Advanced Oncology Certified Nurse Practitioner

REVIEW COURSE 2024

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MDAnderson Cancer Center

Making Cancer History*



Making Cancer History[®]

Oncologic Emergencies: Structural

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Objectives

- Understand the different types of Oncologic Emergencies
- Differentiate between types of structural emergencies
- Identify the high-risk patients with appropriate measures
- Proactive managements of oncologic emergency to prevent complications

Superior Vena Cava Syndrome



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2728369/figure/f2-ija17043/

Superior Vena Cava Syndrome – Incidence

- ► 15,000 people/year diagnosed with SVC Syndrome
- Men have increased incidence
- Common in adults between the ages 50 -70 years

Superior Vena Cava Syndrome- Etiology

- Frequently induced by Right-sided Lung Cancer 70 - 90%
 - 1. SCLC associated with highest frequency
 - 2. SCC of lung
 - 3. Adenocarcinoma of lung
 - 4. Lymphoma
- Nonmalignant causes Presence of intravascular device (CVC or Pacemaker)
- Mediastinal fibrosis from previous radiation, infection (such as TB or histoplasmosis)
- Metastatic disease in the mediastinum





Superior Vena Cava Syndrome



https://www.spandidos-publications.com/ol/8/5/2221



https://www.spandidos-publications.com/ol/8/5/2221

SVCS:Pathophysiology





Superior Vena Cava Syndrome

- SVC syndrome develops as compression of the SVC
- As a result, it may complete or partially occlude the SVC secondary to thrombus or tumor





https://www.ctisus.com/responsive/teachingfiles/chest/217457

Superior Vena Cava Syndrome: Signs and Symptoms

Headache

- Facial or Neck Edema
- Chest Pain
- > Dyspnea
- Laryngeal Edema



Early signs	Late sign	
Nasal congestion	Confusion- AMS	
> Dyspnea	> Stridor	
Chest pain	> Dysphasia	
➢ Fullness in Head	> Hemoptysis	
Ruddy Complexion	Tachycardia	
Facial swelling	Horner Syndrome	
➢ Non productive cough ,	Severe HA	
Hoarseness of voice	Dizziness, Syncope	
Redness and edema to	≻ CHF	
conjunctiva	> Hypotension	
Venous distension in neck and	Severe Respiratory distress	
upper chest	Visual Disturbance, Blurre	
Swelling of neck, arms and	vision	
Hands (Stokes sign		

d

SVCS: diagnosis

- Proper History to identify the risk factors
- Physical examination
- > CXR
- Contrast enhanced CT Chest
- MRI used for contrast allergy cases
- Sputum cytology for lung cancer
- Bronchoscopy with biopsy for definitive diagnosis



Superior Vena Cava Syndrome: Management

Radiation Therapy: an option for radiation-sensitive tumors

• NSCLC for rapid symptom relief (SBRT) with initial 2-4 fractions of 300 – 400cGy followed by daily dose for a total to 30-50Gy

- Lymphomas -lower radiation doses daily fractions of 180- 200cGy over 4 5 weeks
- Chemotherapy sensitive tumors (NSCLC, NHL and germ cell tumors)

Symptomatic relief may occur between 7 -14 days

*Optional for use in combination with palliative radiation





Superior Vena Cava Syndrome: Management

- Initiate Thrombolytic Agent
- Endovascular stenting
- Balloon Angioplasty
- Metal stenting
- Consultation to Vascular Surgery



Superior Vena Cava Syndrome: APRN Role

- Immediate supportive management is very critical
- Steroids and diuretics to help reduce laryngeal and cerebral edema
- Dyspnea and chest pain managed with morphine and anxiolytics
- Management of symptoms and prevent further complications
- May need O2 support (nasal cannula, or intubation for severe cases)
- Anticoagulation as appropriate particularly for venous stenosis



https://www.worldallergy.org/education-and-programs/education/allergic-disease-resource-center/professionals/upper-airway-edema

