Filing and Statistical Analysis of Liver Scan Data with Computer

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Computer diagnosis of liver scans is one of the most interesting part of nuclear medicine. Recent advance and availability of general purpose computer in nuclear medicine department made it possible to try to diagnose liver scans with computer in clinic. The authors reported 80-column coding of liver scan data two years ago. Up to 1975, 945 liver scans were confirmed its diagnosis by biopsy, operation and so on. These liver scan data containing patient data (6 items), radiopharmaceuticals, dose and data (5 items), and liver scan findings and diagnosis (34 items) were punched serially on paper tape (8 bits). Data on this paper tape were fed into HP 2100 computer (24K wards) and transformed into 5 digits/item and filed on magnetic disc. These data could be retrieved with combination of up to 50 data item values using QUERY/2100 system.

In this report the authors evaluated size of liver on liver scan and its distribution in various liver diseases and normal liver. Size of normal liver (mean and S.D.) were as follows: in frontal view, view, right vertical diameter=13.1±2.0 cm, left vertical diameter=7.5±1.6 cm, transvers diameter =18.4±2.2 cm, and in right lateral view, horizontal diameter=14.7±1.7 cm.

From these results, abnormal range of each measurements were decided and sensitivity and specificity of these measurements were calculated in various liver diseases. The results showed that size of liver alone was difficult to be discriminating factor in liver scan diagnosis, and combination of physiologic findings in liver scan other than size was thought to be necessary.

Automated System for Recording Report in Nuclear Medicine

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In order to overcome the rapid expansion of nuclear medicine as diagnostic tool, we developed the system called RABUPORT (Radiological Bunin Report System) to record the clinical report in nuclear medicine automatically using Tosbac 40 time sharing system electronic computer.

In this system a radiologist makes necessary inputs from the usual terminal of the computer and the keymat editor (DTZ 0008A). After the input of the name of the patient, date of the examination,
the number of the chart etc., a doctor selects the sentence and the filling words which are displayed on the keymats, in the following order; procedure, interpretation, diagnosis, and recommendation. Having stored several clinical reports, the computer produces the English written reports as many as one wants automatically by printing order. Furthermore, in view of the rapid progress and change of nuclear medicine, a radiologist is able to change and add sentence and term on keymat very easily so that the system may be able to be kept up-to-date and valuable forever.

We believe this is one of the most characteristic point of the system.

Computer Diagnosis of Diffuse Parenchimal Diseases of The Liver With Radiocolloid

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The study is concerned with automated diagnosis of diffuse parenchimal diseases of the liver on hepatic scintigram using electronic computer.

1) The differential diagnosis of diffuse liver diseases was made using multivariate discriminant analysis system, based on parameters obtained from the multiple findings of hepatic scintiphotograph of 120 cases confirmed histologically.

The computer diagnosis showed 81.7% in accuracy in total.

2) The Sciticamera- Computer ON-LINE System for automated differential diagnosis of diffuse liver diseases without any assistance for pattern recognition by doctor was designed. The original image from camera first processed by 9-points smoothing method. After determination of contour of liver image and reference point, the distance from the reference point to the contour were measured at 24 points with 15 degrees. Then fourier transform produced 9 parameters, and these parameters were transfered to the program of discriminant analysis. A series of 86 cases (normal liver: 30 cases, liver cirrhosis: 26 cases, liver tumor: 30 cases) was diagnosed by this method; the accuracy of computer diagnosis was 81.5% with all cases for training group.