

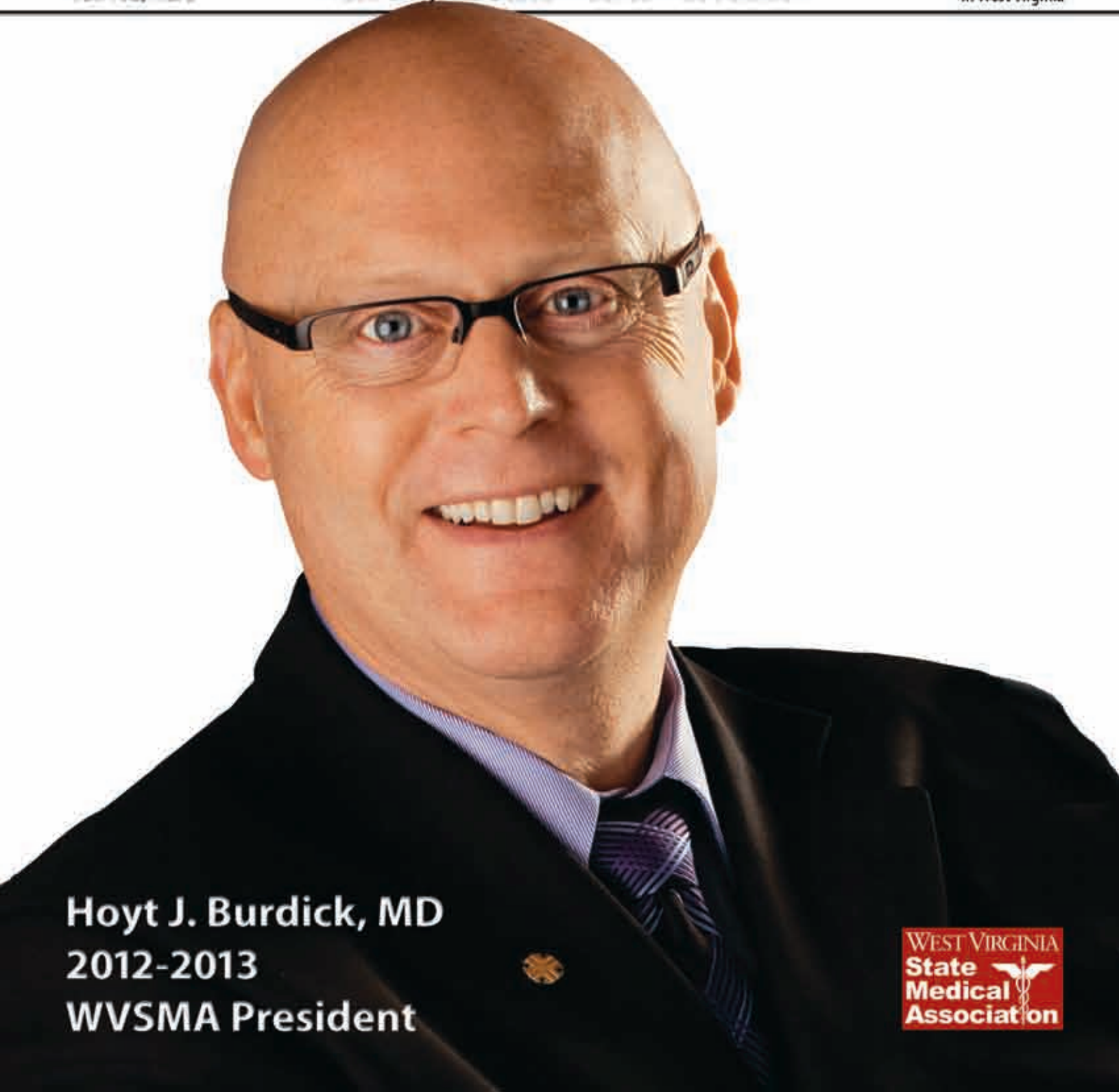
West Virginia

# Medical JOURNAL

September/October 2012  
Vol. 108, No. 5

West Virginia State Medical Association

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**Hoyt J. Burdick, MD**  
**2012-2013**  
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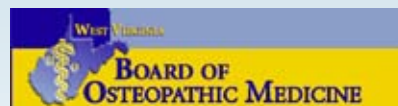
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# President's Message



## The Obsolete Image of the Ideal Physician

by Hoyt J. Burdick, MD  
WVSMA President  
2012-2013

While the subject of my first *President's Message* may seem an unusual choice, I would like to explain why I believe this subject is particularly relevant for West Virginia physicians and for the WVSMA through the upcoming year and beyond.

The title comes from a VIEWPOINT editorial in *JAMA* by Ezekiel J. Emanuel, MD, PhD and Victor R. Fuchs, PhD.<sup>1</sup> The editorial, "Shortening Medical Training by 30%" presented a challenge to the current extension of medical training for mandatory research experience. To help build the case for this shortened training, the authors began by describing "The Obsolete Image of the Ideal Physician".<sup>1</sup>

*For decades, the ideal academic physician has been the triple threat: an incisive diagnostician and empathetic clinician, a productive researcher, and a scintillating teacher. Similarly, the clinical practitioner was supposed to be omniscient, capable of managing all illnesses. The consequence is a broad training regimen that includes mandatory research experience for all physicians, and emphasizes the autonomy of the physician rather than team-based care.*

While the authors present a sound argument for shortening medical training, the more troubling concept for me is whether the remainder of our image of the ideal physician might be at risk of

obsolescence. If so, there could be significant implications for patients, physicians, medical education and the practice of medicine.

I'd like to propose one obsolete image of an ideal physician that dates back to the very beginning of WVSMA.<sup>2</sup>

*On February 28, 1867, Dr. W.J. Bates, who is now known as the Father of the West Virginia State Medical Association, together with fifteen other prominent physicians who resided in the northern part of the state, sent to all of the members of the legitimate profession in West Virginia the following call for a convention at Fairmont, April 10, 1867:*

### **OFFICIAL CALL: TO THE MEDICAL PROFESSION IN WEST VIRGINIA**

*Gentlemen, as a means of elevating the standard of Practical Medicine and Surgery in West Virginia – and to render quackery odious, as it deserves, the want of State Medical Organization is severely felt by all true cultivators of our noble science within the limits of the state.*

*... For over half a century, Dr. Bates devoted himself to his profession and when the end came on January 14, 1892, he was at the bedside of a patient rendering his last professional service.*

Dr. Edward Stanard Buffington, one of the original members of the Huntington Medical Society, the predecessor of the Cabell County Medical Society, presents

another obsolete image of an ideal physician from the 1890's.<sup>3</sup>

*Dr. Buffington, a son of the first Mayor of Huntington, exemplified the noblest qualities of the typical practitioner at the close of the last century. One doctor said of him that Buffington's mere presence in the sick room was oftentimes more effective than the medicine that he prescribed. There were still other physicians with qualities of mind and heart who brought hope and consolation to many a distraught family.*

With almost no technology, they used physical diagnosis to become "incisive diagnosticians" and history identifies them as "empathetic clinicians."

Dr. Emanuel also stated that ideal physicians are "supposed to be omniscient, capable of managing all illnesses". Fast-forward to the not-so-obsolete image of television physician, Dr. Gregory House. The delusion of omniscience was more believable when knowledge was based on paper and could be contained within the covers of a book. Dr. Arthur Guyton taught my medical school class at the University of Mississippi from his book, "Guyton's Textbook of Medical Physiology". When Dr. Guyton finished the last chapter and we closed the back cover, we felt that we knew everything we would ever need to know about medical physiology. If not, we could find it in the library.

Dr. James D. Hardy did the same with "Hardy's Textbook of Surgery".

The modern image of the ideal physician may no longer include how many texts or journals the physician has read, but may depend more upon the physician's ability to master and apply networked medical information from the web. David Weinberger, in his book "Too Big to Know"<sup>4</sup> suggests that we need "stopping points" in knowledge as our historic way of packaging and processing large amounts of information. Now physicians are faced with the "Bottomless Knowledge" of a network without limits, and may require technological skills more similar to those of the fictional Leonard H. "Bones" McCoy from Star Trek – minus the Star Fleet Tricorder.

One image of the ideal physician that some suggest should become obsolete was also described by Dr. Emanuel as one that "...emphasizes the autonomy of the physician rather than team-based care." As a case in point, the 2015 Medical School Admissions Test (MCAT) has been expanded by addition of the Social and Behavioral Sciences section, including the Psychological, Social and Biological Foundations of Behavior to recognize the importance of socio-cultural and behavioral determinants of health and health outcomes. According to Darrell G. Kirch, M.D., President of the AAMC, "Testing students' understanding of these areas is important, because being a good physician is about more than scientific knowledge. It is about understanding people – how they think, interact, and make decisions."<sup>5</sup>

For many, the image of Dr. William Stewart Halstead may best represent the ideal physician. Besides developing the radical mastectomy, Dr. Halstead is credited with developing the modern post-graduate residency training program. His tireless devotion "encompassed in the house staff an esprit de corps of such fervor, that everyone eagerly worked until he dropped."<sup>6</sup> This ideal image of a resident physician became obsolete, for better or worse,

with ACGME duty hours restrictions. Some established competencies for residents are becoming obsolete with a New Accreditation System (NAS) designed to enhance "...the competence of future physicians in areas that are relevant to a well-performing, efficient, and cost-effective healthcare system..."<sup>7</sup>

So how is Dr. Emanuel's concept of the obsolete image of the ideal physician relevant to West Virginia physicians and the WVSMA? One conclusion could be that we only need the devotion of Dr. Bates and Dr. Buffington, the ominocompetence of Dr. House, the technology skills of Dr. "Bones" McCoy while expanding beyond Dr. Guyton's natural sciences and our residency training and practices modeled after Dr. Halstead. Another conclusion could be that we all need to learn to understand better how people think, interact and make decisions and find our place in a well-performing, efficient, and cost effective healthcare system.

The current reality is that we still need to get up every day (and many nights) and practice medicine to the best of our abilities while providing medical leadership in a rapidly changing system. These challenges are the basis of a strategic shift in the American Medical Association (AMA) and part of the challenge for your WVSMA leadership. The AMA is focusing on three strategic areas: improving health outcomes, accelerating change in medical education, and shaping delivery and payment models that demonstrate high quality care and value while enhancing physician satisfaction and practice sustainability.<sup>8</sup> Over the upcoming year, your WVSMA will also focus on these important areas, particularly delivery and payment models, to help identify solutions that best fit the unique local challenges faced by West Virginia physicians.

Regardless of how you feel about shortening medical education by 30%, I hope you've found Dr. Emanuel's concept of the obsolete image of the ideal physicians to be a good starting point for further discussion.

It is my hope that through our lives and practices we pass on the best of our legacy from the obsolete image of the ideal physician. The new challenges and the evolving practice environment are every bit as daunting as those faced in 1867 by Dr. W.J. Bates and his contemporaries. Although they probably knew less about the challenges they would face than we do, at least they had the foresight to create the WVSMA as an organization to help physicians deal with future challenges.

As your President, the **OFFICIAL CALL: TO THE MEDICAL PROFESSION IN WEST VIRGINIA** for 2012-13 is to continue our legacy of the obsolete image of the ideal physician as a means of elevating "... the standard of *Practical Medicine and Surgery in West Virginia.*" by engaging with your physician colleagues through the WVSMA for the benefit of our patients, our profession and all future "cultivators of our noble science within the limits of the state."

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## West Virginia Medical Professionals Health Program Update

The West Virginia Medical Professionals Health Program (WVMPHP) will be up and running for 5 years in November. The WVMPHP continues to be the only physician health program recognized by the WV Board of Medicine and the WV Board of Osteopathic Medicine. Our southern office is located within the State Medical Association building in Charleston West Virginia with a northern office located in Bridgeport West Virginia. The WVMPHP has provided 12 educational lectures to an excess of 911 attendees for 2012 YTD and cumulatively 71 educational lectures for an excess of 4300+ physicians, hospitals, medical staffs, medical societies, students and residents since its inception. Funding, to-date, has been largely provided through the WV Mutual Insurance Company, grants from the WV Hospital Association, Health Care Authority, licensure board's fees, physicians of West Virginia, the West Virginia State Medical Association, donations, participant fees and pro-bono services by many individuals involved.

To-date, there have been 103 signed participants of whom 62 continue under an agreement impacting an excess of 30 hospitals/ medical schools and many other group practices. Forty-five percent of signed participants were referred by their licensure board formally through consent order or informally through direct contact. Of those who have completed treatment and are under contract, 86% have remained abstinent. They are licensed, have resumed working and are practicing medicine safely. Many participants who resided and practiced out of state were able to maintain their active West Virginia medical license as a direct result of their participation with the WVMPHP. Specialties include: family practice; internal medicine; pediatrics; ophthalmology; orthopedics; obstetrics and

gynecology; general surgery; neurosurgery; cardiovascular surgery; radiology; emergency medicine; endocrinology; pathology; psychiatry; cardiology; palliative medicine; medical students and residents in training. Forty-two (42) of the 103 (42%) continued to work or have been returned to the active safe, monitored practice of medicine. Of the 62 under current monitoring agreements, 50 have continued to work or have been returned to work. Thirty (30) of the 103 (30%) had previous issues and recurrence of their chronic medical condition further supporting the need of our physician health program and long-term guidance, assistance and monitoring.

During initial evaluation, some were found to have some type of impairment (physical or on initial neuro-cognitive testing), most of which resolved with treatment. A few remain impaired and are disabled due to physical disorders detected or persistence of cognitive impairment. Many detected impairments were unrelated to their original issues leading to participation with a few individuals having residual impairment due to the "qualifying condition of participation" (mental illness or substance use disorder) or other unrelated physical disorders. These initial and permanent impairments may not have been detected had they not sought the assistance of or been referred to the WVMPHP.

At our most recent Board of Directors meeting, August 25, 2012, there was much to celebrate as the growth and success in the early identification and monitoring of participants was reported by our Medical Director. This good news was overshadowed by the sobering report from the Finance Committee. At the current rate of growth and with the funding sources in place as of August 25, 2012, the WVMPHP

will be unable to meet its financial obligations come February 2013.

Intense ongoing efforts and collaborations are being pursued. The Funding Task Force, a subcommittee of the finance committee, is meeting as you read this article. A meeting of the original stakeholders that conceived and helped draft legislation creating the WVMPHP is scheduled. I am optimistic that as we work with the Boards of Allopathic and Osteopathic Medicine, hospitals and the Hospital Association, the State Medical Association, the WV Osteopathic Medical Association, the Malpractice Carriers, insurers, the Health Care Authority and other state agencies, that a funding solution will be found. I ask that members of the State Medical Association contact any and all of the above mentioned entities and voice your support for a stable, ongoing, viable funding solution.

As has been demonstrated this year and in years past, the WV Medical Professionals Health Program is fulfilling its mission of protecting the public and providing a mechanism for the successful rehabilitation of the sick physician and return to the safe, monitored practice of medicine to the benefit of the public and physicians themselves. West Virginia has created a safe-system with the underlying principles of communication, collaboration, transparency and accountability to the benefit of all. In order for stable, ongoing funding and long term program viability, the continued support of organized medicine, regulatory agencies, the healthcare community, the FSPHP and treatment professionals is necessary and greatly appreciated.

