LEHIGH VALLEY
HOSPITAL

Medical Staff Progress Notes

Volume 6, Number 3
March, 1994

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From the President

The functional planning continues as we await state approval of our Certificate of Need (CON) for a 52-bed skilled nursing facility. Plans to renovate our GI Lab have been cleared at the state level, and remodeling is anticipated to begin in the near future. Also, 7C has been remodeled and is now our Nephrology Unit. At 17th & Chew, 5T and 4T have closed, while 4S has become a 36-bed patient care unit.

Several important searches continue. The Chief of Surgery search continues, and we all hope for positive news shortly. A search is well underway for the Chief Operating Officer. Several excellent candidates have been interviewed, and the committee will be meeting again within the next several weeks to discuss these candidates. Elliot Sussman, M.D., has asked me to chair a committee to search for the Chief of Clinical Services. Our first meeting will be held within the next few weeks, and, hopefully, we will have candidates to interview shortly thereafter.

As a reminder, the Physician Assistance Program is continuing its confidential professional counseling services to active members of the Medical Staff and their dependents.

This program offers physicians and families counseling services for a wide range of personal problems, and is of a strictly confidential nature and easy to use. The number is 433-8550 or 1-800-327-8878, requiring only the identification as a member of Lehigh Valley Hospital medical staff or a family member, and ask to speak to the Program Manager, Oliver Neith.

Also, for the past two years, our Physician Well-Being group has met every other week from 6 to 7:30 p.m. All meetings are held in the Conference Dining Room at Cedar Crest & I-78. If anyone has questions or needs information, please contact John Turoczi, EdD, Group Facilitator, at (610) 481-9161.

Finally, on a sad note, we all extend our sympathies to Russ Rentler for the recent loss of his wife, Susan. Anyone wishing to contribute to a fund to help Russ obtain the services of a nanny for his young children may contact the Medical Staff Office at 402-8900.

Best wishes to all,

Joseph A. Candio
President, Medical Staff

Laboratory Update

Handy Reference

Health Network Laboratories is structured to assure that most technical or logistical questions can be handled by the supervisor of the division in question. However, if you ever have a question that requires further clarification, a technical director is available to assist you.

Listed below is a handy reference of those individuals technically responsible for the various divisions of the laboratory.

Division	Technical Director	Supervisor
Microbiology/ Virology	David G. Beckwith, Ph.D. 402-8157	Georgia Colasante 402-8196
Immunology Flow Cytometry	David G. Beckwith, Ph.D. 402-8157 Gerald E. Clement, Ph.D. 402-8156 or 402-2534	Gale Fritch 402-2845
HLA Laboratory	Bala B. Carver, M.D. 402-8142 or 402-2571	Marjorie Williams 402-8016
Blood Bank	Bala B. Carver, M.D. 402-8142 or 402-2571	Kathleen Mundt 402-8180
Hematology Coagulation	David Prager, M.D. 433-6691	Dolores Benner 402-8177
Toxicology Endocrinology	Gerald E. Clement, Ph.D. 402-8156 or 402-2534	Joann Sell 402-2578
Chemistry	Gerald E. Clement, Ph.D. 402-8156 or 402-2534	Jan Gushen 402-8043
Cytology	William Dupree, M.D. 402-2551	Linda Pflueger 402-2835

General laboratory concerns can be handled by David G. Beckwith, Ph.D., Administrator and Clinical Director, at 402-8150 or John J. Shane, M.D., Chairman, Department of Pathology, at 402-8152.

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Laboratory Newsletter

In an effort to provide you with timely information regarding laboratory-related issues, beginning this month, ***Medical Staff Progress Notes*** will regularly include a brief newsletter published by Health Network Laboratories. This month's newsletter can be found on pages 25-27. If you have any questions or ideas for future topics, please contact Gerald E. Clement, Ph.D., Director, Chemistry, at 402-2534.

Consolidation Moves

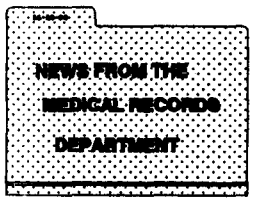
On March 2, the 4S Nephrology unit began transitioning to the newly renovated 7C wing at Cedar Crest & I-78. The new telephone number for the unit is 402-1900. Simultaneously, the 5T medical/surgical unit was closed, and the 4T occupancy increased to 36 patients.

With 4T remaining as the only medical/surgical unit, medical patient admissions will need to be directed to the appropriate sites. All elective medical admissions, with the exception of GIMs C & D and patients of Drs. Mishriki, Kelly, Levy, and Karess, should be directed to Cedar Crest & I-78.

Urgent and emergent medical admissions should be directed to the emergency department at the facility where inpatient medical/surgical beds are available. Facility medical/surgical bed availability information is continuously available by calling 402-1875.

Psychiatric, obstetric, pediatric, and surgical patient services will continue at present at 17th & Chew.

If you have any questions or concerns, please contact Mary Agnes Fox, Administrator, Patient Care Services, at 402-2285, or Kate Quinn O'Hara, Administrator, Patient Care Services, at 402-8210.



A recent violation received from the Bureau of Quality Assurance included the fact that alterations on the records are not corrected appropriately. Please be aware that the correct method for correcting errors on the record is to draw a line through the incorrect entry, write "error," date and initial.

Currently, guidelines have not been established whereby Attestations and Transcription reports can be signed electronically. Attestations must bear the original signature of the physician who has treated the patient. Attestations and Transcription reports which have on-line verification will not be acceptable and physicians will be requested to sign a paper copy.

Intrarectal Ultrasonography Now Available

The John and Dorothy Morgan Cancer Center is pleased to announce the availability of a new modality for the evaluation of anorectal disorders. **Intrarectal ultrasonography** is used pre-operatively to determine the depth of penetration of rectal tumors and to evaluate the possible involvement of regional lymph nodes. In addition, intrarectal ultrasonography is valuable for evaluating recurrent pelvic disease. Lymph node biopsy through the ultrasound probe is feasible.

This technique may also be applied to the evaluation of benign diseases of the anorectum. It can be used to evaluate the sphincter mechanism in patients with incontinence, particularly in post-partum women. For complex anorectal problems, including fistula-in-ano and intersphincteric abscesses, the application of this device has been shown to be valuable.

With the availability of this procedure, in conjunction with other diagnostic tests, one can tailor the operative management to the extent of the disease. Thus, radical surgery with the creation of a permanent stoma may be avoided with the possibility of local excision affording the same cure.

The intrarectal ultrasound is located in the G.I. Laboratory at Cedar Crest & I-78. For more information, please contact Indru T. Khubchandani, M.D., Colon/Rectal Unit Director, John and Dorothy Morgan Cancer Center, at 402-0500. To schedule a patient for this procedure, please contact the G.I. Laboratory at 402-8850.

New Liquid Oxygen System

On Monday, March 28, the Respiratory Services Department will implement a new oxygen system which will be used in the transport and transfer of patients at the Cedar Crest & I-78 site only.

The new oxygen system utilizes liquid O_2 portables (LOX). This system contains more oxygen under less pressure than the traditional O_2 cylinder. In addition, it has a self-contained regulator and flow meter, and the LOX portable is refillable.

