



# THE Synapse

An educational bulletin of Mercer University School of Medicine & The Medical Center of Central Georgia

World Class Care... right where you need it.

SEPTEMBER 2011

Volume 25: Issue 9

The Medical Center of Central Georgia

## DEPARTMENT OF SURGERY TO HOST DISTINGUISHED VISITING PROFESSOR



Don Nakayama, M.D., Milford B. Hatcher Chair of Surgery and Program Director for the General Surgery Residency Program at the Medical Center of Central Georgia and Mercer University School of Medicine has initiated a new CME-QI project on venous thromboembolism. The project began with the new academic year. **Lazar J. Greenfield** (pictured left), Emeritus Professor and Chair of Surgery at the University of Michigan, will be visiting professor at surgery grand rounds on September 8, 2011 at 7:30 a.m. in Joseph W. Eversole auditorium located at the Medical Center of Central Georgia. His topic will be: **The Filter at 40: Lessons Learned.**

Dr. Greenfield graduated from Baylor College of Medicine and completed his surgical training at the Johns Hopkins Hospital. He is internationally known as the inventor of the Greenfield Vena Cava Filter, a device that has saved the lives of thousands with venous thromboembolism. He is also Editor-in-Chief of a major textbook in surgery. The medical community is invited to come out and hear this gifted innovator in the field of venous thromboembolism.

### In this issue

- 1 Quality Improvement Project—Surgery
- 1 Aortic Summit Invite
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- 3 Non-CME Activities
- 4 Journal Article: Treatment of Acute Compartment Syndrome

Your Invitation To A Free Summit On:

**AORTIC DISEASE  
FRIDAY - SEPTEMBER 16  
7:30 AM - 1:00 PM  
EVERSOLE AUDITORIUM**

Come join us for a free continental breakfast, aortic summit, and free vascular screening!

#### Faculty Speakers:

- Juan Ayerdi, MD
- Richard Harvey, MD
- John Mix, MD
- Maurice Solis, MD

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THE GEORGIA HEART CENTER  
The Medical Center of Central Georgia

#### SOME OF THE TOPICS COVERED:

- Aortic Aneurysm
- Aortic Dissections
- Other Aortic Pathologies
- Live Moderated Vascular Case! \*

\*subject to change

**Accreditation:**  
The Mercer University School of Medicine is accredited by the ACCME to provide continuing medical education for physicians.

**Credit:**  
Mercer University School of Medicine designates this live activity for a maximum of 5 AMA PRA Category 1 Credit(s)(tm). Physicians should claim only the credit commensurate with the extent of their participation in the activity.

# CME Accredited Conferences & Meetings

**September 1      Surgery Regularly Scheduled Series**  
**7:30 a.m. – 8:30 a.m.**  
**MCCG Eversole Auditorium**  
**777 Hemlock St Macon, GA 31201**  
**Elizabeth Jennings (478) 633-7101**  
 Multidisciplinary G.I. Conferences  
 Objective: To review G.I. conditions and to discuss diagnostic and management plans to improve multi-disciplinary management.  
*The Mercer University School of Medicine designates this live activity for a maximum of 1 AMA PRA Category 1 Credit(s)<sup>TM</sup>*

**September 8      Surgery Regularly Schedule Series**  
**7:30 a.m. – 8:30 a.m.**  
**MCCG Eversole Auditorium**  
**777 Hemlock St Macon, GA 31201**  
**Elizabeth Jennings (478) 633-7101**  
 Topic: The Filter at 40: Lessons Learned  
 Speaker: Lazar Greenfield, M.D.  
 Professor of Surgery and Chair Emeritus  
 University of Michigan  
 Objective: To learn the rationale for vena cava filter designs and how they influence filter effectiveness and long-term patency. To learn how to manage filter concerns and complications, and understanding roles and limitations of retrievable vena cava filters.  
*The Mercer University School of Medicine designates this live activity for a maximum of 1 AMA PRA Category 1 Credit(s)<sup>TM</sup>*

**September 12      Tumor Conference**  
**12:00 p.m. – 1:00 p.m.**  
**MCCG Trice Auditorium**  
**777 Hemlock St. Macon, GA 31201**  
**Debbie Chambers (478) 633-1902**  
 Objective: Apply learned cancer management issues in regard to diagnosis and treatment and to dictate a plan of care.  
*The Mercer University School of Medicine designates this live activity for a maximum of 1 AMA PRA Category 1 Credit(s)<sup>TM</sup>*

