ASCLS 2004 Annual Meeting: Official Abstracts of Submitted Papers and Posters

LOS ANGELES, CALIFORNIA

The following abstracts have been accepted for presentation at the 2004 American Society for Clinical Laboratory Science (ASCLS) Annual Meeting and Clinical Laboratory Exposition to be held July 27 through July 31, 2004 in Los Angeles, CA. The preliminary meeting program was published in the Spring 2004 issue of *Clinical Laboratory Science.* Abstracts are reviewed by the ASCLS Abstract Review Committee. They are the final authority in selecting or rejecting an abstract.

Papers and posters will be presented during the following times at the annual meeting. Room assignments will be listed in the final program.

POSTER PRESENTATIONS

Los Angeles Convention Center
Tuesday and Wednesday, July 27 and 28, 2004, 10:00 A.M. – 4:30 P.M.
Thursday, July 29, 2004: 10:00 A.M. – 3:30 P.M.

Authors will be present Wednesday, July 28, 2004 from 11:00 A.M. – 12:00 noon to discuss their posters.

CASE STUDY PRESENTATIONS

Hyatt Regency Los Angeles
Friday, July 30, 2004, 2:15 P.M. – 3:45 P.M.

RESEARCH PAPER PRESENTATIONS

Los Angeles Convention Center
Wednesday, July 28, 2004, 2:00 P.M. – 3:30 P.M.

The peer-reviewed Clinical Practice section seeks to publish case studies, reports, and articles that are immediately useful, are of practical nature, or demonstrate improvement in the quality of laboratory care. Direct all inquiries to Bernadette Rodak MS CLS(NCA), CLS Clinical Practice Editor, Clinical Laboratory Science Program, Indiana University, Fesler 409, 1120 South Avenue, Indianapolis IN 46202-5113. brodak@iupui.edu

POSTER PRESENTATIONS

Assessing Students' Cognitive Ability Using a Hybrid Instructional Model

Sandra M Weiss EdD CLS(NCA), Neumann College, Aston PA.

The purpose of this study was to determine if a hybrid course delivery model provided a realistic means for assessing traditional students' ability to become independent learners. Little has been published about the use of the hybrid model to deliver clinical laboratory instruction. According to a literature review, four basic models of instruction commonly employed in higher education are: traditional model (face-to-face), distance learning (totally on-line course), supplemental (traditional with a supplemental on-line component), and the hybrid model (at times the class meets face-to-face, and at other times, on-line). Six students, enrolled in a traditional clinical laboratory science program, were placed into a hybrid clinical hematology lecture course with WebCT 4.0 as the course management system. The course met face-to-face two days a week with the third meeting asynchronously. Students retrieved, applied, and critically analyzed information. In addition, the students were assessed on-line using Respondus 2.0. Final grades and examinations indicated no significant difference in the achievement level between hybrid and traditional face-to-face instruction; however, a survey of students' perception of their comprehension of the material and satisfaction with the course indicated a significant difference (p <0.5).

Development of an Automated Inventory Management System for Patient Laboratory Specimens

David G Fowler PhD CLS(NCA), University of Mississippi Medical Center, Jackson MS.

In the clinical laboratory patient specimens are routinely retained for up to two weeks before being discarded. The number of specimens processed on a daily basis by healthcare facilities has continued to expand to the point that storing and retrieving the specimens has become problematic. Although laboratories have devised manual inventory management systems, such as dating or numbering test tube racks, the sheer number of specimens still results in inordinate

amounts of time spent on retrieving samples at the request of the clinician. This project offers a solution to the problem by incorporating the Visual Basic programming capabilities of Microsoft Excel to develop an automated inventory management system for patient samples. The user enters demographic information about the sample and selects the location of the sample in the test tube rack by utilizing a graphical image of the rack. The program stores the patient name, ID, and barcode numbers, date, and rack location for each sample. The sample location is retrieved by searching on the barcode number. This program should prove useful not only in resolving this inventory management problem but also in demonstrating the power of Microsoft Excel for solving routine problems in daily operations of the laboratory.

Do Clot Activator Tubes Cross-Contaminate Citrate Tubes?

