

Oncologic Emergencies in the ED: Diagnosis, Triage, and Management



Superior Vena Cava Syndrome (SVCS).

- ◆ Mechanical complications of cancer affect the **superior vena cava by obstruction** within the vessel, **invasion** of the vessel, or **external compression** of the vessel.
- ◆ This results in impaired blood flow to the right side of the heart.
- ◆ When a mass is the source of the compression, it **usually is malignant** and may be a **primary or metastatic tumor or a malignant lymph** node.

Presentation of SVCS.

- ◆ SVCS manifests by complaints of extreme fatigue (due to poor blood return to the right side of the heart), ***dyspnea, chest pain, headache, face and neck swelling, flushing, poor vision, syncope, and confusion.***
- ◆ These symptoms most often are notable upon awakening.
- ◆ Patients may complain of tightness in the shirt collar (Stokes sign) that may improve as the day progresses.
- ◆ Patients also may notice that their symptoms worsen if they bend forward.

CM of SVC syndrome

- Extreme fatigue (due to poor blood return to the right side of the heart)

- ***Dyspnea***

- ***Chest pain***

- ***Headache***

- ***Face and neck swelling (e.g., Stokes sign)***

- ***Flushing***

- ***Poor vision***

- ***Syncope***

- ***Confusion***

**** These symptoms most often are notable upon awakening.***





- ◆ The examination may be notable for **facial plethora, periorbital edema, and facial swelling** that may extend to the neck and upper extremities.
- ◆ **Conjunctival edema** may be apparent, along with dilated veins along the thorax and upper extremities.
- ◆ The dilated veins of the upper extremities may not collapse as the arm is elevated above the head because of the elevated venous pressure caused by the obstruction.
- ◆ Less commonly, the patient may manifest with **altered mental status or Horner's syndrome.**

Differential Diagnosis of SVCS.

- ◆ As stated, up to 90-95% of cases of SVCS are the result of malignancy.
- ◆ In adults, the most common malignancies include ***bronchogenic cancer (usually small cell) and non-Hodgkin's lymphoma.***
- ◆ Other malignant causes include **thymic tumors, metastatic tumors, and mediastinal germ cell tumors.**

- ◆ The ***thrombosis*** may be visible on the CT scan when contrast is added, but in some cases venography will be needed to conclusively confirm the diagnosis.

Treatment

- ◆ If the patient has **stridor**, administration of **steroids** may help decrease localized swelling.
- ◆ If the patient is known to have a type of cancer that may cause SVCS urgent **empiric radiation** therapy, with or without concurrent **chemotherapy**, may be necessary.
- ◆ SVC **Stenting**

Pericardial Disease Related to Malignancy.

- ◆ Pericardial involvement due to cancer most commonly is seen in ***leukemia, lymphoma, lung cancer, melanoma, and breast cancer.***

Diagnosis of Pericardial Disease.

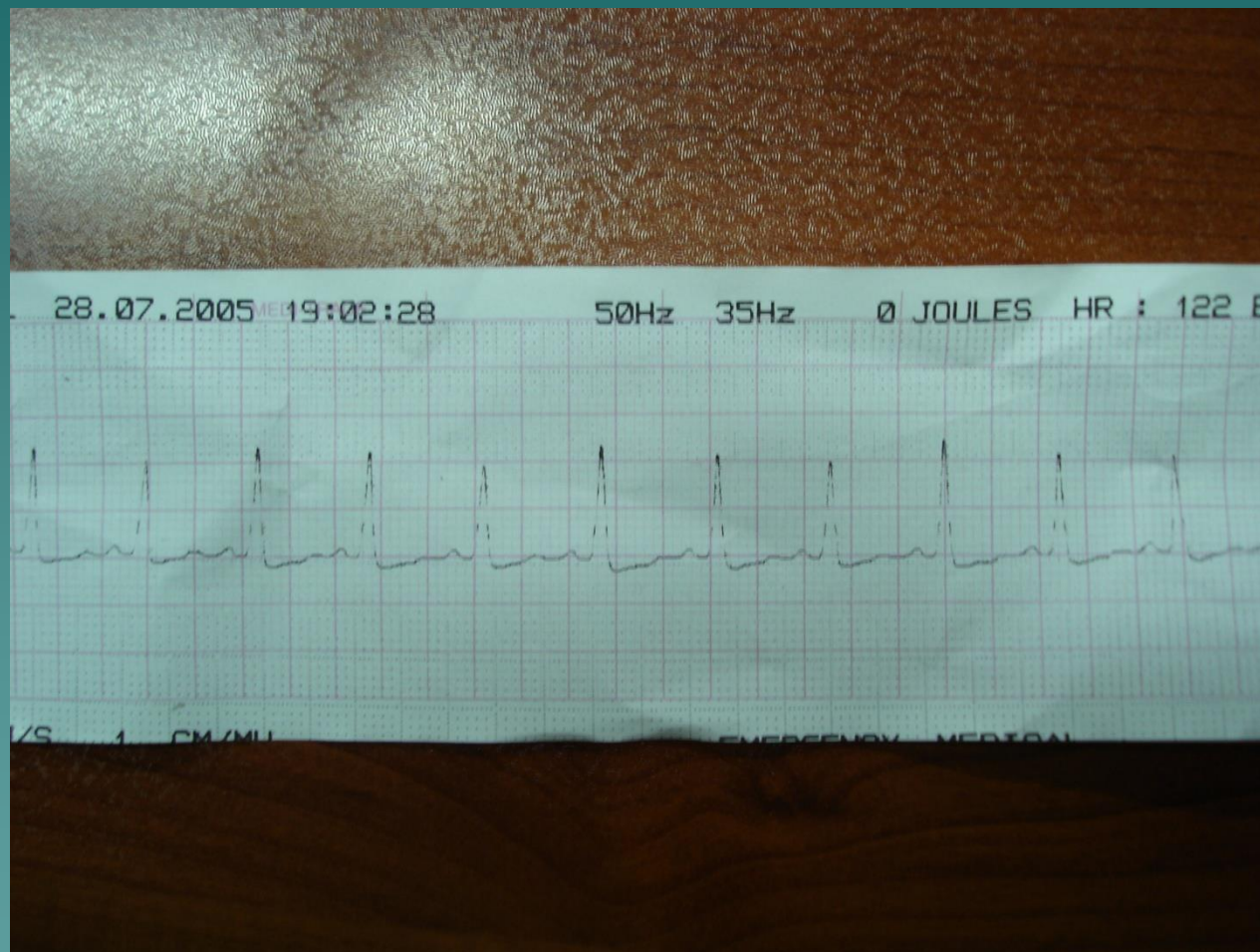
- ◆ Neoplastic involvement of the pericardium most commonly presents as ***progressive shortness of breath, chest pain, and cough***. ***Progression to frank shock with altered mental status and coma will result if it is left untreated.***
- ◆ When the pericardial effusion collects quickly, the onset of these symptoms may be very dramatic.