**September 14      Internal Medicine Regularly Scheduled Series**  
**8:00 a.m.—9:00 a.m.**  
**MUSM Medical Education Building**  
**790 First Street Macon, GA 31201**  
**Lenora Rogers (478) 301-5823**  
**Resident Grand Rounds**  
 Topic: Personalizing Non-Small Cell Lung Cancer Treatment Using Histology-Based Approaches  
 Speaker: Suresh Ramalingam, M.D.  
 Chief of Medical Oncology

Winship Cancer Institute  
 Emory University School of Medicine  
 Atlanta, GA

*CME credit through CBCE*

**September 14      Houston Cancer Conference**  
**12:00 p.m. – 1:00 p.m.**  
**Houston Medical Center**  
**1601 Watson Boulevard**  
**Warner Robins, Georgia 31093**  
**Dawn Carpenter (478) 542-7963**  
 Cancer Conference  
*The Mercer University School of Medicine designates this live activity for a maximum of 1 AMA PRA Category 1 Credit(s)<sup>TM</sup>*

**September 15      Anesthesia Regularly Scheduled Series**  
**7:00 a.m.—8:00 a.m.**  
**MCCG Trice Auditorium**  
**877 Hemlock Street Macon, GA 31201**  
**Jennifer Avant (478) 633- 1200**  
 Anesthesia Informatics/QA  
 Interesting Cases & Grand Rounds Series  
*The Mercer University School of Medicine designates this live activity for a maximum of 1 AMA PRA Category 1 Credit(s)<sup>TM</sup>*

**September 15      Surgery Regularly Scheduled Series**  
**7:30 a.m. – 8:30 a.m.**  
**MCCG Eversole Auditorium**  
**777 Hemlock St Macon, GA 31201**  
**Elizabeth Jennings (478) 633-7101**  
 Resident Case Presentations  
 Objective: Residents will present interesting cases including diagnosis management of unusual surgical conditions.  
*The Mercer University School of Medicine designates this live activity for a maximum of 1 AMA PRA Category 1 Credit(s)<sup>TM</sup>*

**September 19      Tumor Conference**  
**12:00 p.m. – 1:00 p.m.**  
**MCCG Trice Auditorium**  
**777 Hemlock St Macon, GA 31201**  
**Debbie Chambers (478) 633-1902**  
 Objective: Apply learned cancer management issues in regard to diagnosis and treatment and to dictate a plan of care  
*The Mercer University School of Medicine designates this live activity for a maximum of 1 AMA PRA Category 1 Credit(s)<sup>TM</sup>*

**September 22      Surgery Regularly Schedule Series**  
**7:30 a.m. – 8:30 a.m.**  
**MCCG Eversole Auditorium**

**777 Hemlock St Macon, GA 31201**  
**Elizabeth Jennings (478) 633-7101**  
 Topic: VTE Surgical CME/QI Program  
 Objective: To introduce Venous Thromboembolism QI Program  
*The Mercer University School of Medicine designates this live activity for a maximum of 1 AMA PRA Category 1 Credit(s)<sup>TM</sup>*

**September 26      Tumor Conference**  
**12:00 p.m. – 1:00 p.m.**  
**MCCG Trice Auditorium**  
**777 Hemlock St. Macon, GA 31201**  
**Debbie Chambers (478) 633-1902**  
 Objective: Apply learned cancer management issues in regard to diagnosis and treatment and to dictate a plan of care  
*The Mercer University School of Medicine designates this live activity for a maximum of 1 AMA PRA Category 1 Credit(s)<sup>TM</sup>*

**September 28      Internal Medicine Regularly Scheduled Series**  
**8:00 a.m.—9:00 a.m.**  
**MUSM Medical Education Building**  
**790 First Street Macon, GA 31201**  
**Lenora Rogers (478) 301-5823**  
**Resident Grand Rounds**  
 Topic: Management of Stable Ischemic Heart Disease  
 Speaker: David Harold Schaer, M.D.  
 Assistant Clinical Professor of Medicine, University of Medicine and Dentistry of New Jersey  
 New Brunswick, New Jersey  
 Objective: Describe the spectrum of SIHD and the importance of risk assessment in guiding clinical practice decisions.

