Korelasi Antara Rasio Volume Tumor Terhadap Volume Hati Berdasarkan Pemeriksaan CT Scan Abdomen
Multifase Dengan Nilai Alfa-Fetoprotein Pada Pasien Karsinoma Hepatoseluler
Andre Darmawan, Prof. dr. Arif Faisal, Sp. Rad., Subsp. NKL (K), DHSM ; dr. Wigati Dhamiyati, Sp. Rad., Subsp.Onk
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KORELASI ANTARA RASIO VOLUME TUMOR TERHADAP VOLUME HATI BERDASARKAN PEMERIKSAAN *CT SCAN* ABDOMEN MULTIFASE DENGAN NILAI ALFA-FETOPROTEIN PADA PASIEN KARSINOMA HEPATOSELULER

Andre Darmawan[1], Arif Faisal[2], Wigati Dhamiyati[2]

[1]Residen Radiologi, Departemen Radiologi, Fakultas Kedokteran, Kesehatan Masyarakat, dan Keperawatan, Universitas Gadjah Mada

[2]Staf Pengajar, Departemen Radiologi, Fakultas Kedokteran, Kesehatan Masyarakat, dan Keperawatan, Universitas Gadjah Mada

INTISARI

Latar Belakang: Karsinoma hepatoseluler (KHS) merupakan keganasan primer hati tersering dengan mortalitas tinggi. Penilaian beban tumor berperan penting dalam menentukan prognosis dan terapi. Pengukuran volumetrik melalui CT *scan* abdomen multifase dapat memberikan estimasi beban tumor yang lebih objektif, sedangkan alfa-fetoprotein (AFP) memiliki keterbatasan karena tidak selalu mencerminkan ukuran tumor.

Metode: Penelitian analitik observasional dengan desain potong lintang retrospektif dilakukan pada pasien KHS yang menjalani CT scan abdomen multifase di RSUP Dr. Sardjito Yogyakarta periode Januari–Desember 2025. Volume tumor dan volume hati diukur menggunakan *PHILIPS DICOM Viewer*. Nilai AFP diperoleh dari rekam medis. Analisis menggunakan uji korelasi Pearson dan analisis kategorik dengan *cut-off* rasio volume tumor terhadap volume hati ≥0,3 serta AFP ≥400 ng/mL. Reliabilitas interobserver dinilai menggunakan *Intraclass Correlation Coefficient* (ICC).

Hasil: Sebanyak 52 pasien dianalisis dengan rerata usia 61,2 tahun dan dominasi laki-laki (71,2%). Etiologi terbanyak adalah hepatitis B (65,4%). Rerata volume tumor sebesar 986,8 mL, median volume hati 1.856,7 mL, dan rerata rasio volume tumor terhadap volume hati 0,41. Median AFP sebesar 3.543,5 ng/mL. Uji reliabilitas menunjukkan *agreement* sempurna pada pengukuran volume tumor dan volume hati (ICC = 1,000). Tidak terdapat korelasi signifikan antara rasio volume tumor terhadap volume hati dengan nilai AFP (r = 0,252; p = 0,072). Namun, analisis kategorik menunjukkan hubungan yang bermakna antara rasio volume tumor terhadap volume hati ≥0,3 dan kadar AFP ≥400 ng/mL (p = 0,038).

Kesimpulan: Tidak terdapat korelasi linear yang signifikan antara rasio volume tumor terhadap volume hati dan kadar AFP pada pasien KHS. Namun, analisis kategorik menunjukkan hubungan yang bermakna antara kedua variabel. Rasio volume tumor terhadap volume hati berpotensi menjadi parameter radiologis kuantitatif tambahan dalam evaluasi beban tumor pada KHS.

Kata kunci: karsinoma hepatoseluler, CT *scan* multifase, rasio volume tumor terhadap hati, alfa-fetoprotein.

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CORRELATION BETWEEN TUMOR VOLUME TO LIVER VOLUME RATIO BASED ON MULTIPHASE ABDOMINAL CT SCAN AND ALPHA-FETOPROTEIN LEVELS IN PATIENTS WITH HEPATOCELLULAR CARCINOMA

Andre Darmawan[1], Arif Faisal[2], Wigati Dhamiyati[2]

[1]*Radiology Resident, Department of Radiology, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada*

[2]*Faculty Staff, Department of Radiology, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada*

ABSTRACT

Background: *Hepatocellular carcinoma (HCC) is the most common primary liver malignancy with high mortality. Tumor burden assessment is important for prognosis and treatment. Volumetric assessment using multiphase abdominal computed tomography (CT) provides a more objective estimate of tumor burden, whereas alpha-fetoprotein (AFP) does not always reflect tumor size.*

Methods: *This retrospective cross-sectional observational study included patients with HCC who underwent multiphase abdominal CT at Dr. Sardjito General Hospital, Yogyakarta, between January and December 2025. Tumor and liver volumes were measured using PHILIPS DICOM Viewer. AFP levels were obtained from medical records. Pearson's correlation and a categorical analysis using tumor-to-liver volume ratio ≥0.3 and AFP ≥400 ng/mL as cut-offs were performed. Interobserver reliability was assessed using the Intraclass Correlation Coefficient (ICC).*

Results: *A total of 52 patients were included, with a mean age of 61.2 years, and most were male (71.2%). Hepatitis B was the most common etiology (65.4%). The mean tumor volume was 986.8 mL, the median liver volume was 1,856.7 mL, and the mean tumor-to-liver volume ratio was 0.41. The median AFP level was 3,543.5 ng/mL. Volumetric measurements demonstrated excellent interobserver reliability (ICC = 1.000). No significant linear correlation was found between the tumor-to-liver volume ratio and serum AFP levels ($r = 0.252$, $p = 0.072$). However, categorical analysis demonstrated a significant association between a tumor-to-liver volume ratio ≥0.3 and an AFP level ≥400 ng/mL ($p = 0.038$).*

Conclusion: *No significant linear correlation was observed between the tumor-to-liver volume ratio and serum AFP levels in patients with HCC. However, categorical analysis demonstrated a significant association between the two variables. The tumor-to-liver volume ratio may serve as an additional quantitative radiological parameter for assessing tumor burden in HCC.*

Keywords: *hepatocellular carcinoma, multiphase CT scan, tumor to liver volume ratio, alpha-fetoprotein.*