- ◆ Physical examination findings may include ***tachycardia, jugular venous distention, hepatic engorgement, poor peripheral effusion, and a paradoxical pulse.***
- ◆ If the patient is severely dehydrated, the classic features of pericardial tamponade may be absent.
- ◆ A pericardial friction rub may be present, but is uncommon.
- ◆ In severe cases, the patient may be hypotensive, tachycardic, cyanotic, and have altered mental status. Pulse pressure may be narrowed

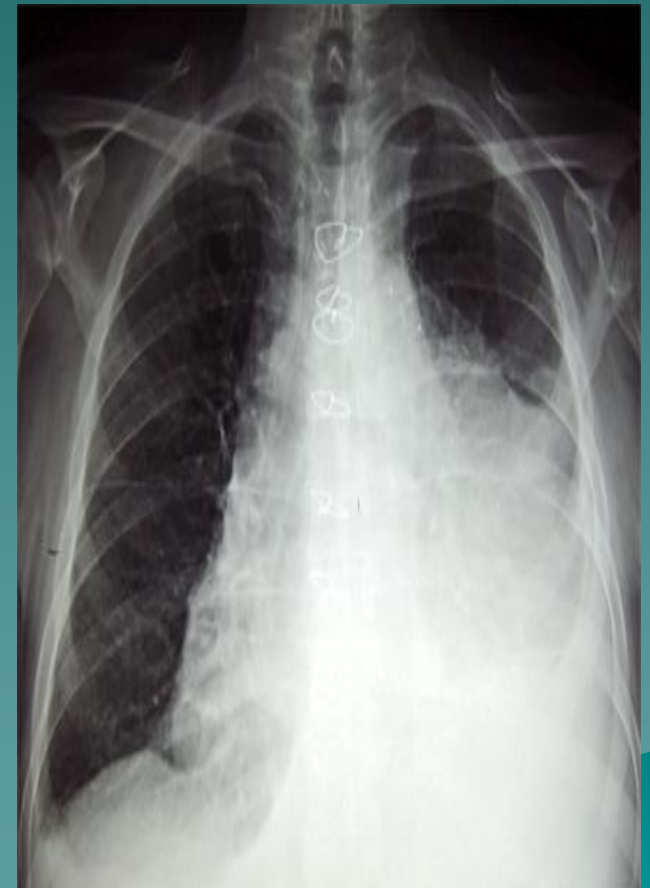
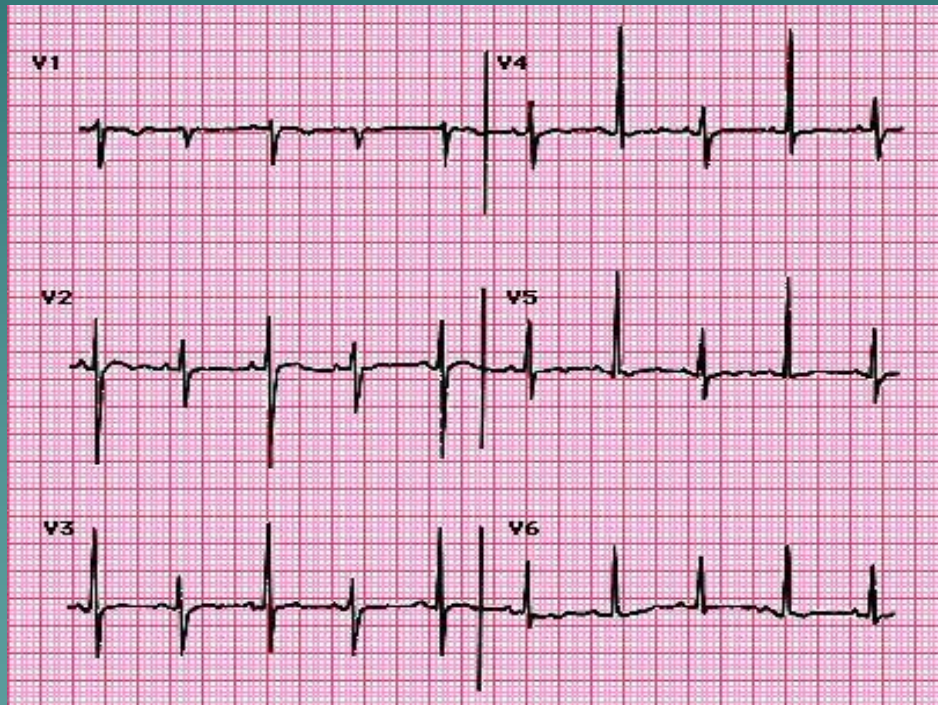
- ◆ Tachycardia
- ◆ •Jugular venous distention
- ◆ •Hepatic engorgement
- ◆ •Poor peripheral effusion
- ◆ •Paradoxical pulse (if the patient is severely dehydrated, the classic features of pericardial tamponade may be absent)•
- ◆ Pericardial friction rub (though uncommon)
- ◆ **In severe cases:**
- ◆ Hypotension•
- ◆ Tachycardia•
- ◆ Cyanosis•Altered mental status•Narrowed pulse pressure.