Grading the severity of malignant superior vena cava syndrome

Grade	e Findings	Estimated incidence (%)
0	Asymptomatic – Radiographic superior vena cava obstruction in the absence of symptoms	10
1	Mild – Edema in head or neck (vascular distention), cyanosis, plethora	25
2	Moderate – Edema in head or neck with functional impairment (mild dysphagia, cough, mild or moderate impairment of head, jaw, or eyelid movements, visual disturbances caused by ocular edema)	50
3	Severe – Mild or moderate cerebral edema (headache, dizziness), mild/moderate laryngeal edema, or diminished cardiac reserve (syncope after bending)	10
4	Life-threatening – Significant cerebral edema (confusion, obtundation), significant laryngeal edema (stridor), or significant hemodynamic compromise (syncope without precipitating factors, hypotension, renal insufficiency)	5
5	Fatal – Death	<1

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Superior Vena Cava Syndrome: MD Anderson Cancer Center Guidelines



Cardiac Tamponade



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2728369/figure/f2-ija17043/

Cardiac Tamponade

- Incidence: 2 cases /10,000 people
- Malignancy is most common cause
- Median Survival is 150 days upon diagnosis

Cardiac Tamponade: Etiology

Malignant

- Bleeding into the pericardium
- Direct invasion of tumor extension into the pericardial sac
- Metastatic spread
- Thoracic radiation
- Chemotherapy- Doxorubicin, Cyclophosphamide
- Biotherapy agents- interferon, IL 2
- Target therapy agents: MonoclonalAntibodies, TKI VEGF

Non-Malignant

- Pericarditis
- Acute MI
- Cardiac surgical procedures
- Anticoagulation
- Hypothyroidism
- Uremia
- Collagen disease

Pathophysiology

Cardiac Tamponade



Cardiac Tamponade: Early Signs and Symptoms



- Dyspnea, Tachycardia, Elevated JVP
- Chest pain, fatigue, apprehension, restlessness and orthopnea
- Distant muffled heart sound, pericardial friction rub, right atrial filling impairment, increased venous pressure
- Symptoms of right heart failure: JVD, edema and hepatomegaly, hepatojugular reflex
- Anorexia, nausea and vomiting due to venous congestion and venous stasis

Cardiac Tamponade: Late Signs and Symptoms

- Worsening cough, dyspnea, hoarseness, and dysphasia
- Pulsous Parodoxus
- Beck triad due to rapid accumulation of pericardial fluid– classic sign
- Oliguria, decreased peripheral perfusion, cool and clammy skin, cyanosis
- Mental status change, decreased level of consciousness



Cardiac Tamponade: Diagnosis

- History & Physical
- CXR- enlarged cardiac silhouette (water bottle heart)
- EKG changes: electrical alterna , swingingmotion of the heart result in alterations inQRS height with every beat
- 2D ECHO Can detect as little as 15 ml most precise diagnostic test
- CT SCAN 50 ml fluid
- MRI detecting type of fluid (Hemorrhagic, transudative or exudative)
- Pericardial tap to confirm malignancy

Differential Diagnosis: Tension pneumothorax, pleural effusion



Cardiac Tamponade: Management

- Goal: Removal of pericardial fluid to restore hemodynamic stability and related symptoms
- Most common approach pericardiocentesis
- Most serious complication: bleeding keep the surgical back up



http://foamcast.org/2016/08/08/episode-54-the-pericardium/

Cardiac Tamponade :management

- Pericardial sclerosis
- Pericardial Balloon Pericardiotomy
- Pericardial Window
- Pericardiectomy
- Chemo therapy
- Radiation therapy
- Supportive therapy

Spinal Cord Compression

- Invasion or extension of metastatic or local tumor to the epidural space
- Occupy the space and compress spinal cord
- > Tumor causes impingement of the spinal cord
- Rapid irreversible damage can occur