CAUTION -- As this is a liquid, the LOX portables must remain upright at all times.

If you have any questions or need further information, please contact Wally Smith, Respiratory Equipment Specialist, at 402-8055.

REMINDER - Medical Staff reappointment applications have been mailed. Please note that the deadline of March 17 has now passed. If you have not yet returned your application, it is imperative that you do so as soon as possible!

New Area Code Change Affects Cellular Telephones

As you know, in January, a significant portion of Pennsylvania received a new area code. In addition to home and office telephones, the area code change has also affected cellular telephones. Cellular telephones mst be physically programmed with the new 610 area code. Depending on the type of cellular telephone you have, reprogramming may take only a few minutes. Failure to have this done by December 31, 1994, will result in the loss of service to your cellular telephone.

As a convenience to physician and employee users on the HealthPage Plan, the CellularOne reprogramming team will visit both sites of Lehigh Valley Hospital on the following dates to re-program your cellular telephones at your convenience and at no charge:

March 21-25
8:30 a.m. to 4:30 p.m.
March 28-April 1
8:30 a.m. to 4:30 p.m.

At Cedar Crest & I-78, the CellularOne van will be stationed in or near the Physicians' Parking Lot. At 17th & Chew, the CellularOne van will be stationed in the Visitors' Parking Lot somewhere between First Fidelity Bank and the parking deck of the Fairgrounds Medical Center. If you are not available during any of these times, please call the reprogramming team at 390-6113 to schedule an alternate time.

Research Advisory Committee -- Request for Proposals

The Research Advisory Committee (RAC) meets bi-monthly to review clinical/epidemiological research proposals (requests for funding) submitted by the medical and professional staff of Lehigh Valley Hospital. All proposals must be submitted to the Research Department for review three weeks before the next scheduled RAC meeting. The next meeting of the RAC is April 20. All proposals submitted by April 1 will be reviewed by the Research Department before being placed on the RAC agenda.

For more information and/or proposal guidelines, contact James F. Reed III, Ph.D., Director of Research, at 402-8889.

Smoking Cessation Services are available to your patients, both inpatient and outpatient.

For more information, contact the Health Promotion and Disease Prevention Department at 821-2152.

Library News

New acquisitions to the Health Sciences Library at Cedar Crest & I-78 include:

- Baum. **Marketing Your Clinical Practice: Ethically, Effectively, Economically.** Aspen Publishers, 1992.
- Harrison. **Harrison's Principles of Internal Medicine.** 13th ed. McGraw Hill, 1994.
- **The Official ABMS Diretory of Board Certified Medical Specialists.** 26th ed. Reed Reference Publishing, 1993.

New acquisitions at 17th & Chew include:

- Avery. **Neonatology.** 4th ed. J.B. Lippincott, 1994.
- Creasy. **Maternal Fetal Medicine.** 3rd ed. W.B. Saunders, 1994.
- Jackson. **Primary Care of the Child with a Chronic Condition.** Mosby-Year Book, 1992.

♦ Physicians routinely receive advertisements for new books. Please forward recommendations for new library purchases to the Library Director at Cedar Crest & I-78. Your assistance in helping to maintain a current/relevant book collection is appreciated.

♦ The library utilizes Rittenhouse as its book jobber. As a convenience, physicians may also order medical books for personal use through Rittenhouse. For a book order form and instructions or for more information, call the Health Sciences Library at 402-8410 (Cedar Crest & I-78) or 402-2263 (17th & Chew).

LVAHEC Annual Category 1 CME Letter

Accreditation for Continuing Medical Education (CME) in the Lehigh Valley is undertaken by the Lehigh Valley Area Health Education Center (LVAHEC). LVAHEC accredits programs for Lehigh Valley Hospital, Sacred Heart Hospital, Quakertown Community Hospital, Easton Hospital, St. Luke's Hospital, Muhlenberg Hospital Center, Carbon County Medical Society, and Allentown Osteopathic Medical Center (for allopathic accredited programs).

Each March, LVAHEC compiles and mails a letter to all physicians listing the programs attended at its member institutions during the past calendar year. This letter serves as documentation for reporting to the American Medical Association Physician's Recognition Award and for documenting CME credits to your insurance carrier.

Shortly, every Lehigh Valley Hospital physician who (a) attended programs approved for CME Category 1 credit, and (b) had the program director report attendance to LVAHEC, should receive their letter. This will be your only documentation. There is a fee for replacement letters.

Category 2 credit may be used for part of the Physician's Recognition Award; however, each physician must keep records of their own Category 2 CME. LVAHEC does not keep Category 2 attendance records.

If you wish to apply for the American Medical Association Physician's Recognition Award, contact the American Medical Association for an application at (312) 464-4672.

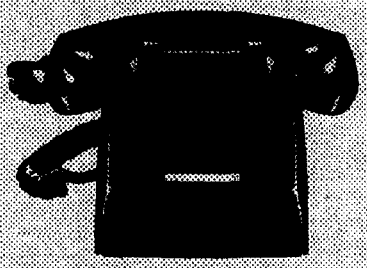
Physician Assistance Program

25 Reasons to Take Advantage of the Physician Assistance Program

1. Emotional and personality conflicts on the job.
2. Money management.
3. Depression.
4. An adolescent who is using drugs or alcohol.
5. Emotional support in deciding about appropriate care for elderly patients.
6. A child who has a behavioral problem at home or at school.
7. Chronic anxiety.
8. Threatened violence or when you are the victim of violence.
9. Feelings of being overwhelmed.
10. Learning to be less passive and more assertive.
11. Clarifying important life decisions.
12. Eating disorders.
13. Grieving the loss of loved ones.
14. Creatively managing stress.
15. Feelings of loneliness.
16. Recognizing a drinking problem.
17. Resources for marital counseling.
18. Drug dependency or addiction problems.
19. Gambling problems.
20. A change in your energy level.
21. Resources to call upon when living with an alcoholic.
22. Working through a serious financial problem.
23. Facing serious physical illness.
24. If you are a recovering alcoholic and want help.
25. Readjusting to a divorce or separation.

For assistance with problems like these, contact The Counseling Program's office at (610) 433-8550 or 800-327-8878, identify yourself ONLY as a member of the Lehigh Valley Hospital's Medical Staff (or a family member) and ask to speak to the Program Manager, Oliver Neith.

When you need someone to talk to...help is just a telephone call away.



Physician Assistance Program

To arrange a confidential appointment or for more information, call (610) 433-8550 or 1-800-327-8878.

Legal Briefings

A recent article published for attorneys who represent plaintiffs in medical malpractice cases offered the following advice.

The high failure rate of claims against health care providers that are tried to a verdict can best be explained by the failure to properly screen a malpractice case prior to accepting the referral and pursuing the case. This is partially accounted for by the tendency of lawyers to "dabble" in medical malpractice and, therefore, fail to recognize the subtleties of what may appear to be negligence at first blush, but actually is an acceptable complication of a procedure or an adverse outcome that occurred without negligent conduct. Another factor is the availability of medical experts who will suggest to the plaintiff attorney that malpractice has, in fact, occurred. Contrary to popular opinion, the number of "hired guns" is actually minimal and the majority of these experts are physicians who do not specialize in medical malpractice testimony.