***Brianna V Miller**, Lawrence T Cooper, Margaret G Fritsma MA MT(ASCP) SBB, Marisa B Marques MD, Victor A Skrinska PhD, George A Fritsma MS MT(ASCP),* Department of Diagnostic and Therapeutic Sciences, University of Alabama at Birmingham, Birmingham AL.

The purpose of this study was to determine if cross-contamination occurs when a clot activator (gel separator) collection tube is drawn immediately before a 3.2% sodium citrate (coagulation) tube. This study intends to support or modify the recommended order of draw for evacuated citrate and gel separator tubes during multiple tube collection. A citrate tube, a gel separator tube, and a second citrate tube were drawn in order using standard venipuncture protocol from 28 healthy participants. To determine the occurrence of cross-contamination, prothrombin time and activated partial thromboplastin time assays were performed on platelet poor plasma from both citrate tubes. Preliminary results indicate the differences in paired mean values between the first and second citrate tubes do not achieve statistical significance. Thus, cross-contamination may not occur when a clot activator tube is collected immediately before a citrate tube.

Do EDTA Tubes Cross-Contaminate Gel Separator Tubes?

***Lawrence T Cooper**, Margaret G Fritsma MA MT(ASCP) SBB, Marisa B Marques MD, Brianna V Miller, Victor A Skrinska PhD, George A Fritsma MS MT(ASCP),* Department of Diagnostic and Therapeutic Sciences, University of Alabama at Birmingham, Birmingham AL.

The purpose of this study was to determine if cross-contamination occurs when an EDTA collection tube is drawn immediately before a gel separator tube. This study intends to support or modify the recommended order of draw for EDTA and gel separator tubes during multiple evacuated tube collection. A gel separator tube, an EDTA tube, and a second gel separator tube were drawn in order from 30 healthy participants. To determine the occurrence of cross-contamination, potassium and calcium assays were performed on serum from both gel separator tubes. Preliminary results indicate the differences in paired mean values between the first and second gel separator tubes do not achieve statistical significance. Cross-contamination may not occur when an EDTA tube is collected immediately before a gel separator tube.

Effects of Chewed, Soluble, and Whole Aspirin Formulations on Platelet Aggregation Inhibition

***DL McGlasson MS CLS(NCA)**, HA Schwertner PhD*, 59th Clinical Research Squadron, Wilford Hall Medical Center, Lackland AFB TX. *M Christopher MD*, Department of Emergency Medicine, Wilford Hall Medical Center, Lackland AFB TX.

The purpose of this research was to compare the platelet inhibitory times associated with three commonly used aspirin formulations. Twenty-five healthy volunteers aged 18 to 39 participated in the single-blinded triple-crossover study. Blood draws occurred at least two weeks apart and after an eight-hour fast. The subjects chewed four baby aspirin (324 mg), ingested an Alka-Seltzer containing 325 mg of soluble aspirin, or swallowed a whole non-enteric coated aspirin tablet (325 mg). Post-dose blood samples were collected at 2.5, 5.0, 7.5, 10.0, 15.0, 20.0, 25.0, 30.0, and 40.0 minutes. Platelet aggregation was determined on platelet-rich plasma using a Chronolog 50VS Platelet Aggregometer with arachidonic acid as the aggregating agent. The times for platelet aggregation inhibition for the chewed, soluble, and whole aspirin formulations were 7.81, 8.44, and 13.22 minutes, respectively. The platelet inhibitions obtained with chewed and soluble aspirin formulations were statistically different from those obtained with the whole aspirin tablets (p <0.007 and 0.001, respectively). The platelet inhibitions obtained with the soluble and chewed forms of aspirin were not statistically different (p 0.649). The results indicate that chewed and soluble aspirin intake may be more advantageous in treating acute emergency events involving platelet aggregation than whole aspirin administration.

Implementing Automation in the Transfusion Service

Suzanne H Butch MA, University of Michigan Health System, Ann Arbor MI.

Decreased staffing levels, increasing demands for technologist time, and the availability of instrumentation have caused transfusion services to automate blood bank testing. To make the most of this opportunity, the entire process of performing blood bank testing was evaluated. Moving from manual to automated methods allowed the application of Six Sigma and Lean principles to reduce the number of steps in processing resulting in fewer opportunities for error. In addition, non-value-added steps that had crept into our processes were removed. Tools used included process mapping, value stream analysis, and failure modes and effects analysis (FMEA). The changes involved all technical areas of the transfusion service including component preparation and issuing of blood components. Increased attention could be devoted to areas of quality concern. No staff members were reassigned or reduced as a result of the implementation.

