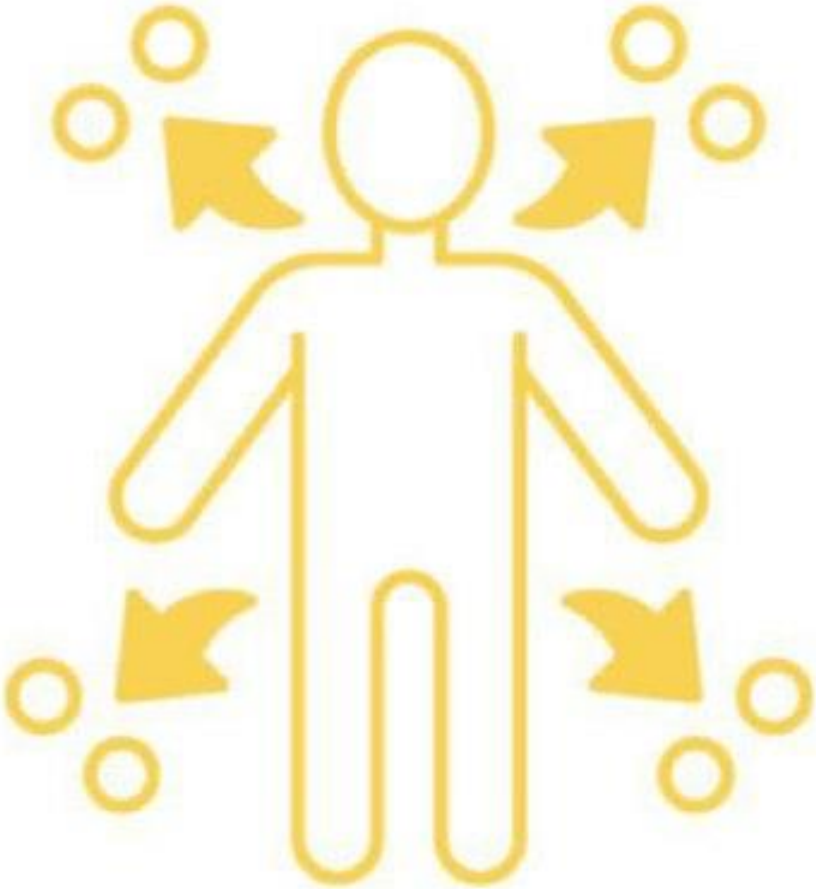


MIRACLE Academy

سموم
زميلتكم نهى حسن

لجان الدفعات

قال تعالى (يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ)

