MEDAVIE HealthEd ÉduSanté

Oncological Emergencies

Primary Care Paramedicine

Module: 15

Section: 04

Case

- You are called to the home of a 48 y/o F c/o SOB. On arrival you are directed to the living room by a family member. You find the patient laying in a hospital bed set up in the room. She is on oxygen via NC. Emaciated in appearance. The family state she has been more difficult to wake up toady and she feels warm to the touch.

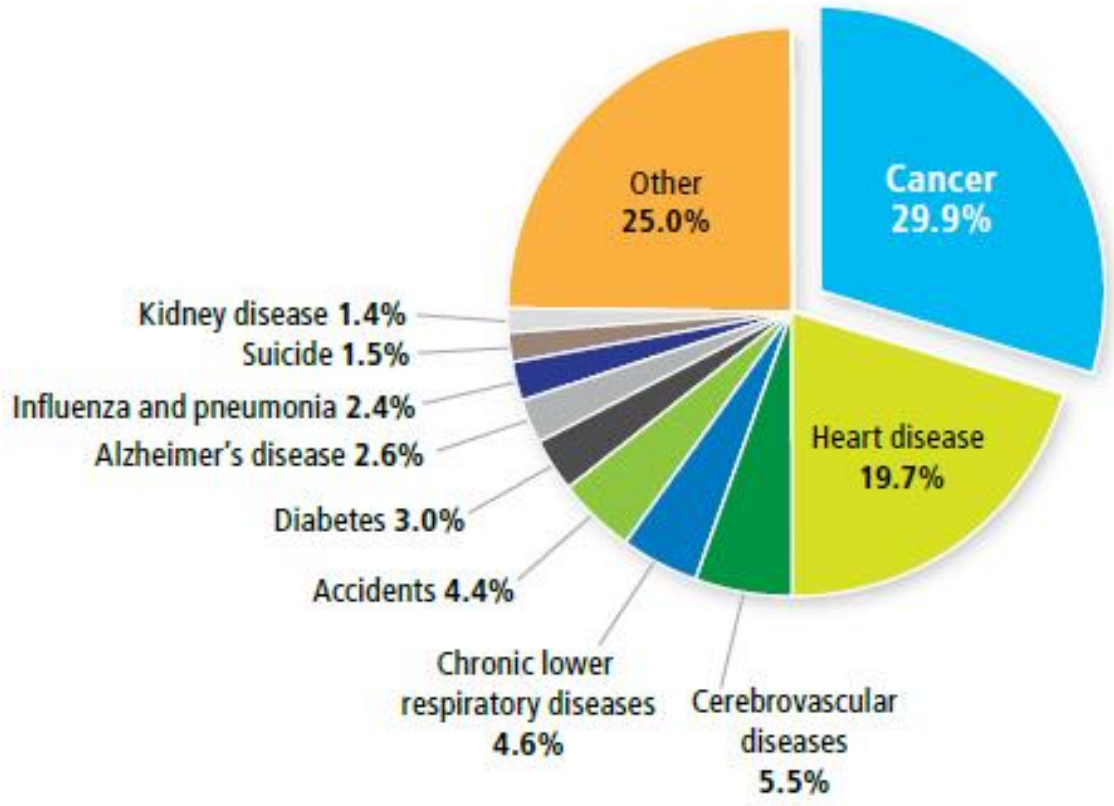
Cancer

- Cancer is a class of diseases characterized by out of control cell growth.
- Occurs when body cells become abnormal and divide without control or order.
- The spread of cancer is called **metastasis**.

- Tumors can be either:
  - Benign (non-cancerous)
    - Cells stay in one place in the body and are not usually life-threatening
  - Malignant (cancerous)
    - Can invade and damage tissues and organs near the tumor.
    - Can break away and enter the bloodstream or lymphatic system.
    - This is how cancer spreads from the original (primary) tumor to form new tumors in other parts of the body.

