

FIBROBLAST GROWTH FACTOR 23 SEBAGAI PENANDA KEJADIAN HIPERTROFI DAN DISFUNGSI VENTRIKEL KIRI PADA PASIEN ANAK DENGAN CHRONIC KIDNEY DISEASE

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INTISARI

Latar belakang: Penyakit kardiovaskuler menjadi penyebab kematian paling banyak pada pasien *chronic kidney disease* (CKD). *Fibroblast growth factor 23* (FGF23) adalah protein yang berperan dalam pengaturan metabolisme mineral dalam darah. Kadar FGF23 yang tinggi merupakan faktor risiko terjadinya hipertrofi ventrikel kiri pada pasien dewasa dengan CKD. Studi pada anak masih terbatas.

Tujuan: Menentukan hubungan FGF23 dengan hipertrofi dan disfungsi ventrikel kiri pada pasien CKD anak.

Metode: Penelitian dilakukan dengan studi *cross sectional* pada 49 pasien CKD anak stadium 2-5 berusia 0-18 tahun yang dirawat di poli nefrologi dan bangsal anak. Pengambilan data dilaksanakan dari bulan Januari-Maret 2019 dengan mengambil sampel darah untuk menilai kadar FGF23 (RU/ml) dan pemeriksaan ekokardiografi. Hipertrofi ventrikel kiri dinilai dengan *left ventricular mass index* (LVMI)(\geq persentil 95) berdasarkan usia. Data FGF23 dan LVMI dianalisis dengan menggunakan regresi linear, sedangkan FGF23 dan disfungsi ventrikel kiri dengan regresi logistic.

Hasil: Sebanyak 55,1% subyek terdiagnosis sebagai CKD stadium 5 yang mendapatkan terapi dialisis. Peningkatan kadar FGF23 terdapat pada 89,9% subyek dan hipertrofi ventrikel kiri terjadi pada 95,9% subyek. Median kadar FGF23 pada CKD stadium 2-4 lebih rendah dibandingkan dengan stadium 5 ($p=0,001$). Pada analisis bivariat, didapatkan hubungan signifikan antara kadar FGF23 dengan LVMI ($p<0,05$). Namun, hubungan kadar FGF23 dan LVMI menjadi tidak signifikan ($p=0,47$) setelah dilakukan *adjustment* terhadap *glomerular filtration rate*, tekanan darah, anemia, jenis kelamin, dan usia (*adjusted R*² $=0,36$; $p=0,47$). *Fibroblast growth factor 23* tidak berhubungan dengan fungsi sistolik ventrikel dan diastolik ventrikel kiri pada pasien CKD anak.

Kesimpulan: Semakin berat stadium CKD, semakin tinggi kadar FGF23. Tidak terdapat hubungan antara FGF23 dengan hipertrofi dan disfungsi ventrikel kiri. Penelitian *multicenter* yang lebih lanjut dapat dilakukan dengan studi kohort prospektif pada subyek CKD anak stadium awal.

Kata kunci: *chronic kidney disease*, *fibroblast growth factor 23*, hipertrofi ventrikel kiri, disfungsi ventrikel kiri

FIBROBLAST GROWTH FACTOR 23 AS A BIOMARKER OF LEFT VENTRICULAR HYPERTROPHY AND DYSFUNCTION IN PEDIATRIC CHRONIC KIDNEY DISEASE

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ABSTRACT

Background: Cardiovascular disease is the most common cause of death in patients with chronic kidney disease (CKD). Fibroblast growth factor 23 (FGF23) is a protein that plays a role in regulating mineral metabolism. High level of FGF23 are risk factor for left ventricular hypertrophy in adult patients with CKD. Studies in children are still limited, especially related to left ventricular dysfunction.

Objective: To evaluate the relationship between FGF23 and left ventricular hypertrophy and dysfunction in pediatric CKD.

Methods: A cross sectional study recruited 49 children who had CKD stage 2-5, aged 0-18 years in department of child health, Dr. Sardjito hospital, Yogyakarta. Data collection was conducted from January to March 2019. Their blood samples were assessed for FGF23 (RU/ml). All patients had an echocardiography to evaluate cardiac structure and function. Left ventricular hypertrophy was assessed by left ventricular mass index (LVMI)($\geq 95^{\text{th}}$ percentile according to age). Data were analyzed using linear regression analysis.

Results: A total of 55.1% of subjects were diagnosed as stage 5 of CKD who received dialysis therapy. Increased FGF23 levels were found in 89.9% of subjects and left ventricular hypertrophy occurred in 95.9% of subjects. The median FGF23 level in stage 2-4 of CKD was lower than in stage 5 ($p=0.001$). There was a significant relationship between FGF23 levels and LVMI ($p<0.05$) in bivariate analysis. However, the relationship between FGF23 and LVMI levels was not significant ($p=0.47$) after adjusting for glomerular filtration rate, blood pressure, anemia, gender, and age (adjusted $R^2=0.36$, $p=0.47$). Fibroblast growth factor 23 is not related to ventricular systolic function and left ventricular diastolic in pediatric CKD.

Conclusion: There was no correlation between FGF23 and left ventricular hypertrophy. Otherwise, there was an association between FGF23 and systolic function in pediatric CKD. Further prospective cohort study should be done in multicenter setting to early stage of pediatric CKD.

Keywords: *chronic kidney disease, fibroblast growth factor 23, left ventricular hypertrophy, left ventricular dysfunction.*