اكثر الناس عرضه اله الي يشتغلو بمحطات البنزين

METALSHEAVY

هسا يا جماعه في أشياء قراتهم الدكتوره قراءه فانا حاولت اشرحهم

Lead toxicity

HEAVY METALS

- LEAD √
- √IRON
- MERCURY
- ARSENIC
- NICKEL

- CADMIUM
- THALLIUM
- ALUMINUM
- GOLD

يعتبر من العادن الي شديد السميه لذلك جسمي ما بحتاجه كثير

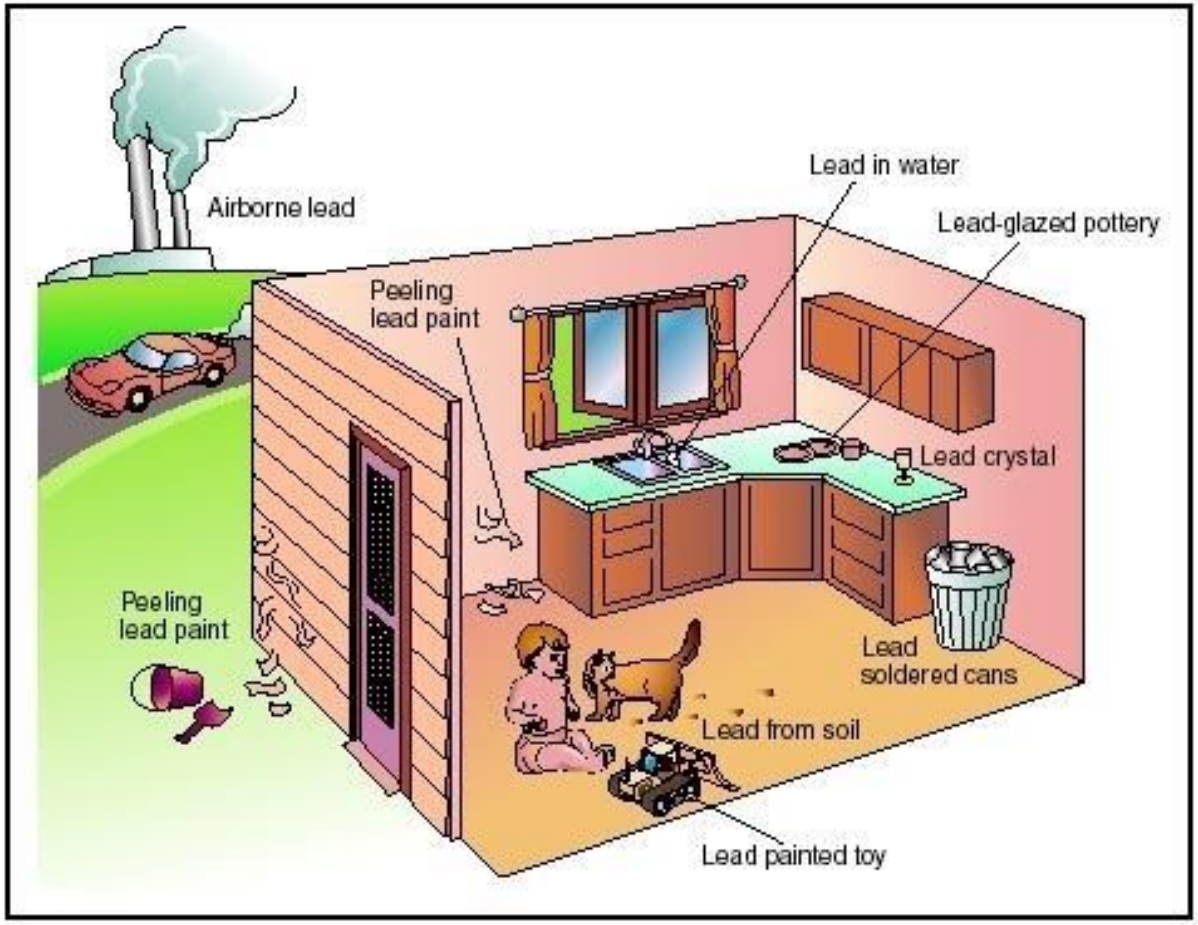
- Some metals needed in trace amounts
- Body lacks any major system to remove excess metals

بالغالب بتخلص منهم عن طريق renal excretion

LEAD

- Lead poisoning is one of the oldest occupational and environmental diseases in the world
- **Exposure from**: **environment** (water, air, soil, food), **fuels**, **paints**, **production of storage batteries**, **glass polishing**, **shooting**
- Environmental lead exposure **has declined considerably in the last three decades.**
- **elimination of lead as an additive in gasoline**, as well as **diminished contact with lead-based paint** and other lead-containing consumer products.

هون يحكولنا صح يدخل بصناعه
الأشياء الي فوق ولكن حاولو يقللو
نظرا لانه سميته عاليه


Airborne lead
Lead in water
Lead-glazed pottery
Peeling lead paint
Lead crystal
Peeling lead paint
Lead soldered cans
Lead from soil
Lead painted toy


UB12350
UNIVERSAL BATTERY
12350 12V 35Ah


GLASS POLISH


110
OCTANE
LEADED
RACING FUELS

LEAD

هاد نادر حدوثه Acut
هاد خطير Chronic
ويعمل مشاكل خطيرة

- Lead is a cumulative poison that causes both **chronic *(plumbism)*** **and** **acute intoxication**
- **Acute** poisoning is **rare** but **chronic** one is a **serious problem** (low-level lead exposure)

معناها انو يكون معرض له لفتره قليله ولكن لمده طوله يعني مثلا كل ما يروح للمصنع ساعه بتعرض اله ولمده طويله