Statistics

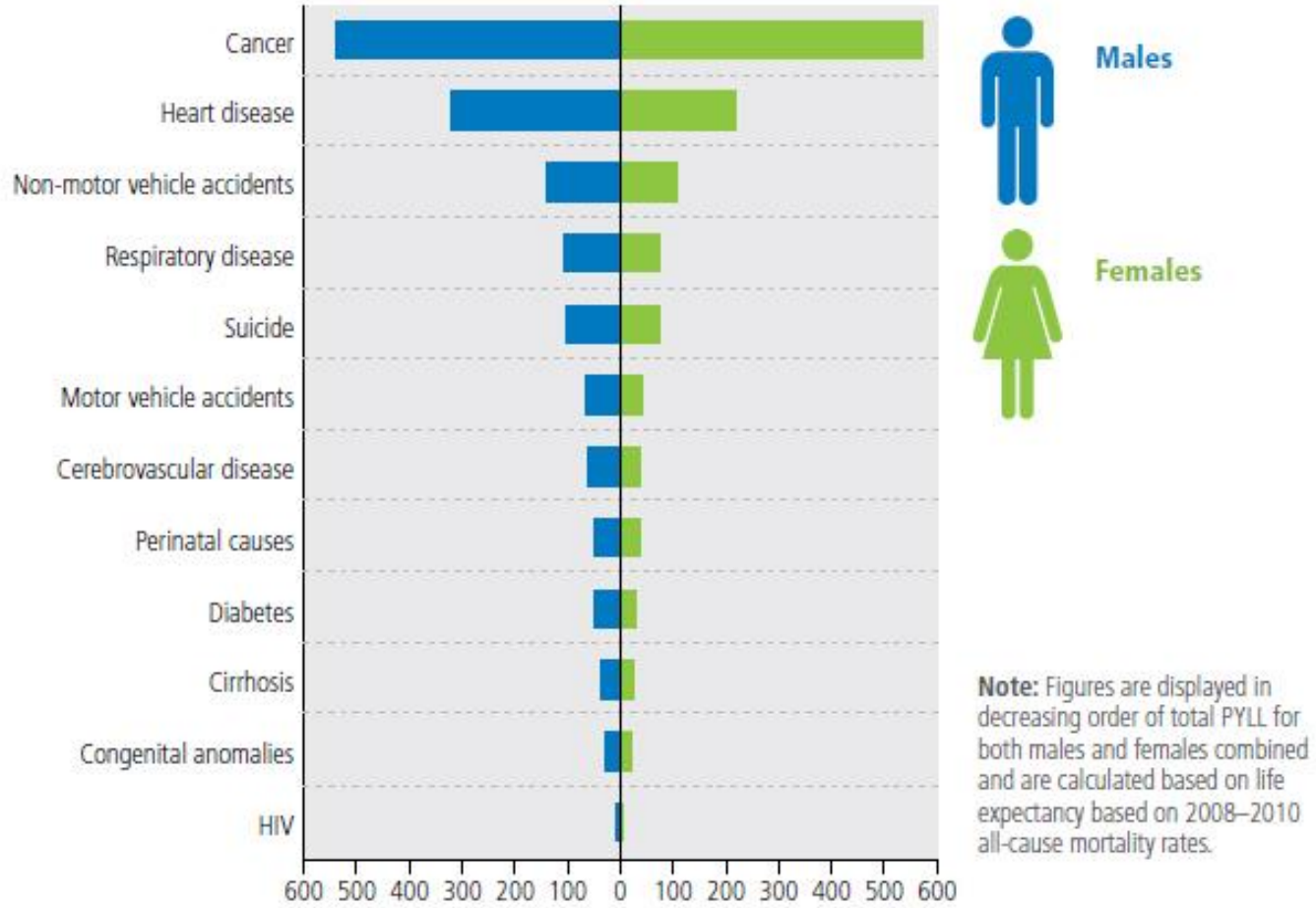
FIGURE A Proportion of deaths due to cancer and other causes, Canada, 2011



Note: The total of all deaths in 2011 in Canada was 242,074.
Adapted from: Statistics Canada. Leading Causes of Death in Canada, 2011, CANSIM Table 102-0522

Statistics

FIGURE B Selected causes of death and their associated potential years of life lost (PYLL), Canada, 2010



Note: Figures are displayed in decreasing order of total PYLL for both males and females combined and are calculated based on life expectancy based on 2008–2010 all-cause mortality rates.

