

Quick Review: Winter's Formula

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Abstract

This brief review will discuss when to administer bicarbonate.

WHEN IS IT PRODUCTIVE TO ADMINISTER BICARBONATE ?

CASE # 1: 60 YR. OLD MALE, SEPTIC SHOCK

- Pulse 116 BP 96/42
- pH = 7.15
- pO₂ = 80
- pCO₂ = 30
- HCO₃⁻ = 16

SHOULD YOU GIVE BICARB ?

CASE # 2: 66 YR. OLD FEMALE, 2 HOURS S/P CABG

- Pulse 98, NSR BP 98/56
- pH = 7.18
- pO₂ = 74
- pCO₂ = 31
- HCO₃⁻ = 10

SHOULD YOU GIVE BICARB ?

ACID/BASE BUFFERING:



Direction is dependent on concentration

THE WINTER'S FORMULA: A GUIDE TO BICARB ADMINISTRATION

$$\text{PCO}_2 = (\text{HCO}_3^-) \times 1.5 + 8 (+/- 4)$$

If the observed pCO₂ is HIGHER than the calculated pCO₂,

then the body is not handling intercellular CO₂ well & extracellular bicarbonate will not be able to enter the cellular environment

Figure 1

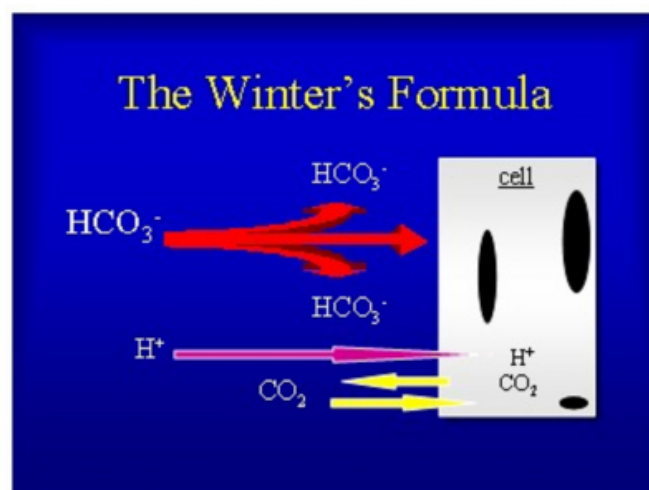
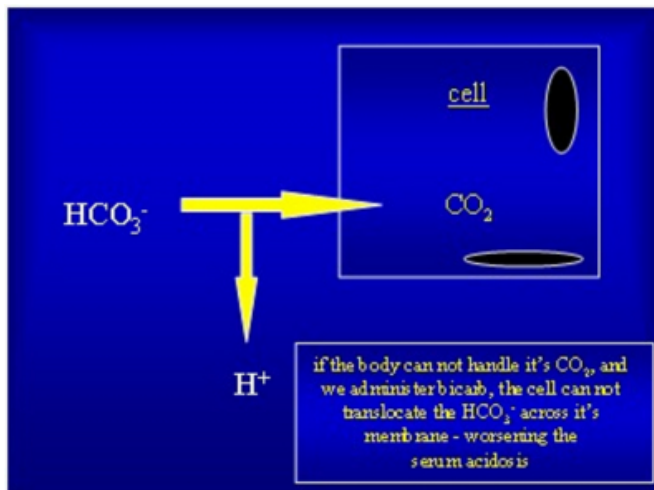


Figure 2



CASE # 1: 60 YR. OLD MALE, SEPTIC SHOCK

- Pulse 116 BP 96/42
- pH = 7.15
- pO₂ = 80
- pCO₂ = 30
- HCO₃⁻ = 16

SHOULD YOU GIVE BICARB ?

- pCO₂ = (HCO₃⁻) x 1.5 + 8 (+/- 4)
- pCO₂ = (16) x 1.5 + 8 (+/- 4)

- pCO₂ = 24 + 8 (+/- 4)
- pCO₂ = 32 +/- 4

* Observed pCO₂ is 30: the body is buffering the CO₂ well - it is physiologically a good idea to administer bicarbonate !

CASE # 2: 66 YR. OLD FEMALE, 2 HOURS S/P CABG

- Pulse 98, NSR BP 98/56
- pH = 7.18
- pO₂ = 74
- pCO₂ = 31
- HCO₃⁻ = 10

SHOULD YOU GIVE BICARB ?

- pCO₂ = (HCO₃⁻) x 1.5 + 8 (+/- 4)
- pCO₂ = (10) x 1.5 + 8 (+/- 4)
- pCO₂ = 15 + 8 (+/- 4)
- pCO₂ = 23 +/- 4

observed pCO₂ is 31: the body is NOT buffering the CO₂ well - it is physiologically wrong to administer bicarbonate !

References

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