- The **intestinal tract** is the primary route of entry in non-industrial exposure....**from food & water**

اول اشي ممكن يدخل الليد فيه للجسم هو عن طرق اكله يعني اشي يوصل للجهاز الهضمي

- **Lead-containing paint** is a **1ry** source of lead exposure in **children (pica)**

حكينا الدهان يحتوي على الليد وهاد ممكن يتعرض الأطفال وتعرفو بيحبو يمسكو ويلعبو بكل اشي

- Lead exist in both **inorganic** and **organic** form

اعلى absorption

معنى pica هي conditionبحكيها عن الأطفال لانهم يوكل الأشياء الغير صالحه للاكل مثل التراب ممكن ويكون يحتوي على الليد او بطاريات تعرفوهم الصغار الدائريات

Toxicokinetics

عنا اكثر من طريقه ليصير امتصاص لليد ويدخل للجسم

- **Absorption:**
- ***Oral exposure:*** امتصاصه بالنسبه للصغار اعلى مقارنه مع الكبار
- adult diet (**10% absorbed, children absorb 50%)**
- ***Dietary deficiencies*** of calcium, iron, zinc enhance lead absorption as well as its tissue storage

اذا واحد عندو نقص بالكالسيوم او الزنك وكان معه انيميا رح يزيد هاد امتصاص الليد وتخزينه محل الكالسيوم

- ***Inhalation:*** absorption is greater and more rapid by pulmonary route….is **the major route of industrial exposure** (lead fumes, fine particles)

تعتبر الطريقه الرئيسه لامتصاصه داخل المصانع وسريع جداا

- ***Dermal absorption*** is poor, Cutaneous absorption of lead is limited (typically far less than 1%), except in case of organic lead

امصاصه بكون قليل من خلال الجلد الا اذا كان organic

رح تبلش نحكي أماكن توزعه بالجسم
بعد ما صار امتصاص

Toxicokinetics

- After absorption lead circulate through the blood associated **99% with erythrocytes** and 1% present in plasma

هسا صار امتصاصا للأسف ف رح يروح على circulation ومنها على bone cns الخ...
ف يمكنوب انه 99% منه بيروح على erythrocyte

- **Distributed first to soft tissues** (renal tubule and liver) and then **incorporates into bone, hair and teeth** for storage

يخل على الكبد والكليه وبعدها
على العظم والشعر والاسنان
ويتخزن هناك

- **Crosses the placenta and the BBB**

- High affinity for bone and other calcified tissue…..90% deposited in bone "lead lines“ (tertiary lead phosphate)

اعطل اشي انو يجل من خلال المشيمه والbbb
و90% يصيرله ترسيب بالعظم بسبب ارتباطه مع الفوسفات

LEAD

شايفين هاد
اللون الأبيض
المشع هاد
لليد

رح يوقف النمو
للعظام ومشاكل
خطيره بالعظم

LEAD LINES

اذا كان بالدم او الكليه او الكبد مده التخلص منه بتكون من شهر لشهرين اما اذا كان بالعظم وترسب هناك لسنين

Toxicokinetics

- **Clearance**: half life in the blood and soft tissues is 1–2 months; while in bone is years to decades
- ~70% of lead excretion occurs via the urine
- Less amounts are eliminated via the feces and exfoliation of epithelial tissue, sweat, and breast milk
- **A dose of 0.5g of absorbed lead is estimated to represent a fatal dose**