Analysis by: Surveillance and Epidemiology Division, CCDP, Public Health Agency of Canada
Data source: Canadian Vital Statistics Death database at Statistics Canada

Statistics

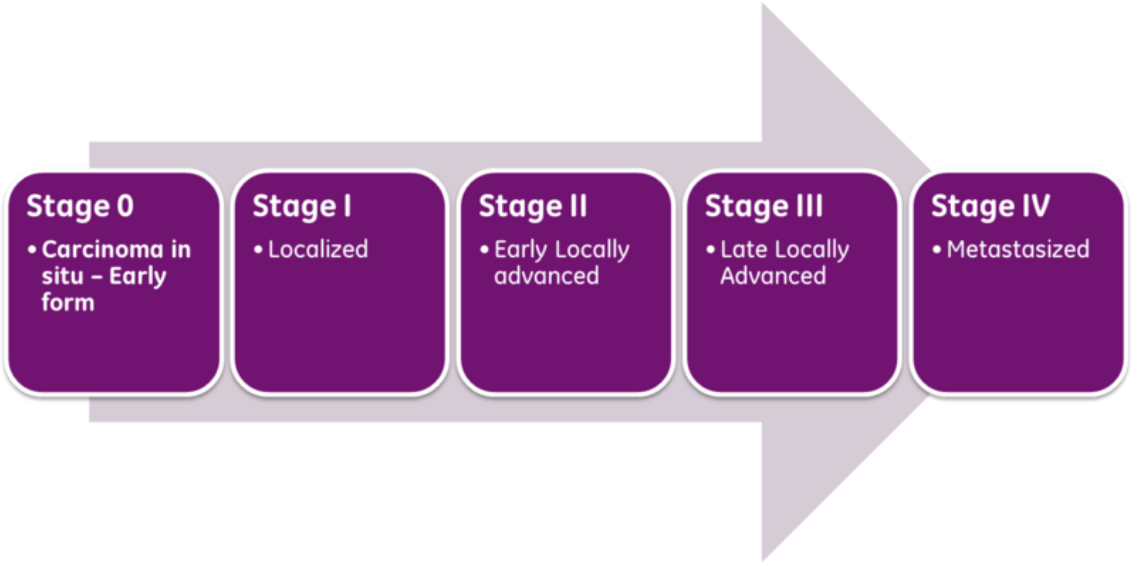
- An estimated 196,900 new cases of cancer and 78,000 deaths from cancer occurred in Canada in 2015.
- More than half (about 51%) of all new cases will be prostate, breast, lung and colorectal cancers.
- About 2 in 5 Canadians will develop cancer in their lifetimes and 1 in 4 will die of the disease.
- 63% of Canadians diagnosed with cancer will survive at least 5 years after their diagnosis.
- At the beginning of 2009, there were about 810,045 Canadians living with a cancer that had been diagnosed in the previous 10 years.

Cancer

- Classifications:
  - Site of origin
    - By primary site of origin
    - Cancer that starts in the colon but spreads to the liver is called colon cancer with liver metastases.
  - Tissue type
    - Carcinoma
    - Sarcomas
    - Leukemia
    - Lymphoma
    - Multiple cell myeloma
    - Mixed

Cancer

- Carcinoma
  - A cancerous growth that develops in the skin, or in glandular tissue ex. tissue of the breast or prostate. (Account for 80 – 90% of all cancer cases)
- Two types:
  - Squamous cell carcinomas generally occur in areas that have chronic exposure to sunlight.
  - Adenocarcinomas generally occur on mucus membranes and are first seen as a thickened plaque-like white mucosa.
    - They often spread easily through the soft tissue that they occur in



Cancer

- Sarcomas
  - Sarcomas grow in supportive and connective tissues such as bone, blood vessels and muscle.
  - In young adults a sarcoma often develops as a painful mass on the bone.
  - Sarcoma tumors usually resemble the tissue in which they grow. That is why the lump on the bone is so painful.

