

Kesesuaian Volume Dan Penentuan Lokasi Nodul Hati Metastasis Pada USG *Fusion* Dengan CT Scan: Studi Pada Pasien Karsinoma Kolorektal Paska Terapi

Andriani Monika N*, A. Gunawan Santoso**, Sukma Imawati**

*Residen Radiologi, Fakultas Kedokteran, Universitas Diponegoro / RSUD Dr. Kariadi, Semarang, Indonesia

**Departemen Radiologi, Fakultas Kedokteran, Universitas Diponegoro / RSUD Dr. Kariadi, Semarang, Indonesia

ABSTRAK

Latar belakang :

Karsinoma kolorektal (KKR) merupakan salah satu kanker dengan insidensi dan mortalitas tinggi di dunia, serta kecenderungan metastasis hati yang berdampak pada prognosis pasien. Evaluasi metastasis hati penting untuk menentukan stadium, terapi, dan respons pengobatan. Ultrasonografi (USG) fusion merupakan inovasi pencitraan yang menggabungkan data USG dengan *Computed Tomography* (CT) sehingga memungkinkan visualisasi dan pengukuran nodul secara lebih rinci dan *real-time*. Penelitian ini bertujuan untuk menilai kesesuaian pengukuran volume dan lokasi nodul metastasis hati menggunakan USG fusion dibandingkan dengan CT scan pada pasien KKR metastasis hati.

Tujuan:

Mengetahui kesesuaian volume dan penentuan lokasi nodul hati metastasis pada USG fusion dengan CT scan

Metode:

Penelitian observasional analitik pendekatan *cross-sectional* di Instalasi Radiologi Dr. Kariadi Semarang pada Juli 2025. Total 38 pasien KKR metastasis hati yang menjalani pemeriksaan CT scan evaluasi dan USG fusion dengan metode *consecutive sampling*. Variabel yang dinilai meliputi volume nodul dan lokasi nodul berupa jarak terdekat nodul ke permukaan hati pada modalitas USG fusion dan CT scan. Analisis statistik menggunakan uji normalitas Shapiro-Wilk, uji korelasi Spearman Rank, dan uji Wilcoxon (signifikan $p < 0,05$).

Hasil:

Total 38 pasien dengan rerata usia $55,68 \pm 10,39$ tahun dan mayoritas perempuan (76,30%). Rerata volume nodul hati dengan USG fusion sebesar $85,19 \pm 183,32$ cm³, sedangkan dengan CT scan sebesar $78,75 \pm 193,49$ cm³. Uji Spearman didapatkan korelasi positif sangat kuat signifikan antara volume nodul pada USG fusion dan CT scan ($r=0,956$; $p=0,0001$). Uji Wilcoxon ditemui perbedaan tidak bermakna antara kedua modalitas dalam pengukuran volume nodul ($p=0,342$). Rerata lokasi nodul hati sebesar $0,69 \pm 0,61$ cm pada USG fusion dan $0,60 \pm 0,71$ cm pada CT scan. Analisis Spearman menunjukkan korelasi positif kuat signifikan ($r=0,729$; $p=0,0001$), namun uji Wilcoxon menunjukkan perbedaan bermakna antara kedua modalitas dalam pengukuran lokasi nodul ($p=0,012$).

Kesimpulan:

USG fusion memiliki kesesuaian yang baik dengan CT scan dalam pengukuran volume nodul metastasis hati pada pasien KKR dengan korelasi positif sangat kuat dan tanpa perbedaan bermakna. Pada penentuan lokasi nodul hati, USG fusion juga menunjukkan korelasi positif kuat terhadap CT scan, meskipun terdapat perbedaan bermakna secara statistik.

Kata kunci: Karsinoma Kolorektal, Metastasis Hati, USG Fusion, CT Scan, Volume Nodul, Lokasi Nodul Hepar

Volume and Localization Agreement of Metastatic Liver Nodules Using Fusion Ultrasound and CT Scan: A Study of Post-Treatment Colorectal Carcinoma Patients

Andriani Monika N*, A. Gunawan Santoso**, Sukma Imawati**

*Radiology Resident, Faculty of Medicine, Diponegoro University / Dr. Kariadi General Hospital, Semarang, Indonesia

**Department of Radiology, Faculty of Medicine Diponegoro University / Dr. Kariadi General Hospital, Semarang, Indonesia

ABSTRACT

Background;

Colorectal carcinoma (CRC) is one of cancers with high incidence and mortality rates worldwide and tendency to metastasize to liver, which may affect prognosis. Liver metastases evaluation is important for determining disease staging, therapeutic, and treatment response. Fusion ultrasonography (fusion US) is an imaging innovation that combines ultrasonography data with Computed Tomography (CT), allowing detailed and real-time visualization and measurement. This study aimed to evaluate agreement of liver metastatic nodule volume and location measurements using fusion US compared with CT scan in CRC patients with liver metastases.

Objective:

This study to evaluate the agreement in volume measurement and localization of metastatic liver nodules between fusion ultrasound (fusion US) and CT scan.

Methods:

Analytic observational study with cross-sectional approach at Radiology Department of Dr. Kariadi General Hospital, Semarang, in July 2025. Total of 38 CRC patients with liver metastases, underwent evaluation CT scan and fusion US examination were included using consecutive sampling. Variables included nodule volume and location, defined as shortest distance from nodule to liver surface, measured using fusion US and CT scan. Statistical analyses were using Shapiro-Wilk test, Spearman Rank test, and Wilcoxon test (significance $p < 0.05$).

Results:

Total 38 patients age of 55.68 ± 10.39 years and majority female (76.30%). Mean liver nodule volume measured by fusion US was 85.19 ± 183.32 cm³, while CT scan showed a mean volume of 78.75 ± 193.49 cm³. Spearman analysis show very strong and significant positive correlation between nodule volume obtained by fusion US and CT scan ($r = 0.956$; $p = 0.0001$). Wilcoxon analysis showed no significant difference between the two modalities in measuring nodule volume ($p = 0.342$). Mean nodule location was 0.69 ± 0.61 cm on fusion US and 0.60 ± 0.71 cm on CT scan. Spearman analysis showed a strong and significant positive correlation ($r = 0.729$; $p = 0.0001$), whereas Wilcoxon analysis demonstrated a significant difference between the two modalities in measuring nodule location ($p = 0.012$).

Conclusion:

Fusion US showed good concordance with CT scan in measuring the volume of liver metastatic nodules in CRC patients, with a very strong positive correlation and no significant difference. In determining liver nodule location, fusion US demonstrated a strong positive correlation with CT scan, although a statistically significant difference was observed.

Keywords: colorectal carcinoma, liver metastasis, fusion ultrasonography, CT scan, nodule volume, liver nodule location