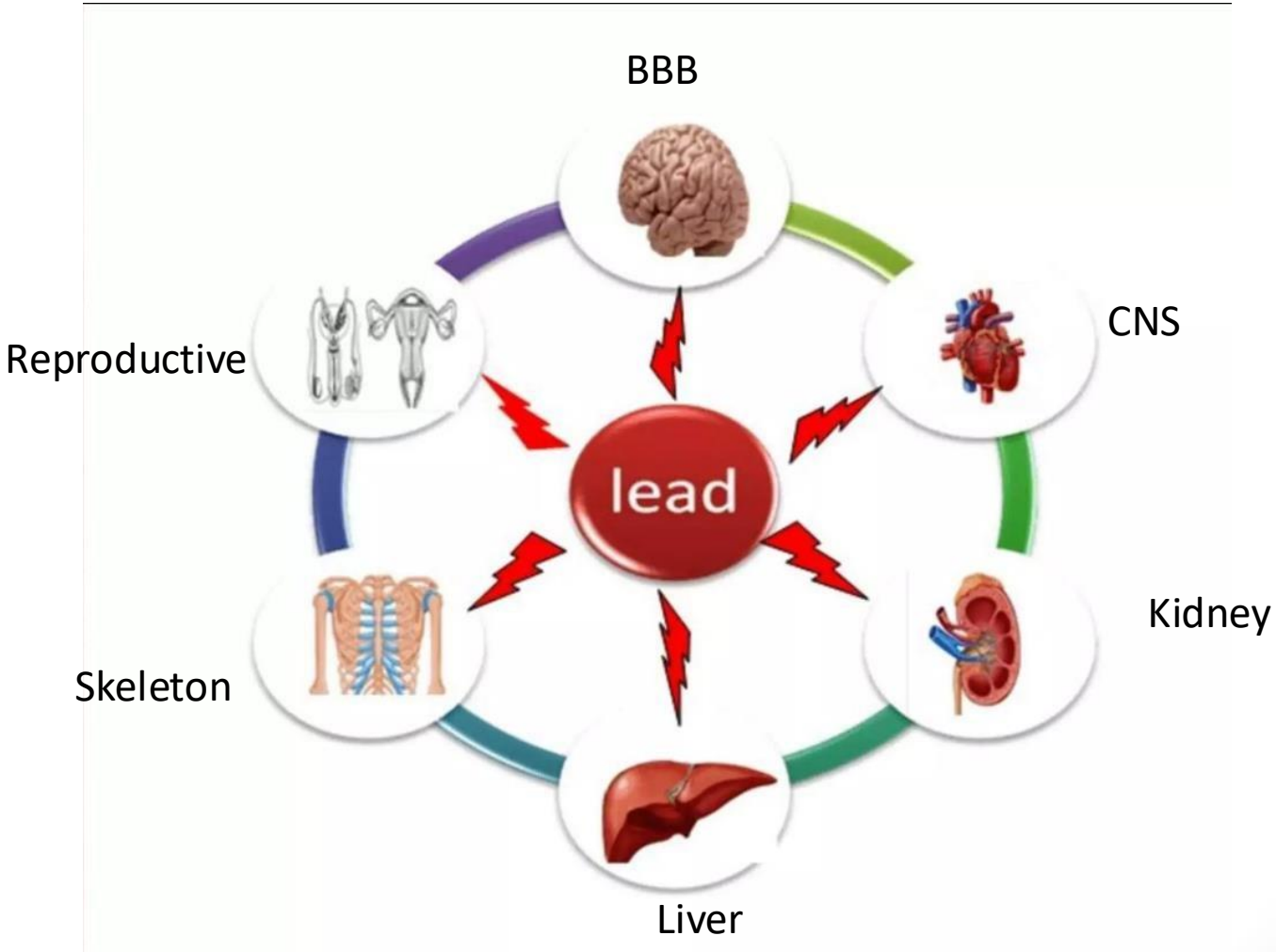
اذا اخد 500mgتكون جرعه قاتله

Toxic dose

	Severe toxic	Non toxic
بالوضع الممتاز المفروض مياه الشرب ما تحتوي على لليد ولكن للأسف فيه ولكن ضمن رينج محدد الا وهو 15ppb	Children:600 micro g(3) Adult :800 micro g(4)	<150microg /L(1mmol)

- Whole blood lead concentrations are non toxic **if < 150 µg/L (1 mmol/L)**
- Concentrations over **600 µg/L [3 mmol/L**] (children) or 800 µg/L [4 mmol/L] (adults) are usually associated with severe toxicity.
- level for lead in drinking water **is 15 ppb**……however, the maximum contaminant level **goal 0 ppb**