Cancer

- Leukemia
  - Mostly develops in the bone marrow.
  - Leukemia is a Greek word that translates to "white blood“
  - Often associated with the overproduction of immature white blood cells.
    - These immature white cells do not function normally therefore the patient is often prone to infection.
    - Leukemia also effects red blood cells and can therefore cause poor blood clotting and tiredness due to anemia.

Leukemia

Cancer of hematopoietic cells

- Precursors of white blood cells
- Produces abnormal and ineffective cells
- Proliferate and spread

Classified by cells involved

- Acute lymphocytic leukemia (ALL)
- Acute myelogenous leukemia (AML)
- Chronic lymphocytic leukemia (CLL)
- Chronic myelogenous leukemia (CML)

Leukemia

- Initial presentation
  - Acutely ill, fatigued, febrile, weak, anemic.
  - Often have a secondary infection.
- Management
  - Follow general treatment guidelines.
  - Utilize isolation techniques to limit risk of infection.

Cancer

- Lymphoma
  - Lymphoma generally occurs in the lymph nodes and the spleen
  - Swelling of the lymph nodes
  - Fever, night sweats, anorexia, weight loss, fatigue, and pruritus
  - Two main forms
    - Hodgkin's disease (chance for long term survival better)
    - Non-Hodgkin's lymphoma

Cancer

- Multiple Cell Myeloma
  - Cancer of plasma cells
  - Collections of abnormal plasma cells accumulate in the bone marrow where they interfere with the production of normal blood cells
  - Most cases of myeloma also feature the production of a paraprotein (an abnormal antibody which can cause kidney problems)
  - Bone lesions and hypercalcemia are also often encountered

Cancer

- Mixed
  - Have two or more components of the cancer
  - Examples include
    - Mixed mesodermal tumor
    - Carcinosarcoma
    - Adenosquamous carcinoma
    - Teratocarcinoma
    - Blastomas are another type that involves embryonic tissues

Cancer

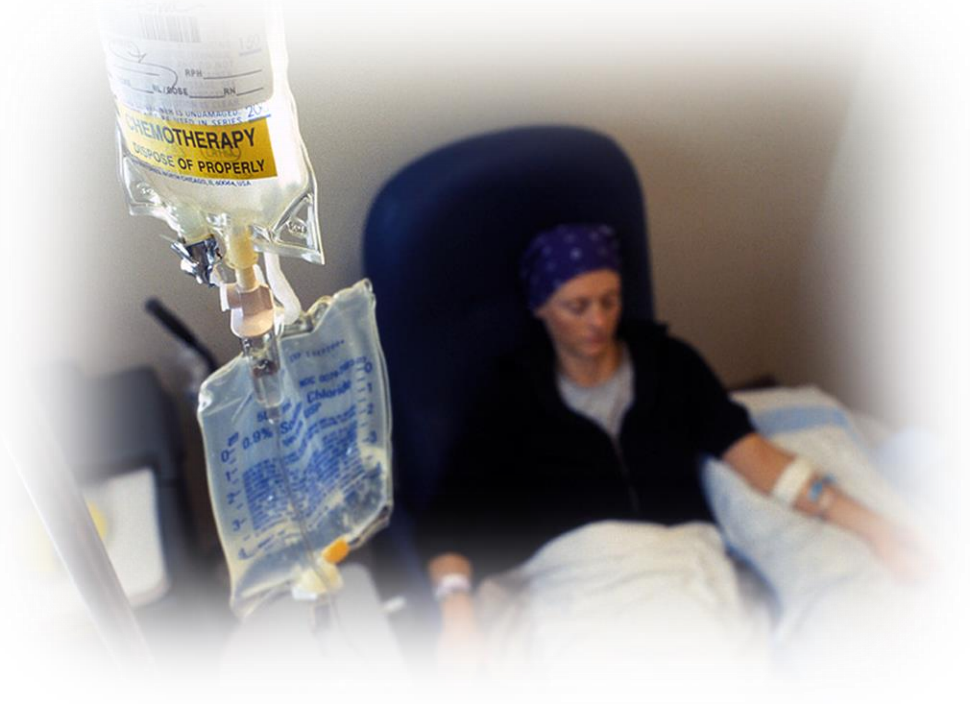
- Locations
  - May be found in most tissue of the body

