Korelasi Volumetri 3D Slicer Tumor Viabel berdasarkan Magnetic Resonance Imaging dengan Persentase Tumor Viabel berdasarkan Pemeriksaan Histopatologi pada Pasien Osteosarkoma Pasca Kemoterapi Neoadjuvan = Correlation of Post Neoadjuvant-Chemotherapy Viable Tumor 3D Slicer volumetry based on Magnetic Resonance Imaging with Histopathological Percentage of Viable Tumor in Osteosarcoma Patients

Humala Prika Aditama, author

Abstrak

Latar belakang: Osteosarkoma adalah tumor tulang ganas yang paling banyak terjadi pada anak dan remaja. Kemoterapi neoadjuvan dapat meningkatkan kesintasan 5 tahun hingga 60 – 80% pada pasien osteosarkoma. Baku emas evaluasi respon kemoterapi neoadjuvan adalah histological mapping untuk menilai persentase nekrosis tumor. Volumetri-Magnetic Resonance Imaging (MRI) menggunakan 3D Slicer dapat menilai nekrosis tumor, tumor viabel, dan volume tumor total secara kuantitatif. Tujuan: Menganalisa korelasi volume dan persentase tumor viabel berdasarkan volumetri-MRI dengan nilai persentase tumor viabel berdasarkan pemeriksaan histopatologi pada pasien osteosarkoma pasca kemoterapi neoadjuvan. Metode: Melakukan volumetri tumor pada MRI pasca kemoterapi neoadjuvan dengan menggunakan teknik segmentasi manual dan semiotomatis pada 3D Slicer untuk mendapatkan volume total tumor, area nekrosis, serta tumor viabel. Hasil pengukuran volumetri tumor viabel dan persentase tumor viabel pasca kemoterapi dikorelasikan dengan persentase tumor viabel berdasarkan histopatologi. Analisis dilakukan dengan uji Spearman. Hasil: Pada 31 subyek penelitian, nilai median persentase tumor viabel berdasarkan volumetri-MRI yaitu 65,9% (range 19,7 – 99,5%), sedangkan berdasarkan pemeriksaan histopatologi didapatkan nilai median 53% (range 8 – 100%). Persentase tumor viabel berdasarkan volumetri-MRI tidak berkorelasi signifikan (p>0,05) dengan persentase tumor viabel berdasarkan histopatologi dengan nilai R: 0,333. Kesimpulan: Terdapat kecenderungan berbanding lurus antara persentase tumor viabel berdasarkan volumetri-MRI dan pemeriksaan histopatologi, walaupun tidak terdapat korelasi yang signifikan.
.....Background: Osteosarcoma is the most common malignant bone tumor in children and adolescents. Neoadjuvant chemotherapy can improve 5-year survival up to 60 - 80% in osteosarcoma patients. The gold standard of neoadjuvant chemotherapy response evaluation is histological mapping to determine the percentage value of tumor necrosis. 3D Slicer volumetry based on Magnetic Resonance Imaging (MRI) can quantitatively assess tumor necrosis, viable tumor, and total tumor volume. Objective: Analyze the correlation between volume and percentage of viable tumors based on MRI-volumetry and histopathological in osteosarcoma patients post neoadjuvant-chemotherapy. Methods: Perform tumor volumetry on MRI post neoadjuvant-chemotherapy using manual and semiautomatic segmentation techniques on 3D Slicer to obtain total tumor volume, necrosis area, and viable tumor. The results of volumetric measurement of viable tumor and the percentage of viable tumor post chemotherapy were correlated with the percentage of viable tumor from histopathological examination. Analysis was performed with Spearman's test. Results: Based on 31 study subjects, the median percentage of viable tumors based on MRI-volumetry was 65.9% (range: 19.7 - 99.5%), while based on histopathology, the median value was 53% (range: 8 - 100%). The percentage of

viable tumors based on MRI-volumetry was not significantly correlated ($p>0.05$) with the percentage of viable tumors based on histopathology with an R value: 0.333. Conclusion: There is a directly proportional trend between the percentage of viable tumors based on MRI-volumetry and histopathological examination, although there was no significant correlation.