

On the relationship of dose when using two different α/β ratios.

Consider the situation where two different α/β ratios are in use for the same tissue. This is presently the case in the CNS where values of 2 Gy and 2.47 Gy are being used.

For any isoeffect, using the above α/β values, the following relationship exists if n fractions are given using the two different α/β values:

$$n d_a \left(1 + \frac{d_a}{2}\right) = n d_b \left(1 + \frac{d_b}{2}\right)$$

So that, for one fraction,

$$d_a \left(1 + \frac{d_a}{2}\right) = d_b \left(1 + \frac{d_b}{2}\right)$$

This is a quadratic equation where the solution for d_a is:

$$d_a = -1. + 0.0636 \sqrt{247. + 494. d_b + 200. d_b^2}$$

This equation may be plotted as:

