Purpose:: To quantify the impact of dose planning using different clinically important parameters such as volume conformity index (VCI), appropriateness of target volume(ATV), conformity gradient index(CGI), integral dose (ID), by categorizing size of tumor volume(TV) in small , medium and large for stereo-tactic irradiation of cranial lesions treated by Gamma Knife.

Method and Materials: Tumor volume(TV) were categorize as (a ) small tumor for less than 2 cc, (b) medium tumor for between 2- 5 cc and (c) large tumor for volume more than 5 cc for evaluating the dosimetric parameters. Randomly 100 patient's data of each category were selected for this study. A uniform treatment procedure for each patient is followed. Treatments steps are:1) Leksell frame fixation 2) MRI/CT/Angiography of the lesion 3) Treatment planning (GAMMAPLAN 5.4, Elekta, AB) and 4) Treatment delivery (Gamma Knife Model B, Elekta, AB). All input data for estimating the different dosimetric parameter were derived from the treatment planning system data. VCI is estimated by ratio of prescribed dose volume and tumor volume. ATV is determined by ratio of minimum target dose and prescribed dose. CGI were estimated using the Wagner formula. ID is in-built function of treatment planning system.

Results: For small TV, VCI is ranges from 1.2-1.4; ATV ranges from 5-10; CGI rages from 80-90 and ID ranges from10-20. In case of medium TV, VCI is ranges from 1.2-1.4;ATV ranges from 2-3 ; CGI rages from 70-80and ID ranges from 40-100. For large TV, VCI is ranges from 1.3-1.6; ATV ranges from 0.3-1; CGI rages from 60-70 and ID ranges more than 100.

Conclusions: Clinically important parameters VCI, ATV, CGI and ID were evaluated in small, medium and large TV cranial lesions treated by Gamma Knife. The value may be compared with other similar treatment modalities to compare the end result.