Lead toxicity



Toxicity

لما يصير تسمم عندي رح يتم تثبيط عده انزايمز مسؤولين عن عده عمليات حيويه بالجسم منهم يرتبطو مع sulfhydryl group ويثبطو عمل الانزيم

- The toxic **effects** range from
- **inhibition of enzymes** to the **production of severe pathology or death**
- Lead exerts **multisystemic toxic effects** that are mediated by multiple modes of action:
- Primarily by **binding to sulfhydryl group** of protein molecules….cause **inactivation of several enzyme systems**
- Lead affect the **nervous system**, the **GI**, **hematopoietic**, **reproductive** & **CV systems**

رح نبلش نشرح عنهم واحد واحد

Hematologic Effects

- **Decreased heme synthesis**.....**increase** production of **RBCs by bone marrow** (compensatory mech.)
- These cells are released as **immature** reticulocytes and **stippled cells** (**basophilic stippling**)
- When blood smear is stained erythrocytes display dots.....accumulation of mRNA
- Normocytic or Microcytic and hypochromic anemia

أنواع الانيميا
الي يسببها

الليد بقلل الهيم تمام فيحاول العظم بزيد من صناعه RBCsولكن الي تكون رح تكون immature
وتكون زي مرقطه فلما نشوفها تحت المايكروسكوب تكون dots

Renal Toxicity

- **Chronic lead nephrotoxicity** consists of interstitial fibrosis, progressive nephron loss, azotemia & renal failure
- **Acute lead nephrotoxicity** consists of proximal tubular dysfunction and azotemia.....can be reversed by Tx with chelating agents
- Impairs the renal synthesis of heme-containing **enzymes involved in vitamin D metabolism**....affect bone
- Hyperuricemia with gout

لما يصير عندي فشل بالكليه رح تبطل تقدر تحول vit D اللى شكله النشط و هاد باثر على العظم لانه نص الفيتامين هاد بقلل امتصاصا Ca+

لانه يتم التخلص من اليوريك اسيد عن طريق الكليه و هون صار فشل فيها ف صار يتراكم بالدم

الدكتوره روان حكت بنركز على الي بالاحمر بالاضافه انها هي الي كاتبه الاسئله

Neurologic, Neurobehavioral, and Developmental Effects in Children

- Manifestations range from **impaired concentration, headache, diminished visual-motor coordination**, & tremor to overt **encephalopathy:** lethargy or delirium, vomiting, irritability, loss of appetite, dizziness, and **convulsions** مشاكل ب cns
- May progress to obvious ataxia, and reduced level of consciousness…**.may progress to coma and death**
- Lead affects virtually ***every neurotransmitter system in the brain*** (glutamatergic, dopaminergic, and cholinergic systems)….

الدكتوره قراتهم قراءه

- **Recovery is often accompanied** bysequelae including **retardation…..inmentalepilepsy, some cases, optic neuropathy and blindness**

Effects on Cardiovascular System

- The pathogenesis of lead-induced ***hypertension*** is multifactorial including:

1. **Inactivation of endogenous nitric oxide and cGMP**, possibly through lead-induced reactive oxygen species;
2. Changes in the **RAAS** and increases in sympathetic activity……important humoral components of HTN;
3. possible rise **in endothelin & thromboxane===vasoconstrictors**

الليد بقلل افراز النايترو أكسيد
وهو مسؤال عن vasodilater

Other Toxic Effects

- Lead **decreases immunoglobulins**, peripheral B lymphocytes, and other components of the immunologic system…..**immunosuppressive agent**
- Retention and mobilization of lead in bone occur by the same mechanisms involved in calcium regulation…..**competes with Ca for GI absorption**
- Lead affects osteoblasts, and osteoclasts…..has been associated with **osteoporosis** and **delays fracture repair**

Other Toxic Effects

يعمل عقم

- Lead toxicity has long been associated also with **sterility** and **spontaneous abortion and low birth weight**

- **GI effects**:
  - Abdominal cramp
  - Constipation, Nausea
  - Less common Diarrhea

Diagnosis

- Skeletal **x-ray's** fluorescence measurement of lead
- **Blood levels** of lead
- **Anemia** microcytic, hypochromic (with basophilic stippling)
- **Azotemia, Gout**
-)

