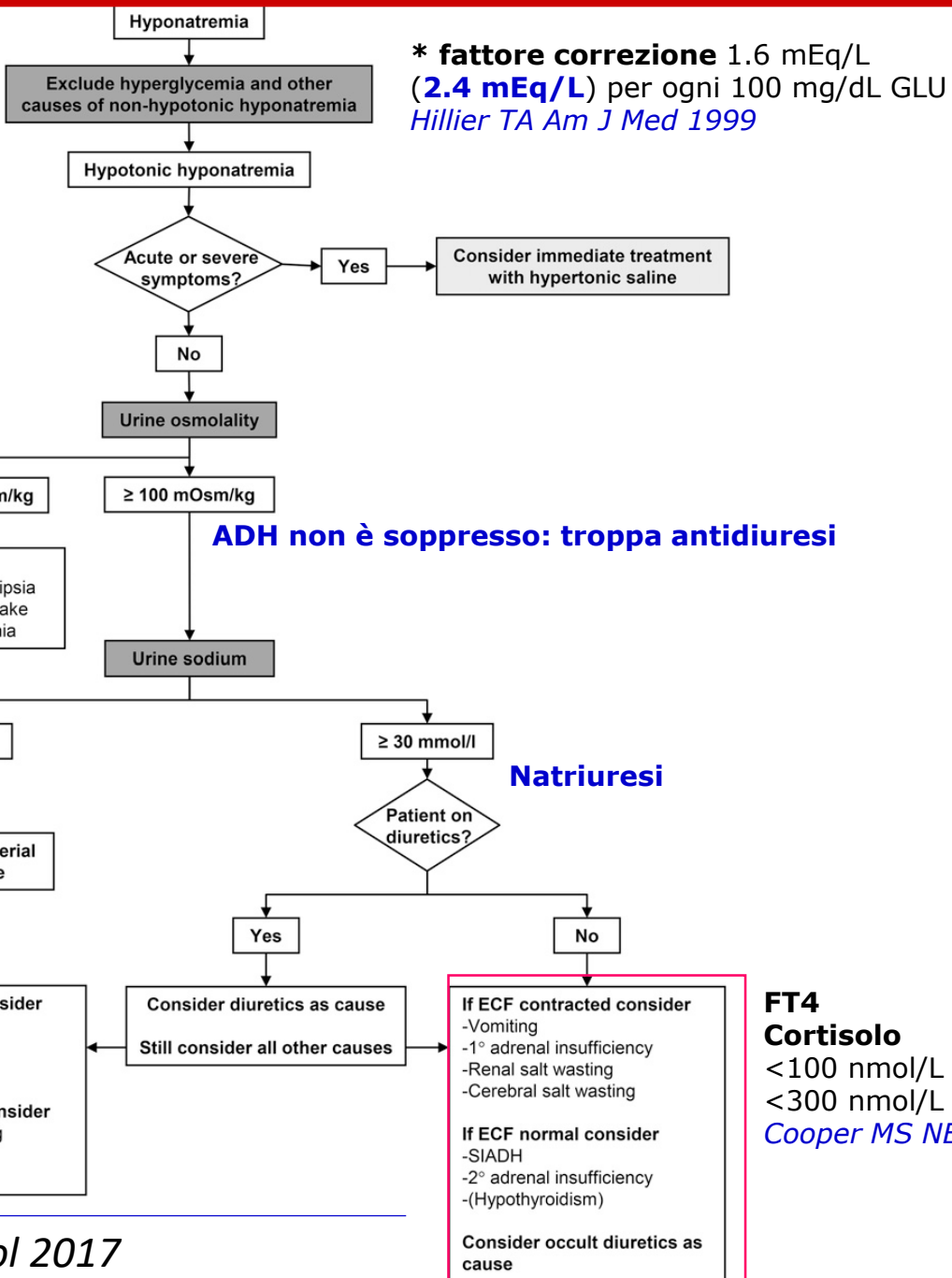


Iponatriemia e ittero

05.03.2026

$$P\text{-Osm} = 2[\text{Na}^+] + (\text{GLU}/18) + (\text{BUN}/2.8)$$

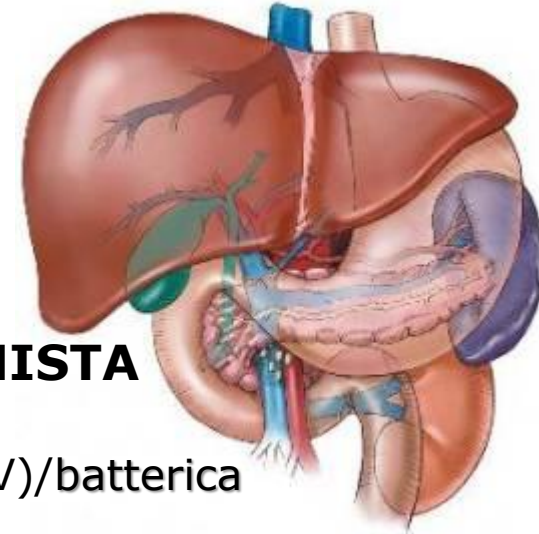
U-Peso specifico	U-Osm
1000	0
1003	105
1005	175
1010	350
1020	700
1030	1050



* **fattore correzione** 1.6 mEq/L
(**2.4 mEq/L**) per ogni 100 mg/dL GLU
