tion, improved display mode and so on, many problems remained to be await on the research oriented off-line processing. The former operations might belong to the software of maker's supply and the latter to that of user's task, which doctor himself should solve according to his various demands how to extract physiologically meaningful parameters from the radioisotopic data.

In respect to the static studies, most serious limitation to quantify depositional distribution of a tracer in a certain organ is lack of informations in the direction of depth. In this sense, recent advent of the software to construct transaxial tomography seems to be epoch-making. Our experience of constructing the tomographic image of RI phantom collecting numerous projection data by the scintillation camera has substantiated applicability of this software to the emission data. Use of posittron emitters, physiological gating, efficient coincidence device and so on might be a promising adjunct for this type of approach in the future.

In respect to the dynamic studies, most serious limitation to implement a straightforward analysis such as deconvolution program for a series of an input-output relation is a various kind of contaminations of an original data. These contaminations are classified into three category; spacial contamination other than ROI, temporal contamination such as recirculated tracer and statistical noise. The analog computer simulation fitting analysis adapts well this type of data, because ability of the pattern recoginition of expert's eyes can easily delineate plausible combination of parameters from the contaminated data. Without consideration for this contamination, the result of digital computer fitting analysis become meaningless.

Even in respect to the data in the form of impulse response which is free from the spacial as well as temporal contaminations, consideration for the statistical noise become important. Fitting analysis should be implemented by weighing, the reciprocal of variance of the noise and tested concerning statistical reliability.

In the case of constructing the functional image, where the analysis applies to the elemental matrix applies to the elemental matrix with low counts, consideration for the statistical reliability become more serious. In this sense, analytical method should be as simple as possible such as the H/A method and the initial slope method.

At any rate, the most important objective of the computer processing is to derive didastic parameter which is physiologically meaningful and, further, to interprete these parameters into integrated functional status using pertinent physiological model, if it is possible.

Computer Application in RIA Laboratory

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Computer application to in vitro testings has been mostly directed to data analysis. However, increasing needs and numbers of radioimmunoassay for routine examination has made desk work increase. Since some tests needs three or four days until the final results are obtained while others need only half a day, reporting system must be the problem to be solved.

Total RIA examination system including filing, data processing and reporting, has been developing in Tokyo Metropolitan Geriatric Hospital. Nova minicomputer (24 KW) was used as a central processing unit. Data input was made using either teletypewriter or paper tape reader. Other peripheral devices included in the system were a CRT display with hard copy, a printer-plotter (Status) disc driver. Programs were written with RDOS and FORTRAN and stored on a disc. Patients file with final results was trasferred from the disc to a magnetic tape.

This RIA LAB. system was composed of several programs. MEMOFILE, FILEM and FILEK are permanent files which are used for inputs of patient identification (FILEM) and test items (FILEK). From these files, a work sheet for a certain test is listed. The content of the work sheet is stored on a working file "NAMEW". Data of each test are put in through teletypewriter or paper tape reader and stored on data files, named CONC, STAND, MSTAND and UNKN.

Raw data once stored are read and processed through a program CALCU and values calculated are also stored on data files. These calculated data are read by a plotting program, POV which draws a standard curve through the printer-plotter. After examining the fitness of each point on the standard curve, concentrations of unknown samples are calculated through a porgram RESULT. The calculated results with standard deviation are transferred into the working file "NAMEW", from which a daily report for each examination is made. After transferring final results from the working file "NAMEW" into the permanent file, FILEK, the working file is deleted.

A patient report is also made once a month as monthly report for tests of the patient.

For the analysis of radioimmunoassay standard curve, a log-logit transformation was used at the present report. Some assay, such as aldosterone are fitted exactly to log-logit curve, while others are not, in our laboratory. A S-shape of standard curve on linea-log paper is not completely improved. Analysis of residual variance disclosed uniformity of residual variances. In TSH assay, models of weighting function for weighted regression analysis in case of log-logit transformation is not fitted to the ones reported in the paper. Even in such cases, partial two phase fitting method gave the nearly uniform scattering of residuals.

Experiences of Minicomputer Application in Nuclear Medicine

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The authors have used two data processing systems connected to scinticameras for about two years. Two systems are namely DAP 5000N using minicomputer Tosbac 40C and scintipac 200 using minicomputer Nova 01.

Application programms have been developed for the research fields of

1. respiratory function analysis
2. cardiac function analysis
3. digital filtering of scintigram
4. correction of respiratory movements in scintigram
5. computed axial scintitomography.

The two systems have each merits and demerits. The merits and the demerits showed cleary the basic problems and limits of minicomputers which were