Identifying the True Extend of Glioblastoma Based on Preoperative FLAIR Images

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Abstract : Glioblastoma is the most malignant brain tumor. In general, the survival rate varies between (14-18) months. Glioblastoma consists a solid and infiltrative part. The standard therapeutic management of glioblastoma is maximum safe resection followed by chemo-radiotherapy. It's hypothesized that the pretumoral hyperintense region in fluid attenuated inversion recovery (FLAIR) images includes both vasogenic edema and infiltrated tumor cells. In our study, we aimed to define the sensitivity and specificity of hyperintense FLAIR images preoperatively to examine how well it can define the true extent of glioblastoma. (16) glioblastoma patients included in this study. Hyperintense FLAIR region were delineated preoperatively as tumor mask. The infiltrative part of glioblastoma considered the regions where the tumor recurred on the follow up MRI. The recurrence on the CE-T1 images was marked as the recurrence masks. According to (AAL3) and (JHU white matter labels) atlas, the brain divided into cortical and subcortical regions respectively. For calculating specificity and sensitivity, the FLAIR and the recurrence masks overlapped counting how many regions affected by both . The average sensitivity and specificity was 83% and 85% respectively. Individually, the sensitivity and specificity varied between (31-100)%, and (100-58)% respectively. These results suggest that despite FLAIR being as an effective radiologic imaging tool its prognostic value remains controversial and probabilistic tractography remain more reliable available method for identifying the true extent of glioblastoma.
Keywords : brain tumors, glioblastoma, MRI, FLAIR
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