

Pola kadar magnesium plasma dan eritrosit serta kalium serum pada infark miokard akut

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Abstrak

ABSTRACT

The incidence of coronary heart disease including acute myocardial infarction (AMI) is increasing in Indonesia. Arrhythmia is the most frequent complication that may cause death. Recent studies revealed a close association between Mg and K levels and the risk of arrhythmia in NWI. This study was conducted to determine the patterns of plasma and erythrocytes Mg levels and serum potassium levels of patients with PMI and Pngina Pectoris (PP), within 40 hours after the diagnosis was established, and to find out whether the patterns of those electrolytes in one group differ from the patterns in the other group of patients. Another objective of this study was to elucidate the correlation between the electrolyte levels and the evidence of arrhythmia in PMI. The subjects for this study were patients with AMI and patients with P as control group, admitted to the ICCIJ Ciptomangtrikusumo Hospital. The diagnosis of DMI was established according to IA-D criteria, including clinical signs and symptoms, ECB patterns and cardiac enzyme levels. Blood samples were collected for the determination of plasma Mg levels, erythrocytes Mg levels and serum K levels at time of diagnosis (0 hour) and subsequently 8 hours, 16 hours, 24 hours, 32 hours and 40 hours after the establishment of diagnosis. This study included 31 patients with FNI, Consisting of 13 patients without arrhythmia (group II) and 18 patients with arrhythmia (group III). Group II consisted of 12 males and 1 female, aged 37-67 years ($Y_i = 53,1$ years; $SD = 6,8$). Group III included 14 males and 4 females, aged 35-65 years ($K_i = 58,1$ years; $SD = 10,5$). Group I as control group consisted of 12 patients with symptoms of AP, of which 8 were males and 4 were females, aged 35-57 years ($\bar{X} = 50,1$ years; $SD = 6,8$). The interval between AMI or AP attack and the time of diagnosis in group I was 3-6 hours ($Y = 4,16$ hours; $SD = 0,20$); in group II the interval was 2-6 hours ($F = 4,07$ hours, $E.D = 1,1-4$), while in group III the interval was 2-6 hours ($m = 4,05$ hours, $SD = 1,2$). Arrhythmia in group III was detected between 0 hour (at time of diagnosis) to 24 hours after diagnosis; 6 patients (55,37%) at time of diagnosis, 6 other patients (25,31%) at 8 hours, 4 patients (22,2%) at 16 hours, and only in 2 patients (11,1%) at 24 hours after the diagnosis. Plasma Mg, erythrocyte Mg and serum K levels in patients with PP were relatively constant during the study, showing a plateau pattern. The mean levels of plasma Mg, erythrocyte Mg and serum K in PP patients were 2,25 mg/dL, 5,136 mg/CL and 3,74 mEq/L respectively in PHI without arrhythmia patients, the mean plasma Mg level at 0 hour ($\bar{x} = 1,96$ mg/dL; $SD = 0,18$) was lower than the levels in AP patients ($Y = 2,17$ mg/dL; $SD = 0,24$), but the difference was not significant. The plasma Mg levels showed a significant decrease compared to the level at 0 hour, reached its lowest level at 16 hours ($\bar{x} = 1,74$ mg/dL) $SD = 0,20$, followed by an increase of its level starting from 24 to 40 hours, forming a parabolic pattern. In PHI without arrhythmia patients, the mean erythrocyte Mg level at 0 hour ($\bar{x} = 5,22$ mg/dL; $SD = 0,32$) was significantly lower than its level in AP patients ($Y = 5,36$ mg/dL; $SD = 0,27$). The pattern of erythrocyte Mg levels during 40 hours observation showed a constant increase starting from 8 hours to 40 hours ($F = 5,42$ mg/dL; $SD = 0,34$), forming a linear inclination. Erythrocyte Mg levels showed a significant increase