An attorney who decides to pursue these cases should understand that the jury system is conservative in general, and highly conservative in medical negligence. Many people called for jury duty are health care patients who like and need their doctors. They do not want to believe that physicians and hospitals in the community do not render quality care. They have also seen and heard the media reports that physicians do not deliver babies anymore and that malpractice judgments significantly drive up health care costs. The latter statement may not be an accurate statement, but is certainly believed widely.

It is also important for the plaintiff's attorney to understand that the legal "killer" is causation. The causation issue is invariably dispositive in cases involving misdiagnosis. In such cases, the defendant's failure to make a proper diagnosis is always evident, retrospectively. The only standard-of-care issue is whether the defendant failed to make a proper differential diagnosis. But the real issue in diagnosis cases is causation. This is the litmus test on which the claim must be challenged repeatedly at the outset.

Consider these examples:

- A 54 year-old woman is diagnosed with cancer of the left breast. During surgery, the doctor discovers two tumors; 15 lymph nodes out of 24 test positive for cancer. The disease is categorized as Stage II.

The patient had felt one of the tumors 12 months earlier, a fact documented in the examining physician's records. He told her not to worry in view of the fact that a screening mammogram conducted six months before had been normal.

Sure sounds like clear negligence. Now consider this - even if the cancer diagnosis had been made 12 months earlier, the cancer still would have been categorized as Stage II.

- A 25 year-old woman with a fever and a heart murmur is seen by her attending physician. Instead of being admitted to the hospital for high-dose intravenous antibiotics, she is given erythromycin as an outpatient. After two weeks, her symptoms have worsened, and she is admitted to the hospital, where she receives intravenous antibiotics for bacterial endocarditis. However, her aortic valve is seriously damaged and must be replaced.

This case sounds solid. But consider that the most common complication of bacterial endocarditis, even when diagnosed early and treated vigorously, is destruction of the aortic valve. Valve replacement in this case would have been likely even if the woman had been admitted to the hospital immediately.

If you have any questions regarding this article or any other legal issues, please contact the Department of Legal Services/Risk Management at 402-8201.

Clinical Nutrition News

Enteral Formulary Revised

The Enteral Formulary has been revised with the following changes being implemented this month.

Replete with Fiber has been added to the Enteral Formulary. **Promote** has been added and will replace Nitrolan. **Vivonex Plus** has been added and will replace Vivonex TEN. **NutriHep** has been added and will replace Travasorb Hepatic.

Description of New Products

Replete with Fiber - A liquid, high protein, isotonic formula with 14 gms. fiber/liter - 1.0 cal/cc and 63 gms. protein per liter.

Promote - A liquid, high protein isotonic formula with 1.0 cal/cc and 62 gms. protein per liter.

NutriHep - A liquid, high calorie formula for liver disease with an amino acid composition high in branched chain amino acids and low in aromatic amino acids. 1.5 cal/cc with 40 gms. protein per liter.

Vivonex Plus - An elemental formula containing 100% free amino acids with 10 gms. of free glutamine/liter. 1.0 cal/cc and 45 gms. protein per liter.

A new Enteral Formulary reference card (purple) is available from Clinical Nutrition Services. For a copy of the new reference card or for more information, contact Clinical Nutrition Services at 402-8313 or 402-8378.

Congratulations!

George A. Arangio, M.D., orthopedic surgeon, has been reappointed as visiting research scientist in the Institute for Biomedical Engineering and Mathematical Biology. His current research and education projects include long term evaluation of iliotibial band replacement for the anterior cruciate deficient knee and the mathematical modeling of the foot and ankle in normal and injured states. Dr. Arangio collaborates with Professor Eric Salathe, Ph.D., graduate and undergraduate students on the above research projects.

David G. Beckwith, Ph.D., Administrator and Clinical Director, Health Network Laboratories, was re-elected Chairman of the Pennsylvania HIV Planning Council and Chairman of the Bethlehem Board of Health.

Ross N. Futerfas, M.D., pulmonologist, was recently notified by the American Board of Internal Medicine that he successfully passed the Critical Care Medicine Examination and is now certified as a Diplomate in Critical Care Medicine.

Thomas D. Meade, M.D., orthopedic surgeon, was recently certified as a team physician by the American College of Sports Medicine. Dr. Meade serves as the orthopedic team surgeon for Muhlenberg College, Parkland High School, and Whitehall High School. Dr. Meade is also the orthopedic consultant to Cedar Crest College, Emmaus High School, and 12 additional area high schools.

Publications, Papers and Presentations

Alan B. Leahey, M.D., ophthalmologist, co-authored a paper, **Histopathologic Findings Following Corneal Gluing with N-Butylcyanoacrylate in 26 Patients.** This is to be presented at the Association for Research in Vision and Ophthalmology in Sarasota, Fla., in May. This study looks at histopathologic changes in the corneal stroma after application of a tissue adhesive to the cornea during clinical trials. The clinical results of the study were previously reported by Dr. Leahey in ***Ophthalmology***, Vol. 100, 1993; however, this is the first time that a large number of clinical cases have been looked at histopathologically.

Defining Value: Turning Softer Issues Into Hard Numbers, an article written by **Donald L. Levick, M.D.,** pediatrician, appeared as the *Guest Editorial* in the February 1994 edition of ***The Physician's Advisory***.

Upcoming Seminars, Conferences and Meetings

Regional Symposium Series V

Update on Heart and Lung Surgery will be presented on Saturday, March 26, from 7 a.m. to 12:45 p.m., in the Auditorium of Lehigh Valley Hospital, Cedar Crest & I-78.

Physicians, nurses, and other health care professionals interested in an update on heart and lung surgery will benefit from this program.

At the completion of the program, participants should be able to:
- describe cardiomyoplasty and its use in various patient populations
- describe the new technique for artificial replacement of the aortic valve and arch, and
- describe the indications for using thoracoscopic surgery as a treatment in pulmonary and mediastinal disease.

Update: Management of Diabetes in Children will be presented on Thursday, April 21, from 1 to 4:30 p.m., in the Auditorium of Lehigh Valley Hospital, Cedar Crest & I-78.

Physicians, family practitioners, nurses, and other health care professionals interested in the management of diabetes in children will benefit from this program.

At the completion of the program, participants should be able to:
- describe the outcomes associated with tight control of diabetes mellitus in children
- discuss the state-of-the-art prevention, diagnosis, and treatment of renal complications in juvenile onset IDDM.

For more information, please contact Human Resource Development at 402-4609.

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Penn State Continuing Education

Fetal Alcohol Syndrome/Fetal Alcohol Effects: Prevention, Intervention, and Diagnosis will be presented on Wednesday, April 6, at the Nittany Lion Inn, State College, Pa.

Family practitioners, obstetricians/ gynecologists, and pediatricians will benefit from the program.

For more information, call (717) 531-7965.

Customer Service Excellence in the Business of Health Care will be presented on Wednesday, April 20, from 8:30 a.m. to 5 p.m., at the Holiday Inn East, Harrisburg, Pa.

All healthcare employees having direct patient or public contact will benefit from this workshop.