- ◆ Chest radiograph may **show cardiac enlargement**, but if a pericardial effusion develops rapidly or if the findings are due to restrictive pericardial disease, the chest radiograph may be normal.
- ◆ In cases in which the effusion develops slowly, the pericardial sac may hold up to a liter of fluid with very few symptoms, but in this case the chest radiograph will show a dramatically **enlarged “water bottle” heart.**

- ◆ Electrocardiogram results often will be nonspecific, but total ***electrical alternans*** is considered pathognomonic of cardiac tamponade.



Pericardial Effusion/Tamponade



Diagnosis

- ◆ The **echocardiogram** evaluates the size of a pericardial effusion as well as how much the heart is affected by the effusion.
- ◆ ***Tamponade is diagnosed when the right atrium or ventricle collapses in early diastole.***

Treatment

- ◆ The immediate treatment is either ***pericardiocentesis***, pericardial window, or pericardiectomy.
- ◆ In patients with severe compromise, the removal of a relatively ***small amount of fluid (50-100 cc)*** may dramatically improve the patient's condition.

Hypercalcemia

- ◆ ***Hypercalcemia of malignancy*** is one of the most common complications of malignancy and occurs in 10-20% of cancer patients at some point during their disease.
- ◆ If patients develop hypercalcemia, it generally is an indicator of **advanced disease**, these patients usually have a limited life expectancy.

- ◆ Among the solid tumors, hypercalcemia most commonly is seen in ***non-small cell lung cancer, squamous cell cancers of the head and neck, breast cancer, renal cell carcinoma, and cholangiocarcinoma.***
- ◆ Among the hematologic cancers, it most commonly is seen in ***multiple myeloma and lymphoma.***

Clinical Manifestations

- ◆ Early manifestations include ***fatigue, depression, constipation, polydipsia, polyuria, and anorexia.***
- ◆ The ***polyuria*** is a result of a reversible concentrating defect.
- ◆ Later, patients may have abdominal pain, obstipation, emesis, lethargy, seizures, altered mental status, and coma.
- ◆ Bone pain may or may not be present.

- ◆ Electrocardiographic changes may be seen as the calcium levels increase and include ***prolongation of the PR and QRS intervals with shortening of the QT interval.***
- ◆ At levels higher than 16 mg/dL, ***bundle branch blocks*** occur that may progress to complete heart block and cardiac arrest.

Acute and chronic renal insufficiency Gastrointestinal Nausea, vomiting Bowel hypomotility and constipation Pancreatitis Peptic ulcer disease Musculoskeletal Muscle weakness Bone pain Osteopenia/osteoporosis Neurologic Decreased concentration Confusion Fatigue Stupor, coma Cardiovascular Shortening of the QT interval Bradycardia Hypertension	Renal Polyuria Polydipsia Nephrolithiasis Nephrocalcinosis Distal renal tubular acidosis Nephrogenic diabetes insipidus
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Clinical manifestations of hypercalcemia

◆ **Hydration** is the most important initial patient treatment for the emergency medicine physician to begin.

- ◆ Those patients with severe elevations of calcium have extracellular volume deficits.
- ◆ Therefore, initial management should focus on ***infusion of normal saline*** to improve extracellular volume and glomerular filtration rate.

- ◆ ***Once fluid deficits have been corrected, diuretics*** may be added to the care of these patients. Loop diuretics, such as ***furosemide***, improve urine excretion of calcium.
- ◆ In elderly people, the use of diuretics also may help prevent fluid overload.
- ◆ However, **thiazide diuretics should be avoided** because they decrease renal calcium excretion and may worsen the patient's hypercalcemia.

