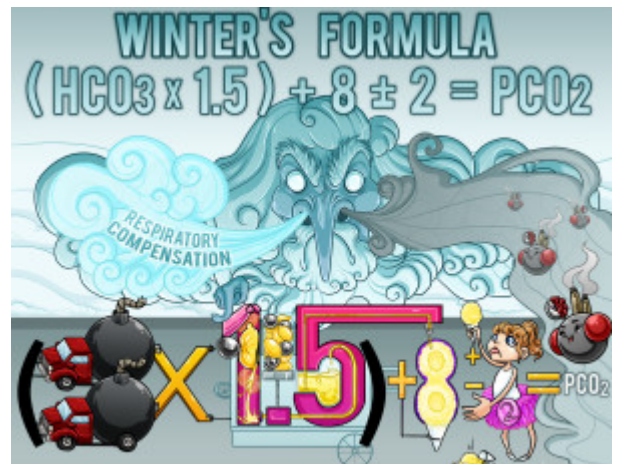


Winter's Formula

Winter's Formula is used to evaluate respiratory compensation when metabolic acidosis is present in a patient. This is used to give an expected value for the patient's PCO₂, which helps to assess whether or not the patient is adequately compensating for their acidotic state. Winter's formula yields the expected PCO₂ = $(\text{HCO}_3 \times 1.5) + 8 \pm 2$.



PLAY PICMONIC

Evaluates Respiratory Compensation

Respiration Compensation

In cases of metabolic acidosis, the body should normally compensate physiologically. The normal PCO₂ range is from 35-45, however, in cases of metabolic acidosis, it should change depending on the patient's bicarbonate (HCO₃) level. Thus, the expected compensation can be calculated with this formula.

Used in Metabolic Acidosis

Metal-ball Acidic-lemon

Winter's Formula is primarily used in metabolic acidosis, and uses the patient's bicarbonate level (HCO₃) to help calculate what the appropriate respiratory compensation should be.

Equation

$(\text{HCO}_3 \times 1.5) + 8 \text{ plus-minus } 2 = \text{PCO}_2$

[Bi-car-bomb x 1.5 + 8 ± \(2\) Tutu = CO₂-exhaust](#)

Winter's Formula calculates the expected PCO₂ value with respiratory compensation in cases of metabolic acidosis. The formula is $(\text{HCO}_3 \times 1.5) + 8 \pm 2$, which yields the expected PCO₂ value.

Steps

Bicarbonate (HCO₃) x 1.5

[Bi-car-bomb x 1.5](#)

Initially the bicarbonate is multiplied by 1.5.

+ 8

[+ 8 snow cone](#)

Next, 8 is added to the value.

± 2

[± \(2\) Tutu](#)

This calculation is then given a range of ± 2.

= Expected Value for PCO₂

CO₂-exhaust

This should yield the expected value for PCO₂ in a normal response to metabolic acidosis. This value should be compared to the patient's PCO₂ value from their arterial-blood gas (ABG) analysis.