# Deteksi Dini Kardiotoksisitas Subklinis Menggunakan Ekokardiografi Speckle Tracking pada Anak yang Mendapat Kemoterapi = Early Detection of Subclinical Cardiotoxicity Using Speckle Tracking Echocardiography in Children Receiving Chemotherapy

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Abstrak

Latar belakang Kardiotoksisitas subklinis merupakan kondisi yang sering terjadi pada anak dengan keganasan yang mendapat kemoterapi, tetapi belum dapat terdeteksi menggunakan pemeriksaan ekokardiografi konvensional. Pemeriksaan global longitudinal strain menggunakan ekokardiografi speckle tracking dilaporkan dapat mendeteksi disfungsi ventrikel kiri lebih awal dibandingkan ekokardiografi konvensional. Namun, belum banyak penelitian terkait pemeriksaan kuantitatif fungsi jantung dengan ekokardiografi speckle tracking pada anak dengan keganasan. Studi ini diharapkan dapat membantu deteksi dini gangguan fungsi jantung.  Metode Penelitian ini merupakan studi potong lintang di RSUPN dr. Cipto Mangunkusumo Jakarta terhadap 49 subyek anak berusia 6 bulan sampai 17 tahun 10 bulan pada September-November 2022. Subyek penelitian adalah  anak yang baru terdiagnosis keganasan, tidak memiliki masalah jantung sebelumnya, dan mendapatkan kemoterapi kemudian dievaluasi pemeriksaan kuantitatif fungsi jantung dengan pemeriksaan kuantitatif ekokardiografi (konvensional, Doppler jaringan, speckle tracking) sebelum dan sesudah mendapat kemoterapi 3 bulan. Pasien yang mengalami reduksi relatif GLS >15% dilakukan pemeriksaan lanjutan berupa biomarker jantung troponin I. Hasil ekokardiografi speckle tracking dapat dipertimbangkan untuk deteksi disfungsi sistolik ventrikel kiri lebih dini dengan sensitivitas 100% (IK 95% 82,35-100) dan spesifisitas 60% (IK 95% 40,60-77,34). Subyek yang mengalami kardiotoksisitas subklinis didapatkan sebanyak 63,3% ditandai dengan reduksi relatif GLS>15% setelah kemoterapi 3 bulan. Didapatkan penurunan bermakna nilai LPSS ventrikel kiri segmen mid dan segmen apikal serta GLS dari median -18,4 (RIK -17,3 sd. -19,6) % sebelum kemoterapi menjadi -15,3 (RIK -13,65 sd. -17,85) % (p<0,0001) sesudah kemoterapi 3 bulan dengan median dosis kumulatif antrasiklin 150 (RIK 120-300) mg/m2. Reduksi relatif GLS>15% ini ditemukan di saat yang bersamaan belum ditemukan penurunan EF/FS sampai di bawah batas normal. Tidak terbukti usia, jenis kelamin, status nutrisi, dan regimen kemoterapi memengaruhi kardiotoksisitas subklinis pada pasien anak dengan keganasan yang mendapat kemoterapi selama 3 bulan pada penelitian ini.  Kesimpulan Pemeriksaan ekokardiografi speckle tracking dapat dipertimbangkan untuk dilakukan dalam mendeteksi kardiotoksisitas subklinis. Pemeriksaan ini memiliki sensitivitas 100% (IK 95% 82,35-100) dan spesifisitas 60% (IK 95% 40,60-77,34).
.....Background Subclinical cardiotoxicity is a condition that often occurs in children with malignancy who receive chemotherapy, but it has not been frequently detected using conventional echocardiography. Global longitudinal strain examination using speckle tracking echocardiography is reported to be able to identify left ventricular dysfunction earlier than conventional echocardiography. However, there are not many studies related to quantitative examination of cardiac function by speckle tracking echocardiography in children with malignancy. This study is expected to help early detection of impaired heart function. Methods This research is a cross sectional study at RSUPN dr. Cipto Mangunkusumo Jakarta on 49 child subjects aged 6 months to 17 years 10 months in September-November 2022. The research subjects were

children who had just been diagnosed with malignancy, had no previous heart problems, and received chemotherapy. Then they were evaluated by quantitative echocardiography (conventional, tissue Doppler, speckle tracking) before and after 3 months of chemotherapy. Patients who experienced a relative reduction of GLS > 15% underwent further examination of troponin I.Results Speckle tracking echocardiography can be considered for early detection of left ventricular systolic dysfunction with 100% sensitivity (95% CI 82.35-100) and 60% specificity (95% CI 40.60-77.34). Children with subclinical cardiotoxicity were found to be 63.3% characterized by a relative reduction in GLS>15% after 3 months of chemotherapy, with a significant decrease in mid and apical segment left ventricular LPSS values and GLS from a median -18.4 (IQR -17.3 sd. -19.6) % before chemotherapy to -15.3 (IQR -13.65 sd. -17.85) % ($p<0.0001$) after 3 months of chemotherapy with a median cumulative dose of anthracycline 150 (IQR 120-300) mg/m2. This relative reduction of GLS> 15% was found at the same time that there was no decrease in EF/FS below normal limits. There was no evidence that age, gender, nutritional status, and chemotherapy regimen had an effect on subclinical cardiotoxicity in pediatric patients with malignancy who received chemotherapy for 3 months in this study.  Conclusion Speckle tracking echocardiography can be considered for detecting subclinical cardiotoxicity. This examination has a sensitivity of 100% (95% CI 82.35-100) and a specificity of 60% (95% CI 40.60-77.34).