- ◆ A class of agents called **bisphosphates** has high affinity for areas of high bone turnover. In areas of malignant bone involvement, these agents block bone resorption.
- ◆ These medications include pamidronate, etidronate, and clodronate. There is some evidence that **pamidronate** may be the most effective medication.
- ◆ The dose **is 60-90 mg/d given intravenously**. It can be given over several hours or over 24 hours.

Tumor lysis syndrome



Tumor Lysis Syndrome

- ◆ Those patients with rapidly proliferating tumors or those with a very large tumor burden may experience ***spontaneous or treatment-related destruction of tumor cells.***
- ◆ Death of these cells releases intracellular components resulting in ***hyperkalemia, hyperuricemia, and hyperphosphatemia with secondary hypocalcemia.***
- ◆ These abnormalities may lead to ***cardiac arrhythmias, renal failure, and death.***

- ◆ This disorder most commonly is seen in patients with ***lymphoma (particularly Burkitt's) and leukemia***, but may occur in a variety of solid tumors (e.g., non-small cell cancer, widely metastatic breast cancer).

Clinical Manifestations

- ◆ **Hyperkalemia** may lead to weakness and altered mental status followed by cardiac dysrhythmias and death.
- ◆ **Hyperphosphatemia and increased uric acid** levels produce acute tubular necrosis and **renal insufficiency**.
- ◆ This results in decreased urine output, urine crystals, flank pain, and hematuria. Severely elevated phosphate levels may cause acute calcium precipitation in the soft tissues and kidneys.
- ◆ **Hypocalcemia** may cause carpopedal spasm, neuromuscular irritability, altered mental status, and seizures.

Lab findings

- ◆ Lab tests generally will show ***elevated blood urea nitrogen, creatinine, potassium, phosphorus, and uric acid levels, and a decreased serum calcium level.***
- ◆ Urine testing will show evidence of hematuria and crystals.



- ◆ Urine sediment loaded with **uric acid crystals**. These crystals are pleomorphic, most often appearing as rhombic plates or rosettes. They are yellow or reddish-brown and form only in an acid urine

- ◆ If adequate renal function remains, then the initial steps in treatment include **aggressive hydration** along with alkalization of the urine.
- ◆ **Alkalinization of the urine** to a pH of greater than 7 will improve uric acid secretion; however, care must be taken to closely monitor the calcium level, as raising the pH may worsen existing hypocalcemia.
- ◆ The addition of **furosemide or mannitol** also may help improve urine output.

- ◆ ***Allopurinol*** may be given to lower uric acid levels and may be given in a 600-900 mg loading dose and then 100-300 mg twice daily during the period of highest risk..
- ◆ Elevation of potassium may be treated with alkalization, insulin/glucose, and calcium.
- ◆ ***Calcium*** also can be given for severe hypocalcemia; however, if phosphate levels are severely elevated, this may cause precipitates of calcium and phosphate.
- ◆ ***Rasburicase***

- ◆ Hydration
- ◆ Correction of Hyperkalemia
- ◆ Rasburicase

- ◆ If the kidneys are not functioning, or the patient does not respond to therapy, ***hemodialysis*** will be necessary.

PT MANAGEMENT FOR TUMOR LYSIS

Maintain hydration by administration of normal or 1/2 normal saline at 3000 mL/m² per day
Keep urine pH at 7.0 or greater by administration of sodium bicarbonate
Administer allopurinol at 300 mg/m² per day
Monitor serum chemistry

If, after 24–48 h

Serum uric acid > 8.0 mg/dL
Serum creatinine > 1.6 mg/dL

Correct treatable renal failure (obstruction)
Start recombinant urate oxidase, 0.2 mg/kg IV daily

Delay chemotherapy or start dialysis

Serum uric acid < 8.0 mg/dL
Serum creatinine < 1.6 mg/dL
Urine pH > 7.0

Start chemotherapy
Discontinue bicarbonate administration
Monitor serum chemistry every 6–12 h

If

Serum K⁺ > 6.0 meq/L
Serum uric acid > 10 mg/dL
Serum creatinine > 10 mg/dL
Serum phosphate > 10 mg/dL or increasing
Symptomatic hypocalcemia present

Begin hemodialysis

Syndrome of Inappropriate Antidiuretic Hormone (SIADH).


- ◆ In oncology patients, the syndrome of inappropriate antidiuretic hormone (SIADH) is **a paraneoplastic syndrome** that results from the secretion of arginine vasopressin (also known as antidiuretic hormone).

- ◆ The increased production of vasopressin results in **hyponatremia**, which is the best-recognized characteristic of SIADH.
- ◆ Approximately 1-2% of patients with malignancy will develop SIADH, although those with **small cell lung** cancer may have rates of up to 10%.

Diagnosis of SIADH

- ◆ . The major manifestations of SIADH result from **hyponatremia**.
- ◆ In some cases, the degree of hyponatremia will be minimal and patient will be asymptomatic.
- ◆ At lower levels (115 mEq/L), patients may complain of **fatigue, emesis, myalgias, and poor appetite**.
- ◆ As the sodium level falls below 100 mEq/L, patients may develop **altered mental status, seizures, psychosis, and lethargy**. **Coma and death** may follow.