A Recruitment Program in Clinical Laboratory Science for High School Scholars

Victor A Skrinska PhD DABCC, Linda R Jeff MA MT(ASCP), University of Alabama at Birmingham, Birmingham AL.

Due to high vacancy rates in medical technology, the quality of medical care may decline unless the number of students entering academic programs increases. Most programs operate below capacity which has forced many programs to close. To increase enrollment, the Clinical Laboratory Science (CLS) Program at the University of Alabama at Birmingham was one of twelve programs participating in a High School Scholars Program. A total of 40 students from Birmingham area high schools attended over the past two years. Students were accepted based on GPA, letters of reference, and interviews. The two-week summer program included three-hour morning and afternoon sessions. Each session included a presentation focused on a specific topic followed by a laboratory exercise. Students asked many questions and requested further information concerning careers in CLS. Surveys showed that 81% of students listed CLS as one of the careers they learned most about and 75% listed an area in CLS as most interesting. Of students surveyed, 50% listed CLS as one of the careers they were most interested in after the program. Outcomes will continue to be measured over five years to determine the effect of the program on choice of career track.

CASE STUDIES

Acute Thrombocytopenia following Administration of Lovenox and Aggrastat

DL McGlasson MS CLS(NCA), 59th Clinical Research Squadron, Wilford Hall Medical Center, Lackland AFB TX; *M McLemore MD* Department of Hematology, University of Texas Health Science Center, San Antonio TX.

A 56-year-old Hispanic female with a history of diabetes was admitted with sub-sternal chest pain. She had no significant EKG changes from a previous tracing. She had an elevated troponin level of 4.8 (1.4 upper limit). She was started on Lovenox, a low molecular weight heparin, and Aggrastat (tirofiban), a Gp IIb/IIIa inhibitor. Her platelet count on admission was 241 x 10^9/L. Overnight her platelet count dropped to 5 x 10^9/L and she displayed significant petechiae. The specimen was checked for clots and mislabeling. The original specimen was checked and the results matched the normal platelet count admission numbers. A new specimen was obtained and the platelet count was 4 x 10^9/L. A consult was requested because of a suspicion of heparin induced thrombocytopenia (HIT). However, HIT usually causes a more gradual reduction of platelets. A literature search revealed that Aggrastat had been implicated in acute thrombocytopenia. The medication was discontinued. After 12 hours the platelet count rose to 71 x 10^9/L. Upon discharge four days later the patient's platelet count was 141 x 10^9/L. Previous findings indicated that acute thrombocytopenia after the administration of tirofiban can be caused by drug-dependent antibodies that are 'naturally occurring' or are induced by prior exposure to the drug.

ABO Problems: History is Not Always a Thing of the Past

Christina Thompson EdD CLS(NCA), Texas A&M University-Corpus Christi, Corpus Christi TX; *Nicole Peters, Marinella Neal*, Christus Spohn Shoreline, Corpus Christi TX.

Two cases are presented to demonstrate the importance of a complete history for the solution of ABO typing problems. The first case is a 53-year-old male with a history of multiple myeloma and stem cell transplant. This patient presented with a blood type of A positive although blood bank records showed a B positive blood type. The second case is a 57-year-old male admitted to the hospital in septic shock and anemia. Blood typing results showed an A positive with mixed field reaction in the front type. No history or blood

type was on record at the admitting hospital. Discussion with the patient's family revealed a liver transplant at a medical center in another city two weeks previously. These cases and the literature discussion present the transfusion challenges associated with stem cell and organ transplantation.

