Problem. Intravenous glucose tolerance test (IVGTT) does not use now in diabetes diagnosing because of unresolved math problem of parameters identification of ODE describes IVGTT data.

Results. Is proposed the following ODE describes IVGTT data:

\[ \frac{dC(t)}{dt} = k \cdot C(t) + H \]

\( C(t) \) – glycaemia after iv glucose injection in IVGTT. The H-value is an indirect index of hepatic glucose production (HGP) during the IVGTT. The H value should be interpreted as the mean concentration of blood glucose that creates HGP during the test that usually is not equal to zero or fasting blood glucose (FBG). Moreover, the blood glucose concentration during IVGTT is a sum of the unknown H-value plus the blood glucose concentration that was created by i.v. glucose injection. And a purpose of our method is directed on finding of an H-value that is in an interval between zero and FBG and is not obvious from glycaemia values in IVGTT. As usual, k-value in ODE reflects a rate of glucose disappearance from the blood during IVGTT.

The H and k parameters are identified from a logarithmic linear equation, which was derived from above mentioned ODE:

\[ \ln C(t) - H = -k \cdot t + \ln C(0) - H \]

The H- and k-values are estimated using numerical methods from IVGTT data. A computer program for identification of H- and k-values can be obtained (as “freeware”) from: www.diabet.ru/Dreval/ivgtt_eng.exe Two dimensional (k,H) plot reliably discriminate diabetic from normal persons as was shown on clinical IVGTT data [1].

Conclusion. New simple math method permits re-estimate reliability IVGTT in diabetes diagnosing and its subtypes

References