

Hubungan volume cairan intrasel dengan katabolisme protein pasca bedah pintas koroner: menggunakan multiple frequency bioelectrical impedance

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Abstrak

Tujuan: (1) mengetahui perubahan komposisi cairan tubuh dalam 24 jam pasca bedah pintas koroner dengan pintas jantung paru (BPK+PJP); (2) mengetahui besarnya katabolisme protein dalam 24 jam pasca PBK+PJP; (3) mengetahui hubungan antara perubahan cairan intra sel (OS) dengan katabolisme protein.

Tempat: Unit Terapi Intensif Rumah Sakit Jantung Harapan Kita

Metodologi: Setelah mendapat persetujuan etik dari komite etik penelitian medis NCC, Harapan Kita Hospital, diperoleh 20 pasien laki-laki dengan BPK terencana. Volume cairan tubuh diukur dengan multiple frequency bioelectrical impedance (Dietosystem, Italy) pada frekuensi 1, 50, dan 100 kHz dengan menggunakan formula Guricci. Impedans diukur, 1 kali pra bedah dan 3 kali pasca bedah setiap 8 jam. Perubahan komposisi cairan tubuh dinilai dengan uji-t untuk 2 kelompok berpasangan. Nitrogen urea urin (NUU), kreatinin urin dan imbang nitrogen digunakan sebagai indikator katabolisme protein dengan menampung urin 8 jam pada interval yang sama dengan pengukuran MFBIA. Imbang nitrogen diperoleh dengan menghitung asupan dan NUU 24 jam pasca bedah. Hubungan antara perubahan cairan intra sel (CIS) dengan indikator katabolisme dihitung dengan uji korelasi Spearman Rank

Hasil: Nilai ZI00 adalah 479 5l, indeks impedans 57,3 cm²/Q, dan volume cairan tubuh total (CM') 33,1 L terdiri dari 44,0% cairan ekstra sel (CES) dan 56,0% CIS. Pra bedah pasien termasuk euvolemia. Intra bedah terjadi imbang cairan +1744 (826-4312) mL. Delapan jam pertama terjadi peningkatan bermakna dari cairan tubuh. Dalam 24 jam pasca BPK+PJP terjadi peningkatan CTT 16,0%; CES 20,7%, dan CIS 13,0%. Peningkatan cairan masih dalam nilai euvolemia. Tidak terdapat hubungan bermakna antara perubahan volume cairan tubuh yang diukur dengan MFBIA dan imbang cairan. Median asupan selama 24 jam pasca bedah adalah 926 (127-1903) kkal dan 28 (0-69) g protein. Secara statistik terjadi peningkatan bermakna dari NUU pada 8 jam ketiga pasca BPK+PIP. Tidak terdapat perbedaan bermakna antara kreatinin urin pra bedah dan pasca bedah. Median imbang nitrogen -8{(-12,7) - (-1,6)} g. Terdapat korelasi negatif antara peningkatan volume CIS dan NUU (r = -0,57; p = 0,01).

Kesimpulan Penelitian ini menunjukkan kompartemen cairan tubuh meningkat dalam 24 jam pasca BPK+PJP. Katabolisme protein ringan terjadi dalam 24 jam pasca BPK+PTP. Terdapat korelasi negatif antara peningkatan volume CIS dengan NUU, namun diperlukan penelitian lebih lanjut untuk menjelaskan hubungan ini, terutama pada pasien BPK+PJP".

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The Correlation Between Intra Cellular Water And Protein Catabolism After Coronary Artery Bypass Grafting: Using Multiple Frequency Bioelectrical Impedance

Objective: (1) to investigate the changes of body water compartment within 24 hours after elective coronary artery bypass grafting (CABG) surgery with extracorporeal circulation; (2) to observe protein catabolism within 24 hours after elective CABG with extracorporeal circulation, and (3) to correlate between the changes of intra cellular water (ICW) with protein catabolism indicators.

Location: Intensive Care Unit, Harapan Kita National Cardiac Center, Jakarta.

Subjects and Methods: Twenty male patients with coronary artery disease were recruited for the study. Impedance was measured at 1, 50, 100 kHz using multiple frequency bioelectrical impedance (Dietosystem, Italy) four times: at baseline, at the 1st, 2 and 3rd 8 hours after surgery. The volume of body water compartment was calculated using Guricci's formula. Urinary urea nitrogen (UUN) and urinary creatinine were assessed using 8-hour urine collection within 24-hour period. Nitrogen balance was calculated by subtracting nitrogen intake with urinary nitrogen. The correlation between the changes of ICW and protein catabolism indicators was tested with Spearman Rank Correlation.

Results: At the baseline, mean values of Ziv impedance and impedance index were 479 S[~] and 57.3 cm²¹ⁿ, respectively. Mean total body water (TBW) was 33.1 ± 3.1 L or 48.8% of body weight, consist of 44.0% ECW and 56.0% ICW. This composition was classified as euvolemic. Median intra-operative fluid balance was 1744 (826-3412) mL. Significant increased in TBW, ECW, and ICW was observed at the 1st 8 hours. At the 3rd 8 hours after surgery, TRW, ECW, and ICW increased by 16.3%, 20.7%, and 12.8%, respectively, but the values were within desirable ranges. There was no correlation between TBW changes measured by MFBIA and calculated fluid balance. During 24 hours after surgery, median total energy intake was 926 (127-1903) kcal and protein intake was 28 (0-69) g. UUN increased significantly at the 3rd 8 hours after surgery. No significant difference in urinary creatinine was observed between before and after surgery. Nitrogen balance was -8 ((-12,7)-(-1.6)) g, and there was a negative correlation between ICW changes and NL-U (r = - 0.57; p = 0.01).

Conclusions: The current study indicates that changes of body water compartment occur during 24 hours after CABG, ICW increases within 24 hours after CABG. Mild protein catabolism occurs within 24 hours after CABG. ICW changes have negative correlation with NULL However further comprehensive study is needed to explain this association, especially in CABG patients.