هاي حكينا تدل على انو acute في renal

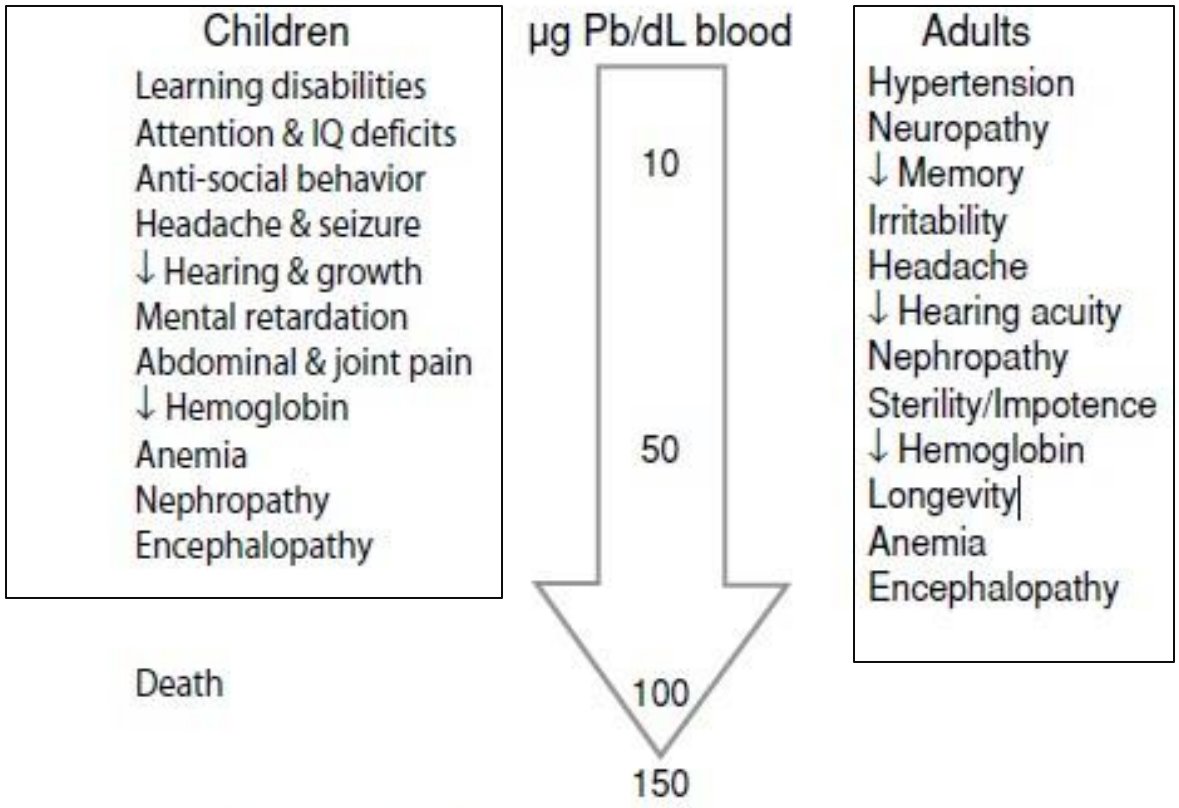
Diagnosis

- N.B: consider lead poisoning in any patient with **multisystem findings** with abdominal pain, headache, anemia, and, less commonly, motor neuropathy, gout, and renal insufficiency.

- Consider lead encephalopathy in any child or adult with delirium or convulsions (especially with coexistent anemia)

S.E and does
مش مطلوب

FIGURE 1. Effects of lead poisoning on human health[a]



[a] Adapted from Gurer and Ercal (49).