Cancer

- Treatments
  - Chemotherapy
  - Radiation
  - Surgery
  - Complementary and alternative therapy
  - Side effect management

Chemotherapy

- Chemotherapy is a method of treating disease with the use of drugs or medications
- Treats the whole body rather than just a specific area
- Often used to destroy cancers of the blood and bone marrow, as well as cancers of the lymphatic system
- Also used to destroy metastasized cells
  - The idea is to wipe out these cancerous cells before they have a chance to multiply and form a new tumour
- May be given IV, PO, intraperitoneal, intra-arterial and CNS delivery



Chemotherapy

- Side effects
  - N/V (most immediate)
    - Occur because of the effect chemotherapy drugs can have on the vomit center centre of the brain and the GI tract, the stomach and the bowels
  - Late (delayed) side effects
    - Hair loss
    - Sore mouth
    - Digestive problems such as nausea, diarrhea or constipation
    - Infections (due to low blood counts)
    - Usually start during the first few weeks of treatment

Radiation

- About 1/3 require no other type of treatment
  - Remainder receive radiation combined with chemotherapy and/or surgery
- In general, radiation therapy works best on a fixed tumour, or group of tumours, that are in an area at which x-ray beams can be directly aimed. (Hodgkin's disease, Cervical cancer)
- Sometimes used to shrink a tumour so that it becomes small enough to be removed by surgery.
- Can be used after surgery to destroy any cancer cells that may have been missed.
- May destroy healthy cells

Alternative Therapies

- Therapies are not usually provided by doctors or other conventionally trained healthcare providers
- Complementary therapies are used along with conventional therapies.
- Alternative therapies are used instead of them
  - Herbal preparations
  - Reflexology
  - Acupuncture
  - Traditional Chinese medicine
- Complementary and alternative therapies have not been scientifically proven to be safe or effective in the treatment of cancer.

Side Effects

- Fatigue and flu
- Eating and appetite
  - N/V
  - Loss of appetite
  - Changes in taste or smell
  - Swallowing difficulties
  - Heartburn and reflux
  - Gas, bloating or cramping
  - Diarrhea
  - Constipation
- Fertility
- Hair Loss
- Sore and/or dry mouth, thick saliva

Oncological Emergencies

PATIENT ASSESSMENT

Assessment

- Presentations can vary depending on the underlying cause
- May manifest quickly with rapid deterioration of the patient
- Remember that not all emergencies experienced by the patient will be related to their oncological condition
- Patient and caregivers are good source of information related to medical history and treatments

History

- Obtain information regarding the oncological diagnosis
  - Recent course of treatments
  - Prognosis
  - Primary site and metastasis if present
- SAMPLE/OPQRST

Physical Assessment

- Primary Assessment (LOC, ABC's)
- Vitals
- Physical assessment

Physical Assessment

- Specific physical assessment findings that suggest an acute, serious oncological emergency include the following:

- Neurologic/cognitive abnormalities
- Paralysis/paresthesia
- Dyspnea
- Fluid overload
- Chest Pain
- Arrhythmia
- Active bleeding
- Febrile
- Skin Signs
- SIRS criteria/sepsis
- Pain
- N/V
- Oliguria