Development and Incorporation of Learning Objects in Laboratory Science Education

***Michelle S Kanuth PhD CLS(NCA)**, Vicki Freeman PhD CLS(NCA)*, University of Texas Medical Branch, Galveston TX

With the increasing demands on both academic and clinical faculty time, shortcut strategies for creating lectures, distance education activities, and other visual and interactive lesson components have become imperative. A FIPSE grant was written to allow University of Texas Medical Branch, in cooperation with the University of Nebraska Medical Center, to develop and catalogue Learning Objects (LO) for educators to share. LOs are simple, stand alone snippets of information that are developed independently of an entire lesson. LOs range from a photograph to video and audio clips to short interactive activities. The LOs being developed for Microbiology will be available in a medical repository, or digital library, that can be accessed by educators in clinical laboratory science and clinical laboratory technician programs, microbiology, and biology. The process of LO development, cataloguing through key words, and examples of the use of a single LO in several different lessons are demonstrated. Using pre-existing LOs in lesson development will significantly decrease the time and effort required to present cutting edge, visually stimulating, and interactive educational activities.

Emerging Parasitic Infections from the Arabian Gulf

Connie R Mahon MS CLS (NCA), Microbiology Consultant, Health Management Systems, Fairfax VA.

The patient, a 29-year-old Asian-American male soldier, presented with non-suppurative, erythematous, and ulcerated lesions on his right mid-arm, right mid-thigh, and left hand. The patient was in Kuwait for "Operation Enduring Freedom". He disclosed that during his stay in the region, he had experienced heavy sandfly biting activity. Skin scrapings and needle aspirate biopsies were taken within weeks of the development of lesions for histopathology and microbiology studies. Direct smear preparations stained with 30% Giemsa stain revealed several amastigotes at active lesion sites. The patient underwent a 20-day regimen of 20mg/kg/day of Pentostam therapy without difficulty. The lesions resolved well with moderate scarring. This case study represents the global public health risks we may face in the near future. Our ongoing military involvement in the Arabian Gulf continuously exposes members of the Armed Forces to biological agents and their vectors endemic to the region. As reservists who were called to duty return to their civilian lives, encounters with this infectious disease will not be limited to military hospitals but will occur in the civilian community healthcare environment as well.

Threadworm Infection: What Does it Take to 'Sew Up' a Diagnosis?

***Linda A Smith PhD CLS(NCA)**, Kelli M Kammlah*, The University of Texas Health Science Center, San Antonio TX.

Infection with *Strongyloides stercoralis* may be asymptomatic or may mimic many different intestinal conditions. Unless there is a high index of suspicion on the part of the physician, the infection can remain undiagnosed for years. This case is that of a 39-year-old male with a ten-year history of repeated bouts of intestinal cramping, distention, and diarrhea. He had been treated for irritable bowel syndrome without resolution of symptoms. Results of laboratory tests performed during the most recent visit to the physician demonstrated decreased hemoglobin, hematocrit, and white blood cell count. There was 16% eosinophilia present. As a result of the persistence of intestinal symptoms and the increased eosinophil count, an endoscopy was performed. Biopsy of tissue taken during the endoscopy revealed eosinophilic infiltration. Examination of the duodenal aspirate demonstrated the presence of *Strongyloides stercoralis* filariform larvae. The patient was treated and the infection was resolved.

ORAL PRESENTATIONS

A Comparison of Biosite Triage BNP to Roche Pro-BNP for Diagnosis of Heart Failure

Sandra Cabrera MS CLS(NCA), Texas A&M University-Corpus Christi, Corpus Christi TX; *Priscilla Quintana MT(ASCP)*, Christus Spohn Shoreline Hospital, Corpus Christi TX.

Patients presenting to the hospital emergency room with chest pain and dyspnea must be quickly evaluated to differentiate pulmonary cause from heart failure. This study compared B-Type Natriuretic Peptide (BNP) with Pro-B-Type Natriuretic Peptide (Pro-BNP) to determine the best predictive indicator of heart failure and also to determine if renal disease caused any discrepancy in the diagnostic value of the tests. BNP was tested by Biosite's Triage fluorescence immunoassay and Pro-

BNP by Roche's Elecsys System electrochemiluminescence immunoassay. One hundred and fifty hospital patient samples were tested by both methods. Test results agreed on 121 out of 150 samples based on patients' history, symptoms, and physician's diagnosis. Twenty nine patients were negative by Biosite BNP and positive by Roche's Pro-BNP. Pro-BNP had 23 false positives, 13 of those had normal renal function. Biosite had no false positive and five false negative results. This suggests that Biosite is the more accurate method for this population. Further research must be done to investigate specific causes for the discrepancies.

