

LIST OF FIGURES

Figure	Page
Fig 2.0: Typical survival curves for mammalian cells exposed to radiation	7
Fig 4.0: Bar chart showing patient distribution according to their age	21
Fig 4.1: Bar chart shows the distribution of 27 patients with parameningeal rhabdomyosarcoma according to radiation dose received	22
Fig 4.2: Bar chart shows the distribution of 12 patients with orbital rhabdomyosarcoma according to radiation dose delivered	22
Fig 5.0: Relationship between TCP and tumor volume	27
Fig 5.1: Relation between TCP and tumor volume over a range of radiation doses	28
Fig 5.2: Shows the typical shape of a DVH	29
Fig 5.3: Scatter plot showing TCP (%) against tumor volume (cc)	30
Fig 5.4: Shows variation of TCP with radiation dose	32
Fig 5.5: Shows a frequency distribution of patients according to TCP	33
Fig 5.6: The graph shows the TCP, NTCP and UCP for patient number 9	35

Fig 5.7: The graph shows the TCP, NTCP and UCP for patient number 3	36
Fig 5.8: Shows how TCP varies with cell radiosensitivity.	37
Fig 5.9: Shows a window from BIOPLAN using the delta-TCP function	38
Fig A.0: Pie chart showing classification of rhabdomyosarcoma according to histology	52
Fig A.1: Photograph of embryonal rhabdomyosarcoma cells	53
Fig A.2: Photograph of alveolar rhabdomyosarcoma cells	54

LIST OF TABLES

Table	Page
Table 4.0: Shows patient characteristics	20
Table 5.0: Shows the calculated values of TCP at different volumes for a total radiation dose of 54.0 Gy	26
Table 5.1: Shows results of TCP calculations over a range of doses	27
Table 5.2: Shows TCP and tumor volume values for 9 patients who had two-dimensional treatment plans and were radiated to 54.0 Gy.	29
Table 5.3: Shows TCP and tumor volume values for 17 patients Treated using two-dimensional treatment plans over a range of total radiation doses	31
Table 5.4: A statistical significance search for prognostic factors in rhabdomyosarcoma patients treated with external beam therapy	40

NOMENCLATURE

TCP	tumor control probability
NTCP	normal tissue complication probability
UTCP	uncomplicated tumor control probability
OAR	organ at risk
DVH	dose volume histogram
D[F]MH	dose [functioning]- mass histogram
BIOPLAN	software for BIOlogical evaluation of PLANs
OS	overall survival
DNA	DeoxyriboNucleicAcid
S	probability of survival
LQ	linear quadratic
FSU	functional sub-units
LET	linear energy transfer
α	cell radiosensitivity
σ_{α}	standard deviation in α
α/β	alpha – beta ratio
HELAX TMS	three-dimensional treatment planning system
T_{pot}	potential doubling time
T_k	kick-off time
m	descriptor of slope of dose response
n	descriptor of dose-volume relationship
TD ₅₀	descriptor of position of dose-response
CT	computed tomography