

ORIGINAL ARTICLE

Estimation of Reference Change Value and Biological Variation of Creatinine Measurements in Healthy Individuals

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SUMMARY

Introduction: The aim of the this study was to assess the biological variation and reference change value (RCV) for creatinine in healthy individuals aged 18 - 45 years using both Jaffe and enzymatic methods.

Methods: Blood samples were collected from ten females and ten males, for four consecutive weeks in our laboratory between November and December 2018. Samples were stored at -80°C before analysis and dissolved in one run and analyzed in duplicate in a single study with the Beckman Coulter AU2700 biochemistry analyzer. Data was evaluated using CV-ANOVA, and analytical (CV_A), intra-individual (CV_I), and inter-individual (CV_G) variations were calculated. The RCV was calculated using the formula.

Results: The average CV_A calculated at 95% confidence interval for creatinine using Jaffe's method was 2.51%, CV_I was 4.51%, and CV_G was 14.17%. The same measures for creatinine were 2.43%, 4.21% and 13.69%, respectively, using the enzymatic method. The individuality index (II) was 0.32 for the Jaffe's method and 0.31 for the enzymatic method. The average RCV calculated bilaterally in the 95% confidence interval for the Jaffe's and enzymatic methods were 14.26 and 13.43, respectively.

Conclusions: This manuscript has underlined the fact that the II of creatinine is less than 0.6 indicating that the use of population-based reference intervals is limited, and interpretation of the RCV and analysis might be a more objective approach. Taken together, these results suggest that it could be valuable to calculate biological variation correctly and increase clinical awareness.

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Supplementary Data

QUESTIONNAIRE FORM

REFERENCE RANGE DETERMINATION SURVEY ACCORDING TO CLSI C28-A STANDARDS

All information will be kept strictly confidential and will be used to evaluate the results obtained from your blood sample.

Example no.:

Sample time:

Name surname:

Marital status:

Phone:

Age: (year)

Gender:

Race:

Size: (m) (cm)

Weight: (kg)

Do you feel healthy? (y) (n)

Do you exercise regularly? (y) (n)

If yes, how often? (hour/week)

Degree of activity?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

Have you been sick lately? (y) (n)

If yes, when? and why?

Are you taking prescription medication? (y) (n)

If yes, what?

Time:

When was the last time you took medicine?

It's name:

Are you taking vitamins? (y) (n)

If yes, what?

Are you exposed to hazardous chemicals in your job? (y) (n)

If yes, what?

Time:

Do you smoke?

If yes, in what way?

How much?

Time:

Are you on a special diet? (y) (n)

If yes, please describe?

Time:

What type of salt do you use? (iodized) (non-iodized)

Do you have a habit of drinking alcohol? (y) (n)

If yes, in what way?

How often?

Time:

When was the last time you drank alcohol?

Are you under the supervision of a doctor? (y) (n)

If yes, why?

Do you use reliever medication? (y) (n)

If yes, what?

How often?

Time:

Have you been hospitalized recently? (y) (n)

When?

Why?

Is there a disease in your family? (e) (h)

Biological Variation of Creatinine Measurement

If there is, describe?

Have you taken aspirin or pain relievers lately? (y) (n)

If yes, what?

When?

Have you been treated for colds and allergies lately? (y) (n)

If yes, what?

When?

Have you taken any antacids or stomach pills lately? (y) (n)

If yes, what?

When?

Do you use diet pills? (y) (n)

Time:

For women:

Are you pregnant? (y) (n)

If yes, when is your due date?

Do you use oral contraceptives? (y) (n)

If yes, which one?

Do you have your periods? (y) (n)

If yes, when was the last time you had your period?

If no, are you taking hormone replacement therapy? (y) (n)

If you have a baby, are you breastfeeding your baby? (y) (n)