Participants should learn:

- the basic skills of excellent customer relations service
- critical communication skills for the public-contact person
- key winning service techniques
- strategies for recognizing and dealing with different types of questions
- methods for handling complaints and anger
- a system for handling stressful disagreements
- strategies for reaching agreement

For more information, call (717) 531-6596.

Otolaryngic Allergy and Immunology: The Basics and Beyond will be presented Friday, May 20 through Wednesday, May 25, at the Sheraton Station Square, Pittsburgh, Pa.

This course is for otolaryngologists or interested primary care physicians wishing to add allergy to their practice or to update their knowledge of current techniques.

For more information, please call (717) 531-7965.

Medical Grand Rounds

H-Pylori will be presented by Robert Ganz, M.D., Clinical Instructor of Medicine, University of Minnesota, on Tuesday, March 15.

Benign Prostatic Hypertrophy will be presented by Edward M. Mullin, Jr., M.D., urologist, on Tuesday, March 22.

Nonsurgical Management of Patients With Lower Back Pain: The Noncutting Edge will be presented by Richard Bonfiglio, M.D., Bryn Mawr Rehabilitation Hospital, on Tuesday, March 29.

The above Medical Grand Rounds will begin at noon in the Auditorium of Lehigh Valley Hospital, Cedar Crest & I-78. For more information, contact the Department of Medicine at 402-8200.

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Department of Pediatrics

Developmental Genetics Screening will be presented by Roger Ladda, M.D., Chief, Division of Genetics, Hershey Medical Center, on Friday, March 25.

Update of HIV will be presented by Rick Rutstein, M.D., Medical Director, Special Immunology Clinic, Children's Hospital of Philadelphia, on Friday, April 8.

Pediatric conferences are held at noon in the Auditorium of Lehigh Valley Hospital, 17th & Chew. For more information, contact Beverly Humphrey in the Department of Pediatrics at 402-2410.

Psychiatric Grand Rounds

Clinical and Research Advances in Multiple Personality will be presented by Marlene Steinberg, M.D., Associate Research Scientist in the Department of Psychiatry, Yale University School of Medicine, New Haven, Conn., on Thursday, March 17, from noon to 1 p.m., in the Auditorium of Lehigh Valley Hospital, 17th & Chew.

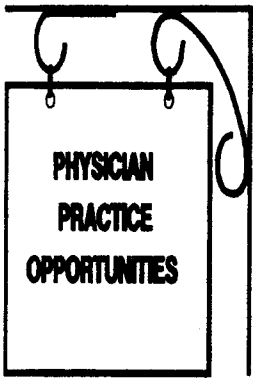
As lunch will be provided, pre-registration is requested by calling the Department of Psychiatry at 402-2810.

Babysitting Class Offered

Would your babysitter know what to do if your child swallowed an object and was choking? Would he or she know who to call if a fire started in your kitchen? These and other questions will be answered during **SuperSitter**, a free babysitting class offered as a public service by Lehigh Valley Hospital. This program will be held on Saturday, April 30, from 8:45 a.m. to noon, in the Auditorium of Lehigh Valley Hospital, 17th & Chew.

SuperSitter is geared toward youths 11 years and older who want information on becoming a knowledgeable babysitter. Speaking on various aspects of safety, emergencies, and first aid will be members of the Allentown Police and Fire departments and an educator from the Lehigh Valley Poison Center. Some helpful tips on general infant and toddler care, how to find babysitting jobs, and the proper way of communicating with employers will also be offered by employees of various hospital departments.

Certificates and special **SuperSitter** notepads will be awarded to all those who attend the three-hour session. As space is limited to 100 participants, early registration is suggested. Deadline to register is April 22. For more information or to register, call WomanCare at 402-3800.



- For Sale or Lease -- Springhouse Professional Center, 1575 Pond Road. Ideal for physician's office. Approximately 1,000 sq. ft.

- For Sales or Lease -- Medical/ Professional three-story office building at 1730 Chew Street, Allentown. Excellent condition with recent renovations. Approximately 6,800 sq. ft. for single or multiple specialty practice. Includes long-term parking lease at Fairgrounds. Potential telephone and dictations systems.

- For Sale -- Office building at Northeast corner of 19th and Turner Streets in Allentown. Upper level - 2,400+ sq. ft., large waiting room, two large consultation rooms, five exam rooms, etc. Lower level - 2,300+ sq. ft. Parking lot for 16 cars.

- For Lease -- Office to sublet on Monday, Tuesday, Thursday, and Friday. 950 sq. ft. Common waiting area. Lakeside Professional Building, Quakertown.

- For Lease -- Monday time slot available in the medical office building on the campus of Gnaden Huetten Memorial Hospital in Lehighton.

- For Lease -- Medical/professional office space located on Route 222 in Wescosville. Two 1,000 sq. ft. offices available or combine to form larger suite.

- For Lease -- Slots are currently available for the Brown Bag suite at Kutztown Professional Center. Ideal for satellite location.

- For Lease -- Large, newly remodeled, completely furnished medical office space available for subleasing/time share at Cedar Crest Professional Park. Top of line telephone system. Transcription and computer system with electronic billing available.

- For Lease -- Medical office space located in Peachtree Office Plaza in Whitehall. One suite with 1,500 sq. ft. (unfinished - allowance available), and one 1,000 sq. ft. finished suite.

- For Lease -- Specialty practice time-share space available in a comprehensive health care facility. Riverside Professional Center, 4019 Wynnewood Drive, Laurys Station. Half- or full-day slots immediately available.

- For Lease -- Professional office space available in an established psychology and psychotherapy practice at 45 North 13th Street, Allentown. Large, warm Victorian building in a relaxed atmosphere. Secretary and billing available and included in some leases. Furnished or unfurnished full offices and sublets available. Utilities included.

For more information, contact Joe Pilla, Physician Relations Rep, at 402-9856.

WHO'S NEW

The Who's New section of ***Medical Staff Progress Notes*** contains an update of new appointments, address changes, newly approved privileges, etc. Please remember that each department or unit is responsible for updating its directory, rolodexes, and approved privilege rosters.

Medical Staff

Appointments

J. Stephen Long, MD
Trexlertown Medical Center
6802 Hamilton Blvd.
Trexlertown, PA 18087
(610) 395-1924
Department of Family Practice
Provisional Active

Meera V. Pathare, MD
Valley Medical Center
Route 663 & Geryville Pike
P.O. Box 216
Pennsburg, PA 18073
(610) 679-8071
Department of Medicine
Division of General Internal Medicine
Provisional Courtesy

Additional Privileges

John J. Stasik, MD
Department of Surgery
Division of Colon & Rectal Surgery
Active
Intra-Rectal Ultrasound Privileges

Change of Status

John B. Longenhagen, MD
Department of Medicine
Division of General Internal Medicine
From Courtesy to Emeritus Courtesy

Martin D. Misenhimer, MD
Department of Pediatrics
Division of General Pediatrics
From Active to Emeritus Active

Carmine J. Pellosie, DO
Department of Family Practice
Division of Occupational Medicine
from Provisional Courtesy to Provisional Active

Clifford G. Vernick, MD
Department of Surgery
Division of Orthopedic Surgery
Section of Ortho Trauma
From Active to Emeritus Active

Brian D. Wilson, MD
Department of Family Practice
From Courtesy to Provisional Active

Practice Changes

Kevin J. Glancy, MD
No longer associated with Surgical Associates of the Lehigh Valley, Inc.