*CME credit through PCME*

**September 29      Surgery Regularly Schedule Series**  
**7:30 a.m. – 8:30 a.m.**  
**MCCG Eversole Auditorium**  
**777 Hemlock St Macon, GA 31201**  
**Elizabeth Jennings (478) 633-7101**  
 Trauma Topics Conference  
 Objective: To review the latest literature on trauma and to discuss plans to improve performance and safety.  
*The Mercer University School of Medicine designates this live activity for a maximum of 1 AMA PRA Category 1 Credit(s)<sup>TM</sup>*





**Dennis Ashley, MD, Conference Host**  
Mercer University School of Medicine  
Macon, GA



**Colonel Rocco Armonda, MD**  
Washington Hospital Center  
Washington, DC

# 21<sup>st</sup> Annual Trauma Symposium

November 3, 2011– Joseph W. Eversole Auditorium  
The Medical Center of Central Georgia

## Featured Speakers & Topics Neurocritical Care

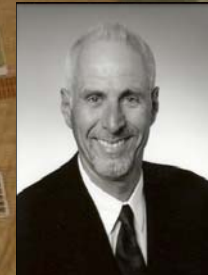
### The Role for Decompressive Craniotomy

### Management of Brain Trauma in the Pre-Hospital Setting

### Sports Concussion: Neuropsychological Overview



**Richard Rowe, MD**  
University of Arkansas for Health Science  
Little Rock, AR



**Stephen Macciocchi, Ph.D., ABPP**  
Shepherd Center  
Atlanta, GA

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Mercer University School of Medicine designates this live activity for a maximum of 3.5 AMA PRA Category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Photo courtesy of William Haun, [whaun.com](http://whaun.com)

## NON-CME Conferences & Meetings

The Following Educational Opportunities Are Available But Do Not Have Continuing Medical Education Credit

**September 6 Pediatric Regularly Scheduled Series**

**8:00 a.m.—9:00 a.m.**  
MCCG Trice Auditorium  
777 Hemlock Street Macon, GA 31201  
**Felicia Bentley (478) 633-7140**  
Topic: Braselow System Update  
Speaker: Rebecca Cogburn, RN  
Pediatric Critical Care  
MCCG

**September 7 Internal Medicine Regularly Scheduled Series**

**8:00 a.m.—9:00 a.m.**  
MUSM Medical Education Building  
790 First Street Macon, GA 31201  
**Lenora Rogers (478) 301-5823**  
Faculty Grand Rounds  
Topic: TBA  
Speaker: Harold Katner, M.D.  
Professor, Medicine/Infectious Disease

**September 9 Family Medicine Regularly Scheduled Series**

**12:15 p.m. – 1:15 p.m.**  
MUSM Medical Education Bldg.  
790 First Street Macon, GA 31201  
**Yolanda Howard (478) 633-5554**  
Topic: Update in Carotid and Vascular Disease Management for the Family Physician  
Speaker: Maurice Solis, M.D.  
Macon Cardiovascular Institute

**September 13 Pediatric Regularly Scheduled Series**

**8:00 a.m.—9:00 a.m.**  
MCCG Trice Auditorium

**777 Hemlock Street Macon, GA 31201  
Felicia Bentley (478) 633-7140**

Topic: Pediatric Neurology  
Speaker: Joseph Trasmonte, MD  
Pediatric Neurologist  
MCCG

**September 16 Family Medicine Regularly Scheduled Series**

**12:15 p.m. – 1:15 p.m.**  
MUSM Medical Education Bldg.  
790 First Street Macon, GA 31201  
**Yolanda Howard (478) 633-5554**  
Topic: Really Rural Family Medicine  
Medical Mission in Cambodia  
Speaker: Fred Girton, M.D.  
Chair, Department of Family Medicine

**September 20 Pediatric Regularly Scheduled Series**

**8:00 a.m.—9:00 a.m.**  
MCCG Trice Auditorium  
777 Hemlock Street Macon, GA 31201  
**Felicia Bentley (478) 633-7140**  
Topic: Endo Emergencies  
Speaker: Catherine “Katy” Preissig, MD  
Pediatric Critical Care  
MCCG

**September 21 Internal Medicine Regularly Scheduled Series**

**8:00 a.m.—9:00 a.m.**  
MUSM Medical Education Building  
790 First Street Macon, GA 31201  
**Lenora Rogers (478) 301-5823**  
Resident Grand Rounds  
Topic: Resident Grand Rounds  
Speaker: Wibisono Hartojo, MD—PGY-3

Hiren Joshi, MD—PGY-3  
MUSM/MCCG

**September 23 Family Medicine Regularly Scheduled Series**

**12:15 p.m. – 1:15 p.m.**  
MUSM Medical Education Bldg.  
790 First Street Macon, GA 31201  
**Yolanda Howard (478) 633-5554**  
Topic: Medication Use in the Elderly  
Speaker: Florence Baralatei, M.D.