Hillier TA Am J Med 1999

PREEPATICO (FLAVINICO) - ittero a BILIRUBINA NON CONIUGATA
URINE ARANCIO FECI SCURE

- Anemie emolitiche (cause intraglobulari o extraglobulari)
- Riassorbimento di ematomi
- Crigler-Najjar e Sindrome Gilbert



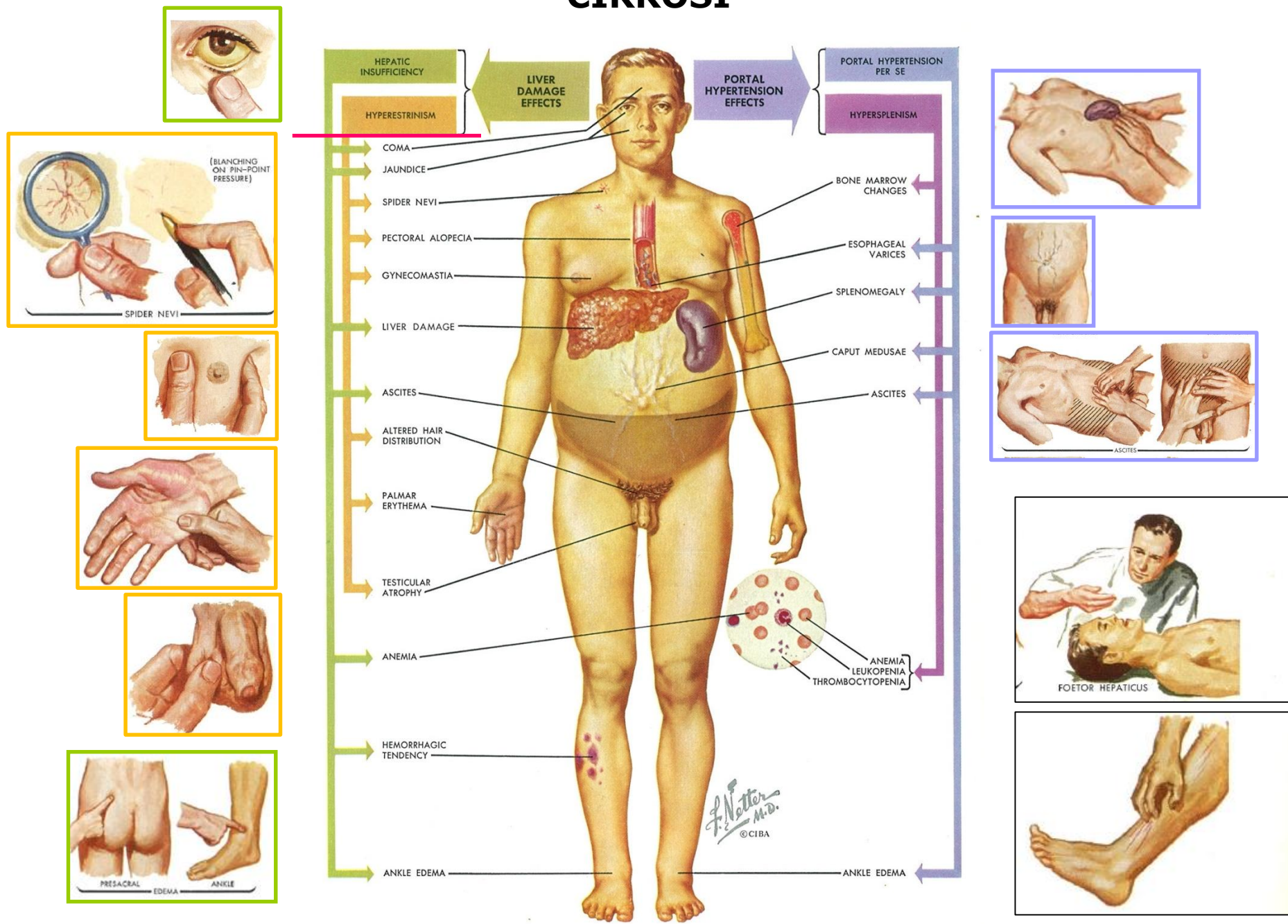
EPATICO (RUBINICO) – ittero a BILIRUBINA MISTA
URINE SCURE FECI IPOCOLICHE