compared to the levels at 0 hour, starting from 24 hours to 40 hours after diagnosis. The change in plasma Mg levels in the AMI without arrhythmia group did not run concurrently with the change in erythrocyte Mg levels. In AMI without arrhythmia the mean serum K level group at time of diagnosis ($E = 4,33$ mmol/dL; $SD = 0,34$) was significantly higher compared to the mean level in the AP patients ($i^{\circ} = 3,69$ mmol/dL; $SD = 0,26$). The pattern of serum K levels in this group, declined starting at 8 hours, reached its lowest level at 32 hours ($i = 4,03$ mmol/dL; $SD = 0,32$); followed by an increase, but its level at 40 hours is significantly lower compared to its level at time of diagnosis. There was a significant difference between the serum K level at 24 hours and 32 hours and its level at time of diagnosis. This study revealed that in AMI without arrhythmia patients there was a significant decrease in plasma Mg, serum K and erythrocyte Mg levels during 40 hours after diagnosis. There was a significant difference in the electrolyte patterns between AMI and AP patients groups at the same time of observation. The decrease in plasma Mg levels in AMI with arrhythmia patients followed the same pattern as that found in patients without arrhythmia, but the levels in arrhythmia patients were consistently and significantly lower. The arrhythmia risk in AMI patients tend to be higher in patients showing low plasma Mg levels. Erythrocyte Mg levels in AMI with arrhythmia patients followed the same pattern as that found in patients without arrhythmia, but their levels in arrhythmic patients were consistently higher. This study failed to prove the efficacy of erythrocyte Mg level determinations to predict arrhythmia in AMI patients. The pattern of serum K levels in AMI with arrhythmia followed the same pattern as that found in AMI without arrhythmia, but the levels in AMI with arrhythmia were consistently lower. The arrhythmia risk tend to be higher in AMI patients showing low serum K levels. The determination of plasma Mg and serum K levels at time of diagnosis might be used to predict arrhythmia in AMI. The arrhythmia risk increase if plasma Mg level is lower than 2,0 mg/dL and or serum K level is lower than 4,0 mmol/dL at time of diagnosis. The risk tend to be greater for combined hypomagnesemia and hypokalemia compared to one. The frequency of arrhythmia in AMI did not correlate well with the decrease in erythrocyte Mg levels, but there was a good correlation between arrhythmia and the decrease in plasma Mg and serum K levels.

ABSTRAK

Di Indonesia penyakit jantung koroner termasuk infark miokard akut (IMA) cenderung meningkat dari tahun ke tahun dengan komplikasi terbanyak berupa gangguan irama jantung (GIJ) yang dapat menyebabkan kematian. Akhir-akhir ini para peneliti menghubungkan penurunan kadar K dan Mg sebagai salah satu 'faktor' risiko terjadinya GIJ pada IMA. Penelitian ini bertujuan untuk mendapatkan pola perubahan kadar Mg plasma, Mg eritrosit dan K serum pada penderita infark miokard akut dan angina pectoris (PP) selama 40 jam sejak diagnosis ditegakkan serta hubungan perubahan kadar elektrolit tersebut dengan timbulnya GIJ pada IMA. Subyek penelitian adalah penderita infark miokard akut dan sebagai kontrol diambil penderita angina pectoris, yang dirawat di ICD RSIM. Diagnosis ditegakkan berdasarkan kriteria N-D, yaitu keadaan klinis, gambaran EKG dan pemeriksaan enzim kardiak. Pemeriksaan kadar Mg plasma, Mg eritrosit dan K serum dilakukan secara serial sebanyak 6 kali pengambilan. Pengambilan pertama setelah diagnosis ditegakkan disebut jam ke 0 selanjutnya jam ke 8 jam ke 16, jam ke 24, jam ke 32 dan jam ke 40.

Didapatkan 31 penderita IMA kelompok kasus terdiri dari 13 penderita tidak mengalami GIJ (kelompok II) dan 18 penderita mengalami GIJ (kelompok III). Kelompok kontrol (kelompok I) terdiri dari 12 penderita IDP. Kelompok I terdiri dari 8 orang pria dan 4 orang wanita dengan usia berkisar- antara 35-57 tahun, $E = 50,1$ tahun ($SD = 6,8$). Kelompok II terdiri 12 penderita pria dan 1 penderita wanita dengan usia berkisar' antara 37 - 67 tahun, $E = 53,0$ ($SD = 6,8$). Kelompok III terdiri dari 14 orang pria dan 4 orang wanita dengan usia ber-kisar' antara 35 - 55 tahun, $E = 53,1$ tahun ($SD = 10,5$). Selang waktu terjadinya serangan