Spinal Cord Compression

- ➢ 2nd most common neurologic complication
- Affects 20,000 people/year
- \geq 25% of cases is the first indication of malignancy
- High incidence with solid tumors
- Poo Prognosis of few months

- True Oncologic emergency
- T-spine most common site 60%
- L-spine 25 %
- ➤ C-spine 10-15%

Spinal Cord Compression – Signs and Symptoms

- Back pain- initial Sx
- * New or worsening
- ✤ Dull, ache
- ✤ Localized, radicular or combination
- Weakness -2nd common Sx
- ✤ Usually follows pain
- Proximal weakness,
- \clubsuit heaviness or stiffness in leg
- \succ Loss of coordination
- Difficulty walking
- > Paralysis

- Autonomic dysfunction –Late Sx
- Autonomic Dysreflexia

Spinal Cord Compression – Signs and Symptoms

T-Spine	LS- spine
 Band like pain across Chest and abdomen 	Radicular pain
Mid Back pain	Lower back pain
Muscle weakness	Weakness in legs and feet
Paralysis	> Loss of sensation
+ ve Babinski reflex	 Bilateral sensory loss with clonus medullaris
 Bladder, bowel or sexual dysfunction 	cauda equina compression
> sensation \downarrow below tumor	Bladder , bowel or sexual dysfunction
Horner Syndrome	
➢ sensation ↑ above tumor	 Decreased or absent reflexes
	 T-Spine > Band like pain across Chest and abdomen > Mid Back pain > Muscle weakness > Paralysis > + ve Babinski reflex > Bladder, bowel or sexual dysfunction > sensation ↓ below tumor > Horner Syndrome > sensation ↑ above tumor

Spinal Cord Compression : diagnosis

➢ H&P

- X-ray spine Pain without neurologic changes
- MRI spine GOLD STANDARD
- Myelography: MRI contra indicated patients
- > PET CT



ESCC: Bilsky Grading



Grade 0 – Tumor confined to bone. Grade 1a – Tumor with epidural extension, without displacement of thecal sac.

Grade 1b – Tumor with epidural extension and displacement of thecal sac but no contact with the spinal cord. Grade 1c – Tumor with epidural extension and spinal cord abutment, without displacement. Grade 2 – Tumor that displaces or compresses the spinal cord, without circumferential tumor extension or obliteration of the CSF space. Grade 3 – Tumor with circumferential epidural extension and/or that causes severe spinal cord compression with obliteration of the CSF space.

Spinal Cord Compression : Management

- Glucocorticoids (Neurologic deficits and pain) decrease vasogenic edema
- Dexamethasone 10mg IV followed with 16mg daily in divided doses (4mg Q6h)
- **PPI with Dexamethasone**
- Opioid pain management
- **DVT prophylaxis**

- Surgery good survival prognosis cases
- Surgical intervention used in rapidly progressing paraplegia, neurologic dysfunction while radiation
- Percutaneous cement augmentation
- Radiation radiation sensitive tumors
- **30Gy in 10 daily FX**
- 8Gy for poor prognosis cases
- SBRT alternative to conventional radiation
- > Chemotherapy

Suggested algorithm for the management of epidural spinal cord compression (ESCC)



Grade this ? Location?



SCC ??



MD Anderson Oncologic Emergencies - Structural



Increased Intracranial Pressure



Increased Intracranial Pressure

- > 24-45% Cancers will have Brain Metastasis
- \blacktriangleright Lung cancer (20%) has the greatest incidence
- ➢ Colorectal is the least 1%
- > 20% mortality rate associated with increased ICP