General Management

- Supportive care
- Symptom management
- Transport to appropriate facility

Oncological Emergencies

SPECIFIC SITUATIONS

Oncological Emergencies

- Broadly defined as any complication related to cancer or anticancer therapy that requires immediate intervention
  - Acute Bleeding
  - Brain metastases, Increased ICP & Seizures
  - Febrile neutropenia
  - Hyperviscosity Syndrome
  - Malignancy associated hypercalcemia
  - Malignant airway Obstruction
  - Malignant epidural spinal cord compression
  - Superior vena cava obstruction
  - Syndrome of inappropriate ADH secretion
  - Tumor lysis syndrome

Acute Bleeding

- DIC
  - Most commonly seen with acute myelocytic leukemia, adenocarcinoma, septicemia or transfusion reactions

Acute Bleeding

- GI bleeding
  - Upper GI bleeding can be caused by primary upper GI malignancies, a number of non-malignancy related causes (peptic ulcer disease, esophageal and gastric varices, hemorrhagic gastritis, etc.)
  - Lower GI bleeding can be caused by primary upper and lower GI malignancies, non-malignancy related causes (diverticular disease, ischemic colitis, inflammatory bowel disease, hemorrhoids, etc.) and various cancer therapies (e.g., graft-versus-host disease following stem cell transplantation, radiation-induced proctosigmoiditis, etc.).

Acute Bleeding

- Hematuria
  - Bleeding anywhere along the urinary tract secondary to drug or radiation-induced damage, infection or progression of cancer
  - Drug-induced cystitis is most commonly seen in patients receiving cyclophosphamide or ifosfamide
  - Radiation-induced cystitis results from damage to the vascular endothelium and endarteritis, resulting in progressive ischemia, inflammation, fibrosis and tissue necrosis

Acute Bleeding

- Hemoptysis
  - Is the most immediate life-threatening symptom of progressive intrathoracic disease
  - Massive hemoptysis can lead to asphyxiation or exsanguination
  - The primary causes are malignancy, infection and hemostatic abnormalities

Management

- Airway management as required
- IV
- Fluid bolus as required

Brain Metastases, Increased ICP and Seizures

- Represent the most common type of brain malignancy (occur in 10 – 30 % all adult patients with cancer)
- Any primary tumour can metastasize to the brain
  - Lung cancer, breast cancer, and melanoma are the most common (70 – 90% of all cases)
  - Multiple brain metastases
    - Melanoma and lung cancer are most frequently
  - Solitary metastases
    - Breast, colorectal and renal cancers are more likely
- Can lead to:
  - Increased ICP
  - Status epilepticus

Brain Metastases, Increased ICP and Seizures

Signs and Symptoms	Management
• Neurological symptoms (ALOC, seizure, headache, etc.) • Cushing triad with ↑ICP • N/V	• Symptomatic care • May require airway management • May require ALS for seizure treatment

Febrile Neutropenia

- The development of fever, often with other signs of infection, in a patient with neutropenia (an abnormally low number of neutrophil granulocytes)
- Most common complications related to cancer therapy
- Considered a potentially life-threatening (2 – 20% mortality)
- Risk for development is 25 to 40% in adult patients with cancer
- Associated Risks
  - Older age
  - Prior treatment with chemotherapy
  - Compromised hepatic, cardiovascular, or renal function
  - Abnormal bone marrow
  - Low baseline white blood cell counts
  - Concomitant use of immunosuppressive medications

Febrile Neutropenia

Signs and Symptoms	Management
• Fever • Chills • Rigors	• Treated as septic (CTAS 2 at a minimum) • Obtain a temperature and document it • Once temperature is obtained antipyretics may be given

