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INTERCONNECTION BETWEEN LABORATORY INFORMATION SYSTEM (LIS) AND HOSPITAL INFORMATION SYSTEM (HIS). ACHIEVEMENTS AND FAILURES

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Introduction: In 1995, Areteion University Hospital invested a large amount of money to purchase and install a Hospital Information System (HIS). In the same year a Laboratory Information System (LIS) was also installed and operated separately. In 1999 we decided to tie HIS and LIS in order to support the submission of laboratory test orders from HIS to LIS and the return of the test results back to HIS. Together with this goal we decided to improve the LIS interface and to use a graphical user interface instead of the previous text based interface.

Materials and Methods: The HIS, named HELIOS, was developed by the Greek company "Intrasoft". Data are stored in the relational database management system INGRES. The interface of HELIOS clients is graphical and operates on Microsoft's Windows 9x, NT and 2000. The new and improved LIS "Medilab Lims", was developed by the Greek company Computer Control Systems. The system supports both uni- and bi-directional communication with the laboratory analyzers. Our aim to integrate HIS and LIS originates from: a) the need to increase the Hospital revenues by decreasing the number of laboratory test carried out without patient's debit and b) most importantly, the need to keep laboratory results into health care records.

Results: The interconnection of HIS and LIS first included the incorporation of the LIS coding scheme of the laboratory tests into HIS. The transfer mechanism was implemented as a "daemon" program that reads and writes to both HIS and LIS databases in predefined periods of time. The technical credibility of the system is almost excellent. However, the aimed targets were not fully achieved. The acceptance of the system by users was not so enthusiastic. For example physicians still prefer to get patient's results directly from the laboratory instead of the using their computers. On the other hand, laboratory personnel complain that after the integration there is an extra delay in samples arrival in the laboratory. **Conclusion:** From a technical point of view, the interconnection of HIS and LIS in Areteion Hospital was implemented successfully. Unfortunately this interconnection didn't induce the desirable improvement of cooperation between Laboratory and Clinical departments.

OP-06

¹H-NMR SPECTROSCOPIC STUDIES OF LIPID EXTRACTS FROM HUMAN LDL PARTICLES

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Disorders in lipoprotein metabolism are critical in the etiology of several disease states such as coronary heart disease and atherosclerosis. Thus, there is a considerable interest in the development of novel methods for the analysis of lipoprotein complexes. This knowledge permits the comparison of normal and pathological conditions, detection of unusual lipids or unusual metabolites and the study of control and regulation. With the classical chemical methods for lipid analysis it is usually very difficult to simultaneously measure all lipid classes. Nuclear Magnetic Resonance (NMR) spectroscopy has provided a rapid and comprehensive lipid assay procedure for intact lipids without previous complex sample processing and has been used to identify the different classes of lipids present in various cell membranes, tissues and body fluids and to determine their relative concentrations.

In this study, we investigated the application of high-resolution ¹H-NMR to the detection and characterization of lipid composition, as seen in intact and in extracts of human LDL particles.

Human LDL particles were isolated by ultracentrifugation. A combination of established lipid extraction procedures and high-resolution 1D and 2D NMR spectroscopic methods has been used to analyse qualitatively and quantitatively their lipid composition. A simple ion-exchange chromatographic procedure using commercial Bond Elut columns prior to

the NMR analysis was applied in order to separate lipids into four individual fractions according to their polarity.

Analysis of the ¹H-NMR spectra allowed the identification of the major lipids present in each structural class, such as cholesterol, phospholipids and fatty acids.

Key words: lipoproteins; LDL particles; NMR spectroscopy; lipid composition.

OP-07

VITAMIN D METABOLITES: THEIR CLINICAL USE AND LAST DEVELOPMENTS IN METHODOLOGY

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From the 30 vitamin D metabolites identified and isolated only four have been studied extensively in humans. Vitamin D is biologically inert and must undergo successive hydroxylations to become active. It is produced in the skin from 7-dehydrocholesterol with the aid of UV irradiation from the sun and then in the liver is hydroxylated to one of its active metabolites the 25OHD. This metabolite in the kidney is further hydroxylated to either 1,25(OH)₂D or 24,25(OH)₂D.

Determination of circulating 1,25(OH)₂D at this stage of our knowledge has very limited clinical utility. It is diagnostic for several clinical conditions including vitamin D-dependent rickets type I and II and hypercalcaemia associated with sarcoidosis, fungal infections, Hodgkin's disease, lymphoma, Wegener's granulomatosis and tuberculosis. In other clinical conditions involving the vitamin D endocrine system including hypoparathyroidism, hyperparathyroidism, and chronic renal failure the assay of 1,25(OH)₂D is a confirmatory test. Essentially it does not provide any information with respect to the patient's nutritional vitamin D status, which is defined by the amount of circulating 25OHD. Subnormal circulating levels of 25OHD usually result from inadequate intake and/or insufficient sunlight exposure. Other conditions that can cause nutritional vitamin D deficiency include malabsorption syndromes such as coeliac disease and biliary atresia. There is great seasonal variation of the 25OHD circulating levels, reaching nadir in the winter (Jan-March) and peak in the summer months (June-Sept).

Differences also exist in the methodology of determining these two metabolites. After extraction, a relatively simple chromatographic step (sep-pak C-18) and a competitive protein assay (CBPA) are required for 25OHD, while high pressure liquid chromatography (HPLC) is also necessary for 1,25(OH)₂D and then radioreceptor assay (RRA). Both assays use ³H-labeled compounds. In the last few years RIA assays with ¹²⁵I-tracers and minimal sample preparation especially for 25OHD have been developed with satisfactory results. There are flaws in the 1,25(OH)₂D determination with these RIA assays since some extraction steps are still needed.

OP-08

LIVER IRON CONCENTRATION AND IRON DISTRIBUTION IN TRANSFUSED PATIENTS

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Measurement of liver iron concentration (LIC) on a liver-biopsy specimen is generally considered as the most precise method to assess body iron stores. The objectives of this study were the evaluation of the reproducibility and reliability of LIC estimation on liver samples and the study of iron distribution in the two liver lobes. Liver tissue specimens were obtained from 22 transfused patients (20 with thalassemia and 2 with HbS disease). Measurements were performed by atomic absorption spectrometry (A-Analyst 800, Perkin Elmer AAS) and the concentrations were expressed as mg/g liver dry weight. All specimens (ca. 20-25mg) were appropriately treated in duplicate and then LIC was measured. Twenty six of the specimens were obtained after laparotomy on splenectomy of 16 patients (20 from both the left and right lobe) and 6* more specimens by percutaneous needle biopsy of the right lobe of the liver. The origin of specimens, and the mean and range values of LIC are shown in the table.