Dose depandent

LEAD TREATMENT

TREATMENT:

- REMOVAL OF THE SOURCE & STABILIZE THE PATIENT
- CHELATING THERAPY:
  - **BAL**
  - **Calcium EDTA**
  - **SUCCIMER**
  - **D - PENICILLAMINE**
- SUPPORT

هسا هدول بعطيهم لناس الي تسممو باليد عشان يعملو complexمع الليد ويقللو من نسبه امتصاصه وتراكمه

Treatment

بالاضافه الى CHELATING
THERAPY رح يحتاج الى علاج
مساعد في حاله حدوث الاتي

- Treat **seizures** and coma if they occur

- Provide **adequate fluids** to maintain urine flow but avoid overhydration.....may aggravate cerebral edema

بعطيه كميه منيحه من السوائل حتى احسن uren
لانه يتم التخلص من الليد من خلاله ولكن بكميه
محدد حتى اتجنب حدوث edema

- Patients with increased intracranial pressure may benefit from **corticosteroids or mannitol**

اذا عنده ضغط على الجمجمه بعطيه هدول

- Decontamination by **activated charcoal and whole bowel irrigation**

CHELATING AGENTS

WHAT MAKES A GOOD CHELATING AGENT?

- **NONTOXIC** & FORMS NONTOXIC COMPOUNDS
- **HIGH WATER SOLUBILITY**
- **SIMILAR DISTRIBUTION TO THE METAL**
- **LOW AFFINITY FOR CALCIUM and other ions**
- **EASILY REMOVED FROM THE BODY**
- GREATER AFFINITY FOR THE METAL THAN ENDOGENOUS LIGANDS

➢ ***Treatment with chelating agents decreases blood lead concentrations and increases urinary excretion***

- **DIMERCAPROL (BAL): British AntiLewisite** comp. (I.M)

برضو استخدمه في حال اتسمم بهدول الاشياء

ليش بستخدهه حتى يربط بدل الليد مع sulfhydryl

- Forms complexes with sulfhydryl groups
- Used for inorganic mercury, arsenic and in **lead** poisoning
- **Chelate lead in serum and cerebral spinal fluid**
- Usually used in combination with calcium EDTA
- The complex is rapidly excreted in the urine
- May cause **hemolysis in patient with G6PD deficiency**

الي يعملهم الدواء الاثار

- ADE: transient hypertension, tachycardia, N,V, fever

CALCIUM DISODIUM EDETATE ($CaNa_2EDTA$) (im/iv)

- Mobilize lead from soft tissue and bone
- Forms a stable, nonionizable, water soluble compound with lead
- Complex rapidly excreted in urine
- ADE: fever, headache, N,V, anorexia, myalgia, hypotension
- **ADEs: nephrotoxicity minimized by adequate hydration**
- May deplete manganese, zinc & iron

SUCCIMER (DMSA)….p.o

- DIMERCAPTOSUCCINIC ACID….water soluble analog of BAL
- Enhances the urinary excretion of **lead** and **mercury** without affecting the elimination of the endogenous minerals as Ca, Fe, and Mn
- ADEs: GI disturbances, mild reversible increase in transaminase enzymes, allergic reaction

PENICILLAMINE…..p.o

- Penicillin derivative without antimicrobial activity…allergy!
- Widely replaced by succimer because of its poor safety profile

مش مطلوب

Symptomatic	Tx. regimen
	EDTA for 5 days

Asymptomatic	Tx. regimen
Blood lead 10-24 µg/dl	Chelation no recommended
Blood lead 25-44 µg/dl	Succimer for 2-4weeks OR EDTA for 5 days
Blood lead 45-69 µg/dl	EDTA for 2 weeks
Blood lead >70 µg/dl	BAL for five days + EDTA for 5 days

LEAD

- **SUPPORT:**

زي ما حكينا قبل شوي لازم اضبط كميه الماء الي يوخذها

- **Establish adequate urine output before administering chelating agent** (fluid bolus but monitor coz may aggravate cerebral edema)

- **Dialysis** for patients with severe renal insufficiency

ممكن يكون بحاجه الها اذا عنده مشكله بالرينل لانه ما رح يقدر يتخلص من الليد

- Blood lead levels: stop chelation if level <30µg/dl

اذا اصبح مستوى الليد في الدم هلقد لازم أوقف chelation

- Recurrent blood level assessment before and after treatment with chelating agents at regular interval

لازم يضل يعمل فحوصات لدم على فترات منتظمه حتى اشوف مستويات chelatingاذا استخدمتهم بالعلاج