- Epatite virale (Epatite A, B, C, D, E; CMV, EBV, HSV)/batterica
 - Epatite alcolica
 - Epatite autoimmune
 - Epatite da farmaci e altri tossici
 - Malattia di Wilson ([NEJM 368;14:1345-1351](#)), emocromatosi e altre malattie congenite
 - Rotor e Dubin Johnston
- CIRROSI

POSTEPATICO (VERDINICO) – ittero a BILIRUBINA CONIUGATA
URINE IPERCROMICHE (COLOR MARSALA) FECI ACOLICHE

- Colestasi intraepatica
- Colestasi extraepatica

CIRROSI



IPONATRIEMIA e ITTERO

- Uomo di 56 anni seguito dall'alcolologia
- Sta abbastanza bene, subittero
- Alle analisi di controllo riscontro di livelli di sodio di 124 mq/L, con lieve rialzo transaminasi.
- Viene mandato in P.S.

- Che patologie alla base del subittero potrebbe avere? = che tipo di ittero ha?
- Su che base potremmo sospettare un ittero epatico?
- Cosa potrebbe dirci l'esame obiettivo?
- Perché l'iponatriemia?

- Perché iponatriemia in un paziente con tale quadro etilismo/cirrosi?

Osmolalità sierica (285 - 295 mOsmol/kg) < 285 mOsmol/Kg

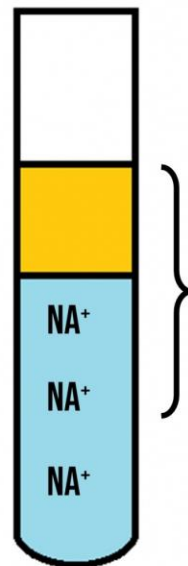
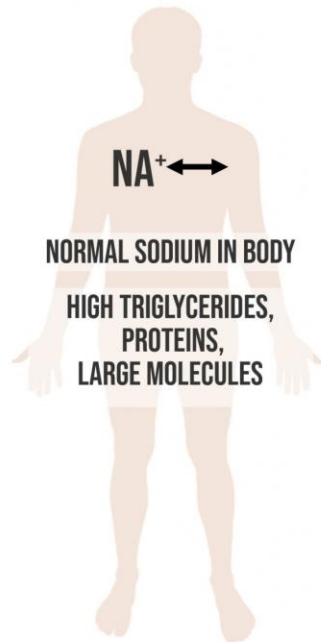
- Osmolalità urine <100 mOsm/Kg – *beer potomania*
- Osmolalità urine >100 mOsm/Kg – *cirrosi* (se sodiuria <30 mEq/L; ma anche se sodiuria >30mEq/L nel caso in cui il paziente sia in terapia con diuretici)