Joseph B. Selby, MD  
*Chairman of the Board*

P. Bradley Hall, MD, FASAM, DABAM  
*Executive Medical Director*



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# Intralobar Bronchopulmonary Sequestration in Adults Over Age 50: Case Series and Review

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## Abstract

**Introduction:** Bronchopulmonary sequestration (BPS) is a rare congenital lung malformation, comprising only 0.15 to 6.4% of all cases of congenital lung malformation. It is characterized by an abnormal segment of bronchopulmonary tissue supplied by an aberrant systemic artery. Diagnostic delays are common in the adult patients since the symptoms often mimic other common diseases such as pneumonia, emphysema, and lung abscess. In 60% of cases, intralobar pulmonary sequestration (ILS) is typically diagnosed at age 20 or younger and is rarely found in adults older than 40 years. Since a heightened clinical suspicion needs to be maintained to entertain this diagnosis in the adult population, we conducted a retrospective chart review of all adult patients at our institution over age 50.

**Materials and Methods:** A retrospective chart review of all adult patients evaluated at our institution with a pathological proven diagnosis of BPS and subsequent surgical correction from January 1993 through December 2008 was conducted. Data obtained included demographics, clinical presentation, diagnostic procedures, location and origin of the lesion, operative therapy, histology

of the surgical specimen, and postoperative complications.

**Results:** Three patients had undergone surgical correction for BPS. All three patients at our institution were female. The average age was 59 years with a range from 57 to 62 years. All three patients had symptoms preoperatively including intermittent cough and recurrent pneumonia. Radiologic evaluation revealed an enlarging lung mass in one patient and lesions suggestive of BPS in two of the patients. Two patients had a right lower lobe sequestration and one patient had a left lower lobe sequestration. All three patients underwent lower lobectomies without any significant postoperative complications.

**Conclusion:** BPS in patients older than 50 is very rare. Persistent lower lobe consolidation in medial or posterior basal segments accompanied by an aberrant artery in adults should heighten suspicion for it. Recurrent pneumonias, cough, chest pain occur in the majority of patients. Surgical excision after correctly identifying the aberrant vessel is curative and also diagnostic in some cases.

## Introduction

BPS is a rare congenital lung malformation, comprising only 0.15 to 6.4% of all pulmonary malformation. It is characterized by an abnormal segment of bronchopulmonary tissue supplied by an aberrant systemic artery.<sup>1</sup> The diagnosis can easily be missed in adult patients since the symptoms often mimic other common diseases such as pneumonia, emphysema, and lung abscess.<sup>2</sup> Intralobar sequestration (ILS) is diagnosed at age 20 years or younger in approximately 50% to 60% of cases, and it is rarely found in patients older than 40 years.<sup>2</sup>

We report our experience over the last 15 years of adult patients over 50 years of age diagnosed with intralobar BPS and treated with surgical resection to further

enhance our understanding of this rare disease in elderly patients.

A review of the epidemiology, pathogenesis, clinical features, diagnostic procedures, and treatment is included in this discussion.

## Materials and Methods

Records of all adult patients at our institution with a pathological proven diagnosis of BPS and subsequent surgical correction between January 1993 and December 2008 were reviewed retrospectively. Age, sex, symptoms, diagnostic procedures, location and origin of the lesion, operative therapy, histology of the surgical specimen, and postoperative complications were evaluated. This study was approved by our institutional review board.

## Results

Three patients had undergone surgical correction for BPS. All three patients at our institution were female. The average age was 59 years with a range from 57 to 62 years. All three patients were symptomatic. Most common presentation was intermittent cough and recurrent pneumonia. Radiologic evaluation revealed an enlarging mass in one patient and lesions suggestive of BPS in two of the patients. Two patients had a right lower lobe sequestration and one patient had a left lower lobe sequestration. All three patients underwent a lower lobectomy without any significant postoperative complications. A summary of each case is given below.

## Discussion

Pulmonary sequestration was first described by Rektorzik in 1861, as a nonfunctioning mass of lung tissue which lacks normal communication with the tracheobronchial tree and

	Age/Sex	Smoking history	Symptoms	Imaging	Treatment	Pathology finding
Patient 1 Figure 1	62/F	Non smoker	Intermittent dry cough with anterior chest wall pain	Chest CT-enlarging mass in the basilar segment of the right lower lobe with extension to the posterior ribs and involvement of the diaphragm.	CT guided biopsy of the mass was nondiagnostic. Video assisted thoracoscopic of the right lower lobectomy was done.	Intralobar pulmonary sequestration
Patient 2 Figure 2	57/F	Non smoker	Four episodes of right lower lobe pneumonia	CT chest - right lower lobe pulmonary sequestration. A CT arteriogram showed a single aberrant artery arising from the anterior right lateral aspect of the thoracic aorta at the level of T10 supplying the right lower lobe pulmonary sequestration	Right lower lobectomy	Intralobar pulmonary sequestration.
Patient 3 Figure 3, 4, 5	58/F	Smoker	Recurrent left lower lobe pneumonias with left sided chest pain and dyspnea.	Chest X-ray- a vague opacity in the lower lobe of the left lung. Chest CT chest- intralobar sequestration with a prominent systemic artery arising from the descending thoracic aorta at the level of the gastroesophageal junction. Extensive cystic changes were also noted in the pulmonary parenchyma	Left lower lobectomy.	Acute and chronic bronchiolitis with cystic dilation characteristic of intralobar pulmonary sequestration.

with an anomalous systemic arterial supply.<sup>3</sup> The systemic arterial supply is via the descending thoracic aorta (72%); abdominal aorta, celiac axis, or splenic artery (21%); intercostal artery (3.7%); and rarely via the subclavian, internal thoracic, and pericardiophrenic arteries. Most venous drainage (95%) is via the pulmonary veins.<sup>4</sup> Pryce first coined the term pulmonary sequestration in 1946 and further classified the lesion as intralobar or extralobar on the basis of the morphologic patterns of sequestration.<sup>5</sup>

### Epidemiology

BPS is estimated to comprise 0.15 to 6.4% of all congenital pulmonary malformations for which even tertiary care centers only diagnose approximately one case per year.<sup>1</sup>

The two types of bronchopulmonary sequestration are intralobar (ILS), as in our patients, and extralobar sequestration (ELS). ILS shares common visceral pleura within a normal lung lobe, whereas ELS has its own pleural lining and thus is separated from the remaining lung tissue. ILS is four times more

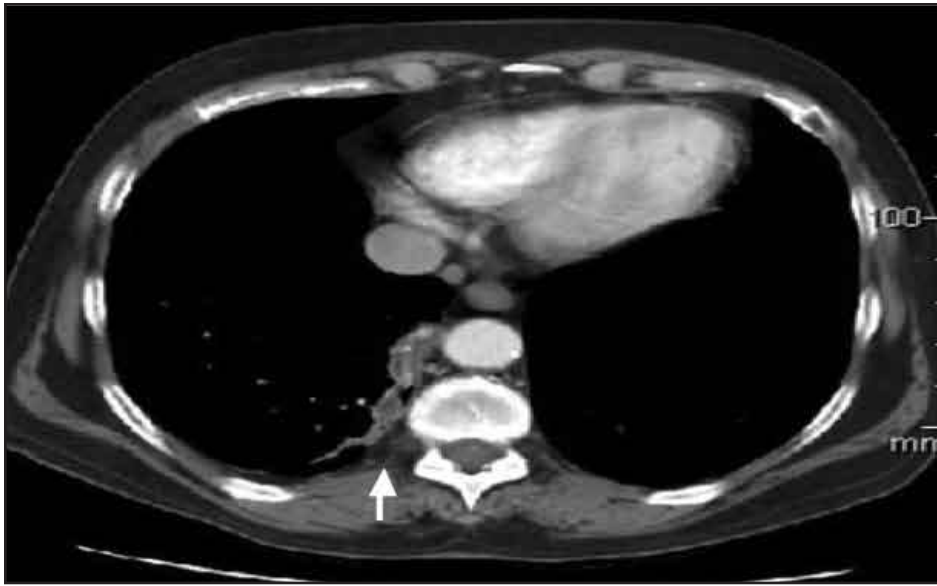
common than ELS. ILS is more common in early adulthood while ELS is more commonly diagnosed in the fetal and neonatal period. Males and females are equally affected by ILS while ELS has a male predominance in most series.<sup>1,2</sup>

### Pathogenesis

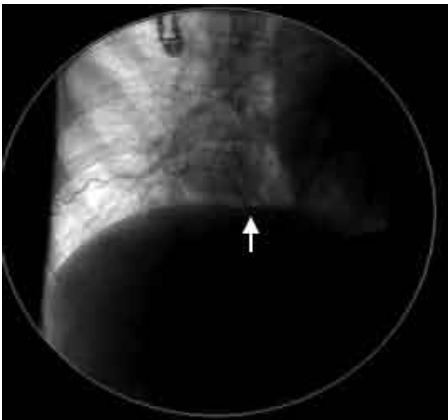
BPS has been postulated to occur due to the formation of an accessory lung bud inferior to the normal lung buds that develop from the primitive foregut as it migrates caudally.<sup>6</sup> During bronchial branching, the bronchial buds are supplied by a

**Figure 1.**

*Chest CT showing aberrant artery supplying right pulmonary sequestration.*

**Figure 2.**

*Thoracic aortogram showing aberrant vessel off descending thoracic aorta.*



capillary plexus derived from the primitive aorta which typically regresses; however, growth arrest locally at the pulmonary artery during bronchial division, which may lead to persistence of the blood supply from the aorta.<sup>7</sup> Since this occurs during fetal development, it can explain the association of BPS, particularly ELS, with other congenital anomalies. Associated congenital anomalies in ELS include diaphragmatic hernia, congenital cystic adenoid malformation, bronchogenic cysts, cardiovascular malformation, and pectus excavatum.

Some authors have proposed that ILS is an acquired defect related to bronchial obstruction, pneumonia, and pleuritis. According to this hypothesis, repeated infection causes angiogenic growth factors to be activated leading to angiogenesis and the development of a systemic arterial supply. This would be a plausible explanation for the prevalence of ILS in adult patients and the lack of association with other congenital anomalies.<sup>8</sup>

### Clinical Presentation and Complications

Due to the association of congenital anomalies, ELS is typically diagnosed in childhood with signs and symptoms of respiratory distress. Although ILS is diagnosed in childhood, up to half of patients are diagnosed after the age of twenty.<sup>6</sup> Hirai recently reviewed BPS in patients over fifty and revealed only 10 reported cases since 1998 as seen in Table 1.<sup>9</sup> We found an additional nine cases since Hirai's series, including our cases (Table 2).

Cough, sputum production, recurrent episodes of pneumonia, and symptoms related to associated

anomalies are the most common symptoms of patients with BPS. Some patients with BPS remain asymptomatic and are incidentally discovered (15.5% of ILS patients and 10% of ELS patients). The risk of infection is counterintuitive since the sequestered lung lacks a direct connection to the tracheobronchial tree. BPS malformations, however, are not completely isolated from the native lung due to bacteria invasion through the pores of Kohn. Once the bacteria have colonized the sequestration, infection can progress because of the lack of normal bronchial drainage.<sup>6</sup> Pulmonary infections described in sequestered lung include *Aspergillus fumigatus*, *Mycobacterium tuberculosis*, *kansasii* and bacteremia due to *Gordonia bronchialis* infection.<sup>10-15</sup>

Besides recurrent infections, both ELS and ILS have been reported to cause fatal hemoptysis, massive hemothorax, and cardiovascular complications.<sup>16,17</sup> Surgical excision remains the treatment of choice in known cases of BPS. When these complications occur in undiagnosed cases, it often leads to diagnostic delays but ultimately surgical excision is both diagnostic and curative.

### Radiographic Features

Most common location of the ILSs are in the medial and posterior basal segments of the left lung. Overall, 98% occur in the lower lobes.<sup>2</sup> Plain chest radiograph is generally nonspecific and shows an ill-defined area of consolidation suggestive of pneumonia.<sup>20</sup> Chest CT usually shows a discrete mass in the medial or posterior basal segments of the left lower lobe with or without cystic changes.<sup>6,20</sup> Two out of three patients in our series showed a lesion in the right lower lobe which is less common than left lung lesions. Lesions present in other than the lower lobe should imply an alternative diagnosis

**Figure 3.**

*Chest CT with contrast shows cystic changes in the left lower lobe.*

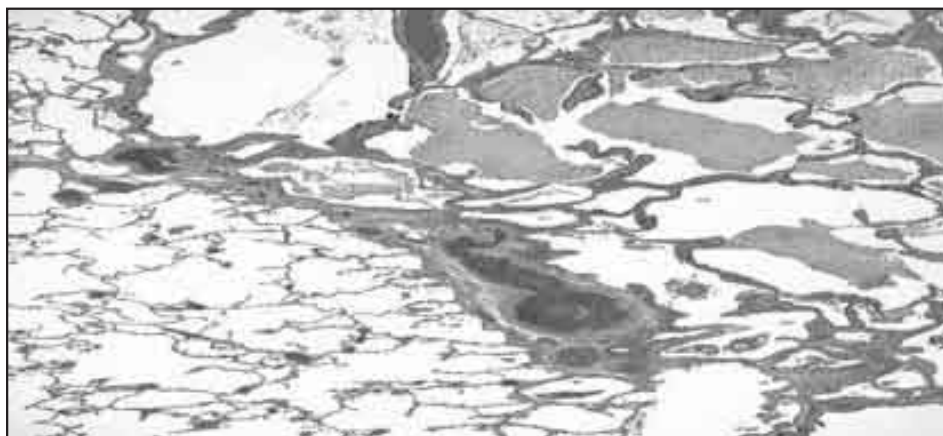


given that sequestered lesions outside the lower lobe account for only 5% of cases reported in the literature.<sup>2</sup> Cystic changes, as seen in patient 3, are usually multiple in nature and are usually surrounded by emphysematous changes, presumably due to air trapping from the sequestration itself (Figure 3).<sup>6,20,21</sup> Other findings include pneumothorax due to cyst rupture into the pleural cavity. Lastly, focal bronchiectasis may also be found.<sup>22</sup>

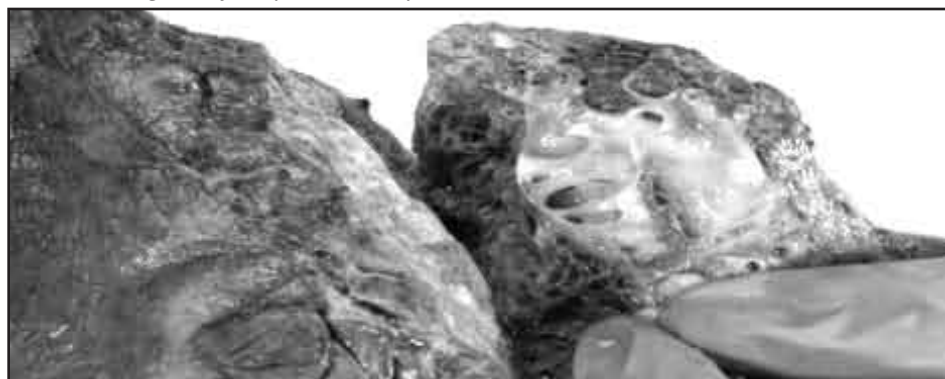
Pre-operative radiographic identification of the aberrant artery is critical in preventing operative morbidity and mortality due to exsanguinations.<sup>23</sup> Due to recent advances in the diagnostic modalities of CT (helical CT, dynamic CT, and 3-D CT), CT chest with contrast may be sufficient in identifying the aberrant artery.<sup>9</sup>

**Figure 5.**

*Microscopic specimen showing sequestration with bronchiolitis and cystic dilation contrasted against normal lung*

**Figure 4.**

*Aberrant lung artery subjacent to surface.*



Some authors have reported the utility of contrast-enhanced MRI and MRA as a means to evaluate the thoracic and pulmonary vasculature.<sup>2</sup> However, the gold standard for identifying pulmonary sequestration is angiography as it confirms the anatomy, identifies the systemic supply, and shows the venous drainage.<sup>2,21</sup>

**Pathologic Features**

Grossly, intralobar sequestrations usually show the effects of chronic inflammation due to recurrent infection. The pleura is thickened with associated adhesions and the parenchyma shows fibrosis and cysts. The cysts often contain mucinous or frankly purulent material, as seen in our case (Figure 5). Histologically, the parenchyma shows the effects of inflammation and fibrosis as well.