Treatment of SIADH

- ◆ ***Mild fluid restriction*** is appropriate (500 cc/d).
 - ◆ Patients who do not respond to fluid restriction may require therapy with ***demeclocycline***.
 - ◆ This medication causes a reversible nephrogenic diabetes insipidus that counteracts the influence of the excess vasopressin.
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- ◆ Normal saline can be initiated, or for those with seizures and altered mental status, 3% **hypertonic saline** (300-500 cc at a time over 3-4 hours) may be administered followed by 1 mg/kg of furosemide.
- ◆ The serum sodium level should not be raised by more than 1 mEq/L/hour. Rapid increases in serum sodium may result in **central pontine myelinolysis**.

Epidural Spinal Cord Compression

- ◆ This complication is seen in up to 5-10% of cancer patients and may be the initial presentation.
- ◆ Patients with ***lung cancer, breast cancer, prostate cancer, lymphoma, sarcoma, multiple myeloma, and renal cell carcinoma*** are at particular risk.

- ◆ The most common area involved is the ***thoracic section of the spine*** (the thoracic vertebrae are the most abundant, and therefore this is the section most commonly involved).
- ◆ Although most tumors do arise from the vertebral bodies, it is possible for some tumors to impinge upon the epidural space by growing through the intravertebral foramen.
- ◆ In this case, there will not necessarily be any bony involvement or destruction.
- ◆ Patients may have involvement of more than one area.

Diagnosis of ESCC.

- ◆ **Pain** is present in 90-95% of patients with ESCC and it often is the initial symptom.
- ◆ The pain may precede any other symptoms by 1-2 months.
- ◆ The pain may be local or radicular, and is constant and progressive. **Similar to lumbar disc** disease, the pain may increase with straight leg raise or with maneuvers that increase intrathoracic pressure, such as the Valsalva maneuver.

- ◆ Unlike the pain associated with disc disease, the patients with ESCC may find that their ***pain is increased with recumbency rather than improved.***
- ◆ Patients also may describe numbness, tingling, or dysesthesia, as well as difficulty ambulating.
- ◆ Constipation or difficulty urinating also may be present.

- ◆ On physical examination, **midline bony tenderness** may be present.
- ◆ As the compression increases, the patient may develop objectively measurable **sensory loss** distal to the lesion. **Ataxic gait** may be present. These deficits can develop rapidly.
- ◆ By the time ESCC is diagnosed, **bilateral weakness** is present in approximately 75% of patients and many are no longer ambulatory.
- ◆ Autonomic dysfunction such as **bowel or bladder dysfunction develops late** and parallels the development of weakness.

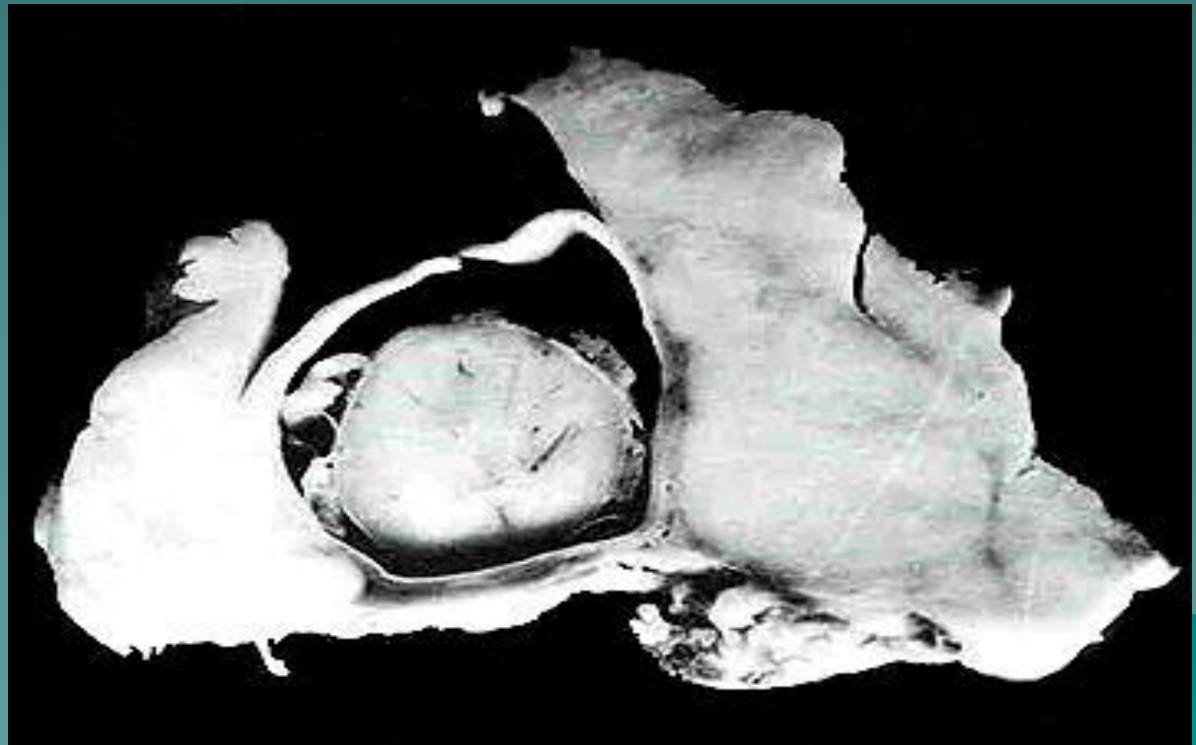
- ◆ ***MRI of the spine*** with gadolinium enhancement is noninvasive and more sensitive than myelography for detecting bone and intramedullary lesions.