IVA dan FP sampai diagnosis ditegakkan diruang ICU untuk kelompok I berkisar' antara 3 - 6 jam, $Y = 4,16$ jam ($SD = 0,90$). Lhtuk kelompok II berkisar antara 2 - 6 jam, $a? = 4,07$ jam ($SD = 1,14$), kelcompok III herkisar' antara 2 - 6 jam, $?R = 4,05$ jam ($SD = 1,12$). Idaktu terjadinya GIJ pada kelompok III berkisar antara jam ke 0 sampai jam ke 24 setelah diagnosis ditegakkan. Dar-i 18 penderita yang mengalami EIJ, 6 orang ($15,3 Z$) terjadi jam ke 0, 6 orang ($BJ Z$) terjadi pada jam ke B, pada 4 orang ($22,2 Z$) terjadi pada jam ke 16 dan hanya 2 orang ($11,1 Z$) terjadi pada jam ke 24. Pala kadar Pg plasma, Mg eritrosit dan K serum pada gderita PP selama 40 jam setelah diagnosis ditegakkan membentuk pola yang mendatar. kadar rata-rata Mg plasma, Vg eritrosit dan K ser-um pada kelornpok AP berturut turut $2,25$ mg/dl., $5,56$ mg/dL dan $3,74$ mmol/L. Kaclar' rata-rata rt; plasma pender-ita IMG tang BL] pada jam ke 0 ($x = 1,96$ mg/dl.; $SD = 0,1B$) Iebih rendah dibanding panderita DF? ($7 = 2,17$ mg/dL; $SD = 0,24$), tetapi secara statistik tidak berbeda bermakna. Pola kadar Mg plasma pada pendarita IMG tanpa GIJ menunjukkan penurunan dan mencapai kadar- rata-r-ata terendah pada jam ka 16 ($52 = 1,74$ mg/dI_; $SD = 0,20$) yang secara statistik ber- becla ber-makna dibanding jam ke 0, kemudian diikuti peningkatan kembali mulai jam ke 24 dan maningkat tems sampai jam ke 40, sehingga mambentuk pola parabolik. Kadar rata-rata Mg aritrosit pada penderita IPR tang; GIJ pada jam ka 0 ($YZ = 5,22$ mg/dL; $SD = 0,32$) lebih rendah secara bermakna dibanding kelmpok PP ($7 = 5,86$ mg/dL.; $SD = 0,27?$). Pala kadar' Mg eritrosit selama 40 jam menunjukkan peningkatan yang dimulai pada jam ke B dan terus meningkat sampai jam ke 40 ($Y = 5,42$ mg/dl.; $SD = 0,ZS4$), nembentuk pola linier maningkat. Kadar Mg eritrosit meningkat bernakna mulai jam ke 24 sampai jam ke 40 setelah diagnosis ditegakkaw dibancling jam ke 0. Perubahan kadar' I?q plasma pada kelompok IMA tanpa GIJ tidak paralel dengan pola psrubahan kadar Mg eritrosit. Kadar rata-rata K serum penderita IMA tang BL] pada jam ke 0 ($i = 4,33$ rmol/L; $SD = 0,34$) lebih tinggi sscara beramakna ditnanding kelompok »9P ($5? = 3,69$ nmol/L; $SD = 0,26$). Pola kadar' K serum pada penderita IMQ tanpa GIJ menunjukkan penurunan dirrulai pada jam ka B dan mencapai kadar terendah pada jam ke 32 ($i = 4,03$ mmol/L; $SD 0,32$), kemudian rneningkat kembali pada jam ke 40, tetapi masih lebih randah secara bermakna dibanding jam ke 0. Penurunan kadar pada jam ke 24 dan 32 berbeda bermakna ds-ngan jam ke 0. Dari hasil palelitian ini. dapat dibuktikan bahwa pada IMQ gang QQ terjadi penurunan kaclar Mg plasma, K serum dan Mg eritrcrsit secara bermakna selama 40 jam setelah diagnosis ditegakkan. Didapatkan pula perbedaan antara parubahan pola kadar- elektrolit tersetut selama 40 jam pada penderita dibandingkan dangan kelompok cP dalam waktu yang sama. Pala penurunan kadar' Hg plasma pada penderita IMA dengan GIJ sama dengan penderita IFR tanpa GIJ, tetapi kadarnya pada pendarita IMA dengan GIJ selalu lebih rendah secara bermakna. Kadar Mg plasma yang rendah, cenderung meningkatkan r-isiko terjadinya GIJ pada IMQ. Pola kadar mg eritrosit pada penderita IMA dengan GIJ sama dengan penderita IMQ tanpa GIJ, akan tetapi kadarnya pada pender-ita IPR dengan GIJ selalu lebih tinggi. Dari penelitian ini tidak terbukti kadar- M3 aritrosit dapat digunakan untuk meramalkan kemungkinan terjadinya GIJ. Pola kadar K serum pada penderita IMA dengan GIJ sarna dengan penderita IHA tanpa GLJ, tetapi kadarnya pada penclerita IMQ dengan GIJ selalu lebih rendah. Kadar' l< serum yang rendah, cenderung meningkatkan risiko terjadinya GIJ. Kadar Mg plasma kurang dari $2,0$ mg/dl dan K serum kurang dari $4,0$ n-mol/L pada jam ke 0 sa-telah diagnosis ditegakkan, kemmgkinan dapat dipakai untuk memperkirakan akan terjadinya GIJ. Bila penderita IM4 mengalami hipomagresemia disertai hipokalemia, risiko terjadinya EIJ lebih besar dibandingkan bila hipnmagnesia atau hipmkalemia saja. Persentase GIJ pada penderita INQ tidak menunjukkan perubahan dengan penurunan kadar' Mg eritr-cnsit, tetapi pawururan parameter Mg plasma dan serum dapat manunjukkan hubungan yang cukup baik.