Bronchi are dilated and contain mucous or purulent material. The alveoli are filled with macrophages. Thick-walled vessels may be revealed with elastic tissue stains.<sup>25</sup>

Similarly, extralobar sequestration may appear normal if there are no secondarily inflamed bronchi or may show the effects of chronic inflammation with a thick pleural surface covered by exudates. The cut surface may reveal cystic changes, fibrosis, and purulent secretions. In uninfected cases, dilated airways are lined by bronchiolar-type epithelium and dilated airspaces are lined with Type 1 and Type 2 pneumocytes. In infected cases, there is nonspecific acute and chronic inflammation, fibrosis, and purulent exudates.

**Treatment**

Surgical excision is the treatment of choice in both symptomatic and asymptomatic patients due to the risk of complications such as recurrent infections, congestive heart failure, and massive hemoptysis.<sup>23</sup> Surgery usually involves lobar resection via standard thoracotomy.<sup>23</sup> However, thoracoscopic techniques are now being reported more frequently in the literature.<sup>26,27</sup> Video-assisted thoracoscopic wedge resection has even been described in patients with localized pulmonary sequestration.<sup>28,29</sup> In cases where the risk of surgery is high, angiographic

**Table 1: A review of the literature concerning the surgical case reports of pulmonary intralobar sequestration in patients older than age 50 since 1998.<sup>6</sup> (This information was originally published in Ann Thorac Cardiovasc Surg, reprinted with permission of ATCS Editorial Office)**

Author (year)	Age/sex	Symptoms	Location	Origin of aberrant artery (number/diameter)	Operation
<b>Tsunezuka and Sato 1998</b>	75/F	Asymptomatic (abnormal shadow)	Left posterior basal segment	Descending thoracic aorta (3/2 mm, 2mm, 2 mm)	Lower lobectomy
<b>Yamanaka et al. 1999</b>	68/F	Dyspnea, hemoptysis	Left posterior basal segment	Descending thoracic aorta (1/20 mm)	Basalectomy
<b>Sakiyama et al 2000</b>	60/F	Lumbago segment	Left posterior basal segment	Descending thoracic aorta (2/7mm, 3mm)	Basalectomy
<b>Lewis and Tsour 2000</b>	66/M	Dyspnea	Left lower lobe	Left circumflex artery (1/unknown)	None
<b>Singh and Nath 2001</b>	53/M	Hemoptysis	Left posterior basal segment	Descending thoracic aorta (1/30 mm)	Lower lobectomy
<b>Petersen et al. 2003</b>	79/F	Hemoptysis	Left lower lobe	descending thoracic aorta (1/1mm)	Lower lobectomy & graft replacement of descending thoracic artery
<b>Sakuma et al 2004</b>	60/M	Asymptomatic Abnormal shadow	Right lower basal segment	Descending thoracic aorta (1/unknown)	Video-assisted thoracoscopic wedge resection
<b>Sato et al 2005</b>	65/F	Hemoptysis	Left lower basal lesion	Descending thoracic aorta (1/10 mm)	Video-assisted thoracoscopic lower lobectomy
<b>Matsuoka and Nohara 2006</b>	62/M	Asymptomatic Abnormal shadow	Left lateral & dorsal basal segment	Descending thoracic aorta (1/ unknown)	Lower lobectomy
<b>Hirai 2006</b>	56/M	Pneumonia	Left posterior basal segment	Descending thoracic aorta (1/10 mm)	Lower lobectomy

embolization of the feeding systemic vessel might be an option.<sup>6</sup>

Despite the origin of ILS from the aorta, the aberrant artery to ILS malformation is not thick-walled like a bronchial artery, but thin-walled with a wide lumen like a pulmonary artery.<sup>7,30</sup> Surgical resection, therefore, requires careful identification and dissection of the systemic arterial supply and venous drainage of the BPS malformation in order to avoid

the exsanguinating hemorrhage.<sup>23</sup>

The prognosis following surgical excision of intralobar sequestration is excellent, and long-term follow-up suggests that these patients do well.

### Conclusion

Because BPS in patients older than age 50 is very rare, we conducted a single institutional case series in patients over 50 with BPS along with

a review of the literature in hopes of raising awareness of this entity.

The constellation of recurrent pneumonia and lower-lobe lesions typically in medial and posterior basal segments fed by an aberrant systemic arterial vessel are hallmarks of this disease. The diagnosis of ILS should be considered in adults with these features. Complications such as unusual bacterial pneumonias,

**Table 2: A literature review of case reports of pulmonary intralobar sequestration in patients older than 50 since 2005**

Author (year)	Age/sex	Symptoms	Location	Origin of aberrant artery	Operation
Hofman et al 2005 (7)	55/M	Hemoptysis and hemothorax	Right lower lobe	Right inferior pulmonary ligament, rest Unknown	Right Pneumonectomy
Okamoto et al 2005 (8)	69/M	Exertional dypnea	Left lower lobe	Descending thoracic aorta	None
Akhavan-Heidari et al 2006 (9)	61	Exertional dyspnea	Right lower lobe	Abdominal aorta	Lower lobectomy
Berna et al 2008 (10)	64/M	Non-productive Cough	Left upper lobe	Bronchial artery	Upper lobectomy
Masuko et al 2008 (11)	74/M	Asymptomatic	Right lower lobe, medial basal segment	Descending thoracic aorta	Lower lobectomy
Parvathy et al 2008 (12)	58/F	Massive hemoptysis	Posterior basal segment of left lower lobe	Descending thoracic aorta	Lower lobectomy
Montjoy 2010	62/F	Intermittent cough	Right lower lobe	Descending thoracic aorta	Video assisted thoracoscopic lobectomy
Montjoy 2010	57/F	Recurrent pneumonia	Right lower lobe	Descending thoracic aorta	Lower lobectomy

hemoptysis and hemothorax have been recognized in these patients.

Symptomatic patients should be referred to surgery for definitive lobectomy or wedge resection. Given the potential risk of massive hemoptysis in asymptomatic patients, they should be referred for resection as well.

The main and feared surgical complication, exsanguinating hemorrhage, can be prevented by preoperative radiographic identification of the arterial supply of the sequestration and appropriate early surgical isolation and management of the aberrant vessel.

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# Exploring Takotsubo Cardiomyopathy in an Elderly Patient with Acute Anxiety Attack

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## Abstract

Takotsubo cardiomyopathy (“broken heart”) exhibits a highly possible link between acute emotional stress and the onset of left ventricular dysfunction. This article describes a case report of takotsubo cardiomyopathy in an 89-year-old female; the patient is significantly older than the median age for this condition, which ranges from 63 to 76 years of age.<sup>1,2,3</sup> The exact mechanism of this condition is unclear and there are several hypotheses under investigation. Several studies have shown a link between takotsubo cardiomyopathy and elevated catecholamines.<sup>1,4</sup> Similarly, other studies have documented emotional and physical stress to be the underlying pathophysiology of this condition.<sup>3,5</sup> Another case study has proposed a novel hypothesis of a link between septal thickening in cases of takotsubo cardiomyopathy.<sup>6</sup> This article is an interesting case report of an elderly patient with takotsubo cardiomyopathy.

## Introduction

Takotsubo cardiomyopathy is a condition characterized by a sudden onset of cardiac symptoms along with transient left ventricular apical wall akinesis and ballooning, electrocardiography (EKG) changes with ST elevation or depression, formation of abnormal Q-wave, and/or elevation of cardiac enzymes in the absence of coronary artery disease. The condition was first described by Satoh et al.<sup>7</sup> The Japanese name of the syndrome is derived from its appearance on imaging studies.<sup>4</sup> On echocardiogram, cardiac MRI, or ventriculography, the heart looks like a flask with short neck and wide rounded body. At the end of systole, the shape of

ventricle resembles the Japanese fisherman’s octopus pot, the takotsubo. The syndrome was renamed stress cardiomyopathy in 2006.<sup>8</sup>

The newly described cardiomyopathy mimics the symptoms of an acute myocardial infarction after a sudden emotional or physical stress. The disorder classically affects older women, causing apical ballooning and basal hyperkinesis of the left ventricle.<sup>8</sup> Over 90% of the reported cases have been in females.<sup>4,6,9</sup>

The prognosis of patients with takotsubo cardiomyopathy is excellent. The left ventricular function and apical wall motion return to normal within days or weeks after the onset.<sup>3</sup> Several case studies have reported that the ejection fraction improved markedly within 48 hours.<sup>3,5,9,10</sup> On one to four years follow-up, the ejection fraction returned to baseline.<sup>3,9</sup>

## Case Description

An 89-year-old woman presented with left-sided chest discomfort, generalized weakness, and shortness of breath. She had a history of hypertension, hyperlipidemia, and chronic anxiety disorder. She did not smoke or drink.

She was admitted to the hospital shortly after the demise of her husband to whom she had been married for more than 60 years. The initial examination revealed no acute ECG abnormalities. However, a few hours later, there were significant ST elevations across the precordial leads with lateral wall involvement. Also, laboratory studies showed CK-MB at 1.6 and relative CK-MB index at 3.3 (elevated troponin at 0.29 and NT-proBNP 7124). The chest x-ray showed increased pulmonary vascularity and the echocardiogram showed an estimated ejection fraction of 30%. The cardiac catheterization

showed no evidence of obstructive coronary heart disease, increased left ventricular end diastolic pressure and marked distal anterior and distal inferior wall hypokinesis with apical dyskinesis. A follow-up chest x-ray showed improvement.

She was treated symptomatically and discharged on simvastatin, aspirin, carvedilol, furosemide, potassium supplementation, and losartan. A few weeks later, on echocardiogram showed that her ejection fraction had improved to 55%. She gradually improved and twenty-one months later, she is still doing quite well.

## Discussion

### Pathophysiology

The exact cause of the condition is not fully understood; however there are several hypotheses for better understanding of takotsubo cardiomyopathy. Many studies report that the underlying factor behind takotsubo cardiomyopathy might be emotional-stress-induced and neurohumoral-induced myocardial infarction.<sup>1,2,4,11</sup>

### Stress: Emotional and Physical

Anxiety increases risk of sudden cardiac death in patients who have cardiovascular disease.<sup>12</sup> In a recent prospective study, profound psychological stress was the triggering factor in developing takotsubo cardiomyopathy.<sup>5</sup> In this study, all subjects were women who had experienced some psychological or physical stress immediately prior to, or at least on the same day, of onset of symptoms. Another study showed a link between the cardiomyopathy and exposure to emotional and external stress including: trauma, surgical procedures, and exacerbation of a comorbidity.<sup>9</sup> A further report described an elderly woman suffering



from takotsubo cardiomyopathy a few hours after receiving tragic news regarding her son.<sup>10</sup> Dote et al,<sup>13</sup> feel the precipitating factor is emotional stress leading to spasm of the coronary arteries and resulting in reversible left ventricular dysfunction.

Several studies<sup>1,2,5</sup> have listed many psychological stressors that lead to the takotsubo cardiomyopathy. These include: confrontations and arguments with family members or relatives, emotional counseling sessions, deaths of close friends or relatives, catastrophic news related to loved ones, financial instability, fear of invasive medical procedures, acute onset or exacerbation of systemic disorders, court appearances, motor vehicle accidents, glossophobia, excessive alcohol consumption, surprise reunions, and surprise parties. Similarly, another study<sup>3</sup> indicated common cold, pneumothorax, exercise, and ventricular fibrillation

as some of the triggering sources for takotsubo cardiomyopathy.

### Biochemical

Some have explored the relationship between catecholamine levels and their role in the onset of the takotsubo cardiomyopathy. As reported, increase in catecholamine levels along with a mid-cavity obstruction potentiates a decrease in sub-endocardial coronary blood flow.<sup>6,14</sup> The proposed explanation is that a dynamic mid-cavity obstruction separates the left ventricle in two sections: basal and apical. The basal section of the ventricle has normal pressure and wall stress, while, the apical section has high pressure and high wall stress. This leads to decreased blood flow through the sub-endocardial coronary vessels. The mid-cavity obstruction is associated with structural abnormalities such as mid-septal thickening and left ventricular hypertrophy. An increase in catecholamine

level further decreases the sub-endocardial coronary blood flow.