**September 27 Pediatric Regularly Scheduled Series**

**8:00 a.m.—9:00 a.m.**  
MCCG Trice Auditorium  
777 Hemlock Street Macon, GA 31201  
**Felicia Bentley (478) 633-7140**  
Topic & Speaker: TBA

**September 30 Family Medicine Regularly Scheduled Series**

**12:15 p.m. – 1:15 p.m.**  
MUSM Medical Education Bldg.  
790 First Street Macon, GA 31201  
**Yolanda Howard (478) 633-5554**  
Topic: Introduction to Hospice and Palliative Medicine for the Family Physician  
Speaker: Urvi Patel, MD

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# Surgical Pearls for Performing a Leg Fasciotomy

Fried, Jeffrey A., M.D., Clinical Assistant Professor of Surgery, Mercer University School of Medicine

University of Pennsylvania Orthopaedic Journal

Volume 21, May 2011

The treatment of acute compartment syndrome remains a major medical-legal issue for orthopaedic surgeons. Fasciotomy is the best treatment for acute compartment syndrome. In performing fasciotomy of the leg, all four compartments need to be decompressed without causing iatrogenic injury to neurovascular structures. The fasciotomy incisions need to be long enough to fully decompress the skin, subcutaneous tissue, fascia, muscles and neurovascular structures. Dead and non-viable muscle needs to be fully débrided to prevent infection. Muscle stimulation via direct contact or electrocautery may assist in the evaluation of muscle viability. Soft tissue management with skin grafts or negative pressure wound therapy may assist in the later closure of the fasciotomy wound. A single lateral incision fasciotomy may be indicated in some cases. Fasciotomy may not be indicated when there is irreversible ischemia to the leg.

## Introduction

Acute compartment syndrome is a surgical emergency in orthopaedic surgery. It should be suspected in orthopaedic patients with excessive pain and tight compartments. It may be difficult to diagnose in obtunded or hypotensive patients. A low threshold for fasciotomy is recommended in patients with signs and symptoms of compartment syndrome and/or compartment pressures within 10-30 mm Hg of diastolic blood pressure or higher<sup>1</sup>.

Fasciotomy of the four compartments of the leg remains the definitive treatment for acute compartment syndrome before the onset of irreversible ischemia. Attention to surgical technique can result in decreased morbidity from this surgical emergency. Surgical pearls for performing a leg fasciotomy are reported here.

1. Mark-out incisions, on both the medial and lateral sides prior to performing the fasciotomy. The lateral incision is performed in the mid-lateral axis between the anterior crest of the tibia and the fibula. The medial incision is made about one fingerbreadth posterior to the posteromedial border of the tibia. Mark the incisions first, because the skin shifts after incision due to swelling. This may lead to a narrower skin bridge than expected and increase the risk of skin necrosis.
2. Keep incisions long. Most fasciotomy incisions in the leg are 20-30 centimeters long depending on the length of the leg. A long incision is necessary to fully decompress the muscles, tendons, nerves, subcutaneous tissues, and skin. In addition, it is important to visualize all non-viable tissue for adequate debridement.



Figure 1. Superficial peroneal nerve piercing the crural fascia distal in the lateral incision.

