MEDICAL EQUATIONS

Alveolar Gas equation: $P_AO_2 = P_iO_2—(P_ACO_2/RQ)$

A-a gradient = (BP-pH20) * FiO2- (1.25 * PaCO2)-PaO2
- BP = barometric pressure = 760mmHg at sea level
- pHH20 = 47mm Hg
- PaCO2 & PaO2 = measured from ABG

Anion Gap = Na+ - (Cl- + HCO3-)

BMI = kg/m^2

Carrying capacity of arterial blood:
$C_aO_2 = (Hgb \times 1.34 \times S_aO_2) + (P_aO_2 \times 0.003)$

Corrected calcium
- A change in serum albumin of 1g/dL from 4 g/dL changes serum Ca++ in same direction by 0.8mg/dL

Corrected sodium
- Hyperlipidemia: Na+ decreased by 0.002 x lipid(mg/dL)
- Hyperproteinemia: Na+ decreased by 0.25 x [protein – 8]
- Hyperglycemia: Na+ decreased 1.6 for each 100 ↑glucose

Cerebral perfusion pressure (CPP) = MAP-ICP, goal >50-60, normal ICP <20

$FeNa = (U_{Na} * P_{Cr})/(P_{Na} * U_{Cr}) \times 100$

Free water deficit (mL)
$[(Na_{actual}/Na_{goal})-1] \times 1000mL/L \times 0.6\ mL/kg \times wt(kg)$

GFR ($ml/min/1.73m^2$) = 0.43 * L/sCr (L = height (cm), sCr = serum creatinine)

GIR (mg/kg/min) = (% glucose x ml/hr)/(6 x kg)

Mentzer index = MCV/RBC
(>13.5 suggests Fe deficiency, <11.5 suggests thal minor)

Mid-parental height
Male = [(Mom ht + 5in) + Dad ht]/2
Female = [(Dad ht – 5in) + Mom ht]/2
For centimeters, replace "5 in" with "13 cm"

Minute ventilation = Resp Rate (RR) x Tidal Volume (TV)

Oxygenation Index (OI) = (MAP (cmH20) * FiO2 *100)/PaO2
MAP = mean airway pressure; OI >25 consider HFOV, >30 consider ECMO

Parkland formula = 4mL x wt (kg) x TBSA (%). Give 1/2 in first 8 hrs, then next half over 16 hrs.

QTc = QT/√RR

Serum osmolality = 2[Na+] + glucose/18 + BUN/2.8

Temperature Conversion