Another hypothesis proposed by Lyon et al<sup>4</sup> explores "epinephrine-mediated acute myocardial stunning." Under ordinary catecholamine release, norepinephrine and epinephrine bind to myocardial  $\beta_1$  and  $\beta_2$  adrenoreceptors ( $\beta$ ARs) and increase both heart rate and contractility. Specifically, epinephrine has a propensity for  $\beta_2$  receptors. When epinephrine binds to the  $\beta_2$ AR, the Gs protein pathway is activated, increasing cAMP which activates protein kinase A (PKA). PKA phosphorylates other downstream intracellular targets, ultimately resulting in increased inotropy. However, during times of supra-therapeutic release of epinephrine (such as in times of severe emotional stress), the epinephrine binding to the  $\beta_2$ AR initiates a different cascade of intracellular events because the Gi protein, rather than the Gs

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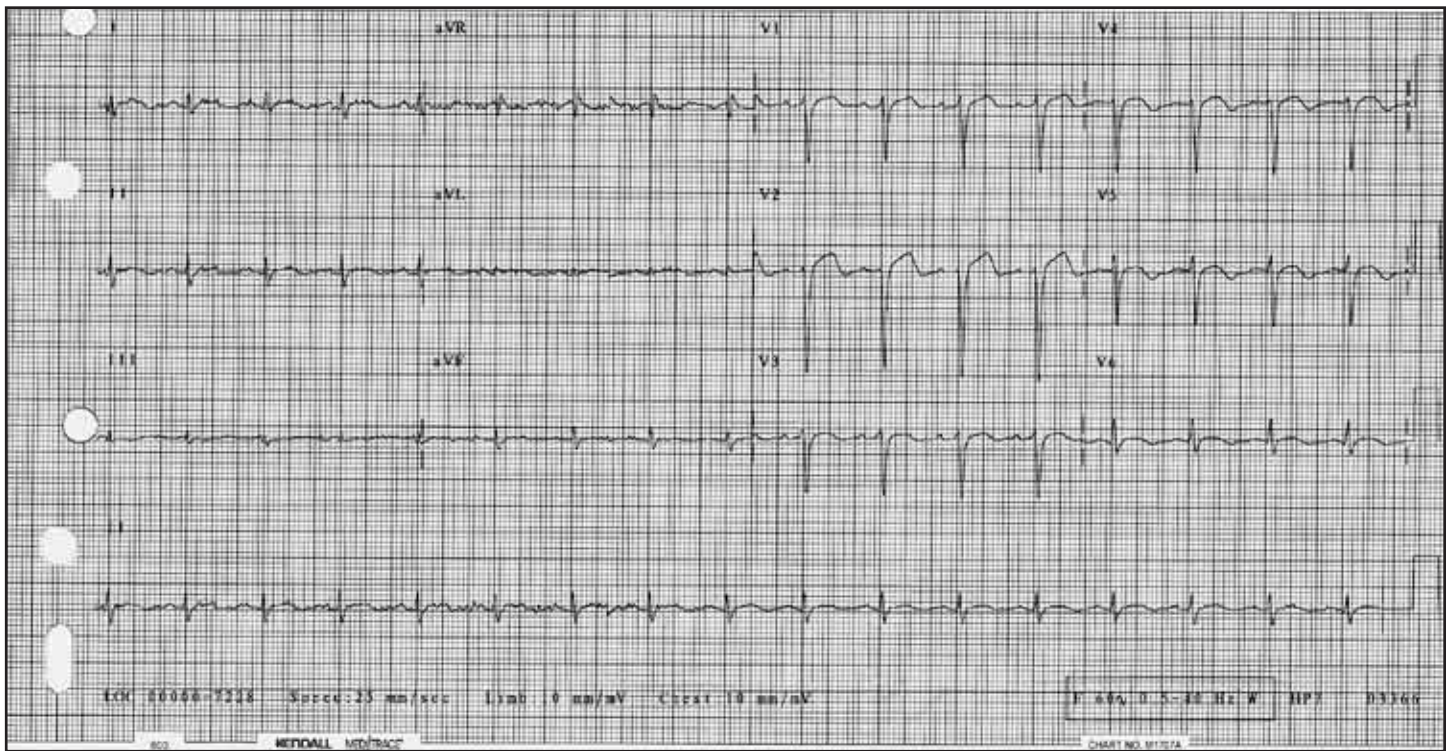
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**Figure 1a.**

ECG showing normal sinus rhythm with generalized non-specific ST changes prior to the occurrence of Takotsubo Syndrome.



protein, is activated. This switch from one intracellular pathway to another is called stimulus trafficking. The end result of Gi activation is negative inotropy. Furthermore, there is a physiologic increased density of  $\beta$ ARs in the apex of the human ventricle. This negative inotropy of the apex relative to the base of the ventricle brings about the characteristic ballooning seen on catheterization of patients with takotsubo cardiomyopathy. Similarly, another study<sup>11</sup> indicates that there is an underlying molecular mechanism which leads to the activation of alpha and beta adrenoceptors during emotional stress.

A study of nineteen patients demonstrated a significant discrepancy in plasma catecholamine levels at presentation between patients with takotsubo cardiomyopathy and Killip class III myocardial infarction; levels of epinephrine, norepinephrine, and dopamine were approximately 4:1, 2:1 and 3:2, respectively.<sup>1</sup>

Additionally, a recent case study<sup>15</sup> shows a link between elevated catecholamine levels due to undiagnosed pheochromocytoma and symptoms like takotsubo cardiomyopathy. A transthoracic echocardiogram (TEE) showed hypokinesis of the basal segments of the anterior, inferior, and lateral walls with preserved function in the apical segments which is opposite of the findings in takotsubo cardiomyopathy. Hence, it is commonly referred to as inverted-takotsubo pattern. The exact mechanism of these findings was not explained in the study.

#### Clinical Characteristics

A recent study stated that there is no universal diagnostic criteria for takotsubo cardiomyopathy.<sup>15</sup> However, Mayo Clinic has proposed diagnostic criteria for this condition. They include 1) transient hypokinesis, akinesis, or dyskinesis of the left ventricular mid segments with or without apical involvement, with the regional wall

motion abnormalities extending beyond a single epicardial vascular distribution, 2) absence of obstructive coronary disease or angiographic evidence of acute plaque rupture, 3) new EKG abnormalities or elevation in cardiac troponin level and 4) the absence of pheochromocytoma and myocarditis.<sup>16</sup>

Similarly, the most common presenting symptoms of patients with takotsubo cardiomyopathy are abrupt onset of severe substernal chest pain, acute dyspnea, ST segment elevation and hypotension. Some patients also presented with loss of consciousness, cardiac arrest and congestive heart failure.<sup>1,3,5</sup> Also elevated cardiac enzyme and increase in norepinephrine levels, significant ST changes in the ECG, and cardiac catheterization showing coronary arteries with no stenosis or obstruction.<sup>1,3,5,10,13</sup>

#### Comorbidities

Several studies have reported<sup>1,3,5,9</sup> patients with takotsubo cardiomyopathy who had a history of hyperlipidemia,

**Figure 1b.**

ECG showing ST changes in precordial leads consistent with anterior wall infarction with lateral wall extension.



hypertension, chronic obstructive pulmonary disease, diabetes mellitus, depression, physical and mental stress, and smoking. Some also had a previous history of cerebral infarction and syncopal episodes of unknown origin.<sup>3</sup>

## Conclusion

Takotsubo cardiomyopathy is characterized by the absence of demonstrable coronary artery disease with ECG evidence of myocardial infarction after enzyme elevation. Emotional stress is a possible underlying cause of the cardiomyopathy because it leads to an increase in catecholamine levels. Catecholamines activate the adrenoreceptors in the myocardium, resulting in reversible left ventricle apical ballooning and hypokinesia. In this case report, an elderly woman with history of chronic anxiety, presented a few days after her husband's funeral with typical features of takotsubo cardiomyopathy. Therefore, there is a possibility

that she suffered from acute exacerbation of her chronic anxiety.

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# Invasive Pneumococcal Disease Potentially Preventable: A Case Report

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## Introduction

The pneumococcal vaccine, the first vaccine derived from a capsular polysaccharide, is an important landmark in medical history. More people die from pneumococcal infections (an estimated 40,000 annually in the United States) than from any other vaccine preventable disease.<sup>1</sup> We are presenting a case of a young female who was admitted with meningitis and septic shock due to Streptococcus Pneumonia.

## Case Report

A 24 year old female with no major medical problems, presented to the emergency department with one day history of high fevers, headache, and neck stiffness. On arrival to the emergency department she had a seizure and was immediately intubated. She remained hypotensive despite aggressive fluid hydration and was started on vasopressors. She was admitted in the Medical Intensive Care Unit. Blood cultures were drawn and she was started on IV Vancomycin, ceftriaxone, flagyl and dexamethasone for suspected meningitis. She underwent a head CT which was normal. Subsequently she had a lumbar puncture. The results were:

- WBC count of 3900
- 84% PMNs
- RBC count of 130

- Protein of 297
- Glucose of 6

On admission her blood WBC count was 15000 which went up to 44000 that night. She remained acidotic with a Ph of 7.10 despite receiving bicarbonate boluses. Through the course of the night she went into pulseless electric activity three times and required cardiopulmonary resuscitation.

Her GCS remained 5 throughout the night and despite being on four vasopressors she continued to be hypotensive. At that time a family meeting was arranged. After talking to the family a brain flow study was ordered which was consistent with brain death. The patient was subsequently pronounced dead.

Her CSF and blood cultures were positive for Streptococcus Pneumoniae. Historical review of her chart revealed that about two years prior she had a motor vehicle accident and suffered frontal, nasal and orbital bone fractures causing a CSF leak at that time. She was however not vaccinated against pneumococcus during that hospitalization. She was also was a life long smoker.

Based on current recommendations; having a significant smoking history and a CSF leak are two indications for receiving a pneumococcus vaccination. Genotyping of her CSF fluid revealed strain 11A which is one of the strains which is present in the pneumococcal vaccine. Autopsy revealed basilar skull fractures which could have been potential portals of entry of the infection which led to the patient's presentation of meningitis.

## Discussion

The currently available pneumococcal polysaccharide vaccine, is manufactured by both

Merck (Pneumovax 23) and Lederie Laboratories (Pnu-Immune 23), and includes 23 purified capsular polysaccharide antigens ( serotypes 1 ,2,3,4,5,6B,7F,8,9N,9V,10A,11A,12F,14 , 15B,17F,18C,19A,19F,20,22F,23F and 33F). These serotypes represent 85-90 percent of the serotypes that cause invasive disease in the United States.

Invasive Pneumococcal Disease (IPD) is defined as isolation of Streptococcus pneumoniae from a normally sterile site such as blood and cerebrospinal fluid and not from sputum. The efficacy of the PPSV23 against invasive disease in adults is about 57 percent.<sup>2,3</sup> However, there is conflicting data regarding its efficacy for prevention of pneumonia, with most studies not showing a reduction in either all-cause pneumonia or pneumococcal pneumonia.<sup>4,5</sup>

A 2008 meta-analysis by Cochrane group that assessed the efficacy of PPSV23 for preventing pneumococcal infection in adults had the following findings:<sup>4</sup>

- strong evidence of efficacy against IPD (odds ratio 0.26, 95% CI 0.15-0.46)
- Inconclusive evidence regarding efficacy against all cause pneumonia

Based on this analysis PPSV23 vaccination is recommended by CDC for the following persons:

- Immunocompetent patients
  1. Persons aged > 65 years
  2. Persons aged 19-64 years with chronic cardiovascular disease, chronic pulmonary disease( including asthma) or diabetes mellitus
  3. Persons aged 19-64 years who smoke cigarettes, or who have alcoholism, chronic liver disease, cerebrospinal fluid leaks, or cochlear implants.
  4. Persons aged 19-64 years living in special environments

or social settings such as chronic care facilities.

• Immunocompromised Persons

1. Age >19 years with HIV infection, malignancy, chronic renal disease, nephritic syndrome, congenital immunodeficiency, on chemotherapy, asplenia and post organ or bone marrow transplantation.<sup>6</sup>

Surveillance data from the CDC of pneumococcal vaccination in adults >65 in 2005; found coverage varied from state to state with a median vaccine coverage of 66 percent (range 28 - 72 percent) and for age group <65 who are high risk as described above it was even lower.<sup>7</sup>

Investigators used the Active Bacterial Core (ABC) surveillance-Emerging Infections Program Network to determine the proportion of invasive pneumococcal disease (IPD) that might be prevented if persons with vaccine indications

had been vaccinated and to evaluate potential new indications.<sup>8</sup> From 2001 to 2003 1878 IPD case patients were identified in USA, 1558 (83%) had at least one current vaccine indication; only 590 (38%) were vaccinated.

Adherence to existing vaccine recommendations would have prevented 21 percent of all cases.

**Conclusion**

With this case report we are trying to increase awareness about the benefits of the pneumococcal vaccination against preventing invasive disease. Our patient had two potential risk factors; i.e. cigarette smoking and cerebrospinal leak. She still did not receive vaccination against pneumococcus. Unfortunately she had septic shock from a potentially preventable strain of the pneumococcus and had she been vaccinated, she might not have had a fatal outcome.

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# Neurosurgical Therapy for Central Area Status Epilepticus

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## Abstract

The authors report a case of status epilepticus localized to sensorimotor cortex that was successfully treated with surgical resection and multiple subpial transections (MST). A 43 year old woman presented in status epilepticus emanating from a right central area focus as verified by subdural grid and strip electrodes. The seizures were medically intractable but were successfully aborted after surgical intervention. The authors describe their case and review the literature on central area status epilepticus.

## Introduction

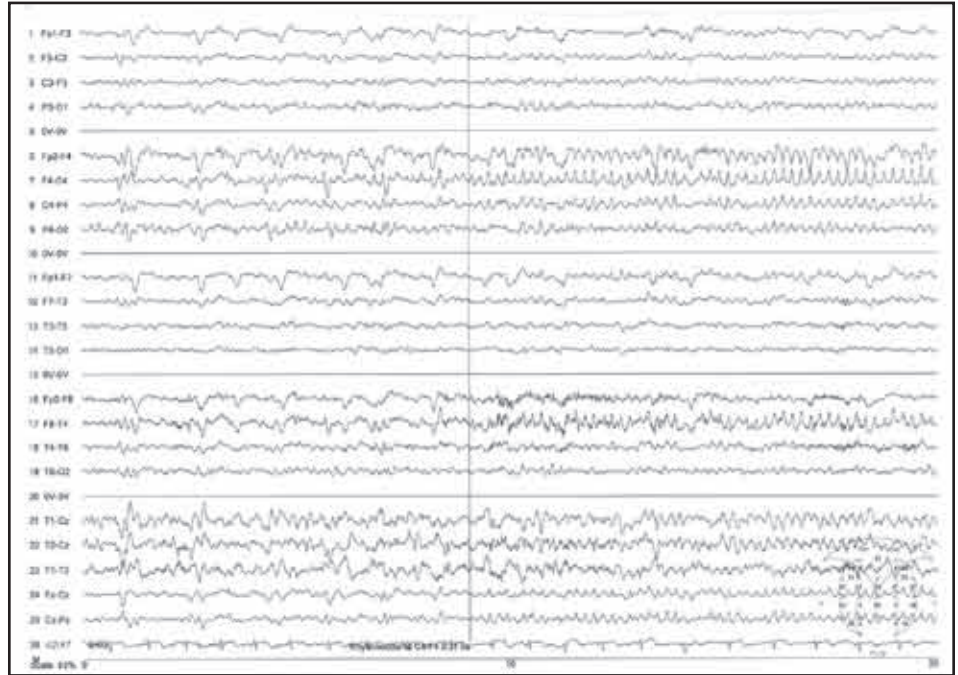
The central area consists of the pre- and post-central gyrus and contains the primary motor and sensory cortex. Central area epilepsy affects approximately 7-24% of patients with partial seizures.<sup>1</sup> Seizures emanating from the central area are frequently intractable and status epilepticus may result.

Surgical therapy of status epilepticus is increasingly reported in the literature.<sup>2,3</sup> Characteristics of these cases are listed in table one. Surgery has been traditionally considered a "last ditch effort" and is usually undertaken only after prolonged hospitalization and failure of high dose suppressive therapy.<sup>2,3</sup> This assumption may unnecessarily prolong hospitalization and surgical intervention may be frequently considered relatively early.

Surgical therapy of seizures emanating from functional cortex carries a higher risk of post-surgical

## Figure 1.

EEG tracing showing right fronto-central seizure activity.



neurologic deficits, making this option less attractive, particularly when there is no clearly visible lesion amenable to resection. We present a case of non-lesional central area status epilepticus successfully treated early in the course of hospitalization with a combination of resection and multiple subpial transections (MST).