Increased Intracranial Pressure - Etiology

- Change in Brain volume trauma, ischemia, hyper- ammonia, uremic encephalopathy, hyponatremia
- ➤ Mass effect Hematoma, tumor, abscess, blood clots
- ➢ Increase CSF − increased production, choroid plexus tumor
- Decreased Reabsorption Obstruction, meningeal inflammation or granuloma
- Increase in blood volume hypercarbia, aneurysms, venous stasis, venous sinus thromboses, elevated CVCP
- Other causes- Idiopathic or benign ICP, skull deformities, hypervitaminosis A or tetracycline use
- Monro-Kellie doctrine or hypothesis, is that the sum of volumes of brain, CSF, and intracranial blood is constant

Increased Intracranial Pressure: Signs and Symptoms

- Diplopia
- Blurred vision
- Extremity drifts
- Decreased visual fields
- Decreased visual acuity
- Change in level of consciousness (LOC)
- Headache (most severe in early morning)
- Lethargy, apathy, confusion, restlessness
- Gastrointestinal: Loss of appetite, nausea, occasional/ unusual vomiting

Increased Intracranial Pressure :Signs and Symptoms

Change in Level of Consciousness

- Subtle changes close family members notice it
- Progressive disorientation to time, place & person
- Restlessness and lethargy
- Stupor Coma

Increased Intracranial Pressure: Signs and Symptoms

Change in Level of Consciousness

- Frontal lobe Personality changes with emotional lability, flat affect
- Posterior frontal lobe- speech deficit, motor weakness, focal seizure activity
- Parietal lobe- deficit in sensation, inability to recognize common objects, neglect syndrome, seizure activity
- Temporal lobe- short term memory loss, weakness, visual field deficit (diplopia, blurred vision, decreased visual field, decreased visual acuity, changes in PERRLA)
- Cerebellar signs- ataxia, nystagmus, incoordination, vertigo, nausea

Increased Intracranial Pressure: Late Signs

- Abnormal posturing
- Temperature elevations
- Cardiovascular: Bradycardia, hypotension, widening

pulse pressure

• Respiratory: Slow, shallow respirations, tachypnea,

Cheyne-Stokes respirations

• Neurologic: Decreased ability to concentrate,

decreased LOC, personality changes, hemiplegia,

hémiparésies, seizures, pupil changes, papilledema

(cardinal sign)

PATHOPHYSIOLOGY MAP



Increased Intracranial Pressure: Diagnosis

- > MRI with IV gadolinium for lesions and edema
- ➢ Non-Contrast CT to r/o hemorrhage and Hydrocephalus
- MRI Angiography
- > PETCT
- Proton MRI Spectroscopy
- Stereotactic Bx
- > LP



- Treatment focuses on:
 - Reducing fluid in the brain
 - Providing symptom relief and measures to prevent increased ICP and control seizures
 - Interventions to reduce tumor mass

- Dexamethasone: IV bolus of 10–24 mg of dexamethasone followed by 4 mg every six hours Initiated prior to Radiation – reduce the vasogenic edema
- Mannitol : 20%–25% solution given as an initial IV bolus of 0.75–1 g/kg body weight, followed by 0.25– 0.5 g/kg body weight every three to six hours. Draws free water out of the extracellular space.
- Check Serum Osmolality to keep 310-315 mOsm
- Lasix used when the mannitol cause rebounding symptoms and increase ICP
- Anticonvulsants use is not supported
- Mechanical hyperventilation to lower paCo2 25-30 mm of hg

- Radiation: WBRT/SRS
- WBRT : 30Gy 10FX over 2 weeks
- SRS: Local or partial field



- Surgical Resection
- Debulking/Hematoma Evacuation
- VP Shunt : No shunting for LMD
- > Chemotherapy Single agent or combination chemotherapies for chemo sensitive tumors



Increased ICP-management

- > APNs to identify early signs of increased ICP
- > APNs coordinate care between Oncology ,Neurosurgery and radiation
- Encourage basic nursing care
- ➢ Use of appropriate analgesics and sedative
- Avoid Hypotension and dehydration
- ➢ Main BP >90mm of hg
- ➢ Isotonic solutions to maintain fluid volume
- Maintain normothermia

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Questions?

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