Report from the SYSMEX USER SYMPOSIUM 2000

–Advancing Understanding in Haematology

Sysmex UK Ltd.

Imagine being just three mouse clicks away from accessing a global network of clinical databases able to provide all the available haematology and oncology information for any case under investigation. This was the inspiring vision offered by ***Dr. Pranav Sinha*** in his keynote speech to the Sysmex Users Symposium held at Stratford-upon-Avon in November last year. Dr. Sinha's amusing and informative address described his evaluation of the Sysmex LAFIA (Laboratory Filing System for Image Analysis) at the Charité Hospital, Berlin, and highlighted the main focus of the meeting: the application of automated analysis to haematology practice and research.

As clinical knowledge advances, analytical technologies are developing rapidly to keep pace with the demands for new diagnostic tools, and the need for sophisticated data capture and storage capability becomes ever more crucial for efficient laboratory performance. Real-time analysis of blood smears, integration of CBCs, differentials, etc., recall of patient case histories, immunocytochemistry, cytogenetics, morphology, therapy schemes – whatever the source or application, the sheer volume and complexity of accumulated data can be daunting, but intelligent data analysis, integration and storage is now a working reality. Dr. Sinha described the Sysmex LAFIA as an extremely flexible, high-capacity package that can be operated as a stand-alone data integration unit (microscope, CCD camera and software), or can be tailored to link by email with other analysers in intra-or internet systems. The benefits of such a versatile system are significant. Scattergrams, histograms, numerical data, morphological images, FACS analysis – the entire range of data formats can be stored and accessed via simple user operations as and when required. As well as displaying and integrating current data, the LAFIA's exceptional storage capacity means that patient information can be retrieved sometimes years after treatment when follow-up is required and past records may be relevant.

The addition of a web server facility means that participating laboratory databases worldwide can be accessed and downloaded, almost instantly, and regardless of user location. Connecting users via such a link has allowed video con-

A scene of the symposium

Dr. Pranav Sinha

ferencing with telehaematology (transmission of live morphological images direct from the microscope) to become routine. This rapid and comprehensive global data-sharing facility provides an archive of teaching and reference material second to none, and real-time assessment of parameters on-line offers a valuable exchange of clinical expertise and assessment which has important implications for improved patient management.

The Syposium attracted an international audience of more than 200 delegates who showed their enthusiastic appreciation for the excellent scientific presentations as well as the lively social agenda. A stimulating and informative scientific programme addressed a broad spectrum of topics outlining current developments and understanding of many haematology issues.

Prof. S. Machin (Haematology Department, University College London Hospital) gave a comprehensive outline of his evaluation of some of the new technologies incorporated into the latest Sysmex XE-2100 analyser. The XE-2100 is a top-of-the-range, fully automated blood cell counter which utilises the technology of fluorescence flow cytometry with semiconductor diode laser to quantitate the standard five cell differential. New diagnostic features on the analyser are an immature granulocyte count, a nucleated red cell count, and the ability to measure platelets in two ways (by impedance and by an "fluorescent optical" platelet count using a new fluorescent dye and semiconductor diode laser in the reticulocyte channel). In addition, the reticulocyte channel determines new parameters that can potentially help to assess functional iron deficiency. Early detection of iron deficiency is vital to optimize chronic anaemia associated with renal failure and malignant disease erythropoietin therapy. Failure to supply iron at a sufficient rate adversely affects patient outcome but standard biochemical measurement of iron status can be misleading and unreliable. It has been suggested that reticulocyte haemoglobin (Chr ® Bayer) concentrations may be a more sensitive and specific indicator of functional iron deficiency, particularly in individuals with otherwise normal red cell indices. Two new parameters (RBC-Y and RET-Y), measured in the reticulocyte channel, seem to equate indirectly with CHr concentrations. By measuring the reticulocyte mean value of the forward scatter histogram of these two parameters during reticulocyte analysis, excellent correlation was obtained. Once the correlation was established, Prof Machin proposed that the utilisation of RBC-Y/RET-Y values potentially allows a more accurate assessment of functional iron deficiency and hence is of significant clinical benefit.

From the same laboratory and on behalf of the ISCH, ***Dr. Paul Harrison*** outlined the problems associated with the existing international reference method of platelet counting (manual phase count) and described an inter-laboratory evaluation of a recently proposed measurement procedure utilising the advanced analytical parameters. The new flow cytometric method, using immunoplatelet counting based on the platelet: RBC ratio, meets the criteria for a new international consensus reference method and offers a more accurate and reliable platelet count. This will facilitate re-evaluation of the platelet transfusion threshold and decrease the frequency of unnecessary platelet transfusions.