## Case Presentation

A 43 year old female was admitted for multiple daily episodes of left arm and hand clenching. Continuous video EEG monitoring showed right centro-frontal electrographic seizures. (Fig.1)

Injections of lorazepam, fosphenytoin, valproic acid, and Phenobarbital were given. Oral topiramate, levetiracetam, and felbamate were given. Therapeutic levels of all medications were achieved, despite this, seizure activity remained. MRI of the

## Figure 2a, 2b, and 2c.

Axial Flair magnetic resonance imaging showing left middle cranial fossa arachnoid cyst.

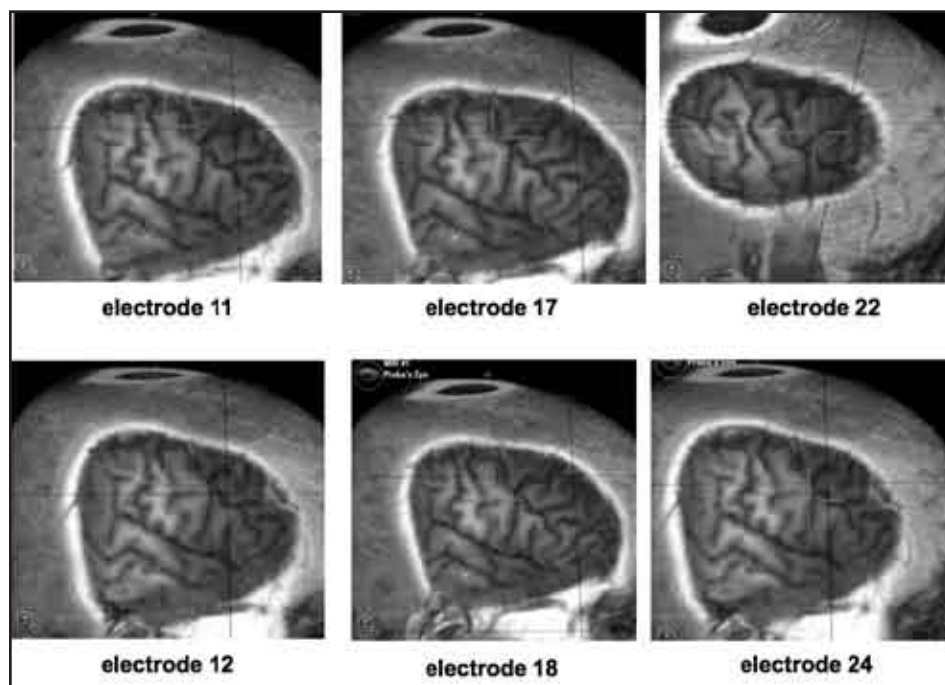


brain revealed a left arachnoid cyst with no abnormalities in the right hemisphere. (Fig.2) A decision was made to attempt surgical cure of the seizures.

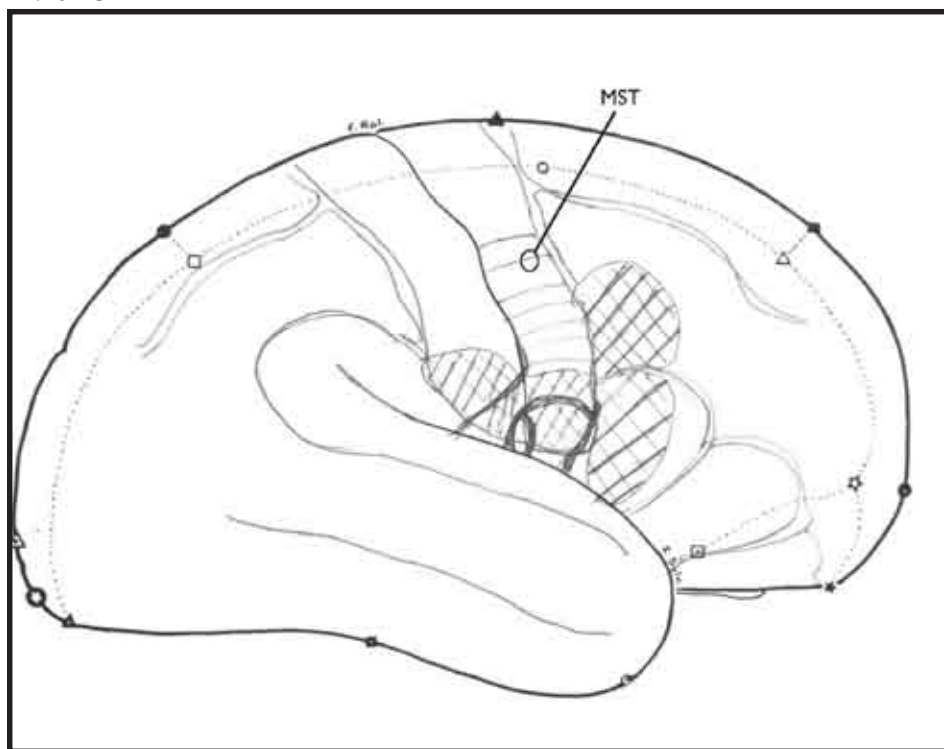
The patient underwent craniotomy and placement of subdural strip and grid electrodes over the right central and frontal regions for localization of the epileptic focus. Seizures were recorded and the seizure focus was localized to the inferior precentral gyrus and prefrontal area. Epileptiform activity was identified at leads 11, 12, 17, 18, 22,

**Figure 3.**

Image guided screen shots with the pointer placed over each electrode that recorded the seizure onset and the presumed epileptic focus.

**Figure 4.**

Postoperative brain map. Single lines across the pre-central gyrus represent the multiple subpial transections (MST). The hash marks delineate regions of subpial gyral emptying.



and 24. (Fig.3) Cortical mapping was performed to document primary sensorimotor localization. The patient returned to the OR for resection of the posterior portion of F2 and F3 followed by MST in the precentral gyrus. MST was performed by making multiple serial transections through cortex of the hand area. Sixteen channel electrocorticography was then positioned over the cortical surface and EEG recording was performed. There was continuous epileptiform discharge persisting at the most inferior precentral and postcentral gyrus, and this area was emptied. (Fig.4)

Following surgery, the patient was seizure free. She was seen in clinic nine months later and continued to be seizure free. She was then lost to follow up.

**Discussion**

Medically refractory status epilepticus is a life threatening condition. Both generalized and focal status carry high morbidity.<sup>4,5</sup> Treatment frequently involves high dose suppressive therapy which results in prolonged hospitalization and complications including line infections, pneumonia, deep venous thrombosis, ileus, and sepsis. This morbidity is unacceptably high and alternative therapies are needed. Surgical therapy of medically intractable status may be life saving.

While the medical protocol for convulsive status has been well defined, therapy for focal status epilepticus is more ambiguous.<sup>5,6</sup> Physicians may be hesitant to use high dose suppressive therapy because patients frequently present with intact cognition, making the risks of high dose suppressive therapy seem unacceptably high. In these cases, surgical therapy may present a more reasonable option for treatment but reports of this have been rare.<sup>7</sup>

**Table 1. Previously reported cases of surgical therapy for status epilepticus as cited in references** <sup>2,3,7,10</sup>

Age	Sex	Lesion	Prior Therapy	Type of Surgery	Outcome
4 years	female	nonlesional	coma induction with high dose suppressive therapy	right mesial parietal resection	seizure free off medications
7 years	male	right hemicortical dysplasia	coma induction with high dose suppressive therapy	right hemispherectomy	seizure free on one antiepileptic drug
30 months	male	hypothalamic hamartoma	six antiepileptic drugs	transcallosal resection followed by second resection	seizure free after second resection
4 month	female	focal cortical dysplasia	six antiepileptic drugs	left insular resection	continued seizures but less frequent
24 month	female	left frontal cerebral cavernous malformation	fosphenytoin phenobarbital	left frontal lesionectomy	seizure free off medications
2 month	female	right frontoparietal cortical dysplasia	coma induction with high dose suppressive therapy	right frontoparietal resection	seizure free at 15 months
16 years	male	left parietooccipital cortical dysplasia	coma induction with high dose suppressive therapy	left temporo-parieto-occipital resection	seizure free at 6 months
7 years	male	tuberous sclerosis	coma induction with high dose suppressive therapy	right frontal lobectomy	seizure free at 10 months
6 month	female	left hemimegalencephaly	coma induction with high dose suppressive therapy	left hemispherectomy	decreased seizure frequency
16 year	female	prenatal left ACA, MCA infarction	coma induction with high dose suppressive therapy	right functional hemispherectomy	unchanged seizures
4.5 month	female	right hemimegalencephaly	coma induction with high dose suppressive therapy	right hemispherectomy	seizure free at 4 months
14 year	female	Rasmussen encephalitis	coma induction with high dose suppressive therapy	left functional hemispherectomy	seizure free at 4 years
7 months	female	left hemimegalencephaly	coma induction with high dose suppressive therapy	left hemispherectomy	seizure free at 6 months
22 months	male	possible Rasmussen encephalitis	coma induction with high dose suppressive therapy	right functional hemispherectomy	seizure frequency decreased
13 year	male	right frontal cortical dysplasia	coma induction with high dose suppressive therapy	right frontal resection	seizure free at 4 months
36 year	female	nonlesional	coma induction with high dose suppressive therapy	left middle frontal gyrus resection and MST	seizure free at 16 months
9 year	male	right frontoparietal cortical dysplasia	coma induction with high dose suppressive therapy	right frontoparietal resection	seizure free

Surgery for central area and frontal lobe epilepsy is challenging and is usually less successful than that for temporal lobe epilepsy.<sup>8</sup> This is due to the difficulty of localizing the epileptic focus in the frontal and central areas with EEG, as well as the risk of sensorimotor deficits from surgery in the central area. Surgical therapy for central area status requires cortical mapping to identify sensorimotor cortex,

prevent postsurgical paresis, and maximize the size of excision.

The lack of a visible lesion on MRI makes surgical intervention more difficult. It increases the need for intracranial monitoring and decreases the chance for postsurgical seizure freedom.<sup>9</sup> Only a few cases of surgery for partial status epilepticus have been reported involving non-lesional MRI.<sup>3,4,10</sup> While lack of a clearly visible lesion may make surgery more

difficult, it does not eliminate this option, as illustrated by our case.

The epileptic focus in our patient involved a region of sensorimotor cortex. The inferior pre- and post-central gyri corresponding to lip, face, and tongue regions were resected. This can be done with no residual neurologic deficits due to bilateral hemisphere input. MST had to be performed through the somatotopic hand area, however to



prevent postsurgical deficits. This technique disrupts only horizontally oriented axons while leaving vertically oriented axons intact. Since the cerebral cortex has a columnar organization, this leaves cortical function intact but disrupts seizure spread. While MST may be less effective than resection at aborting seizures in long term follow up, it has been shown to successfully abort status epilepticus emanating from areas which cannot be resected.

## Conclusion

Despite the multiple challenges of surgical therapy for central area epilepsy, it should be considered relatively early in the course of status epilepticus. The mortality of epilepsy surgery is low<sup>2</sup> and earlier intervention may abort status faster, prevent complications of

prolonged medical therapy, and produce long term seizure freedom.

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# Mildly Reduced Preoperative Ejection Fraction Increases the Risk of Stroke in Older Adults Undergoing Coronary Artery Bypass Grafting

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## Abstract

**Introduction:** Current guidelines based on clinical trials may have inadvertently excluded a representative cohort of older adults. As a result, little is known about the predictors of stroke among elderly patients undergoing coronary artery bypass surgery (CABG). The purpose of this study was to determine how a lower than normal ejection fraction (EF) predicted post surgery stroke among elderly patients undergoing CABG when compared with younger populations.

**Methods:** Retrospective cross-sectional cohort analysis.

**Setting:** Charleston Area Medical Center, a tertiary medical center.

**Participants:** 8661 consecutive CABG cases between 2003 and 2009.

**Measurements:** Participants were divided into three different age groups: <65 years old (Group 1), between 65 and 79 years old (Group 2), and ≥ 80 years old (Group 3). We calculated the rate of overall neurological complications after CABG for patients with ejection fraction values: <40%, between 40% and 59%, and ≥60.

**Result:** Group 3 (age ≥ 80) with EF ≤ 39 had the highest odds of developing post CABG stroke (Odds Ratio (OR): 5.6) followed by Group 2 (age 65-79) with EF

40-59 (OR: 3.9). In addition, Group 2 (age 65-79) with EF ≤ 39 had the next highest odds of developing post CABG stroke (OR: 2.3) followed by Group 2 (age 65-79) with EF 40-59 (OR: 1.9).

**Conclusion:** Contrary to current guidelines, in our study population, mildly affected EF increased the overall risk of neurological complications among elderly patients undergoing CABG.

## Introduction

As Americans get older, more elderly patients will undergo Coronary Artery Bypass Grafting (CABG).<sup>1</sup> Some of the resulting consequences are higher costs to take care of these patients and adverse outcomes.<sup>2</sup> On the other hand, as a recent study has suggested, advances in surgical techniques have allowed the very old patients (> 80 years old) to undergo CABG with reasonable outcomes.<sup>3</sup>

Some believe that most of the non-fatal complications of CABG are the result of de-conditioning and stroke. As current practice guidelines were created based on studies including a small percentage of older adults<sup>4</sup>, we believe that such a body of literature fails to identify accurately the risk factors for post CABG stroke among the elderly.

Among the risk factors mentioned in current guidelines is decreased left ventricular systolic function. Based on current guidelines, an ejection fraction (EF) of less than 40% confers a 1.5 times increase in stroke risk after CABG. As a high percentage of elderly patients undergoing CABG have a decreased EF<sup>3,5</sup>, we sought to evaluate the probability of stroke among elderly with different levels of decreased left ventricular systolic function.

The primary aim of the study was to determine the effect of

left ventricular systolic function (reported as EF) on the risk of stroke among elderly patients undergoing CABG when compared with younger patients.

The secondary objectives were to compare the influence of decreased left ventricular systolic function in the probability of stroke among patients between the ages of 65 and 79 and those 80 years old and older with younger patients and to determine the predictors of adverse outcomes including mortality and major cardiac events (MACE) in our study population.

## Material and methods

This study included 8,661 patients undergoing CABG at our tertiary medical center from June 2003 to June 2009. For our analysis, we excluded patients that had concomitant valve surgeries or experienced cardiac arrest before or while they were undergoing their index procedure. The data were obtained, partially from the Society of Thoracic Surgeons Database (STS)<sup>6</sup> and complemented with information collected from hospital records.

Our study population was divided into three different groups; one group included patients less than 65 years old (Group1), another group included patients between the ages of 65 and 79 years old (Group2) and a final group included only patients 80 years old or older (Group3). For a subsequent analysis we subdivided the groups in categories based on their baseline ejection fraction (EF). As EF was expressed as a continuous variable we divided the values in three categories based on the following rationale: 1) <40%: considered an increased risk for post CABG stroke by current guidelines<sup>4</sup>,

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2) between 40 and 59%: considered clinically decreased but not a risk factor for stroke based on current guidelines, and 3) more than 60%: considered clinically normal.