Practice Name Change

The corporate name **Robert Kiesel, MD, PC** has changed to **Fairgrounds Eye Associates, PC**. The practice includes **Robert Kiesel, MD, & Alan Leahey, MD**

Address Change

Kevin J. Glancy, MD
1210 S. Cedar Crest Blvd.
Suite 3900
Allentown, PA 18103
(610) 402-8445

Allied Health Professionals

Resignation

Donna Strain, MA
Physician Extender
Technical Category - MA
(Dr. Khan)

P & T Highlights

The following actions were
taken at the February 14, 1994
P & T Committee meeting.
James A. Giardina, R.Ph.,
Director of Pharmacy

FORMULARY ADDITIONS

BREATHING EASIER.....

Dornase Alfa (Pulmozyme, Genentech) - is the newest biotechnology agent approved in 1993. Dornase Alfa is indicated in conjunction with standard therapies in the management of cystic fibrosis patients to reduce the frequency of respiratory infections requiring parenteral antibiotics and to improve pulmonary function. Dornase Alfa is recombinant DNase, a glycoprotein, and is thought to work through selective cleavage of DNA in purulent secretions in the airway. Dornase Alfa is given via certain nebulizers or compressors as an inhalation. It's onset of action is usually seen in 3 days. To be effective, Dornase alfa should be given chronically. The recommended dose is 2.5 mg daily. Some patients (study subset analysis suggests pts > 21 years or with FVC > 85% of predicted) may benefit from twice daily inhalations. Patients with FVC < 40% of predicted showed no pulmonary function benefit in short term use from Dornase Alfa therapy. Safety & efficacy have not been demonstrated in pts < 5 years old. There are no well controlled studies in pregnant women, and excretion in breast milk is unknown. Dornase alfa is contraindicated in patients with known hypersensitivity to any of its ingredients, including its derivation source, Chinese Hamster Ovary cell products. The most common adverse events include voice alteration, pharyngitis, laryngitis, conjunctivitis, chest pain, and rash. In clinical trials, most reactions were transient, mild, and did not require dosing alterations. Few patients (3%) experienced reactions which required permanent discontinuation. While no formal drug interaction studies have been performed, it appears that Dornase alfa can be safely and effectively used in conjunction with standard cystic fibrosis therapies. It should not be mixed with other drugs in the same nebulizer. Dornase alfa inhalation solution must be refrigerated & protected from strong light. It should not be exposed to room temperatures for a total time of 24 hours.

Loratidine (Claritin, Schering) is a long acting antihistamine, classified as a selective peripheral H1 receptor antagonist. Loratidine possesses less potential for CNS effects than earlier generation antihistamines, and also appears to have less tendency for adverse cardiac (Torsades de Pointes) events and drug interactions than either Terfenadine (Seldane) or Astemizole (Hismanal). It is rapidly absorbed following oral administration and undergoes rapid first pass metabolism to an active metabolite. Onset of action occurs within 1 to 3 hours, reaching a peak in 8 to 12 hours and lasting longer than 24 hours. Patients with hepatic impairment have reduced clearance. Both Loratidine and it's metabolite are excreted in breast milk. Loratidine is given as a 10 mg tablet daily to patients over 12 years of age. Although peak concentrations are elevated in renal failure, elimination half lives appear similar to those in non renal impaired patients, therefore no dosage adjustment is recommended by the manufacturer in these patients. In patients with hepatic failure, the dose should be given every other day. Common adverse events include headache, somnolence, fatigue & dry mouth. Risks of adverse effects increase with increased dose (not recommended), in geriatric patients and in those with renal or hepatic impairment, even at usual doses. While no ECG or adverse effects were noted in limited studies with ketoconazole or erythromycin, caution should be used with these and any other agents known to impair hepatic metabolism. Loratidine costs about $1.30/day, which is comparable to Terfenadine & Astemizole, yet significantly more than Chlorpheniramine ($0.12/day). Given that Loratidine appears to offer several advantages over Astemizole, Loratidine was added and Astemizole was deleted from the formulary.

REVERSING THE SWITCH...

Diltiazem CD (Cardizem CD, MMD) is one of the once daily formulations of this Calcium Channel Blocker. The Committee approved adding this formulation to the Formulary and reversing the substitution practice of dispensing Diltiazem SR when either Cardizem CD or Dilacor XR was ordered. Diltiazem CD comes as 120 mg, 180 mg, 240 mg & 300 mg sustained release capsules. Aside from the once daily dosing and the different strengths, all other prescribing information is the same as with the other Diltiazem formulations. As with many other sustained release formulations, these products should not be crushed. The Committee agreed to the following:

- Add Diltiazem CD to the Formulary
- Dispense the CD formulation for all **twice daily** SR orders and identical strength Dilacor XR orders
- Dispense the SR formulation for **non twice daily** SR orders
- Communicate these changes to the Prescriber via an Order "per P&T Policy" in the patient's Medical Record

THERAPEUTIC EVALUATION

Finasteride (Proscar, Merck) & Hydroxypropylmethylcellulose (HPMC) 2% (Occucoat, Storz) had been added to this category in 1993 to allow for evaluation prior to consideration for formulary addition. Finasteride has had consistent use and was added to the formulary. Note was again made of the precaution relative to females of child bearing potential not touching the tablets. (Pharmacy dispenses each dose with a caution sticker). On the other hand, the Committee requested that the Ophthalmology Division review the role of HPMC together with Sodium Hyaluronidate (Healon) and Chondroitin & Sodium Hyaluronidate (Viscoat) prior to a decision on formulary status for this agent.

DRUG USE EVALUATION (DUE) CORNER

Target Antibiotics

Overview - December costs were $110,478, which is 2% less than November. Average cost per gram was also less than November 93 as well as December 92.

Ciprofloxacin - 20 patients receiving IV ciprofloxacin were reviewed in December. No cases of surgical prophylaxis were noted. 14 (70%) cases of empiric therapy were observed with the average length of therapy of 3 days. IV to PO conversion memos were placed on 12 of 20 60%) charts. The remaining 8 cases were either non applicable for oral therapy or had their antibiotic regimen changed or D/C'd prior to review. Of the 12 notes placed only 2 (16.7%) were changed to oral therapy.

Ceftazidime - 48 patients receiving ceftazidime were reviewed in December. (Piperacillin therapy was chosen in 83 cases during this month). 64.6% of the ceftazidime use was empiric with an average length of therapy of 4.1 days. Piperacillin conversion notes were non applicable in all the ceftazidime 2 Gm cases due to allergy, piperacillin failure, or therapy discontinuation before our review. One pan sensitive PSAE UTI received I.V. ceftazidime therapy for 4 days before it was changed to oral ciprofloxacin.

Ampicillin/Sulbactam - 60 patients receiving ampicillin/sulbactam were reviewed in December. 17 (28.3%) of cases were being treated for mixed infections with therapy changed to oral as soon as feasible in the majority of cases. 38 (63.3%) received amp/SB empirically with an average LOT of 3.6 days. One surgical prophylaxis case is noted with 48H of antibiotic therapy post vaginal hysterectomy. The approved amp/SB chart memos were begun mid-December. No data regarding their success is available as yet.