Treatment of ESCC

- ◆ ***Higher dose dexamethasone (24 mg/d)*** also was supported by a recent evidence-based literature review, which found that it was better supported by the literature than the use of moderate steroids

- ◆ After this initial treatment, the typical therapy for ESCC is to initiate ***radiation therapy*** at the level of the epidural compression.
- ◆ ***Surgical treatment*** may be appropriate to control pain, limit the progression of neurologic deficits, and to allow the spine itself to be stabilized.
- ◆ If the source of the tumor is not known, a tissue diagnosis could be made at the time of surgery

- ◆ A 32-year-old woman who developed **hypesthesias of the lower extremities** in the terminal phase of a seven-year course of Hodgkin's disease



- ◆ 69-year-old women with a remote history of breast cancer, interscapular back pain for one month, and a normal neurologic examination. The scans demonstrate a large epidural



Brain Metastasis

- ◆ Cancer of the *lung, breast, skin, gastrointestinal tract, and genitourinary system* account for the majority of metastatic diseases to the brain.
- ◆ Intracranial metastases, which may consist of *solitary or multiple* lesions, occur in 20-30% of those patients who have a systemic cancer.

- ◆ **Headache** is one of the most common complaints of the patient with a brain tumor and is the presenting complaint in approximately 35% of patients.

- ◆ Brain tumors cause headaches due to alteration in ICP and traction or displacement of pain sensitive areas within the brain (cranial nerves, venous sinuses, dura mater).
- ◆ The headache associated with increased ICP typically is ***retro-orbital and is associated with nausea and vomiting.***

- ◆ Classically, teaching states that this headache will be worst in the morning, with improvement upon arising.
- ◆ However, since there are other mechanisms that result in tumor-related headaches, this classical presentation is frequently not present.

- ◆ If the cranial nerves are involved, there may be complaint of ***blurred and double vision or visual field defects.***
- ◆ If the ICP continues to worsen, ***alterations in mental status*** may develop

- ◆ Usually, these symptoms will develop slowly over a period of weeks to months.
- ◆ However, if there is an ***acute change in the ICP or hemorrhage*** into the tumor, life-threatening symptoms may develop rapidly and acute intervention will be necessary.

Diagnosis

- ◆ Diagnosis can be made with contrasted CT or MRI. Studies comparing these two modalities have not been done, but when available, a ***MRI with gadolinium contrast*** is preferred.

Treatment of Brain Metastasis

- ◆ ***Acute changes in mental status, new focal abnormalities, and acute seizures*** all may result from vasogenic cerebral edema. Urgent intervention may help prevent cerebral herniation.

- ◆ Initial management should address the ABCs. Once the patient is intubated, he or she should be hyperventilated to a pCO₂ of 25-30 mmHg.
- ◆ ***This is the most rapid way of decreasing ICP.***

- ◆ After airway management, the patient should receive ***intravenous dexamethasone*** 40-100 mg followed by similar doses every day.
- ◆ In addition, the patient may receive ***furosemide*** 40-120 mg intravenously.
- ◆ Finally, a 20-25% solution of ***mannitol*** at a dose of 0.5-2.0 mg/kg may be added.

- ◆ For less significant problems related to tumor edema, the patient may be given ***lower doses of dexamethasone*** to improve symptoms but limit side effects.

Neutropenic Fever

- ◆ Neutropenia is present when the counts of polymorphonuclear leukocytes plus bands falls below ***500/mm³***, and profound neutropenia is present when these counts fall below ***100/mm³***.

Diagnosis of Neutropenic Fever.

- ◆ Patients are at greatest risk for neutropenia in the period from ***seven to 15 days after cytotoxic*** chemotherapy.
- ◆ Potentially serious infection should be assumed in the patient with neutropenia after a single temperature elevation of greater than 38.3 C, or when recurrent temperature elevations of 38 C occur over a 24-hour period.

- ◆ Aside from the fever, the patient may have ***few signs to help localize the site of infection*** because of his or her limited immune response.
- ◆ Physical examination should evaluate the common areas of infection, such as ***sinuses, throat, skin, lungs, urinary tract, prostate, and perirectal area***. If indwelling devices are present, they need to be evaluated for pain, swelling, redness, and drainage.

- ◆ The patient should be completely cultured, including blood cultures from each indwelling catheter.
- ◆ Chest radiograph also should be done, although ***in the severely neutropenic patient the radiograph may be normal even when a pneumonia is present.***
- ◆ Despite a complete work-up and search for the source of the fever, an infectious source may be identified in only 30-40% of patients.

