AbstractID: 1386 Title: Clinical Experience with calibrating I-125 seeds and the “altitude effect”.

For low energy sources in the HDR1000+ well chamber, Standard Imaging has identified a pressure dependence beyond the normal C_{tp} correction, and suggest a multiplicative correction term of the form $C_{alt} = k_1 P^{k_2}$. Before adopting this formalism into our clinical practice a retrospective analysis of 25 I-125 seeds (±4% uncertainty around nominal activity) and one calibrated seed (±2%) was performed to validate this change. Using the ADCL well chamber calibration factor C_c (±2.5%), the average deviation from nominal activity was 3.25% ±0.5% (range 8.0%). C_c would have to change more than 2.5% to reduce the mean deviation to zero, and is therefore unlikely. The calibrated seed was used to determine a local value of C_c, differing by 3.1%, consistent with the observation above. Including the C_{alt} term with the recommended values of k_1 and k_2 for our seeds, the mean deviation between measured and nominal activity changed to -2.21%±0.45% (range 7.14%). Interpreting this difference as due only to error in the determination of C_c is consistent with the ADCL uncertainty of 2.5% in their calibration. In addition, the range of measured seed activity is within the manufacturer’s stated ±4%. The ‘altitude effect’, though unexplained physically, better explains our measurements in light a-priori knowledge. Clinically, one could just use a calibrated seed to determine a C_c for local conditions, though the slightly larger range of deviations might increase seed rejection rates during seed QC.