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“The influence of eGFR calculation method on patients classification to different CKD stage”

SUMMARY

BACKGROUND

There is no clear recommendation in polish literature regarding the use eGFR calculated according CKD-EPI. Information derived from many laboratories in Poland show that it is generally accepted to use MDRD equation for calculating of eGFR. This comes from the concern of making changes and necessity to provide clinician with the reliable information about desirability of modification. This study is evidence base on the basis upon which, in 2017, Central Laboratory SP CSK changed way of reporting results. Now eGFR is estimated by recommended new CKD-EPI equation.

AIM OF THE STUDY

The aim of this study was to compare the performance of the MDRD and CKD – EPI equations used by Central Laboratory SP CSK in Warsaw. Comparison was focus on interpretation on of the result and influence on qualifying to different stages of chronic kidney disease (CKD).

The aim of the study was also to compare eGFR under and above 60 ml/min/1,73m² in certain serum creatinine ranges that could be used to update normal range of creatinine concentration for men and women.

MATERIAL AND METHODS

Data was obtained from samples for serum creatinine. Creatinine concentration was measured using standardized Jaffe`s method. Creatinine concentration was used to calculate eGFR using the CKD-EPI and MDRD equations.

Samples were from patients examined by the Central Laboratory SP CSK. Their creatinine concentration was used to calculate eGFR using the CKD-EPI and MDRD equations. Data was obtained from 4883 samples, serum creatinine was between 44 – 178 $\mu\text{mol/l}$ (0.5 – 2.0 mg/dl). There was 49,2% of women (N=2402) and 50,8% man (N=2481). The patients age ranged from 20 to 80 years. Patients were divided according to sex (men, women) and age (six groups : 20-30, 31-40, 41-50, 51-60, 61-70, 71-80) and level of creatinine (fifteen groups: 0,10 mg/dl increments). eGFR was calculated using both CKD –EPI and MDRD formulas. Statistic analysis includes mean average and SD and also calculated difference between the absolute value of eGFR. eGFR values were divided into two groups: under and above 60 ml/min/1,73m² and their numerosity in certain serum creatinine ranges was presented. Statistical significance between average eGFR calculated by MDRD and CKD-EPI was also examined in this study. Correlation coefficient was calculated to express strength of correlation between analyzed variables.

RESULT

The biggest difference between eGFR MDRD and CKD-EPI is noticeable in G1 of CKD. Among men in higher eGFR in G2 (60-89 ml/min/1,73m²) and G3A (45-59 ml/min/1,73m²) eGFR did not differ significantly, only 1%. Difference of 4% and 5% in G1 of CKD (≥ 90 ml/min/1,73m²) – 28% CKD-EPI and 23% MDRD and in G3b (30-44 ml/min/1,73m²) – 15% CKD-EPI and 19% MDRD. Among women the biggest difference are mostly noticeable in G1 (19% vs 12%), in G2 (29% vs 28%) and G3a (21% vs 22%) are only some slight differences. In other groups the results were comparable.

For men with eGFR >60 ml/min/1,73m² was for all cases of creatinine levels were lower than 97 $\mu\text{mol/l}$ (1.1 mg/dl). Between serum creatinine 98-106 $\mu\text{mol/l}$ (1,11-1,2 mg/dl) result concurrence is decreasing slightly, however between 107 -115 $\mu\text{mol/l}$ (1,21-1,30 mg/dl) about 40% patients are suspected to have Chronic Kidney Disease. The border line value of serum creatinine that translates to a correct eGFR in whole population of female patients was 80 $\mu\text{mol/l}$ (0,9 mg/dl). Above this range concurrence of serum creatinine results and eGFR was decreasing. Between 107 -115 $\mu\text{mol/l}$ (1,21 – 1,30 mg/dl) eGFR was >60 ml/min/1,73m² in almost all cases.

CONCLUSION

Use of MDRD or CKD-EPI equation does not influence much on classifying of patients to certain CKD stage but give us possibility to take first prevention step.

“Normal” range is only given for approximation purposes.