

Physiologic effects

- those with more physiologic effects, disability, more likely to experience psychosocial effects, eg symptoms of depression, relationship issues
- need more help to manage physical changes
- may have heightened anxieties about recurrence

Oncologic emergencies

- Increased intracranial pressure
- Metastatic Spinal Cord Compression (MESCC)
- Superior vena cava syndrome
- Septic shock

Complications of cancer

- Hypercalcemia of malignancy
- Syndrome of Inappropriate Secretion of Antidiuretic Hormone (SIADH)
- Deep vein thrombosis (DVT)

Socio economic effects

- employment problems may arise related to myths and beliefs
- the work performance of cancer survivors differs little, if any from others
- availability of insurance can be problematic

Fears of relapse and death

- probably the most common concern for all survivors
- control over destiny
- many forms, hyper alert, feelings of vulnerability
- health care providers need to offer continued support, reassurance and information

Dependence on health care providers

- as treatment ends ,feelings of happiness and abandonment both
- some may avoid providers for fear of “finding something”
- information on health promotion, prevention and maintenance

Survivor guilt

- re-examining the question “why me?”
- “why not me?”
- many re-examine life priorities, meaning of life, “life rekindled”
- transition from sick role to healthy role, can be impeded by physical limitations, beliefs, social stigma

Effect upon the family

- families worry about the same things as patients, eg recurrence
- marital problems, sexual problems
- parenting

Rehabilitation

The ultimate purpose of rehabilitation for people with cancer, is to improve the quality of survival, so that the person's life will be as comfortable and productive as possible, and he or she can function at a minimum level of dependency, regardless of life expectancy.

- (Dietz, 1980, p. 145)

Rehabilitation

- prevents, or avoids dysfunction
- reduces the extent of disability
- assists in developing strategies to cope with alterations in health status and functional abilities
- is a dynamic process, involving preventative and restorative goal setting
- is a philosophy of care, across the cancer continuum, and must be integrated into everyday nursing practice

Benefits of Exercise

- Benefits depend on type on intervention used.
- Intervention should be based on principles of exercise physiology, patient specific exercise prescription, and patients' medical and physical status.
- Generally... exercise will improve cardiac output, improve oxygen consumption during activity, increase lung ventilation, improve flexibility and range of motion, and increase muscle strength and endurance.

Challenges to Rehab

- General Fatigue, Cachectic Muscle Dysfunction
- Nausea and Vomiting
- Anemia
- Neutropenia/Infection
- Bleeding Disorders: Falling Risk in rehab
- Fracture Risk
- Co-morbidities associated with aging
- Psychological:
 - Patient
 - Provider

Medical considerations in the rehab setting

- Anemia: minimal exertion with Hb less than 80
- Thrombocytopenia: minimal exertion with platelet less than 50
- May need to alter neuro bowel protocol: do not use supp or digital stimulation with absolute granulocyte count of 1.0 or less, platelet less than 50
- May need to alter neuro bladder routines based on treatment eg use foley vs I & O catheterization while on chemo

Contraindications to exercise

- Low blood counts
Hb 80 or less
absolute gran. 1.0 or less
platelet 50 or less
- fever of 38 or greater
- dizziness

(Courneya et al, 2000)

Contraindications to exercise

- shortness of breath
- bone pain
- severe nausea
- extreme fatigue
- severe muscle wasting

(Courneya et al, 2000)

Fatigue

- 40-100% of all cancer patients
 - Muscle wasting – cachexia
 - Changes in metabolism and cytokines
 - Anorexia – malnutrition
 - Disuse Atrophy
- Sleep disturbance
- Pain
- Depression
- Anemia

Interventions to help manage fatigue

- Prioritize activities and need to conserve energy, eg. Use of lift vs slide board transfer
- Ensure adequate rest periods
- Schedule therapy times based on patient's energy levels
- Schedule radiation late in day, after therapy
- Provide shorter, more frequent therapy sessions vs 2 longer sessions
- Intensity of therapy needs to be balanced with fatigue
- Health teaching to patients about positive effects of activity and exercise on counteracting fatigue

Cachexia

- Metabolic dysfunction characterized by:
 - Wasting of fat and muscle
- Wasting is out of proportion to reduced oral intake
- Skeletal Muscle > Cardiac or Smooth muscle
- Vital organs relatively preserved

Cachexia

- 40% of cancer patients at diagnosis*
- Most by time of death

*Semin Oncol 2000 27(1); 64 the cancer anorexia-cachexia syndrome

Strategies to address cachexia

- Referral to therapeutic dietician to ensure adequate nutrition
- Offer complimentary menu, food from home
- Concurrent care with oncologists to minimize/discontinue steroids as soon as possible to minimize muscle wasting
- Offer regular antiemetics vs PRN to promote eating and counteract nausea

Strategies to address alopecia

- use mild “baby” shampoo
- wash hair infrequently (q 4-7 days)
- avoid hard brushing, hair spray, dyes, blow drying, elastics, barrettes
- always use sun screen and a hat when outside
- refer to Canadian Cancer Society for wigs, head wraps

Rehab planning

- Timeframe to discharge may be shorter
- Goals may be more functional to get home quickly and safely, higher level goals can be continued in the community
- Assessment of equipment needs may be shortened, and funding sources may be different

Mr. Z. O.

- 68 years old, retired labourer
 - Thoracic back pain X 2-3 months
 - Slight leg weakness X 1 week
 - Tingling in legs, gait disturbance
- Still ambulatory but with difficulty
- Continent of bowel and bladder, constipated

Mr. Z.O.

- MRI revealed compression fracture T 7 with spinal cord compression
- Multiple levels of metastases throughout entire spine, surgery to decompress and stabilize ruled out
- Fitted with Jewitt brace to stability

Mr. Z.O.

- Rx:
 - Radiation x 5 to T spine
 - Dexamethasone 16 mg/day
- Back pain improved by 90%
- Mild residual weakness Grade 4/5
 - Ambulatory with wheeled walker
- Further testing including bone marrow: Multiple myeloma
- Started chemotherapy and after 2 cycles referred for rehab

Mr. Z.O.

- Admitted to rehab with concurrent care from oncology
- Progress interrupted by pneumonia and short stay on acute care
- On return to rehab pain in L groin on weight bearing: plain film x-ray revealed lesion L femoral neck with impending fracture

Mr. Z.O.

- Good response to radiation and chemotherapy
- Min assist with sliding board transfer
- Ambulated with rollator walker
- Socially continent

Challenges to Rehab with Mr. Z.O.

Challenge

- Fatigue, muscle wasting
- Neutropenia, pneumonia, DVT
- Bone mets and pathologic fracture

Response

- Prioritizing goals, pacing
- Concurrent care with oncologist, assessment and monitoring of symptoms and side effects
- Access to orthopedic surgeon

Summary

- Cancer results from uncontrolled cell growth
- Cancer, and the treatments for cancer have the potential to effect every aspect of a person's being
- Advances in treatments lead many types of cancer into the realm of chronic disease, with long range consequences

Summary

- Growing evidence to support exercise as an intervention to prevent recurrence, and manage side effects of cancer and its treatment
- Rehabilitation nurses working with cancer patient need to learn about disease process, side effects of treatment, oncologic emergencies, and specific interventions

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