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Critical Care Testing in the New Millennium – The Integration of Point of Care Testing

In June, 2000 over 150 scientists and clinicians meet in Helsingor, Denmark to discuss the integration of Point of Care Testing and Critical Care Testing. The American Association for Clinical Chemistry Critical Care and Point of Care Testing divisions presented this meeting, which was held under the auspices of the IFCC. It was organized in cooperation with the IFCC Working Group on Selective Electrodes and the Japan Society of Clinical Chemistry Committee for Blood gases and Electrolytes.

Point of Care Testing has become a major trend in the delivery of laboratory testing over the last decade. Increasing demands for faster delivery of test results and the limitations imposed by cost constraints is challenging laboratory medicine professionals. The pressures on healthcare systems to reduce cost and increase productivity is causing patients to spend less time in traditional hospital settings and those cases that remain in the hospital are more acute than several years ago. Also, increased use of alternative healthcare in the form of outpatient clinics, same day surgery centers and home nursing is further emphasizing the need for faster, more portable and easier to use laboratory-testing devices. With refinements of biosensor technology, development of solid state, stable reagents, and advances in miniaturization and computer control, as well as enhancements in data management and quality assurance, POCT promises to increase its influence even more in the next decade.

The organizers of the committee identified five key areas. Each was covered in a half-day session during the symposium. The areas that were covered were: 1) Clinical applications – The Role of POCT in Critical Care Medicine, 2) Insuring the Quality of Critical Care Testing, 3) Informatics: Data Collection to knowledge, 4) Standardization of measurements in critical care, and 5) Technological trends for the 21st century.

In this issue of the eJIFCC, articles are presented which represent some of the viewpoints expressed during the meeting. Informatics and technology are the keys to the successful integration of POCT into Critical Care medicine, as well as into the entire spectrum of patient care. Data integration of POCT results is not only necessary for patient management but also for quality assurance and billing purposes. In the first article, Dr. Kenneth Blick from the University of Oklahoma Health Science Center in Oklahoma City, Oklahoma, US, presents his views on the key role of information management in modern critical care medicine. His basic thesis is that today's physicians taking care of critically ill patients require laboratory results in real-time and, if possible, at the patient's bedside. This translates into a demand for laboratories to utilize information technology and those laboratories without an overall plan for data management of critical care testing will probably not survive.

Technology is always a driving force for change. However, is the change always for the better? The article by Dr. Lawrence Kricka from the University of Pennsylvania, Philadelphia, Pennsylvania, US, discusses how micro miniaturization of analytical procedures will have a significant impact on all aspects of diagnostic testing as we move into the 21st century. He states that not only can it have a significant impact on healthcare costs via timely intervention and monitoring, combined with improved treatments but that it will empower consumers to perform self testing via personal laboratories. Dr. Kricka predicts that the latter will produce a level of self-awareness of biochemical and genetic information hitherto unimaginable.

Obviously, despite technological improvements, POCT will not be a viable form of diagnostic testing unless there are appropriate clinical and operational benefits associated with its implementation. The third article in this issue, by Dr. Paul Holloway and co-workers from John Radcliffe Hospital in Oxford, UK, describes an application of POCT in critical care medicine. In their article the value of blood lactate measurements during hemofiltration is described. They demonstrate that rising blood lactate values without improvement in base deficit during hemofiltration is an indicator of patient harm.

Standardization of diagnostic testing is always an important issue, especially when dealing with different methodologies performed on different sample types. This is especially true when one is discussing glucose testing where direct or indirect ISE technology is used on a multitude of sample types, i.e., whole blood, plasma, and serum. In the last article, Dr. Niels Fogh-Andersen reports on the IFCC Working Group on Selective Electrodes recommendations regarding the reporting of blood glucose results. They recommend the reporting of glucose concentration in plasma mmol/L, irrespective of sample type of technology. Additionally, to avoid misleading low results, the working group believes that the analysis of capillary (or arterial) blood is mandatory for diagnosing diabetes mellitus and for glucose tolerance testing.

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