Management of increased intracranial tension

Increased intracranial tension is a common neurological problem encountered in cancer patients.

Causes:

(1) Metastatic brain tumors (commonly from Ca Lung & Melanoma)
(2) Primary brain tumors [especially those located in the posterior fossa (Medulloblastoma, Ependymoma)]
(3) Intracranial hemorrhage
    tumors, eg metastasis from Melanoma, Germ Cell Tumor, RCC)
    bleeding diathesis
    trauma
    vascular causes, eg vasculitis, aneurysms
(4) Dural sinus thrombosis
(5) Vasogenic oedema (surrounding tumors/ hemorrhage)
(6) Medications (eg Vitamin A, ATRA, Tetracyclines, Sulfonamides)
(7) Cerebral Infections (Toxoplasmosis, HSV, Candidiasis)
(8) Brain abscess
(9) Leptomeningeal carcinomatosis

Workup:

(1) History & Physical examination (neurodeficits, fever, meningism, etc)
(2) Complete blood count & coagulation profile
(3) Serum Urea, Creatinine, Electrolytes
(4) Liver function test
(5) CT scan/ MRI scan of brain
(6) Fundoscopy
(7) Lumbar puncture

Treatment:

(1) Rest with head and upper trunk slightly elevated
(2) Corticosteroids-Dexamethasone 8 mg PO./IV QID-to be avoided in case of suspected primary CNS lymphoma
(3) Osmotic diuretics-Mannitol
(4) Hyperventilation (for rapid reduction of raised ICP)
(5) Surgery-for obstructing lesions-resection +/ shunting
    for hemorrhage-evacuation of clot
    for brain abscess-drainage
(6) Stoppage of drug-for drug-induced increase of ICP
(7) Antimicrobials-for infections
(8) Thrombolytics-for venous thrombosis
(9) Transfusion of platelets/ plasma-for bleeding diathesis
(10) Chemotherapy-for meningeal carcinomatosis & for chemosensitive metastatic tumors (germ cell tumors, SCLC)
(11) Radiotherapy-for primary/metastatic malignant brain tumors.

Management of Malignant Spinal Cord Compression

Causes -ADULTS: (1) Verterbal metastasis (Ca Lung, Breast, Prostate, Colorectum, Multiple Myeloma)
(2) Spinal tumors (metastasis-rare, primary-meningioma, Schwannoma)
(3) Paravertebral tumors (Lymphoma, Neuroblastoma)

Causes-CHILDREN: (1) Neuroblastoma
(2) Wilms' tumor
(3) Lymphoma
(4) Primary verterbral osteosarcoma

Initial presentation of cancer with MSCC: (20%)
(1) Multiple Myeloma
(2) Metastasis from SCLC
(3) NHL
Rare in case of Ca Breast

Common sites of MSCC:
(1) Thoracic (commonest-65-70%)
(2) Lumbar (20%)
(3) Cervical
(4) Sacral

Non-malignant causes of spinal cord compression in cancer patient:
(1) Epidural hematoma (coagulopathy)
(2) Abscess

Differential diagnosis of spinal cord compression:
(1) Pain-degenerative disease
(2) Neurodeficit-transverse myelitis

Symptoms of MSCC:
(1) Pain (commonest)
(2) Neurodeficits-
- Motor deficits (occurs earlier than sensory)
  Cervical→ quadriparesis/quadriplegia
  Thoracic→ paraparesis/paraplegia
  Lumbo-sacral→ cauda equine /conus medullaris syndrome (saddle anaesthesia, distal lower extremity weaknes, overflow bladder and bowel incontinence)
- Sensory deficits→ hypoesthesia (usually 2-3 segments below the level of the spinal lesion)
- Autonomic deficits are common (urinary retention, fecal incontinence).

