ABSTRACT

Background: Protein Energy Malnutrition (PEM) is still a health problem in developing countries. PEM can cause changes in the structure and function of organs, including cardiovascular organ. Reference standard to evaluate function of cardiac was Echocardiography In The cardiac dysfunction, NT-proBNP and Troponin I can a raised.

Objective: to assess left of ventricular mass, to determine the cut of point of NT-proBNP and Troponin I, to diagnostic capabilities NT-proBNP and Troponin I left ventricular dysfunction

Methods: The study was cross sectional, underweight and severe malnutrition not congenital heart disease, kidney, pneumonia, sepsis, anemia, hypotensi, hypothermia, electrolyte disturbances, hypoglycemia, hypoalbuminemia and drug treatment were included. Minimal sample calculation was 53 children. The sample bloods were checked on Prodia Aceh and conjunction with two times echocardiography measurement. The bloods results were removed by Prodia after all subjects collected. The analyzed with SPSS 18, confidence interval (CI) of 95%, a significant difference; $p < 0.05$.

Results: 71 child of PEM were referred, 11 not analyzed , 2 with down syndrome, 3 pneumonia, 2 anemia and 4 CHD . There are 39 children (65%) of underweight and 21 children (35%) of severe malnutrition. 17 Boys (43.5%) and 22 girls (56.5%) on underweight, of 8 boys (38.1%), of 13 girls (61.9%) on severe malnutrition. The range age of 8 - 186 months (15 years and 6 months) and the median, 38 months. NT-proBNP is 199.35 pg/ml (50-8134) and Troponin I is 4,1 ng/ml (4 to 18.3). There were 55 (91.7%) had systolic dysfunction and 51 (85%) had diastolic dysfunction with a restrictive pattern .The median, ejection fraction of 57.4% (40-89), median, shortening fraction of 29% (20-58), median, the E wave (m/s) 1.11 (0.62 to 1.89), median, the A wave (m/s) 0.42 (0.27 to 1.08), the ratio E/A 2.62 (1.49 to 3.97). 52 subjects (86.7%) had hypotrophy of left ventricular, median, 67.38 g (29.64 to 149.21). The cut of point NT- proBNP ≥ 100.3 pg/ml, sensitivity 85.5%, specificity 60%, Troponin I ≥ 4.05 ng/ml sensitivity 92.7%, specificity 40%. The analyzed of 2 x 2 table (CI 95%), NT-proBNP, Troponin I or Combined of NT-proBNP and Troponin I, respectively: the sensitivity was 85.5%, 90.9% and 81.8%, the specificity was 40.0%, 40.0% and 40.0%, the positive predictive value was 94.0%, 94.3% and 93.8%, the negative predictive value was 20.0%, 28.6% and 16.7%, the positive likelihood ratio of 1.4, 1.5 and 1.4, the negative likelihood ratio 0.4, 0.2 and 0.5 and the AUC of 62.7, 65.5 and 60.9

Conclusion: left ventricular mass was hypotrophy , the cut of point NT-proBNP of ≥ 100.3 pg/ml and Troponin I ≥ 4.05 ng/ml. NT-proBNP and Troponin I were increased in the PEM child and the sensitivity of both the markers very high

Keywords: Malnutrition Energy Protein, LV mass, LV function, NT-proBNP, Troponin I, Echocardiography, Diagnostic value.

ABSTRAK

Latar belakang: Malnutrisi Enerrgi Protein (MEP) masih merupakan masalah kesehatan dinegara berkembang. Pada MEP terjadi perubahan struktur dan fungsi organ termasuk organ kardiovaskular. Ekokardiografi adalah referensi standar untuk menilai fungsi jantung. Biomarker NT-proBNP dan Troponin I dapat meningkat pada gangguan fungsi jantung.

Tujuan: Menilai massa ventrikel kiri, menentukan nilai titik potong NT-proBNP dan Troponin I, menilai kemampuan diagnostik NT-proBNP atau Troponin I terhadap gangguan fungsi ventrikel kiri.

Metode: Desain penelitian sekat lintang, anak kurus dan sangat kurus tanpa PJB, gangguan ginjal, pneumonia, sepsis, anemia, hipotensi, hipotermia, gangguan elektrolit, hipoglikemia, hipoalbuminema atau mengkonsumsi obat jantung tidak masuk dalam penelitian. Hitungan sampel minimal 53. Sampel darah diperiksa di Prodia Aceh bersamaan dengan pemeriksaan ekokardiografi dengan dua kali pengukuran oleh peneliti. Hasil darah dikeluarkan oleh Prodia pada akhir penelitian. Data dianalisa dengan program SPSS Versi 18. Interval kepercayaan (IK) 95%, perbedaan bermakna bila $p < 0,05$.

Hasil: Selama periode penelitian Ada 71 MEP, 11 dikeluarkan dari penelitian yaitu: 2 sindrom Down, 3 pneumonia, 2 anemia dan 4 PJB. Kurus 39 anak (65%) dan 21 (35%) sangat kurus. Laki-laki 17 (43,5%) dan 22 (56,5%) perempuan dijumpai pada gizi kurus, 8 (38,1%) laki-laki dan 13 (61,9%) perempuan pada gizi sangat kurus, rentang usia 8–186 bulan (15 tahun 6 bulan) dengan median 38 bulan. Nilai NT-proBNP 199,35 pg/ml (50 – 8134), Troponin I 4,1 ng /ml (4 – 18,3). Gangguan fungsi sistolik 55 (91,7%), gangguan fungsi diastolik 51 (85%) dengan pola restriktif.. Median fraksi ejeksi 57,4% (40 – 89), median fraksi pemendekan 29% (20 – 58), median puncak gelombang E (m/s) 1,11 (0,62 – 1,89), median puncak gelombang A (m/s) 0,42 (0,27 – 1,08), rasio E/A 2,62 (1,49 – 3,97). Hipotropi ventrikel kiri pada 52 (86,7%) anak dengan median massa ventrikel kiri 67,38 g (29,64 – 149,21). Nilai titik potong NT- proBNP ≥ 100,3 pg/ml, sensitivitas 85,5%, spesifisitas 60%, Troponin I ≥ 4,05 ng/ml sensitivitas 92,7%, spesifisitas 40%. Analisis tabel 2 x 2 (IK 95%) untuk NT- proBNP, Troponin I dan gabungan NT-proBNP dengan Troponin I masing-masing dengan sensitivitas 85,5%, 90,9% dan 81,8%, spesitifitas 40,0%, 40,0% dan 40%, nilai duga positif 94,0%, 94,3% dan 93,8%, nilai duga negatif 20,0%, 28,6% dan 16,7% rasio kemungkinan positif 1,4, 1,5 dan 1,4, rasio kemungkinan negatif 0,4, 0,2 dan 0,5, AUC 62,7, 65,5 dan 60,9.

Kesimpulan : Terjadi penurunan massa ventrikel kiri, Nilai titik potong NT-proBNP ≥ 100,3 pg/ml dan Troponin I ≥ 4,05 ng/ml. Nilai NT-proBNP dan Troponin I meningkat pada MEP. Nilai sensitifitas kedua marker tinggi.

Kata kunci: Malnutrisi Eenergi Protein, massa ventrikel Kiri, fungsi ventrikel kiri, NT-ProBNP, Troponin I, ekokardiografi, nilai diagnostik.