RSPT 2350: Module F – Shunt Equations

Classic Shunt Equation (Gold Standard)

1. Given the following information, calculate the % shunt: Hb: 10 gms%; P_{Baro}: 750 torr; PaO_2: 80 torr; SaO_2: 92%; PvO_2: 36 torr; SvO_2: 65%; $PaCO_2$: 40 torr, FiO_2: .40

   A. PAO_2: **[(750-47) x .4] – (40 x 1.25) = (703 x .4) – 50 = 281.2 – 50 = 231 torr**

   B. CcO_2: **(10 x 1.34 x 1.0) + (231 x .003) = 13.4 + .69 = 14.09 vol%**

   C. CaO_2: **(10 x 1.34 x .92) + (80 x .003) = 12.33 + .24 = 12.33 + .24 = 12.57 vol%**

   D. CvO_2: **(10 x 1.34 x .65) + (36 x .003) = 8.71 + .11 = 8.82 vol%**

   E. $$\frac{Q_s}{Q_t} = \frac{(Cc'O_2 - CaO_2)}{(Cc'O_2 - C\bar{v}O_2)} = \frac{(14.09 - 12.57)}{14.09 - 8.82} = \frac{1.52}{5.27} = .288 = 28.8\%$$

Clinical Shunt Equation

2. Given the following information, calculate the % shunt: P_{Baro}: 730 torr; FiO_2: .50; PaO_2: 66 torr; SaO_2: 91%; PvO_2: 42 torr; SvO_2: 70%; $PaCO_2$: 50 torr; Hb 8 gms%

   A. PAO_2: **[(730-47) x .50] – (50 x 1.25) = (683 x .5) – 62.5 = 341.5 – 62.5 = 279 torr**

   B. CaO_2: **(8 x 1.34 x .91) + (66 x .003) = 9.76 + .2 = 9.96 vol%**

   C. CvO_2: **(8 x 1.34 x .7) + (42 x .003) = 7.28 + .13 = 7.41 vol%**

   D. CaO_2-CvO_2: **9.96 – 7.41 = 2.55 vol%**

   E. $$\frac{Q_s}{Q_t} = \frac{(AaDO_2 x .003)}{(AaDO_2 x .003) + (CaO_2 - C\bar{v}O_2)} = \frac{(279 - 66) \times .003}{([279 - 66] \times .003) + (2.55)} = \frac{213 \times .003}{(213 \times .003) + 2.55} =$$