PATCHING CHRONIC PAIN...

Transdermal Fentanyl Usage Criteria

The manufacturer recently included a boxed warning in the official labelling stating that serious or life threatening hypoventilation could occur with transdermal fentanyl (Duragesic, Janssen) and that it is contraindicated in the management of acute or post operative pain (including outpatient surgery), mild or intermittent pain manageable by lesser means, in doses exceeding 25 mcg/hr at initiation of opioid therapy, and in children less than 12 or patients under 18 weighing less than 50 kg except in an authorized investigational research setting. The Committee approved the following criteria for study of transdermal fentanyl usage:

Justification	Chronic pain (pain present 48 hours post op & expected to last 30 days) uncontrolled by lesser means, which requires continuous opioid use.
Dosing (initial)	25 mcg/hr if naive to opioids; if receiving opioids, dosing is based on comparable total daily morphine use.
Dosing (adjustment)	After three days based on supplemental analgesics; subsequent adjustments should be made every six days.
Contraindications	Pre-existing pulmonary disease.
Complications (presence)	Occurrence of side effects together with management (if required).
Outcome measure	Documentation of pain relief.

ERRATA, ERRATA

In the last issue of P & T Highlights the cost of Liothyronine injection 60mcg was inadvertently stated at $1100/dose. The correct cost is $185/dose.

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LEHIGH VALLEY
HOSPITAL

Issues In Medical Ethics

Spring 1994

Editorial:

In this second issue of "Issues..." Dr.Stephen Lammers discusses Do-Not-Resuscitate orders, advance directives and the patient self determination act (PSDA). These timely and important issues are presently the subject of a growing debate. Should cardiopulmonary resuscitation be applied to all patients unless specifically requested? Are we resuscitating people with no hope of recovery, squandering health care dollars on a 'futile' activity? Has the PSDA helped patients and families make their wishes known to hospitals and physicians in the event of a terminal or unrecoverable illness? Dr.Lammers guides us through these topics with thought provoking insights. Later in the spring the Ethics Committee will host a debate on Do-Not-Resuscitate orders. Look for announcements for this upcoming event. In the next issue: "Medical care for Jehovah's Witnesses."

–A.D. Rae-Grant

The New "DNR" Debate

Once again, cardiopulmonary resuscitation (CPR) is the topic of contentious discussion in nursing and medicine. This very powerful and dramatically effective intervention is at the center of what some are calling a "new" debate. The occasion of the new debate is a worry that useless interventions are being tried and a related concern about the rising costs of medical care caused by these useless interventions. What are the issues?

The first issue concerns the concept of futility in medical care. What is crucial here is how one defines "futility." For some commentators, a procedure is futile if it has less than a 15% chance of being effective. For other commentators, a procedure is futile only if the probability of effectiveness is 0%. These latter commentators are focusing upon what has been called the "physiological" concept of futility. CPR is not futile under this latter definition of if it restores cardiac function to a patient in Persistent vegetative state (PVS) even though it will not restore consciousness to the patient.

Once one has determined how futility should be defined, and as yet there is no consensus in the literature, the next issue is whether CPR should automatically be given to patients? If the procedure is "futile", should it even be offered to patients? Is there any need to involve patients in a discussion of a therapy which cannot assist them?

If we extend the analysis however, the issue of futility and CPR becomes even more complex. What happens if we take into account the patient's conception of futility, so that a patient might think CPR would be futile if it were unlikely to restore the patient to a level of functioning desired by the patient? Thus we could have a situation in which CPR might not

Continued on Page 2

be physiologically "futile" but would be "futile" in terms of the outcome desired by the patient and projected by the physician.

A recent paper (Jecker and Schneiderman, 1993) has suggested that a physiological definition of futility (a procedure is "futile" if and only if the probability of benefit is 0%) might set too high a standard but that there is a way for medical professionals to set a "patient centered" standard. In contrast to the physiological standard, physicians would be allowed to withdraw treatments, including CPR, not only when the probability of benefit is 0%, but when the quality of benefit falls below a certain minimal standard. One way to judge this is to ask whether the proposed treatment benefits only a failing organ or benefits the patient. In cases where there is a patient in a persistent vegetative state, CPR does not, in the opinion of these authors, benefit the patient. What remains in dispute is the process of consultation the physician would have to go through in order to do this.

This new debate also has made it clear that there are some issues which were not settled in previous discussions of CPR and DNR orders. For some physicians and nurses, a DNR order is compatible with aggressive care; for others, a DNR order is a signal that one has "given up" on trying to cure the patient and one has begun the process of care that will lead to the patient's death. In fact, the ethical standard here is clear. DNR orders are compatible with aggressive care and should not be interpreted, by themselves, as evidence that other treatments should be withdrawn. Of course, a DNR order may be part of a care plan for a patient that will include "comfort measures only", but there is no necessary connection between DNR orders and comfort care.

The new debate has also made it clear once again that different physicians have strikingly different understandings of what is being withheld if a DNR order is written. For some, it means all attempts at resuscitation; for others, it means only those resuscitative measures supported by a code team. In this hospital, DNR indicates that the hospital code team will not be called in the event of a cardiac, pulmonary or cardiopulmonary arrest. Further, DNR also means that intubation and ventilation will not be initiated, there will be no closed cardiac massage, and no emergency medications will be given.

Perhaps the most interesting proposal thus far questions whether CPR should have the status which it has in modern medicine. DNR orders are quite unusual in one sense, in that the usual hospital protocol is that whatever is going to be done must be ordered by a responsible party. There are always emergency exceptions to matters but the norm is that orders must be given before care is to be rendered. This is not true of CPR. It is done without an order and is withheld only if an order to withhold is given. CPR has become so much a part of the functioning of a modern hospital that we rarely give this a second thought. The point here is not that this is necessarily irrational. If nurses had to wait for orders in many situations, the patient that could have been helped will have died. The point is that CPR is different and the difference should be noted.

Indeed, in the literature on nursing homes, one of the proposals is that CPR not be the norm, but should be given only if there is a physician's order that CPR is appropriate for this particular patient. The norm would be that DNR would be standard for all nursing home residents and CPR would be given only if it was directed.

I am not taking a position here on this proposal, but the existence of the proposal does indicate that there is some attention to the status of CPR. The issue is being raised about classes of cases where the norm would not be "DO CPR!!" but the norm would be, "In cases like this one, we do CPR only if it is ordered". What sorts of cases these might be bring us back to the first discussion above.

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For example, there are cases in which CPR is not known to have any benefit to a patient if benefit is measured as "being discharged alive". When such cases arise, the question is, should the standard of care be, "DO CPR!"? Perhaps the standard should be, "DO CPR ONLY IF IT IS ORDERED!" Patients could and should still be approached, so the argument goes, but the information that would be given would include the prognosis of death even if they survived CPR. In such a circumstance, the question, "Do you want us to do everything?" is entirely inappropriate. Better here, and elsewhere, is the following: "How do you want us to care for you? Let me tell you what we might do and what are the probable outcomes. Then let us discuss what you would like done".