Causes of pain in MSCC:

(1) Stretching of vertebral periosteum, damage to posterior longitudinal ligament, damage to synovia of intervertebral joints
(2) Compression of spinal nerve roots
(3) Paravertebral muscle spasm

Mechanism of spinal cord compression:

(1) Direct extension of vertebral bone metastasis into epidural space
(2) Pathologic fracture of vertebral segment with impingement of bony fragments into epidural space
(3) Extension from paravertebal mass into epidural space
(4) Intradural mass lesions
(5) Direct hematogenous metastasis to epidural space (rare)

Pathology:

(1) Acute stage→ impairment of venous drainage & vasogenic oedema
(2) Chronic stage→ necrosis & demyelination

Workup:

(1) History & physical examination (including complete neurological examination)
(2) Routine biochemistry
(3) Chest X Ray
(4) USG/ CT scan whole abdomen & pelvis
(5) MRI scan whole spine
(6) WBBS
(7) FNAC from spinal lesion

Treatment:

(1) Corticosteroids-Dexamethasone 20 mg PO/IV loading followed by 10 mg PO/IV QDS
(2) Radiotherapy-Most cases are managed by EBRT, Usual dose is 30 Gy/10#/ 2 weeks to an area comprising the vertebra affected with 2 vertebra above and below it. Shorter regimes are also there. Dose is prescribed at 3 cm for cervical cord, 4 cm for thoracic and 5 cm for lumbar cord (alternatively the depth may be assess from the MRI).
(3) Surgery-antero-lateral decompression. It is only indicated in certain specific instances: (1) Vertebral fracture or instability
    (2) Known radio-resistant tumor
    (3) Recurrent lesion following EBRT
(4) Chemotherapy-only for extremely radiosensitive tumors such as SCLC and NHL.
(5) Bisphosphonates-used in case of metastatic Ca Breast/Prostate/Myeloma

Management of Superior Vena Cava Syndrome

It comprises the signs and symptoms caused by obstruction to blood flow (intraluminal/ luminal/ extraluminal) through the superior vena cava.

Why does it occur?
Due to the fact that the SVC is a thin-walled compliant blood vessel with scanty muscular tissue in its walls-so it is easily compressed.

Causes: (ADULTS)
Malignant (main)→Ca Lung (80%)(SCLC> NSCLC)
Lymphoma (8%) [NHL (Lymphoblastic lymphoma & DLBCL) > HD]
Mediastinal germ cell tumor
Thymoma
Metastatic mediastinal lymphadenopathy from Ca Breast
Non-malignant (10-20%)→ Mediastinal fibrosis (histoplasmosis)
Thrombosis of central venous catheter
Retrosternal goiter
Aortic aneurysm
Causes: (CHILDREN) –rare
Non-malignant (70%)→ Iatrogenic (post-surgery for congenital heart disease, ventriculo-atrial shunting, central venous catheterisation)
Benign granulomas
Malignant (30%)→ Lymphoma is the commonest cause (70%).

Prognosis: Median survival= 9 years (benign causes)
5 mo (Lung Cancer)
Clinical features:
Symptoms→ Dyspnoea, Fullness in face & neck, headache, cough, chest pain, hemoptysis
Signs→ Distended veins in neck & chest wall, facial oedema & plethora, cyanosis

Workup:
(1) History & physical examination
(2) Complete blood count
(3) Routine biochemistry
(4) Chest X Ray
(5) CECT scan thorax +/- guided FNAC
(6) Biopsy of any suspicious lymph node
(7) Thoracocentasis (if pleural effusion)
(8) Sputum cytology
(9) Bronchoscopy +/- biopsy
(10) Mediastinoscopy
(11) Thoracoscopy
(12) Thoracotomy

Treatment:

(1) Medical management→ all cases. Bed rest with head end elevated + Salt-restricted diet + Diuretics + Corticosteroids + Moist oxygen inhalation
(2) Radiotherapy→ for malignant SVCO. Whole mediastinum along with primary parenchymal tumor (if present) with margin, should be treated. Dose =16 Gy/4#/ 4 days.
(3) Chemotherapy→ for chemosensitive tumors like SCLC and NHL.
(4) Surgery (bypass grafting) → in case of rapidly progressive SVCO/ refractory SVCO/ SVCO caused by retrosternal goiter or aortic aneurysm.
(5) PTCA +/- stenting→ can be done for both benign & malignant causes
(6) Thrombolysis (urokinase/streptokinase/TPA)→ for thrombosis of central venous catheter (catheter should be removed in all cases)
(7) Anti-coagulants (Heparin followed by Warfarin)→for thrombosis of central venous catheter