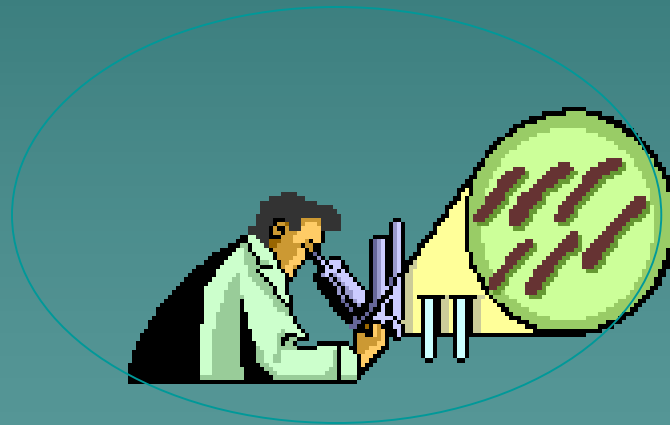
Treatment of Neutropenic Fever

- ◆ ***Empiric treatment with broad-spectrum antibiotics*** has been the foundation of treatment for the patient with neutropenic fever..
- ◆ Infections are most commonly caused by gram-positive bacteria (*Staphylococcus aureus*, coagulase-negative staphylococci, and streptococcal species) and gram-negative aerobic bacteria (*Escherichia coli*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa*).

Empiric AB therapy

- ◆ Ceftazidim + Amikacin
- ◆ Imipeneme + Vancomycin
- ◆ Ceftriaxon
- ◆ Amphotericin if still febrile after seven days

Typhlitis





- ◆ Supine film of the abdomen of a 18-year man showing **pneumatosis intestinalis** of the right ascending colon (arrows) with slightly distended small bowel loops from typhlitis .

- ◆ Typhlitis (from the Greek word "typhlon," or cecum) is a life-threatening, necrotizing enterocolitis occurring primarily in immunosuppressed patients .It is synonymous with **"neutropenic enterocolitis"** and **"ileocecal syndrome."**

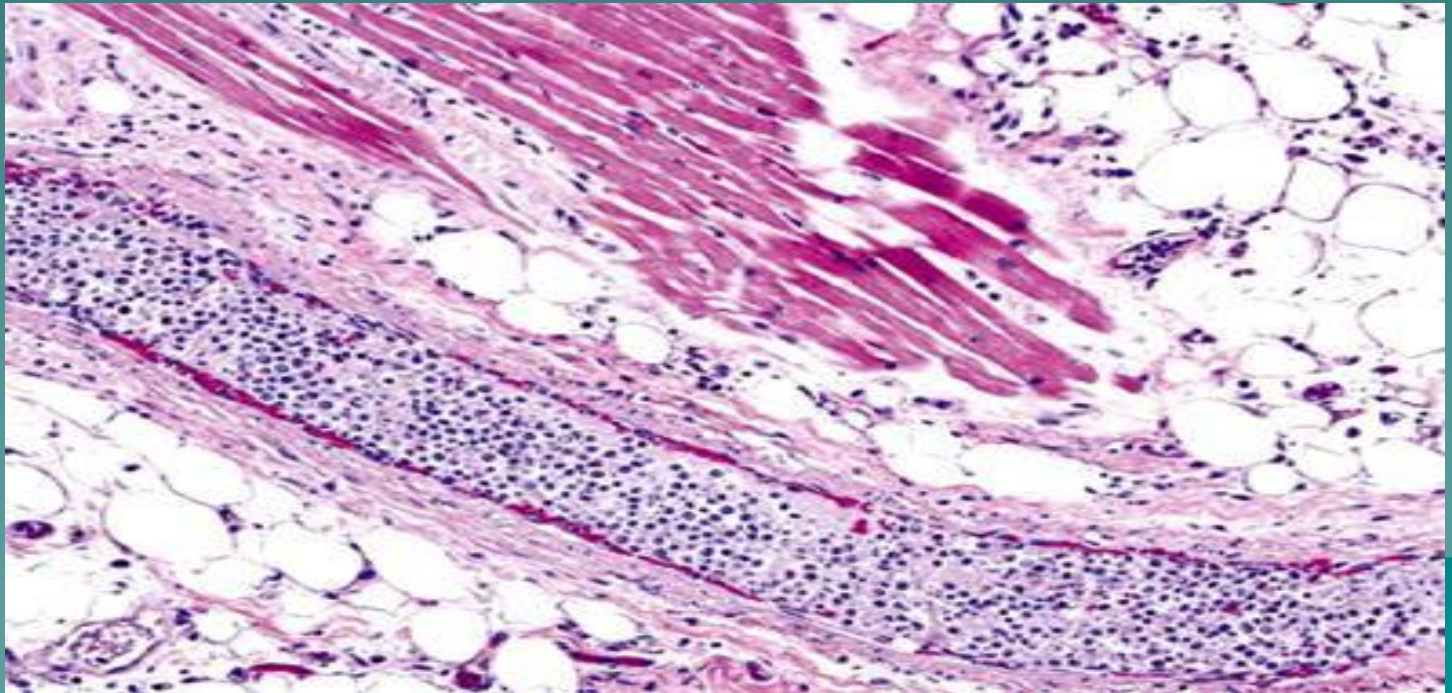
- ◆ It probably involves a combination of factors, including **mucosal injury** by cytotoxic drugs or other means, profound neutropenia, and impaired host defense to invasion by microorganisms .
- ◆ The **microbial infection** leads to necrosis of various layers of the bowel wall.
- ◆ The **cecum** is almost always affected, and the process often extends into the **ascending colon and terminal ileum** .