A complete list of variables included in our analysis is located in Table 1. For this study (as they have been widely accepted by the medical community), we used the definitions of the STS database to define outcomes and baseline characteristics. The outcomes included stroke, overall mortality and major cardiac events (MACE). For the stroke variable, we created a combined outcome variable from the two permanent stroke fields from STS and a separate transient neurological outcome variable (TIA).

All analyses were performed using SPSS \ Version 17.0. (Chicago Illinois.) Descriptive statistics are expressed in terms of frequencies, percentages or means  $\pm$  Standard Deviation (SD). Categorical variables were tested by chi-square or Fisher exact tests and continuous variables were tested by student t-test or analysis of variance (ANOVA) where deemed appropriate. A 'p' value of 0.05 or less was considered significant.

A two step logistic regression model was used. First, we completed a backwards stepwise logistic regression which identified all significant predictors of stroke excluding age and ejection fraction. After identifying all of the significant variables during the first step, age

and ejection fraction were added to create a full regression model that allowed the comparison of the risk of stroke among the different age groups based on their pre-CABG ejection fraction.

## Result

The overall age of our cohort was  $63 \pm 11$  years, and 30.8% were females (n=2,669/8661). As explained in the methods sections, three groups were created. A total of 4651 patients were in Group 1, 3,453 in Group 2 and 557 in Group 3. Patients in Group 1 had a higher incidence of smoking and dyslipidemia and Group 2 had the highest percentage of patients with diabetes. As expected, patients in Group 3 had the largest number of subjects with peripheral vascular disease congestive heart failure (CHF), atrial fibrillation, and three-vessel coronary disease (see Table 1 for a full description of baseline characteristics).

All procedures were CABG only. A total of 1,704 (19.7%) were Off Pump procedures, and 6957 were on-pump. For the patients on pump, the pump time was <2 hours for the majority (55.9%) and >2 hours (22.6%) for the remainder. B-blockers were given to 76.9% of patients in Group 1, 75.5% of patients in Group 2, and 75.2% of patients in Group 3. Moreover, ACE inhibitors were used in 39.2%, 41.2%, 40.6%, of each group respectively (see Table 2)

The rate of TIA did not significantly differ among study comparison groups regardless of the baseline EF. The highest TIA rates were among Group 2 (age 65-79) with EF 40-59 (0.96%) and Group 3 (age  $\geq 80$ ) with EF  $\leq 39$  (0.83%), while two of the lowest TIA rates were found for Group 2 (age 65 -79) with EF  $\leq 39$  (0.16%) and Group 1 (age  $\leq 64$ ) with EF  $\geq 60$  (0.18), all non-significant (see Table 3 for complete listing).

Using backwards logistic regression it was found that a history of atrial fibrillation (OR 2.2), diabetes (OR: 1.4) or renal failure (OR: 1.9) were co-morbid conditions

**Table 1. Base Characteristics Variables Included**

Variables	Age Groups						p
	<64		65-79		$\geq 80$		
	n= 4651		n= 3453		n= 557		
	n	%	n	%	n	%	
Current smokers	1581	34.0	567	16.4	32	5.7	<0.001
Family History of CAD	2717	58.4	1624	47.0	214	38.4	<0.001
Diabetes	1858	39.9	1461	42.3	190	34.1	0.001
Renal Failure	106	2.3	109	3.2	23	4.1	0.007
Dyslipidemia	1277	27.5	906	26.2	120	21.5	0.010
COPD	1708	36.7	1293	37.4	216	38.8	0.570
CVD	321	6.9	486	14.1	100	18.0	0.001
PVD	381	8.2	500	14.5	85	15.3	0.001
Previous CABG	249	5.4	226	6.5	19	3.4	0.004
Previous MI	722	15.5	465	13.5	87	15.6	0.029
CHF	312	6.7	302	8.7	71	12.7	0.001
Angina	2782	59.8	1878	54.4	321	57.6	0.001
Atrial Fibrillation	579	12.4	827	24.0	151	27.1	0.001
Three Vessel Disease	3226	69.4	2569	74.4	437	78.5	0.001
Pump Time							
Off pump	968	20.8	699	20.2	127	22.8	
$\leq 119$ minutes	2692	57.9	1900	55.0	297	53.3	
$\geq 120$ minutes	991	21.3	854	24.7	133	23.9	0.003



**Table 2. Pre-operative Medications**

Pre Op Medications	Age groups						p
	<64		65-79		>=80		
	n	%	n	%	n	%	
Beta Blockers	3576	76.9	2606	75.5	419	75.2	0.284
ACE Inhibitors	1823	39.2	1421	41.2	226	40.6	0.199
Anticoagulants	1939	41.7	1155	33.4	217	39.0	<0.001
Statin	3349	72.0	2437	70.6	389	69.8	0.273
Plavix	176	3.8	96	2.8	10	1.8	0.006

**Table 3. TIA Rates by age and by EF**

Group	EF value	At Risk		TIA		p
		n	n	n	%	
1 <=64 years	EF<=39	820	5	0.61		
2 65 - 79 years	EF<=39	620	1	0.16		
3 >= 80 years	EF<=39	120	1	0.83		0.36
1 <=64 years	EF 40-59	2717	11	0.40		
2 65 - 79 years	EF 40-59	1878	18	0.96		
3 >= 80 years	EF 40-59	294	2	0.68		0.07
1 <=64 years	EF >=60	1114	2	0.18		
2 65 - 79 years	EF >=60	955	5	0.52		
3 >= 80 years	EF >=60	143	1	0.70		0.34

associated with post CABG stroke. In addition, patients with a past history of Cerebrovascular Disease (CVD) (OR: 1.5), Peripheral Vascular Disease (PVD) (OR: 1.5) or angina (OR: 1.6) had increased odds of developing post CABG stroke. Female gender (OR: 1.4) and longer pump time >= 120 minutes OR: 2.7) were significant predictors of stroke as well (see Table 4 for complete listing).

There was a significant increase in stroke rates as age increased. The absolute unadjusted stroke rates were 1.5% (64/4243), 3.3% (106/3187) and 7.4% (38/513) for Group 1 (<= 64 years), Group 2 (65-79 years) and Group 3 (>= 80 years), respectively (p<0.001). The full regression model

controlling for all of the risk factors for stroke showed that those patients in Group 3 with EF <= 39 had the highest odds of developing post CABG stroke (OR: 5.6) followed by patients in the same group with EF 40-59 (OR: 3.9). In addition, it was found that patients in Group 2 with EF <= 39 had the next highest odds of developing post CABG stroke (OR: 2.3) followed by those with EF 40-59 in the same group (OR: 1.9) All these findings significantly differed from the reference category (age <=64) with EF >= 60.

As might be expected, the operative death rate was highest in Group 3 (8.6%), slightly lower in Group 2 (3.1%) and lowest in

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**Table 4. Predictors of Stroke**

Variables	Odds Ratio	95% C.I.		p
		Lower	Upper	
Age<=64 EF>=60	Reference			
Age65-79 EF<=39	2.3	1.5	3.6	.000
Age65-79 EF40-59	1.9	1.3	2.6	.000
Age>=80 EF<=39	5.6	2.9	10.9	.000
Age>=80 EF40-59	3.9	2.3	6.4	.000
Off Pump	Reference			
Pump time <=119 minutes	1.6	1.0	2.6	.032
Pump time >= 120 minutes	2.7	1.7	4.3	.000
AFIB	2.2	1.6	2.9	.000
Diabetes	1.4	1.0	1.8	.027
Renal_Failure	1.9	1.1	3.3	.019
CVD	1.5	1.1	2.1	.023
PVD	1.5	1.0	2.1	.042
Angina	1.6	1.2	2.1	.003
Female gender	1.4	1.1	1.9	.016

Group 1 (1.4%;  $p < 0.001$ ). Likewise, a similar pattern was found to be significant for the MACE rates for the 3 groups. The rates varied from 3.9%, to 6.7% to 15.3% for Groups 1, 2 and 3, respectively ( $p < 0.001$ ). Lastly, we plotted the risk of stroke by EF category and compared the risk of stroke by age and EF combined (The results are demonstrated in Graph 1).

## Discussion

As more individuals that are elderly undergo CABG, the experiences accumulated by clinicians and surgeons are allowing them to obtain better outcomes. Moreover, there are proven benefits of the use of CABG in the elderly. Such benefits range from increased survival to better quality of life.<sup>7</sup> However, such positive results are often obscured by the potential higher cost and increased need of post surgical and post discharge special care.

Our main objective was to determine how pre-CABG left

ventricular function expressed as EF can predict the risk of stroke in older adults. Although we expected that age would play a role in the incidence of stroke among those patients 65 years or older, what we found interesting is the exponential increase of risk among the patients with EF between 40 and 59%. This finding is more evident in those 80 years or older.

Traditionally, an EF of less than 40% is considered a risk factor for perioperative stroke.<sup>4</sup> In our study, for patients older than 65 years old, the risk of stroke increased with a slight reduction of preoperative EF (e.g., values between 40 and 59%). The effect of decreased preoperative EF on the risk of stroke is even more evident for the subgroup of octogenarians. Similar results were found in a study conducted by Ennker J et al<sup>8</sup> in which it was found that an EF of less than 50% was a predictor of mortality, although their study included

patients undergoing aortic valve replacement with or without CABG.

Furthermore, Gopaldas et al<sup>3</sup> completed a series of logistic regression analyses to identify independent predictors of surgical mortality and discharge status among 5731 octogenarians. The authors found that congestive heart failure was one such factor. However, in their methodology they embedded this variable within the Deyo index and not as a sole variable.

An expected finding in our cohort was the relationship between age and adverse neurological outcomes. Current guidelines and many studies have found the same relationship between age and adverse outcomes in patients undergoing CABG as well as the general population. Data from the Centers for Disease Control reported a stroke prevalence of around 8% from 2005 to 2010 among individuals 65 years or older in the US. The incidence of stroke associated with CABG has been reported between 1 and 5%, with a consistent strong relationship with age (most often using 75 years of age as a cut of point. In our study group the incidence of stroke among those 80 years old or more was 7.4%. Contrasting with traditional knowledge, a recent mini review of the literature suggests that older adults have similar outcomes post CABG as younger populations. Other studies have found that adjusted CABG-related mortality among elderly patients is comparable to the general population when outcomes are controlled for by co-morbid conditions such diabetes and renal failure.<sup>7</sup>

Overall, the importance of our study is based on the unique way EF was treated as a sole variable and the way that the study population was categorized based on age and EF. Overall, the emerging literature is encouraging. Although some data suggest that elderly patients undergoing CABG are at higher risk of perioperative morbidity and mortality, newer techniques and experienced surgeons are allowing these patients to undergo

these procedures with more than acceptable outcomes and with obvious benefits in terms of quality of life and some times, prolonged life expectancy.<sup>5</sup>

On the other hand, the current body of evidence suggests that one the most devastating complications of CABG is stroke which results in longer hospital stays and the obvious need for post discharge rehabilitation.<sup>3</sup> Elderly patients are more susceptible to being affected long-term by strokes especially due to their baseline conditioning.<sup>9</sup> As our data shows, any minimal decrease in EF in elderly populations can significantly increase the risk of stroke. In our opinion, efforts from clinicians and the scientific community should focus on identifying baseline comorbid conditions associated with stroke and determine ways to optimize them prior to CABG in order to improve outcomes. For example,

as demonstrated before, the use of beta-blockers and ACE inhibitors before CABG is not only associated with inhibition of the ventricular remodeling<sup>10</sup> but also with a rapid improvement in left ventricular function. In our study population, only a fraction of the patients in each group received concomitant preoperative ACE inhibitors while a moderate amount received beta-blockers which is consistent with previous reports in the literature.<sup>11</sup>

The limitations of our study include the retrospective nature with its inherent biases. It is also possible that unmeasured and/or potential confounding variables not used in the current analysis could explain more of the variance in the outcomes measured. The fact that this was a single-center study, although quite large, could limit the generalizability of the study findings.

In our study population, mildly reduced EF is a predictor of stroke

among elderly patients undergoing CABG. These findings contrast with current guidelines, which might underestimate the real risk of stroke in the patient population.

### Acknowledgements

We want to thank Mrs. Cyndi Hanna for her assistance editing the final version of the manuscript.

No financial support was obtained to complete this study and the authors have no conflicts to report.

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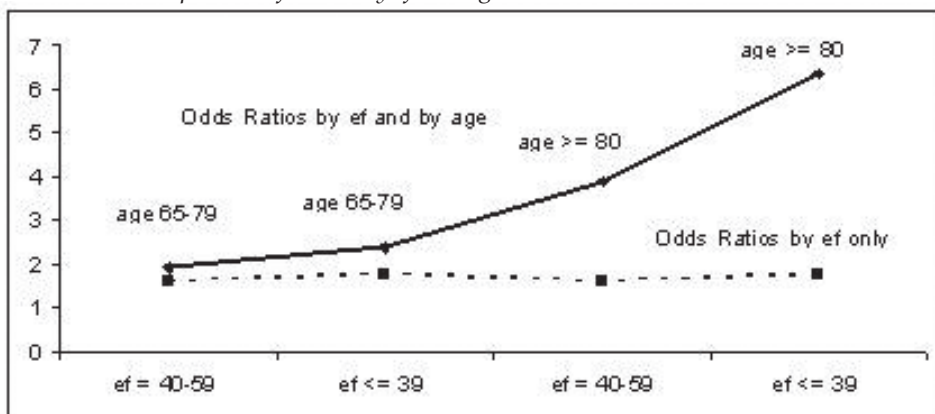
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**Figure 1.**  
Odds Ratio comparison of stroke by ef and age.



ef = ejection fraction

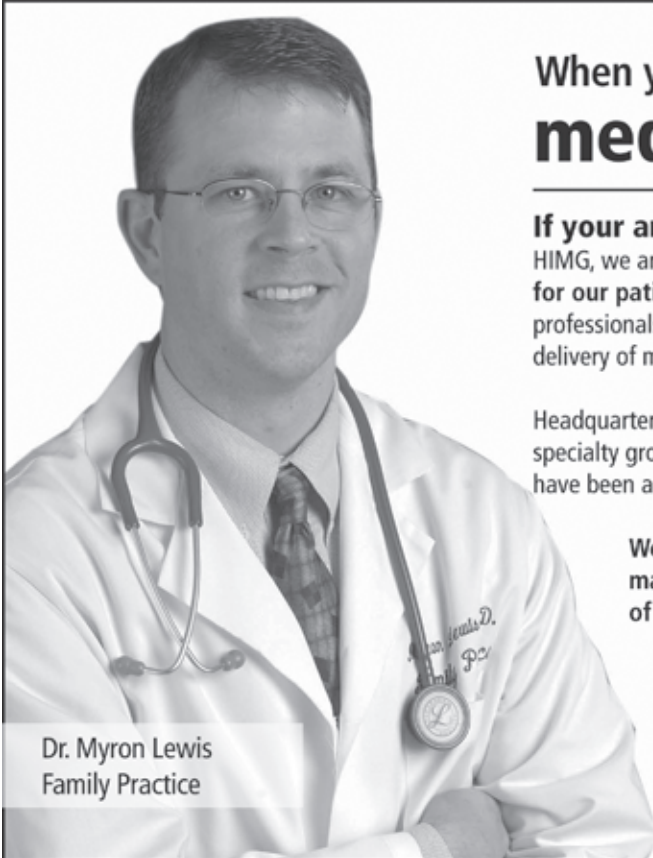
Reference category (comparison group) = ef >60 and age <64

The odds ratios that on the dashed line are based on ef only, while the odds ratios that fall on the solid line represent values based on age and ef categories

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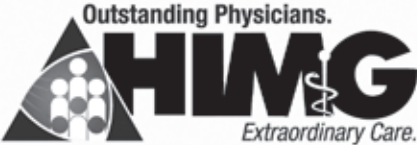
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# To Scan or Not to Scan

**Sirinan Tazen, MD**

WVU, Dept. of Neurology, Morgantown

**Gauri Pawar, MD**

Program Director, WVU, Dept. of Neurology,  
Morgantown

## Introduction

Parkinsonism is a neurologic syndrome that has clinical features similar to Parkinson's disease. The differential diagnoses for Parkinsonism include normal aging, drug-induced Parkinsonism, Parkinson-plus (progressive supranuclear palsy, corticobasal degeneration, multiple system atrophy), vascular Parkinsonism, normal pressure hydrocephalus.<sup>1</sup> Due to the long list of differential for Parkinson's disease, careful attention to the signs, symptoms, and time course is important for an accurate diagnosis and treatment.