Osmolalità sierica (285 - 295 mOsmol/kg) 294 mOsmol/Kg

Alcohol-induced hypertriglyceridemia. In patients with hypertriglyceridaemia, a low serum sodium result is often due to *pseudo hyponatraemia*. Absolute sodium levels in these patients are normal, but because of the expanded plasma lipid fraction the measured plasma sodium fraction is reduced. The same occurs in patients with hyperproteinaemic states, such as myeloma. Measured serum osmolality will be normal and greater than the calculated osmolality.

PSEUDO-HYPONATRAEMIA

(NORMOTONIC HYPONATREMIA)



NORMAL



ABNORMAL

Triglyceride, Proteins,
Large molecules.

Water content

ANALYSED
SAMPLE

False hyponatraemia as sodium in vivo is normal.

However, as water (and sodium) containing fraction is reduced - analyser will demonstrate falsely low sodium.

Normotonic hyponatraemia (pseudohyponatraemia)

Pseudohyponatraemia occurs when a laboratory result shows hyponatraemia but the serum sodium concentration in vivo is actually normal. **All laboratory instrumentation is programmed to make certain assumptions about the composition of a blood sample. The volume of a normal sample is made up of around 93% water, with the remaining volume containing triglycerides, proteins, and other large molecules. In the presence of severe hypertriglyceridaemia this water containing fraction will be markedly reduced, and the amount of sodium taken up by the analyser will appear falsely low.**

Some laboratory methods for sodium will show only minimal interference from high triglycerides (for example, direct ion-specific electrode methods, such as those used in many point of care blood gas analysers). However, some methods may show markedly abnormal sodium quantitation in the presence of hypertriglyceridaemia. This includes many standard laboratory analysers (indirect ion-specific electrodes) that have been optimised to use a very small sample (eg 10 µl). After the analysis, the result is multiplied up to get a result in mmol/l. If a discrepancy occurs due to pseudohyponatraemia the error is also multiplied many times, which can lead to a grossly abnormal report. If you suspect pseudohyponatraemia, discuss the result with the local laboratory team who will arrange for retesting.

Clinically, marked hypertriglyceridaemia can cause eruptive xanthomas, and a blood sample will appear lipaemic or turbid. Pseudohyponatraemia can also occur when there is hyperproteinaemia, for example in multiple myeloma. This might be accompanied by anaemia, renal impairment, and bone pain. Abnormal triglyceride profiles are often associated with HIV, and it is worth considering this within your evaluation.

IPONATRIEMIA e ITTERO

- Donna di 60 anni giunge in PS per ittero progressivo ingravescente
- Lamenta prurito
- Agli esami di laboratorio urgenti presenta rialzo bilirubina totale, lieve rialzo delle transaminasi e livelli di sodio di 124 mq/L
- Viene mandata in P.S.

- Che patologie alla base dell'ittero potrebbe avere?
- Su che base potremmo sospettare un ittero post-epatico?
- Perché l'iponatriemia?

- Perché iponatriemia in un paziente con tale quadro di ittero post-epatico?

Osmolalità sierica (285 - 295 mOsmol/kg) < 285 mOsmol/Kg

- Osmolalità urine >100 mOsm/Kg
- Sodiuria >30mEq/L
- FT4 e cortisolo nella norma
- Non assume diuretici, non ha altre patologie
- SIADH in adenocarcinoma testa del pancreas