3. Identify the superficial peroneal nerve (Figure 1) in the lateral incision before releasing the fascia in both compartments. The course of the superficial nerve can be variable and iatrogenic injury is possible. Adkison et al<sup>2</sup> described the variation in superficial peroneal nerve anatomy in 85 limbs. The superficial peroneal nerve exited the lateral compartment and went through the crural fascia in the majority (62) of limbs. However, in 12 legs the nerve crossed from the lateral compartment to the anterior compartment before exiting the fascia. In 10 legs, the superficial nerve was noted to divide into two branches before exiting through the crural fascia in both the anterior and lateral compartments. In one leg, the nerve never lay deep to the peroneal longus and exited distally. There was a variable penetration through the fascia from 3 to 18 centimeters proximal to the lateral malleolus. This nerve supplies sensation to the dorsum of the foot and lateral second toe to the fifth toe. Division of the nerve may result in neurogenic pain, in addition to numbness.
4. Identify the saphenous nerve and vein in the medial incision. These structures are found subcutaneously near the posteromedial border of the tibia. The saphenous vein is the longest vein in the body and empties into the femoral vein near the hip. The saphenous nerve is purely sensory and injury results in decreased sensation.
5. Release the deep posterior compartment. The deep posterior compartment is often not identified or incompletely released. The easiest location to identify the deep posterior compartment is distal in the calf, where the flexor digitorum longus and overlying fascia is identified just posterior to the tibia. The incision is first made distal and the fascia is incised proximally by releasing or retracting the soleus off its insertion at the posteromedial tibia in the middle of the leg. Failure to release this compartment may result in clawed toes.



6. Direct stimulation of the muscle can help with assessment of viability. Commonly used techniques include direct stimulation with an instrument or electrocautery to identify contractility. In addition, color and bleeding are indicators of muscle viability.
7. Debride all nonviable muscle (Figure 2) early. Nonviable muscle increases the risk of infection and rhabdomyolysis. Debridement should include all muscle that does not contract or bleed.
8. Use of a negative pressure wound therapy system (VAC Therapy, Kinetic Concepts Inc., San Antonio, Texas) with vessel loops for dermatotraction (Figure 3) may decrease the need for skin grafting at closure without risking recurrent compartment syndrome<sup>3</sup>. Pressures as low as 50 mm Hg can assure the outflow of edema fluid using negative pressure. Apply a porous dressing such as xeroform (Kendall) under the sponge connecting the two incisions to prevent skin maceration.



Figure 3. Non-viable muscle that needs debridement.



Figure 2. Wound VAC with vascular loops used to facilitate early closure without skin grafts in this patient with compartment syndrome and rattlesnake bite.

9. Consider no fasciotomy in late cases without rhabdomyolysis. After six to eight hours of ischemia, there is generally irreversible damage to the muscle. Performing a fasciotomy may expose the underlying necrotic muscle and increase the risk of infection and/ or amputation. In addition,

Whitesides and Heckman have described scarring of the muscles to leave a checkrein effect to aid in ambulation<sup>4</sup>. Allowing the muscles to scar with the foot in the neutral position may be aided by a spanning external fixator or splint.

10. Consider a one-incision lateral parafibular fasciotomy in tibial plateau and pilon fractures. The one incision leg fasciotomy described by Whitesides and Heckman<sup>4</sup> involves a single lateral incision. However, decompression of the deep posterior compartment is much more difficult using this exposure. Single-incision fasciotomies should be reserved for those with experience in this procedure, either surgically or in the lab.

#### Conclusion:

Compartment syndrome is a major medico-legal issue for the Orthopaedic Surgeon. A low threshold for fasciotomy is important. Attention to surgical details can prevent iatrogenic neurovascular injury, minimize irreversible nerve and muscle damage, decrease the risk of infection, and allow earlier wound closure.

#### References

- Heckman, Michael M., Whitesides, Thomas E. , Jr., Greene, Scott R., Todd, Randy C., Miller, Marion, Lawrence, John H. III. Histological Determination of the Ischemic Threshold of Muscle in the Canine Compartment Syndrome Model. *J. Orthop. Trauma* 1993, 7(3):199-210.
- Adkison, DP, Bosse, MJ, Gaccione, DR, Gabriel, KR. Anatomic variations in the course of the superficial peroneal nerve. *J. Bone Joint Surg. Am* 1991, 73:112-114.
- Janzing, HM, Broos, PL. Dermatotraction: an effective technique for the closure of fasciotomy wounds: a preliminary report of fifteen patients. *J. Orthop. Trauma*. 2001, 15: 438-441.
- Whitesides Jr., TE and Heckman, MM. Acute Compartment Syndrome: Update on Diagnosis and Treatment. *J. Am. Acad. Ortho. Surg*. 1996, 4: 209-218.



## *The Synapse*

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