- ◆ Gross and histologic reveal **bowel wall thickening, discrete or confluent ulcers, mucosal loss, intramural edema, hemorrhage, and necrosis.**
- ◆ Various bacterial and/or fungal organisms, including gram-negative rods, gram-positive cocci, anaerobes (eg, *Clostridium septicum*), and *Candida* sp., are often seen infiltrating the bowel wall.
- ◆ ***Polymicrobial infection*** is frequent.

- ◆ In neutropenic patient (absolute neutrophil count **<500**), who presents with **fever and abdominal pain**, usually in the **RLQ**.
- ◆ Symptoms often appear **10 to 14 days** after cytotoxic chemotherapy
- ◆ Abdominal distension, nausea, vomiting, and watery or bloody diarrhea .
- ◆ Peritoneal signs and shock suggest the possibility of bowel wall perforation.
- ◆ **Stomatitis and pharyngitis,**

- ◆ A 59-year-old man presented with a sudden onset of abdominal pain in the left upper quadrant, associated with low-grade fever and shortness of breath. He had had a recent relapse of AML. WBC 15,900 (60 % monoblasts). In 24 hours, WBC increased from 29,000 to 102,340 and his monoblast count increased from 5510 to 55,264, despite the administration of cyclophosphamide. The patient's hypoxemia worsened. Mechanical ventilation was initiated, but his condition continued to deteriorate, and he died.

- ◆ A postmortem examination was performed, and profound ***leukostasis*** was found throughout multiple organs, including the heart, lungs, adrenal glands, liver, and spleen;




HYPERLEUKOCYTOSIS AND LEUKOSTASIS

- ◆ Leukemic blasts are considerably less deformable than mature myeloid cells .With increasing blast counts in the myeloid leukemias, ***variously defined as a total white blood cell count >50,000 or >100,000/microL (hyperleukocytosis), blood flow in the microcirculation can be impeded by plugs of these more rigid cells***

- ◆ ***Local hypoxemia*** may be exacerbated by the high metabolic activity of the dividing blasts along with the production of various cytokines, with resultant endothelial damage and hemorrhage occurring in addition to hypoxic damage secondary to reduced blood flow .


- ◆ This situation can be worsened by **red blood cell transfusions that rapidly increase whole blood viscosity in the presence of hyperleukocytosis**
- ◆ In addition, coagulation abnormalities, including DIC, further increase the risk of local hemorrhage.
- ◆ **Liberal use of platelet transfusions is recommended**, particularly since the platelet count can be overestimated because of the presence of fragments of blasts on blood smears, which can be mistakenly counted as platelets by automated blood cell counters

- ◆ Although **pathologic evidence** of leukostasis can be found in **most organs** in patients with extremely high white cell counts, clinical symptomatology is usually related to ***central nervous system and pulmonary*** involvement
- ◆ Occasionally, pulmonary symptomatology with **worsening hypoxemia** can occur following therapy with resulting lysis of trapped leukemic cells. **Leukapheresis** is often of modest benefit to patients who develop pulmonary problems during cytotoxic treatment, since symptoms are related, at least in part, to a local inflammatory response following leukocyte lysis.

- ◆ **Spurious elevation of serum potassium** can occur because of release from leukemic blasts during the in vitro clotting process, and it is sometimes necessary to **assay potassium levels on heparinized *plasma samples, rather than serum.***
 - ◆ Similarly, arterial ***pO₂*** can appear falsely decreased because of the enhanced metabolic activity of the malignant cells, even when the specimen is appropriately placed on ice during transport to the laboratory.
 - ◆ ***Pulse oximetry*** provides an accurate assessment of O₂ saturation in such circumstances.
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- ◆ **Hyperleukocytosis** is more common in patients with myelomonocytic (FAB-M4) or monocytic (FAB-M5) leukemia
- ◆ Symptomatic hyperleukocytosis in AML (and rarely in ALL) constitutes a medical emergency.
- ◆ In most patients, **rapid cytoreduction** can be achieved by chemotherapy, with either **standard induction agents** or with high oral doses of **hydroxyurea** (eg, 3 gms/m² /day or 50 to 100 mg/kg /day)

- ◆ Some centers also advocate **low dose cranial irradiation**, including the retina, in order to prevent further proliferation of leukemic cells in CNS.
- ◆ Although intensive leukapheresis, with procedure times often lasting many hours, can produce **rapid improvement of pulmonary and central nervous system symptomatology**, there are theoretic and practical limitations to its benefits.

- ◆ In **established vascular plugs**, particularly if vascular invasion and/or damage has taken place, **chemotherapy and possibly radiotherapy** remain the primary modalities
 - ◆ Cycle-specific chemotherapeutic agents are more likely to be the most rapidly effective.
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◆ **Treatment**

- ◆ Efficacy of leukapheresis is in reducing early mortality and/or improving overall survival
Leukapheresis cannot be recommended as routine therapy as a form of tumor "debulking" in patients with high blast counts.

- ◆ Leukapheresis can clearly be of value in the occasional patient to whom chemotherapy cannot be administered immediately.
- ◆ If facilities are available, to leukapherese AML patients with $WBC > 100,000$ or 50000 and associated symptomatology as an adjunct to chemotherapy

تقديم به شما