Parkinson's disease (PD) is a progressive neurodegenerative disorder secondary to the loss of dopaminergic neurons in the nigrostriatal pathway. The cardinal symptoms of PD are resting tremor, rigidity, bradykinesia, and postural instability. Onset of motor signs of PD is usually asymmetric, unilateral resting tremor of upper extremity. Tremor in PD is rhythmic with the frequency of 3-5 HZ known as pill-rolling tremor. It usually spreads to the contralateral extremity within three years.<sup>2</sup> In early disease of PD, tremor may be intermittent. It may be accentuated with outstretched hands and mental task performance, but diminished with voluntary activity. PD's patients have rigidity that is described as lead pipe or cogwheeling rigidity. Bradykinesia is also one of the prominent signs of PD. It is described as slow, decreased spontaneous movement with low amplitude. It can include

micrographia, hypomimia, hypophonia as well as decreased blink rate. Late course of PD, patient may develop flexed posture of neck, trunk, shorter stride, trouble initiating gait or stopping gait which leads to frequent falls. Postural instability usually occurs within five to eight years after the onset of the disease.<sup>1</sup> Advanced PD and Parkinsonism are the most common neurologic causes of falls in elderly.<sup>3</sup> The frequent falls may lead to the first neurology visit since an approximate 30% of patients with PD do not have resting tremor.<sup>3</sup>

PD is a clinical diagnosis based on history, neurologic examinations, and improvement of motor symptoms with dopaminergic therapy.<sup>2</sup> Thus patients with classic PD's features do not require neuroimaging studies. However when the examination, history, and symptoms do not follow the typical PD course i.e. unilateral tremor that does not usually progress to other extremities within 3 years from symptoms onset,<sup>2</sup> imaging studies such as MRI brain should be considered to rule out other structural causes.

## Case Presentation

A 57 years old right-handed male with history of hypercholesterolemia presented to our neurology clinic with three years history of tremor of right upper extremity which was unchanged in severity during that duration. The tremor was limited to the right upper extremity and had not spread to other extremities over the past 3 years. The family had noticed soft voice with stiffness, and decreased movement of right upper extremity. However, patient still remained functional with his two jobs as a mailman and janitor. Patient denied memory problem,

visual hallucination, urinary incontinence, or history of using dopamine blocking agents.

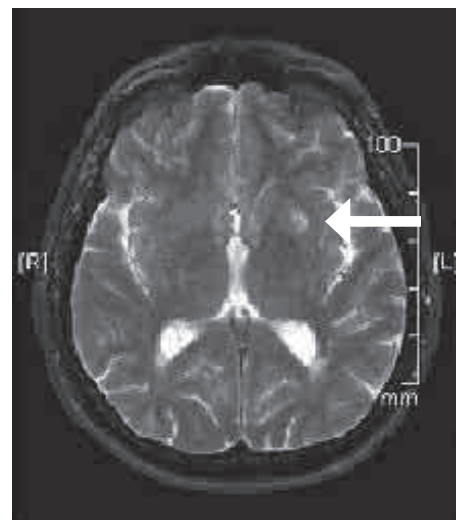
## Physical examination

Patient's mental status and cranial nerves were normal except for hypophonic speech. Patient's right upper extremity revealed spasticity with flexion at the elbow and wrist. A resting tremor of right upper extremity was seen, which worsened with action. Patient had decreased fine fingers movements on the right hand. On gait testing, patient was noted to have decreased arm swing on the right. Motor examination and reflexes were normal. Routine investigations revealed normal electrolytes and TSH. An MRI brain revealed a lacunar infarct in left putamen and internal capsule (see picture).

## Discussion

Understanding the cardinal symptoms and progression of PD is helpful in long term management and education of patient. If

*MRI Axial T-2 weighted: old lacunar infarct left putamen and internal capsule.*



symptoms and clinical presentations do not follow the typical course of PD, neuroimaging, preferably a MRI brain scan, should be obtained to investigate and rule out other structural abnormalities. As in our patient, there were many clinical abnormalities that did not suggest typical presentation of PD. Firstly, the resting tremor did not spread to contralateral side for more than three years. The subtle decreased fine fingers movements as well as spasticity of his right upper extremity were indications of pyramidal tract involvement. In this case the MRI brain confirmed our suspicion of structural lesions in basal ganglia and internal capsule regions.

Many hyperkinetic and hypokinetic movement disorders have been reported after ischemic and hemorrhagic stroke. Post stroke

movement disorder can present acutely or as a delay.<sup>4,5</sup> Treatment with dopamine agonist (DA) is usually not necessary since the etiology is not due to the loss of dopaminergic degeneration of nigrostriatal neurons. However, the symptomatic treatment may be required if symptoms hinder the activity of daily living.<sup>4</sup> Levodopa or a dopamine agonist can be used initially for patients who require symptomatic therapy. However levodopa and peripheral decarboxylase inhibitor, carbidopa, remain the standard of treatments for Parkinsonism with bradykinesia and rigidity.<sup>3</sup> Anticholinergic drugs should be reserved for younger patients in whom tremor is the predominant problem as it can worsen confusion in elderly. Unfortunately there

is no pharmacologic therapy for postural instability which may lead to fall. Measures such as home safety assessment, gait training, walker, or wheelchair should be implemented in patients with history of frequent falls.<sup>3</sup>

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**WEST VIRGINIA** is considered one of the most rural states in the nation according to the U.S. Census Bureau. Our citizens are statistically older, less educated, have lower incomes, and contend with chronic medical conditions more than their national counterparts. In addition to these statistical barriers, access to healthcare is often limited by a scarcity of local providers. This special edition of the *West Virginia Medical Journal* will focus on the challenges these disparities create and will strive to offer solutions for the betterment of healthcare delivery to our citizens.

The *West Virginia Medical Journal* is soliciting articles for this special CME edition to address issues such as:

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# West Virginia Vectorborne Disease Surveillance Report

## For the Period: May-July 13, 2012

The WV Bureau for Public Health's Office of Epidemiology and Prevention Services routinely monitors for arthropod-borne diseases. These are not an uncommon occurrence with ten cases of Lyme disease reported in WV since January 1, 2012. Attached to this report are some patient education materials about preventing insect exposures. As noted below, these insects in WV are regularly found to be carrying pathogens, such as West Nile virus.

### Mosquito-borne disease surveillance summary

Human Surveillance: During the period May-July 13, 2012, two human cases of malaria have been confirmed in West Virginia; both are travel-associated cases and were not acquired within West Virginia. In addition, two

possible LaCrosse encephalitis cases are currently under investigation.

### Tickborne disease surveillance summary

Human Surveillance: During the period May-July 13, 2012, 7 Lyme disease cases were detected in West Virginia. The cumulative total of human Lyme disease cases for all of 2012 is ten. No human cases of Ehrlichiosis, Anaplasmosis, Babesiosis, or RMSF have been confirmed in West Virginia during 2012.

### Tick Surveillance

Tick drags in the National Parks of Harpers Ferry and New River Gorge were conducted this past spring. The blacklegged tick (*Ixodes scapularis*), vector for Lyme disease, human anaplasmosis, and human babesiosis, was found in almost every collecting locality in Harpers Ferry within Jefferson county.

The Army Institute of Public Health, United States Army Public Health Command is testing the ticks from Harpers Ferry for the disease agents responsible for Lyme disease, human anaplasmosis, and human babesiosis. A single adult, female blacklegged tick was found in Fayette County in the New River Gorge National Park. Since this specimen represents a new county record for the species, it will be preserved and not tested for pathogens.

*Ixodes scapularis* was also found in new counties. Tick drags captured fifteen *I. scapularis* nymphs from Kanawha County in May and June 2012. One blacklegged tick nymph was captured in Preston County in late May despite multiple collecting trips.

For questions or comments, contact Rachel Radcliffe (Division of Infectious Disease Epidemiology) at [rachel.radcliffe@wv.gov](mailto:rachel.radcliffe@wv.gov)

**Table 1. Summary of human cases of mosquito-borne diseases for the current reporting period and 2012 (cumulative) – WV**

Mosquito-borne Disease	# Confirmed or Probable Human Cases <sup>a</sup>		Comments
	May-July 13, 2012	Total 2012	
La Crosse infection, human	0	0	2 cases are currently under investigation
West Nile virus infection, human	0	0	
Other mosquito-borne infection, human	1	2	All cases are travel-associated malaria infections

<sup>a</sup>Note: Table includes only confirmed or probable cases that have been reviewed and closed by Division of Infectious Disease Epidemiology staff

**Table 2. Summary of adult mosquito surveillance for the current reporting period and 2012 (cumulative) – WV**

Mosquito Species	Current (May-July 13, 2012)					Total 2012					Comments
	# Pools collected	+ Arbovirus <sup>a</sup>				# Pools collected	+ Arbovirus <sup>a</sup>				
		WNV	LAC	SLE	EEE		WNV	LAC	SLE	EEE	
<i>Culex</i> spp.	76	5	-	-	-	76	5	-	-	-	
Non- <i>Culex</i> spp.	124	36	-	-	-	124	36	-	-	-	

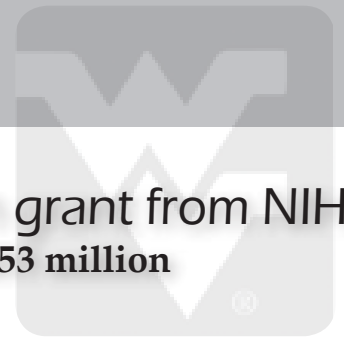
<sup>a</sup>Mosquito pools testing positive for arboviruses. WNV=West Nile virus; LAC=La Crosse ; SLE=St. Louis encephalitis; EEE=Eastern equine encephalitis

Note: The West Virginia Department of Health and Human Resources Mosquito Surveillance program has recovered West Nile virus (WNV) from mosquitoes collected in the following counties: Boone, Cabell, Fayette, Kanawha, Nicholas, Putnam, Wayne, Webster, and Wood counties. West Nile virus was not found in mosquitoes captured in Harrison, Mercer, Raleigh or Roane counties. Currently, 41 of 200 (20.5%) collected mosquito pools have tested positive for WNV. The majority of the positive pools were collected from June 28-July 10, 2012. In comparison, by the same time last year, one of 70 (1.4%) mosquito pools were WNV-positive.

**Table 3. Summary of human cases of tickborne diseases for the current reporting period and 2012 (cumulative).**

Tickborne Disease	# Confirmed or Probable Human Cases <sup>a</sup>		Comments
	May-July 13, 2012	Total 2012	
Lyme disease, human	7	10	3 Lyme disease cases conf. prior to May 1, 2012
Rocky Mountain spotted fever <sup>b</sup>	0	0	
Ehrlichiosis, human	0	0	
Other tick-borne infection, human	0	0	

<sup>a</sup>Note: Table includes only confirmed or probable cases that have been reviewed and closed by Division of Infectious Disease Epidemiology staff <sup>b</sup>Includes all spotted fever rickettsioses



## WVU Health Sciences gets \$19.6 million research grant from NIH Additional investment from statewide partners makes total \$53 million

The Robert C. Byrd Health Sciences Center of West Virginia University has been awarded a \$19.6 million grant from the National Institutes of Health (NIH) that will be used to address the health issues that most commonly affect West Virginians.

The grant to the West Virginia Clinical and Translational Science Institute (WVCTSI) is part of the NIH Institutional Development Award Program for Clinical and Translational Research (IDeA-CTR). The federal program provides funding for the development of infrastructure and to enable scientists to become more competitive for NIH and other biomedical research funding opportunities over the next five years.

In addition to the NIH grant, other leading educational, health sciences and healthcare entities from across the state have committed to providing another \$33.5 million

to the WVCTSI, to make the total initiative worth an unprecedented \$53.1 million over the next five years.

The partnership includes the West Virginia University Health Sciences Schools of Medicine, Dentistry, Nursing, Pharmacy and Public Health; WVU Healthcare and the West Virginia United Health System; Charleston Area Medical Center, CAMC Institute and WVU-Charleston; the West Virginia School of Osteopathic Medicine and more.

“This NIH grant serves to instantly propel WVU Health Sciences onto a higher level as a research institution,” Christopher C. Colenda, M.D., M.P.H., chancellor for WVU Health Sciences, said. “I consider this one of the greatest accomplishments to have occurred in the history of WVU Health Sciences. It will help us to transform lives and eliminate the health disparities in the state.”

Colenda said the grant would pay for infrastructure – the people,



equipment, programs and protocols – that would qualify WVU for more and greater NIH grants in clinical translational research that would fund specific disease-related studies to target cancer, heart disease, stroke and obesity related diseases.

Under the grant, 24 physician scientists will be hired over the next five years, along with 22 other staff and professional positions.

The principal investigator for WVU is Uma Sundaram, M.D., director of the WVCTSI.

The grant will allow the WVCTSI to establish collaboration among the in-state partners, and with other institutions that already have established and NIH-funded programs in clinical and translational research, such as the University of Kentucky, Ohio State University and Indiana University, who were all part of WVU’s grant application.

The grant required a 472-page application to the NIH. With this award, WVU will join an elite group of institutions committed to improve human health by streamlining science, transforming training environments and improving the conduct, quality and dissemination of clinical and translational research.



## Marshall scientist awarded NIH grant for lung cancer research

A Marshall University faculty member has been awarded a three-year, \$426,000 grant by the National Institutes of Health (NIH) to further her lung cancer research.

Dr. Piyali Dasgupta, associate professor in the Department of Pharmacology, Physiology and Toxicology in the university's Joan C. Edwards School of Medicine, will use the grant to continue her work to determine if the nutritional agent capsaicin—the active ingredient in chili peppers—can improve the anti-cancer activity of the commonly used chemotherapy drug cisplatin in patients with small cell lung cancer.

Dasgupta received the funding through the National Cancer Institute's Academic Research Enhancement Award program. The program supports research projects in the biomedical and behavioral sciences that strengthen the research environment of the institution and expose students to research. Her co-investigator is Dr. Monica Valentovic, a professor in the same department.