All this will not be easy, of course. In part it will not be easy because physicians may fear not offering and not doing everything for patients, when "everything" is defined and described as high technology interventions. In part it is because we have radically undercut physician moral authority in our society so that the physician might discuss with us how we might be appropriately cared for, instead of being only technologically assisted. We have confused "medical care" with "technological assistance". Nor does refusal of technological assistance mean, "Doing nothing". It may include all sorts of comfort care measures.

In part it is difficult because Americans continue to perpetuate a death denying attitude which makes it difficult to discuss these matters. Thus they submit themselves to interventions such as CPR because they are unwilling to admit that there is a "time to die".

It has been suggested that the new DNR debate began for the wrong reasons, that it might be driven by worries about the cost of health care. In truth, this charge may be true. But whatever the reason for which it began, it offers the opportunity to be clearer about the limits of medical care and what is appropriate when the limits on one kind of care are reached and another kind of care should begin. As confusing and as contentious as the debate might be, in that aspect at least, it is an opportunity for physicians and nurses to have conversations with their patients about what is important to them, and about the limits of the practices of nursing and medicine. The debate also makes it clear that values are an integral part of medical practice, and that any choices which one makes on this issue involves values.

What could help is if we knew more about CPR in particular contexts, so that physicians and nurses could better advise patients. Perhaps the next step in our own DNR debate would be to find out what we could about the experience at this hospital. Any volunteers?

–S. Lammers

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PSDA And Advance Directives: What Have We Learned After Two Years?

Over two years ago, hospitals and other health care providers were required to ask whether their patients had advance directives and to provide information about advance directives if the patients desired that information. The Federal legislation which mandates this process is called the Patient Self Determination Act (PSDA) and the advance directives usually discussed under this legislation include living wills and durable power of attorney for healthcare documents. In theory, of course, any written instruction could be an "advance directive." Thus organ donation documents and patient signed DNR orders might fall into this category. For purposes of the discussion here, we will focus only upon living wills and durable power of attorney for healthcare documents.

The hope was, of course, that by asking patients whether they had such documents, and offering them information about advance directives, more patients would complete such documents and this would give patients more control over their medical care. In addition, some persons hoped that more patients would choose less medical care at the end of their lives and health care expenditures would slightly decrease.

Advance directives are now the subject of much attention in the medical literature. Investigators are curious about whether they are in fact used and, if they are used, under what circumstances. They are investigating what forms of advance directives are more helpful and which less helpful. The results of these investigations are interesting. They give us a look at the limits of centralized intervention in medical care and they also tell us a lot about the ethos of medicine today. What do I mean?

It is clear that advance directives are not being used as often as the proponents of them wished them to be.

For example, patients are too often writing advance directives right at the end of life. The reasons for this are unclear but what is clear is that patients should formulate advance directives much earlier in their lives if they are to be helpful to physicians, nurses, and family members. Investigators have learned that patients desire discussions about advance directives more than physicians desire to discuss the subject with their patients. Investigators learned that patients are more likely to develop useful advance directives if they participate in an educational process which includes more than one educational event. Advance directives which give patients scenarios to which they respond rather than statements to which they assent or disagree are more helpful, both to physicians and patients.

One of the consistent findings in study after study is that surrogates are very often at odds with the persons for whom they are supposed to be speaking. It is not simply that surrogates often do not really know what the person wanted; they often straightforwardly disagree and do not wish for the patient what the patient wishes for her or himself. This finding makes it more important than ever to discover why surrogates are deciding what they decide in particular cases. Are they following the patient's wishes or are they substituting their own wishes for the judgment of the patient?

All of the above means that those of us who thought that PSDA would bring in a new day were mistaken. Now what must be done is to attend to the issues raised by the implementation of PSDA so that better care can be given to patients.

In such a situation, what would seem like sensible advice to nurses and physicians who have to care for patients? The

Continued on Page 5

first finding that appears to be consistent is that physicians ought to be more forthcoming in discussing with patients their wishes at the end of life. It appears that patients are much more willing to have these discussions than physicians believe and are less frightened by discussions of death than is widely believed in the medical community. (This correlates well with an old social science finding that incoming medical students feared death more than the general population.) Having these discussions leads to more clarity about what patients desire, what are the limits upon treatment which they wish to have implemented in their case, and who they wish to speak for them. One study argues that the first patient visit is the time to begin.

Having the discussions, of course, is only the beginning. Physicians and nurses should realize that they must be careful with their use of language, since that will sway patients. It is not that physicians do not have a role here; that role must be undertaken responsibly. Secondly, patients will vacillate on what they wish to be done. Patients will display here the same uncertainties they display about other aspects of their medical care.

Part of what is being considered here is a new direction in medical ethics, which some are calling "preventive ethics." This new direction grows out of the commonplace observation that to leave a question unanswered often causes greater difficulty later when the primary decision maker, the patient, is no longer able to answer the question. If the patient had been sensitively and forthrightly approached, there would be a much better chance to know what the patient would have wanted. Assuming that the patient's wishes did not ask the physician and the nurses to violate the law or professional codes, the patient's wishes could be followed. In this sense, advance directives are a form of preventive ethics. They allow all of us who will be patients an opportunity to reflect on what we would like done medically as our lives come to their end and to indicate who should speak for us when ambiguous circumstances arise.

–S. Lammers

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Advance Directives And PSDA

The following information sheet was developed by the Ethics Committee. It is our hope that this will help with the most asked questions about Advance Directives and PSDA.

1. **What does PSDA mean?** PSDA stands for the "Patient Self Determination Act." It is a shorthand way of referring to Federal legislation which applies to all providers of healthcare.

2. **To whom does PSDA apply?** The Patient Self Determination Act applies to any adult patient admitted to the hospital.

3. **What must the hospital do?** The hospital has three immediate obligations under the law. First, the hospital must advise the person that they have the right to make an Advance Directive. Second, the hospital must ask whether the person has an Advance Directive. Third, if the person does not have an Advance Directive, the hospital must inquire if they wish more information about advance directives and, most importantly, the hospital must try to supply that information.

4. **Who does these things at LVH?** At Admission, all patients will be provided with written information. Nursing staff are responsible for asking if the patient has an advance directive and, if the patient has one, for a copy for the chart. Nursing also asks whether the patient desires more information.

5. **What does Nursing do when it discovers that a patient wants more information?** Nursing should contact the PSDA team. They are responsible for seeing the patient and assisting the patient in any way appropriate. The PSDA team consists of patient representatives, chaplains, and clinical social workers.

6. **What is an Advance Directive?** An Advance Directive is most often a document which either 1) indicates the patient's wishes about medical treatment when the patient can no longer speak for her or himself (Living Will) and/or 2) indicates who may speak on behalf of the patient when the patient can no longer speak for her or himself (Durable Power of Attorney for Healthcare Decisions). However, a patient's statement to a physician about how s/he wishes to be treated, properly documented in the chart, will also serve as an Advance Directive.

7. **Does that mean an Advance Directive does not apply to a competent patient?** That's right! Advance Directives only go into action when a patient cannot speak for her or himself; if the patient can communicate, the patient should be addressed. To put this another way: Advance Directives do not determine medical care for a competent patient.