The new analyser also features a global "On-line-QC" facility which provides both internal and external QC assessment simultaneously and effortlessly for participating XE-2100 laboratories. ***Mr. Torsten Reinecke***, Scientific Support Manager for Sysmex Europe GMBH, described the benefits of this enhanced quality system which connects QC reference labs and user labs via a web server in Japan to give daily assay values for each parameter and updates international peer group reference values every ten minutes.

The practical applications of XE-2100 technologies for the busy working haematology laboratory were brought into sharp focus by ***Mr. Cliff Stephens*** (Gloucester Royal Hospitals) who described how automation had dramatically improved workflow efficiency by increasing throughput, improving autovalidation and decreasing film review rate. Whilst recognising such benefits, ***Dr. Bain*** (St Mary's Hospital) added a cautionary note by highlighting the need to retain human input in blood film observations in order to avoid erroneous counts and missed abnormalities caused by infection, unusual haematological conditions, sample storage or treatment, etc., that cannot be assessed by automated analysis.

Other laboratories offered some fascinating insights into recent advances in the understanding of specific conditions. ***Prof. Alexander*** (Belfast City Hospital) discussed the previously underestimated role of the adaptive immune response in immune reconstitution post haemopoietic progenitor cell transplantation and the potential problems arising from severe T Helper cell, Cytopenia's post transplant. A potential anti-leukaemic procedure using the provision of donor

lymphocytes after low intensity conditioning regimes was investigated by ***Dr. Craddock*** (Queen Elizabeth Hospital). This mini-allograft treatment protocol was designed to reduce transplant related mortality and preliminary results are promising. ***Prof. Greaves*** (Aberdeen Royal Infirmary) summarized current thinking on the pathogenesis and development of new and more specific treatments for thrombocytic thrombocytopenic purpura and haemolytic uraemic syndrome. The severity of acute or chronic exercise-induced changes to the immune system is of particular importance to the professional athlete's training. ***Prof. McNaughton/Dr. Dylan Thompson*** (University of Bath) summarized studies investigating the effects of mode and intensity of exercise on immune function assessed by haematological profiling, and the clinical implications of such changes for the athlete's performance. The application of automated analytical procedures to haemoglobinopathy screening has permitted screening programmes to expand and develop considerably ***Dr. Wild*** (King's College Hospital, London) detailed the complexity and limitations of such programmes in terms of both diagnostic and ethical considerations and emphasized the need to establish error statistics for use in guidelines for national screening policies

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Sysmex User Symposium 2000

Date and place : 10th – 11th November, 2000
Stratford-upon-Avon, UK

Speakers :

The Implementation and use of Telehaematology
Dr. Pranav SINHA, Institut fur Laboratoriumsmedizen und Pathobiochemie, Charité Hospital, Berlin

TTP: Improved understanding of the pathogenesis may lead to better treatment?
Prof . M GREAVES, Dept of Medicine and Therapeutics, Aberdeen Royal Infirmary

Haemoglobinopathy: Screening Versus Definitive Diagnosis
Dr. B WILD, Dept of Haematology, Kings College Hospital, London

Immune reconstitution Post Haematopoietic Progenitor Cell Transplantation
Prof . Dennis ALEXANDER, Dept of Haematology, Belfast City Hospital

Online Quality Assurance Scheme
Mr. Torsten REINECKE, Scienific Support Manager, SYSMEX EUROPE GMBH

Clinical Utility of new XE-2100 Parameters
Prof. SJ MACHIN, Dept of Haematology, University College London Hospitals

A New International Reference Method for Platelet Counting
Dr. Paul HARRISON, Dept of Haematology, University College London Hospitals

Implementation of the XE-2100 in a busy District Hospital!
Mr. Cliff STEPHENS, Dept of Haematology, Gloucester Royal Hospital

Is there a future for the blood film?
Dr. BJ BAIN, Dept of Haematology, St Marys Hospital, London

Haematology in Sport & Exercise Science
Prof. Lars McNAUGHTON & Dr. Dylan THOMPSON, University of Bath

Mini-Allografts: What do they tell us about how to cure Leukaemia?
Dr. C CRADDOCK, Dept of Clinical Haematology, Queen Elizabeth Hospital, Birmingham