Hyperviscosity Syndrome

- A group of clinical symptoms related to increases in blood viscosity leading to adverse effects on tissue perfusion
- Causes include:
  - Increased protein content and large molecular size
  - Abnormal polymerization
  - Abnormal shape of immunoglobulin molecules
- Can occur secondary to a variety of hematologic malignancies
  - Most common being Waldenström macroglobulinemia (80%)
  - Less frequent with multiple myeloma, leukemia, polycythemia
- Suspect in pt's of known hematological malignancy that present with symptom triad:
  - Bleeding, visual disturbances, and/or focal neurologic signs

Hyperviscosity Syndrome

Signs and Symptoms	Management
• Bleeding from mucosal sites • Visual disturbances • Neurological manifestations • Unexplained respiratory symptoms	• Symptomatic relief

Malignancy Associated Hypercalcemia

- Defined as a corrected serum calcium > 2.6 mmol/L
- Occurs in up to 30% of patients with cancer
  - Most commonly breast, lung and head/neck tumours, multiple myeloma and adult T-cell leukemia/lymphoma
    - Humoral hypercalcemia (80%)
    - Osteolytic bone metastases (20%)

Malignancy Associated Hypercalcemia

Signs and Symptoms	Management
• Neurologic symptoms • Shortened QT • ST elevation • Bradyarrhythmias • Nausea and vomiting • Polyuria/nocturia • Oliguria (late sign)	• Symptomatic • ALS may be considered for AW/arrhythmia treatment

Malignant Airway Obstruction

- Most commonly caused by adjacent tumour (lung cancer, thymoma) or a primary tumour of the head and neck

Malignant Airway Obstruction

Signs and Symptoms	Management
• Inspiratory stridor • Dyspnea • Wheezes • Hoarseness • Difficulty clearing secretions • Cough • Hemoptysis	• Airway management may be required • May be difficult due to anatomical changes as a result of the tumour • Consider oxygenation/BVM

Malignant Epidural Spinal Cord Compression

- Common neurological complication that affects up to 5% of adult patients with cancer
- Most common in widespread metastatic disease
- A true oncologic emergency that needs rapid diagnosis and treatment
  - Left untreated it can lead to progressive pain, sensory loss, incontinence, and irreversible paralysis

Malignant Epidural Spinal Cord Compression

Signs and Symptoms	Management
• Neck or Back pain (earliest and most common – 90%) • Motor weakness and sensory impairment • Autonomic dysfunction (Late and poor prognosis) • Paresthesias	• Pain management as indicated

Superior Vena Cava Obstruction

- Partial or complete obstruction of blood flow through the superior vena cava to the right atrium
  - May be caused by compression, invasion, thrombosis, or fibrosis
  - Lung cancer (small cell and non-small cell) and non-Hodgkin lymphoma account for 85%
- Is rarely a rapidly occurring presentation but is life-threatening (due to ↑ICP)

Superior Vena Cava Obstruction

Signs and Symptoms	Management
• Facial or neck swelling • Dilated chest vessels • Stridor	• Supportive care/symptom relief • If IV required left arm is preferred

Syndrome of Inappropriate ADH Secretion (SIADHS)

- Results from the inappropriate production and secretion of antidiuretic hormone which leads to:
  - Water retention/intoxication
  - Hyponatremia
  - Hyposmolality
  - In cancer patients can be caused by the ectopic production of ADH by tumour tissue
  - Small cell lung cancer most common cause

Syndrome of Inappropriate ADH Secretion (SIADHS)

Signs and Symptoms	Management
• Delirium • Seizures • Decerebrate posturing • Coma • Respiratory arrest	• Symptomatic care

Tumor Lysis Syndrome

- Massive cellular breakdown in tumours and subsequent release of intracellular contents into the bloodstream
- Characterized by:
  - Hyperuricemia
  - Major electrolyte disturbances (hyperkalemia, hyperphosphatemia and hypocalcemia)
- Can quickly lead to oliguric renal failure, seizures, cardiac arrhythmias and death

Tumor Lysis Syndrome

Signs and Symptoms	Management
• Fluid overload • Arrhythmias • Seizures • Oliguria • Lethargy • Muscle cramps	• Symptomatic care