Secretory Antibodies' Influence Upon *Candida albicans*

Tiffany A Klemann MS, Children's Hospital of Akron, OH; ***Marcia R Lee DVM MS***, Miami University, Oxford OH.

Candida albicans' pathogenicity is attributed to diverse virulence factors, including germination and adherence to host epithelial cells. Portals of entry for *C. albicans* include mucous membranes protected by secretory IgA (SIgA). This study aimed to determine the effects of SIgA upon *C. albicans* germination and adherence to HEp-2 cells, using a germination assay with phase contrast microscopy and flow cytometry, respectively. Eighty percent of strains exposed to a dilution series of pooled human SIgA, ranging from 1667 to 62 µL/mL, experienced a decrease in germination, whereas 20% showed either no change or an increase. Removal of *Candida*-specific SIgA negated the reduction in germination. To assess SIgA's influence upon adherence, eight *C. albicans* strains were exposed to 10-fold dilutions of SIgA, ranging from 500 to 0.5 µL/mL, fluorescently stained, and incubated with HEp-2 cells. Two of eight strains exhibited increased adherence after SIgA exposure, whereas, six strains demonstrated no significant change. In conclusion, germ tube formation is inhibited by *Candida*-specific SIgA. However, adherence is largely unaffected by SIgA. These findings suggest SIgA has a novel role of controlling germination and subsequent invasion of the host by *C. albicans*.

Solving the Puzzle of Hemolysis: A Critical Role for the Laboratory

Shirlyn B McKenzie PhD CLS(NCA), Brandon Hiller, University of Texas Health Science Center at San Antonio, Department of Clinical Laboratory Sciences, San Antonio TX.

This case concerns a 60-year-old woman who was seen in the emergency room for flu-like symptoms, dizziness, weakness, and cough. She reported dark stools and several days of dark colored urine. Previous history revealed suspected hemolytic anemia and mild thrombocytopenia. At admission, her hemoglobin was 5.9 g/dL and platelet count was 100 x 10^9/L. Evidence of hemolysis included: total bilirubin 1.6 mg/dL, lactate dehydrogenase 850 U/L, and a positive DAT with IgG and C3. She received four units of packed red blood cells and her hemoglobin stabilized at about 10 g/dL. Upon outpatient follow-up, the complete blood count showed a worsening of the cytopenias with a hemoglobin of 7.7 g/dL and platelet count of 60 x 10^9/L. The differential showed many abnormalities including marked polychromasia, nucleated red blood cells, basophilic stippling, schistocytes, Pappenheimer bodies, and Howell-Jolly bodies. Of particular interest was phagocytosis of platelets by neutrophils. The reticulocyte count was 37%. The diagnosis of Evan's syndrome, a severe thrombocytopenia with warm autoimmune hemolytic anemia was made. This syndrome is diagnosed after other causes of progressive cytopenias have been ruled out including myelodysplasia, malignancy, and liver and kidney dysfunction. There is no definitive treatment.

A Swollen Eye? A Case of Rapidly Progressive Neuroblastoma

Libby Spence PhD CLS(NCA), *Susan L Gaskin*, University of Mississippi Medical Center, Jackson MS.

An eight-month-old female was seen by her physician due to irritability and sleeplessness of several nights duration. No physical reason was detected for her discomfort. Two weeks later she returned with a swollen left eye. A CBC revealed a 14,600 WBC and low-grade anemia. She was then referred to a pediatric ophthalmologist who performed a CT scan of her head and a biopsy of a left peri-orbital tumor. The biopsy revealed a malignant neoplasm. The bone marrow showed tumor clumps. The laboratory values were consistent with a diagnosis of Stage IV neuroblastoma. Staging of the tumor along with biologic features determined treatment. The MYCN oncogene was not amplified and the DNA index was 1, indicating a poor prognosis. Chemotherapy was initiated, but biopsies showed progressive tumor involvement. Surgical interventions removed tissue and fluid from both eyes. She was hospitalized with respiratory distress due to mediastinal masses compressing the airway. Six weeks later she died. Neuroblastoma is a serious, rapidly developing cancer common in infants and young children. Because survival rates and recovery are dependent upon the stage and age at diagnosis, precise laboratory diagnostic tests are indispensable for providing information to physicians to aid in determining treatment and prognosis.