8. **Where would I find a patient's Advance Directive?** A patient's Advance Directive should be put in the chart, in front of the Inpatient Face Sheet. If there is a DNR order, the Advance Directive should be placed immediately behind it.

9. **Are Advance Directives legal in Pennsylvania?** In April, 1992, Pennsylvania passed legislation making Living Wills and Durable Power of Attorney for Healthcare legal documents.

10. **Who can cancel an Advance Directive?** An Advance Directive may be cancelled at any time by a competent patient.

11. **Does an Advance Directive means that a patient should be a DNR?** Not at all! Patients may wish to have DNR status but the existence of an Advance Directive implies nothing about code status.

12. **Where can I obtain answers to questions which may arise regarding Advance Directives?** The patient representatives and the Legal Affairs department can be used as a resource when questions arise.

–S. Lammers

NEWSLETTER HEALTH NETWORK LABORATORIES
LABORATORY DIAGNOSIS OF MYOCARDIAL INFARCTION

Myocardial infarction is a medical emergency requiring careful management of the patient. In excess of 50% of all deaths associated with a MI occur within the first 2 hours after the onset of symptoms.

Myocardial infarction is due to the reduction of blood flow (ischemia--energy deficit) which leads to cell death. With cell death comes increased permeability of the plasma membranes releasing three types of cellular components: ions (e.g., potassium), metabolites (e.g. lactate) and macromolecules (e.g. enzymes). All cellular components are measurable. However, from a laboratory position, the cytoplasmic enzymes are preferred for the following reasons:

1) The are readily released from the cell.

2) They have a finite half life with concentrations amiable to be measured.

3) They are easily measured employing "routine" laboratory techniques with results reportable within 1-2 hours.

Creatine kinase (CK) has been identified as the enzyme of choice. Its activity in tissue is highest in skeletal muscle followed by cardiac muscle, brain, intestine, kidney and lung. There are two types of CK monomers namely muscle (M) and brain (B). However CK actually exists as a dimmer and there are 3 ways to combine 2 monomers: MM, MB, BB known as CK isoenzymes. Skeletal muscle cytoplasmic CK isoenzyme composition is 98% MM and 2% MB followed by heart at 70% MM and 30% MB and finally brain which is 100% BB. The other organs are largely BB with a small amount of MM with almost no MB.

With this background, laboratories utilized the production of CKMB isoenzyme and total CK activity for the differential diagnosis of a myocardial infarction from skeletal muscle or other organ damage. Following a MI the total CK activity and CKMB isoenzyme will peak (rise and fall) within a 24 hour period. This peaking can be used as one of three criteria for the diagnosis of a MI. The other two criteria are changes in EKG and clinical presentation of the patient. None of these criteria is 100% sensitive for the diagnosis of a MI but serial cardiac isoenzymes are 95%, followed by EKG at 70% and finally clinical presentation such as chest pain at 40%.

For many years we have provided MI profiles that were comprised of total CK & CK isoenzymes and total LD and LD isoenzymes ordered as a battery of 3 specimens obtained upon admission, 6-12 hours later and finally 24-36 hours post admission. These were offered on a routine basis, not STAT, and exhibited excellent predictive value.

In response to the changing requirements in delivery of healthcare services, the laboratory changed its methodology for MI profiles to include total CK, a very sensitive mass molecule CK-MB measurement and a specific LD1 activity measurement. These tests are offered STAT and the entire profile is completed within a 16-24 period. These changes allow for a more rapid diagnosis of the patient either for admission or discharge.

In considering a change of methodology for the laboratory diagnosis of a MI, the following strategy was developed as guidelines for selection and subsequent monitoring of this new testing protocol.

1) Use complementary markers in the cardiac panel
   a. Total CK, MCKMB and LD1.

2) Select optimal cutoff values for our population
   a. Comparative studies were completed.

3) Interpretation should consider test combinations not individual results.
   a. Reference ranges on the reports reflect this concept.

4) Continuation with sequential sampling.
   a. The ordering of an MI profile of 3 specimens should be transparent to the physician.

5) Determine the prevalence of MI in the population.
   a. Low prevalence results in low specificity.

6) Use Total CK cutoff to indicate CKMB testing.
   a. This criteria has not been instituted at this time. After experience with the new testing, it will be proposed that we do **not** do CKMB testing on patients with total CK less than some number (for example 75 U/L). It is this group of patients that **contribute** the **most** to the **false positive result.**

Reference ranges for the new testing protocol.

Total CK	10 - 230 u/L
MCKMB	< 5.0 ng/ml
Relative Index	< 4.0%
LD1	25 - 70 u/L

The relative index is obtained by dividing the MCKMB value by the total CK. It is particularly useful to help differentiate between a MI and skeletal muscle trauma. It may **not** be as useful for those patients who exhibit a low normal total CK. It is mandatory, in using these laboratory values to help in diagnosing a MI, to look at the serial pattern presentation of the 3 specimens. Depending on the patients age and sex none of the measured parameters may be above the reference range. The elderly, especially females, have lost muscle mass so that their laboratory values may start very low and never rise into the abnormal range. Even in these cases the peaking of MCKMB with increasing LD1, is expected for the diagnosis of MI.

However, the serial presentation of peaking of MCKMB with increasing LD1, may still be consistent with the diagnosis of MI.

It has been brought to the laboratories attention that a number of patients present with normal to low normal total CK, a slightly elevated CKMB with an abnormal relative index (RI) and a low LD1. This presentation does not change for the 3 specimens of the MI profile. Examples of patient presentations with diagnosis are given below.

SPECIMEN 1					SPECIMEN 2				SPECIMEN 3			
	CK	MCKMB	RI	LD1	CK	MCKMB	RI	LD1	CK	MCKMB	RI	LD1
ISCHEMIC HEART DISEASE WITH CHF												
Pt. 1	88	7.1	8.1	57	113	7.6	6.7	49	125	8.1	6.5	59
UNSTABLE ANGINA WITH CORONARY ARTERY DISEASE												
Pt. 2	115	10.6	9.2	30	119	12.1	10.1	48	100	8.7	8.7	67
ACUTE ANTERIOR WALL MI												
Pt. 3	178	14.5	8.1%	56	201	18.6	8.8%	61	145	12.8	8.8%	73

Although the MCKMB is elevated in the first two profiles they do not exhibit the standard increase-decrease of the total CK and MCKMB. The relative index is elevated because the total CK is low and the MCKMB is slightly elevated. These results are usually consistent with a cardiomyopathy, ischemic heart disease due to coronary insufficiency, unstable angina, CHF or some combination of the above. It is often difficult to differentiate unstable angina from minimum cardiac damage with these laboratory tests. Some laboratories designate a **grey area** for MCKMB range of 5-8 ng/ml and LD1 70-120 U/L but we have chosen not to institute this approach at this time.

We will continue to monitor the MI profile results with the following objectives. First, do our reference ranges require adjustment? Secondly, can we increase the diagnostic predictability of the profile by establishing a cutoff point below which we will not do MCKMB and LD1 measurements? Thirdly, does the LD1 measurement help in the diagnosis of a MI? If it is not clinically useful in the identification of a prior MI, (occurring > 12 hours prior to treatment) then should it be offered especially in these times of cost containment?

John J. Shane, MD
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