A SOFTWARE FOR AUTOMATIC CALCULATION OF GLOMERULAR FILTRATION WITH ^{51}Cr- EDTA.

J.L. Gómez Perales[1], A. García Mendoza[2], P Valderas Montes[1], J.A. Furest Perez[1]

[1]Nuclear Medicine Service, "Puerta del Mar" University Hospital (Cádiz, SPAIN)

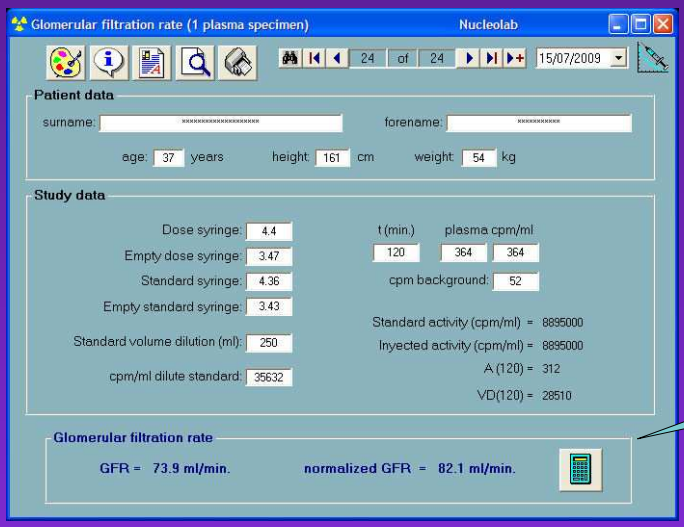
[2]Nuclear Medicine Service, "San Cecilio" Univesity Hospital, (Granada, SPAIN)

Introduction:

Glomerular filtration rate (GFR) studies with ^{51}Cr-EDTA are performed in a large number of hospitals throughout the world. There are important methods to determinate GFR: the method of Ham and Piepsz, the method of Mistry and the bicompartmental model proposed by Sapirstein. The calculation of GFR using any of these methods is not very complex, but tedious and time consuming.

Objetive:

The goal of this work is to develop a computing facility to automatically calculate GFR by three different methods.



Material and Methods:

For developing a software incorporating these calculations we have used Visual Basic 6.0 and Visual Studio Installer.

Method of Ham and Piepsz:

$GFR = 2.602 \times V_{120} - 0.273$

$V_{120} = Dose / A_{120}$

$A_{120} = A_{(t)} \times e^{(0.008)(t-120)}$

Bicompartmental Model of Sapirstein:

$GFR = I\ \lambda a\ \lambda b\ (A\ \lambda a + B\ \lambda b) =$

$= I\ ln2/(A\ T_{1/2a} + B\ T_{1/2b})$

$A_t = A\ e^{-\lambda at}$ (fast exponential)

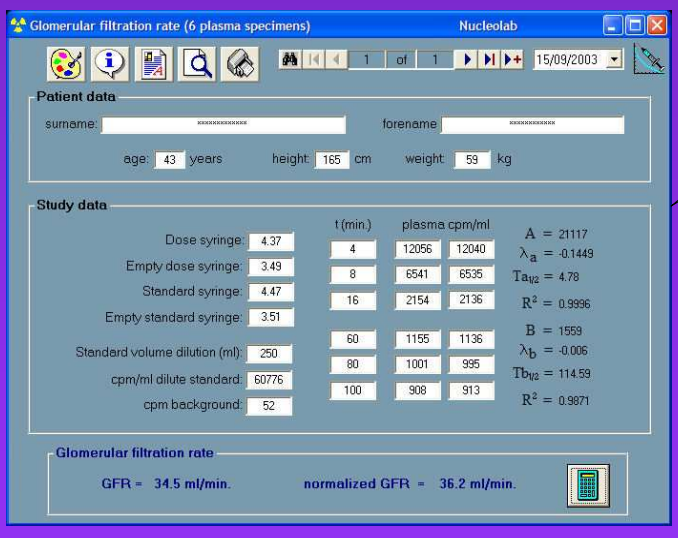
$Bt = Be^{-\lambda bt}$ (slow exponential)

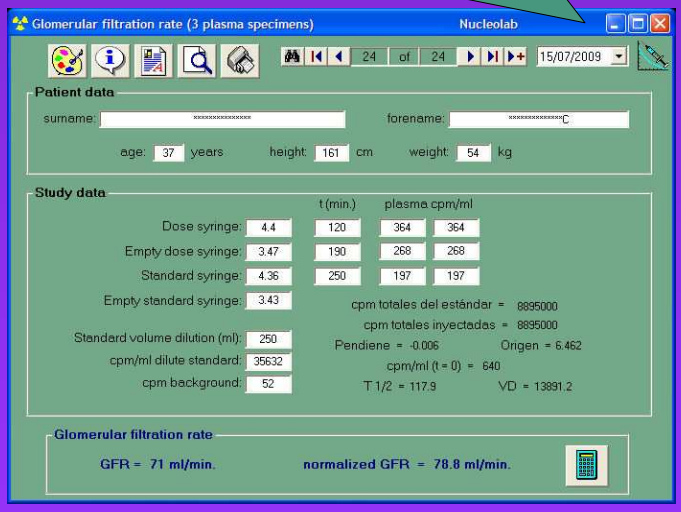
I= doses in cpm

$\lambda = ln2 / T_{1/2}$

Method of Mistry:

$GFR = Dose \times 0.693 \times 0.87 \times 1000/(A_0 \times 1000 \times T_{1/2})$





Results:

We have developed three forms for automatic calculation of GFR by means of three methods: the method of Ham and Piepsz, the method of Mistry and the bicompartmental model proposed by Sapirstein. Each form relies on a database to store, manage and retrieve the data of GFR studies. Moreover these forms offer the possibility of printing a detailed report of each GFR study. These forms are included in a software called Nucleolab which is available at:

www.radiofarmacia.org/nucleolab-english

Conclusion:

The software we have developed has an easy-to-use interface, that makes the calculation complexity of GFR studies hidden for the user, saving you the time that you previously spent on these laborious calculations and reducing the risk of error.