"Small cell lung cancer is characterized by a high rate of growth, early metastasis and a dismal survival rate," said Dasgupta. "Although chemotherapy works well initially in these patients, they often relapse quickly and become unresponsive to chemotherapy. Since the preliminary data in our laboratory shows that

capsaicin manifests anti-cancer activity in this type of cancer, we are hopeful our studies under this new grant may lead to new treatments."

She continued, "I am thrilled to receive this funding and I am grateful to a lot of people who have been instrumental in our success to this point. My collaborator Dr. Valentovic is a fabulous scientist to work with. I am also grateful to all the members of my lab for their hard work and dedication."

Dasgupta also acknowledged the support of the chairman of her department, Dr. Gary Rankin, and acknowledged Dr. Marcia Harrison and the MU-ADVANCE program, which she says made it possible for undergraduate students to work in her lab. MU-ADVANCE is a National Science Foundation-funded program to help increase the number of female science and engineering faculty at the university.

Dasgupta says she believes her proposal was selected for funding at least in part because the grant program's focus on student research made it a good match for her lab. Undergraduates working in her lab have a track record of receiving research grants, authoring publications and presenting their findings at international conferences.

Dr. John M. Maher, Marshall's vice

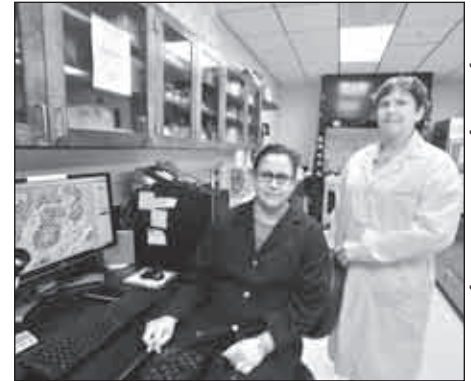


Photo by Rick Hays, Marshall University

Dr. Piyali Dasgupta, left, and Dr. Monica Valentovic

president for research, congratulated the researchers, saying, "NIH grants are extraordinarily competitive, and I applaud Drs. Dasgupta and Valentovic for having a successful application. They are doing vital research that may very well have a positive impact on human health in the not-so-distant future. In addition, the grant will allow them to continue to give students hands-on, meaningful research opportunities in the lab."

Dr. Dasgupta recently was notified that her grant from the Flight Attendant Medical Research Institute has been renewed for an additional two years. That grant is funding Dasgupta's study of how nicotine, the active component in cigarette smoke, facilitates the progression of lung cancer. Valentovic is also the co-investigator on that award.

## Scholarship created in honor of retiring Joan C. Edwards School of Medicine administrator

James "Jim" J. Schneider retired from the Marshall University Joan C. Edwards School of Medicine in June, but his service to the school will live on through the creation of an endowed scholarship in his name.

The scholarship, known as the James "Jim" J. Schneider Endowed Scholarship, will be awarded to an entering first-year

student chosen by the School of Medicine scholarship committee in conjunction with the Marshall University Financial Aid office.

"Jim was a steady and effective leader during the School of Medicine's expansion to the Marshall University Medical Center in the 1990s," said Linda Holmes, director of development and alumni affairs with the School of

Medicine. "He also guided several other multi-million dollar School of Medicine building projects."

Schneider served the School of Medicine and University Physicians & Surgeons, Inc., for 21 years, finishing his career as the senior associate dean for finance and administration and executive director, respectively.

## Japanese osteopathic students visit WVSOM



Six osteopathic students and their instructors traveled nearly 7,000 miles to learn more about anatomy and osteopathic manipulation at the West Virginia School of Osteopathic Medicine (WVSOM).

WVSOM hosted the Japanese visitors, from the Atlas College of Osteopathy (ACO) near Tokyo, from June 18-27. In Japan, osteopaths are

not recognized as full physicians practicing medicine. While the Japanese osteopathic students can perform osteopathic manipulation once they have graduated, they cannot perform surgeries or prescribe medicine to patients.

The agreement between the two schools is a way to try to provide the same rights to osteopathic physicians across the globe.

Drs. Zachary Comeaux and Hiro Morita, two physicians from each school, realized that WVSOM could help strengthen the osteopathic profession in Japan through the international collaboration. Dr. Morita earned his degree in osteopathic medicine in the U.S.

WVSOM faculty and administrators recognize the importance of building strong relationships with other schools in

their effort to make osteopathy universally understood.

"The relationship between our school and your school is such a great opportunity," Dr. Lorenzo Pence, D.O., vice president for academic affairs and dean said in remarks to the visiting students.

The Japanese school is only three years old, but leaders are working toward receiving full physicians' rights.

"By giving the ACO visitors access to our facilities and faculty we are helping them achieve their goal as an organization so they can pursue full rights as physicians in the future," Ward said. "This program has built a bridge between WVSOM and the international osteopathic community. We hope to see it continue for many more years."

## "Abracadabra" teaches healthy lifestyle choices

Watch out Big Bird. Tener cuidado Dora. New characters are arriving on West Virginia's Public Broadcasting Station to great fanfare.

The show is called "Abracadabra" and, as you might expect, much of the action and excitement takes place inside a magic shop teeming with illusions and sleight of hand. The show is hosted by Magician Mike, aka Michael Adelman, D.O., D.P.M., J.D., the president of the West Virginia School of Osteopathic Medicine (WVSOM).

With friends Professor Science, Salty the Pirate and Daisy the Gardener, along with ventriloquist characters, Joey and Duk, Dr. Adelman employs magic, music, ventriloquism and gentle humor to demonstrate to children ages 4-10 how to make healthy lifestyle choices.

Smart choices are often threatened by temptation and it's no different at the magic shop. Nastini, a

character overly fond of sugary sweets, can often be found lurking around the shop trying to create mischief. Thankfully, a talented cast of local children's actors are on-hand to set things right.

"In their medical practices, WVSOM's graduates are working hard to serve the citizens of West Virginia and keep them in good health," Dr. Adelman said. "Our school's mission is to serve the state of West Virginia and the special health care needs of all its residents. With this show, I'm hoping we can educate and inform a younger generation of citizens who will adopt healthy habits that strengthen their well-being as they grow."

He continued. "Most people understand that a carrot is better for you than a cookie, but I believe it's truly possible to create scenarios where individuals want to make the healthy choice. They want to



put food into their bodies that will nourish them. With Abracadabra, we try to demonstrate that and have fun in the process."

The Abracadabra television series was made possible by contributions from sponsors including Charleston Area Medical Center (CAMC), West Virginia Mutual Insurance Company and Alpha Natural Resources.

The show airs on WV PBS weekdays from 1 to 1:30 p.m. and 8:30 to 9 a.m. on Saturdays and Sundays. For fun games and activities, as well as parent/teacher guides, visit the show's website at [www.abracadabra.org](http://www.abracadabra.org).

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## Important Dates to Negotiate, Evaluate, Educate, Participate and Associate!

by Barbara Good, CMC, CMOM  
Physician Practice Advocate, WVSMA

The autumn season brings a flurry of activity for medical practices. Although contract changes and fee schedules may not take effect until January, now is the time to take a good look at payor contracts. Changes in language, reimbursement and other contract terms should be made in writing.

Automatically renewed contracts (also known as evergreen), be reviewed each fall. Many require any modifications or requests for changes to be made sixty (60) or ninety (90) days prior to the end of the year.

Once a contract is in place, it becomes non-negotiable for the agreed upon contract period. It is important to be aware of and meet all deadlines.

On October 1, 2012, physician practices must begin using the 2013 ICD-9 codes on all claims. Don't let your claims be rejected because you are using outdated or changed codes.

The WVSMA fall educational offerings include the Certified Medical Compliance Officer (CMCO) course, beginning September 17. Prior to this offering, the CMCO course was offered only in webinar format. WVSMA is the first state medical association to host a classroom course.

The second fall offering is the Certified Medical Coder course beginning October 26. The CMC course is a certification designed for physician-based coding professionals. Classes will cover Medical Terminology, ICD-9-CM

Diagnostic Coding, ICD-10-Coding Conversion, HCPCS/CPT Procedural Coding, Ancillary and Advanced Coding. The program includes "hands on" classroom instruction, a course manual, homework exercises, an exam preparation handbook and the certification exam.

For more information and registration forms for both classes, please visit the WVSMA website, [www.wvsma.org](http://www.wvsma.org).

Finally, remember that one of your most valuable practice tools is to associate. Remember, there is power in numbers! Whether you are a physician, a practice administrator, an office manager or a certified coder, there is great value to becoming a member of your association.

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WESPAC is the West Virginia State Medical Association's bipartisan political action committee. We work throughout the year with elected officials to make sure they understand the many facets of our healthcare system.

WESPAC's goal is to organize the physician community into a powerful voice for quality healthcare in the West Virginia Legislature. We seek to preserve the vital relationship between you and your patients by educating our legislators about issues important to our physicians.

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For membership information, contact Mona Thevenin, 304-925-0342, ext. 16 or [mona@wvsma.org](mailto:mona@wvsma.org).

# West Virginia Medical Insurance Agency Becomes the West Virginia Academy of Family Physicians' Agent-of-Choice

The West Virginia Medical Insurance Agency (WVMIA) is very pleased to announce an "Agent-of-Choice" relationship with the West Virginia Academy of Family Physicians (WVAFP) effective September 1, 2012.

A dinner announcing the relationship was held on August 29th at the WVSMA offices; attending and representing the WVAFP were: Sarah Chouinard, MD, President; Stephen Sebert, MD; Tracy Hendershot, MD; and Gerry Stover, Executive Vice President. Attending and representing the WVSMA were: Hoyt Burdick, MD, President; Reginald McClung, MD, President-Elect; and Executive Director Evan Jenkins. Special guests included Joe Noca of Ameritas Life Insurance Corporation; John Snodgrass of Benefit Design Services; and Scott Atkins of West Virginia Mutual Insurance Company. Other attendees included: Steve Brown and Robin Saddoris of the WVMIA; Barbara Good, Amy Tolliver and Angie Lanham of the WVSMA Staff.

This relationship will allow members of the WVAFP to utilize the services of the WVMIA as their insurance agent with the WVMIA providing educational funding to the WVAFP.

The relationship applies to all lines of insurance, meaning any insurance provided by WVMIA to a member of the WVAFP will result in educational assistance from WVMIA to WVAFP.

The WVMIA will be allowed to promote its services through advertising in the WVAFP publications, on its web-site, at WVAFP conferences and by direct mail solicitation.

WVAFP members can utilize the WVMIA for medical professional liability insurance, business owners and workers' compensation insurances, individual or group health, life, disability, dental and vision insurances and also retirement planning.

For more information, you may visit either the web-site of the WVAFP at [www.wvafp.org](http://www.wvafp.org) or the WVMIA at [www.wvmia.com](http://www.wvmia.com) or by calling Steve Brown, Agency Manager of WVMIA at 1-800-257-4747 ext 22 (locally at 304-925-0342 ext 22) or cell at 304-542-0257, or e-mail at [steve@wvsma.org](mailto:steve@wvsma.org).



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From left to right, Sarah Chouinard, MD, Tracy Hendershot, MD and Hoyt Burdick, MD.



Reginald McClung, MD, Joe Noca and Amy Tolliver.

Steve Brown, Agency Manager presents first educational grant to WVAFP Executive Vice President, Gerry Stover. Left to right, Reginald McClung, MD, Hoyt Burdick, MD, Steve Brown, Gerry Stover, Tracy Hendershot, MD, Sarah Chouinard, MD, and Evan Jenkins.







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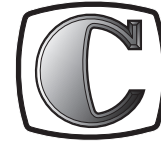
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# Obituaries

The WVSMAs remembers our esteemed colleagues...

## Owen C. Meadows Jr., MD

Owen C. Meadows Jr., M.D., of Beckley, West Virginia, died on Tuesday, May 29, 2012. One of the original members of Associates in OB-GYN with Dr. Charles Merritt, Dr. Warren Elliott, and Dr. Robert Pulliam, he retired in 2000, due to ill health, after delivering over 8000 babies.

He attended the University of Virginia for undergraduate Medical School and residency in OB-GYN for four years.

He is survived by his wife of 37 years, Brenda J. Meadows; sons, Robert Scott, Elise and Cody of Bethel, Maine; and Chris Meadows, his wife, Becky, and their daughter, Crystal of Valencia, California.

He was a member of the Beckley Presbyterian Church, served on staff at Raleigh General Hospital for forty years, a member of the West Virginia State Medical Association, Raleigh County Medical Society and many more medical associations; as well as the University of Virginia Executive Committee for a number of years.

The family request donations of sympathy be made to either the Beckley Presbyterian Church or the Raleigh County humane Society.

## Robert Earl Stone, MD

Dr. Robert Earl Stone, "Rocky," 83, of Daytona Beach, Fla., died Monday, July 23, 2012, at Central Baptist Hospital in Lexington, Ky. Dr. Stone was a former resident of Charleston, where he practiced OB/GYN for many years.

Dr. Stone is survived by his loving wife, Deloris O'Brien Stone. Dr. Stone is also survived by his daughters, Julie Stone Dickie (Thomas), Marta Stone Hayne (John) and Catherine Stone Hoffman, "Kitten"; Deloris' children, John O'Brien (Kelly) and Shauna O'Brien Pearson; his grandchildren, Alicia Dickie Smith (Reiner), Brittany Dickie Lucci (Todd), John Rippetoe Hayne (Christi), Erin Scott Hayne, Robert Chett Hoffman, Lt. Robert Stone Hayne (Emily), Donald Grant Hoffman and Catherine Christina Dickie; his step-grandchildren, Alley Pearson, Taylor Pearson, Darby O'Brien, Delaney O'Brien, Brooks O'Brien and Brody O'Brien; five beautiful great-grandchildren; and his brother, William Burgess (Rose) Stone.

The family wishes to express their grateful appreciation for all the love and support from Rocky's wonderful friends.

In lieu of flowers, donations may be made to Central Baptist Hospital Cancer Foundation, 1740 Nicholasville Road, Lexington, KY 40503.

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# WEST VIRGINIA RESPONDER EMERGENCY DEPLOYMENT INFORMATION SYSTEM REDI



## West Virginia Responder Emergency Deployment Information

### What is WV REDI?

West Virginia Responder Emergency Deployment Information system

- WV REDI is a web-based registration system developed to facilitate health and medical response through identification of West Virginians willing to serve in public health emergency and non-emergency situations

### Who can register?

- Registration is open to West Virginia's health and medical professionals, and others who live or work in West Virginia

### How can I help?

- You can help by being willing to assist during a health related emergency or event and by registering in WV REDI

### What if I can't go when called?

- Please remember that "volunteer" truly means volunteer. You can choose, at any time, to decline any request that you receive for deployment

### How do I register?

- To register go to [www.wvredi.org](http://www.wvredi.org) and click on "register now"

### Where do I get more information?

- For more information, call **304-558-6900 ext. 2009**

Register today  
to be  
prepared for  
tomorrow!

Visit the  
[www.wvredi.org](http://www.wvredi.org)  
homepage and click on  
"register now."