The BEAM

Mississippi Society of Radiologic Technologists

Affiliated with the American Society of Radiologic Technologists

Summer 2011

Inside this issue:

Letter from the MSRT President:

Hello to All,
I hope you all are doing well and have not lost family or homes in the recent tornado disasters and floods. If you know of any fellow RT's who have, please let us know so we can see if we can help. Our state is prone to these disasters, but unlike preparing for a hurricane, you can't run from a tornado or the permanent damage of a flood.

Congratulations to all the graduating radiology students...and to their instructors for doing a great job! Without the great instructors we have, we would never turn out great students. I hope they pass along a passion for our profession like mine did. And I would like to commend those who have chosen to push forward with a doctorate degree. I consider it a privilege to know you and say you guys are fellow RT's!

I have heard rumblings that the pass rate for the registry is great. That is a testament of hard work for our students. I was invited to UMC by Mark Gray to hand out an outstanding radiology student award. That was a privilege! Thanks, Mark! I love our students and want to see them do well. Jobs are tough to find out there right now. If you know of a job for one of them, put in a good word about their work ethic while in school and let's try to help them find jobs and stay in our state.

Our CARE Bill has been introduced! Hopefully, most of you have gotten an email from Diane Mayo or the ASRT about it. If not, I would like to post the basic info here and ask you to do your part in helping us get it passed.

"The bill was introduced in the House of Representatives on June 2 by Rep. Ed Whitfield (R-KY-1) as H.R. 2104. It is now time to work as a united front to get the CARE bill enacted into law. Please help.

Send an e-mail or call your representative today and ask them to contact Taylor Booth in Rep. Whitfield's office to become a co-sponsor and find out how to help get the CARE bill enacted. The CARE bill will

guarantee that radiologic personnel who perform medical imaging and radiation therapy procedures are educated and certified as proof of being qualified. Its passage is a vital step for ensuring patient safety.

Your representative will be home working in the district the week of June 6-10, please make every attempt to reach him or her by attending town hall meetings, making an office appointment or calling the local office. You can find phone numbers and the schedule of meetings on their websites.

Also, please contact the Washington, D.C. office and let them know how important this bill is to you and the patients in your state. You can use the ASRT 'eAdvocacy for You' site or your representative's website to send a message. Rep. Greg Harper is a co-sponsor, so if he's your congressman please send him a thank you. It would be great to contact all four of our congressmen, even those of you who do not live in their district. Please do it now!"

Thanks, Diane, for keeping us informed!

Some of us are headed to the ASRT Annual Meeting and House of Delegates in June. If you've never been, I encourage you all to try it one time. It's impressive to see our governing body in action! And don't forget about our MSRT Annual meeting in October. We will combine with Tennessee this year and the meeting will be in Tunica. Stay tuned for more information!

Take Care. Love Y'all!

Suzanne Fisher, MSRT President

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(To be decided at Conference 2011)

Alternate Student Delegate
(To be decided at Conference 2011)

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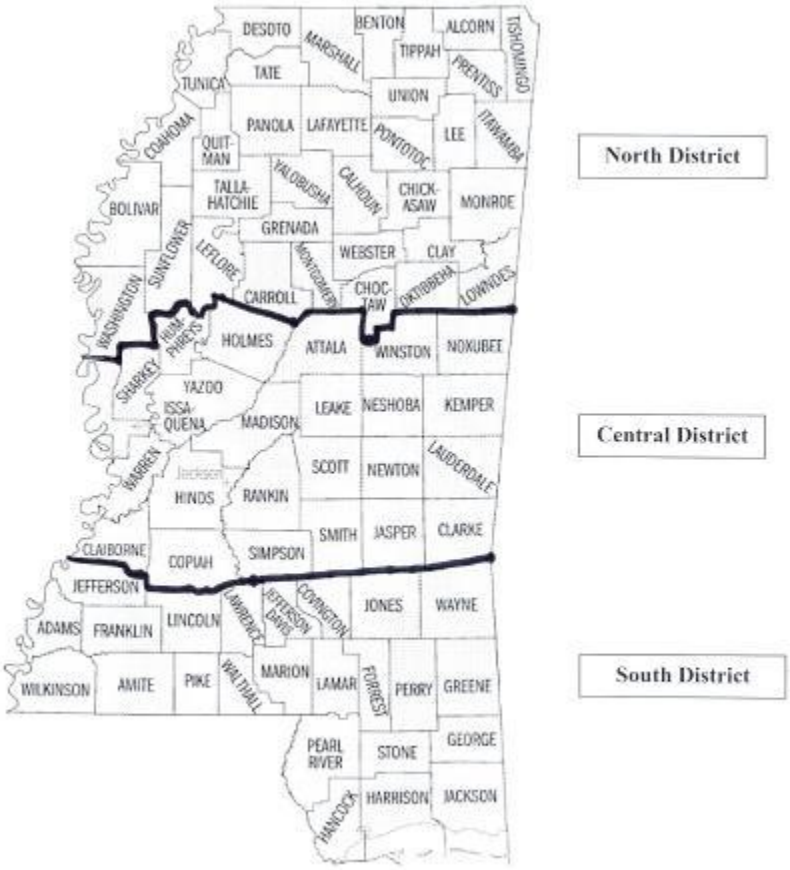
South District
Inactive

New MSRT District Map



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RT in DC – Influencing The Issues Affecting You!

CARE Bill is Consistency, Accuracy, Responsibility, and Excellence in Medical Imaging and Radiation Therapy. It is designed to establish minimum educational and certification standards for personnel who plan and deliver radiation therapy treatments and who perform various types of medical imaging exams (CT, PET, MR, Nuclear Medicine, X-Ray and Ultrasound).

We had a very positive reception in Washington, DC this year! Our MS group included myself, Christy Thomas, and Diane Mayo. We hit the ground running Sunday afternoon with a reception and instructions on what to expect while there.

Monday morning started with a presentation about Issues Facing the RT Profession, which included a review of the CARE Bill and radiation safety issues. Did you know the CARE Bill was first introduced in the 106th Congress in 2000? It has evolved from a state licensure bill to a Medicare condition of payment. The bill states that those people delivering ionizing radiation "must meet education and certification standards" for payment from Medicare. The bill does not mandate state licensure.

You may ask, will Radiologic Technologists be required to get a federal or state license to practice? The answer is NO. Specifically, the law merely requires that an individual have a minimum level of education and competency to perform the medical procedure and receive funds for it. The law could be met several ways, including: certification by a recognized NGO body, a state license to practice, or even demonstrating minimum competency (i.e., grandfathering).

The CARE Bill promises to do these three things:

- *Reduce Health Care Costs*: Accurate diagnosis and fewer repeat exams and delays in treatment will save the Medicare program millions of dollars.
- *Maximize Patient Safety:* Certified individuals perform exams and treatments safely, accurately and effectively minimizing radiation exposure.
- *Increase Quality:* Competent, educated and certified technologists and therapists increase overall exam and treatment quality.

After presentations on Monday, we started out early Tuesday morning for the Hill! Our first stop was at Senator Roger Wicker's office, where we spoke with Wesley Clay. Senator Wicker has always supported us in the past, and we believe he will be a co-sponsor as soon as the Senate version of the CARE Bill has been assigned a number.

Our second stop was at Senator Thad Cochran's office. We spoke to Elise in his office and she was very receptive of us and the literature we brought to them. Christy had made a

folder for each congressman which included articles from the New York Times on radiation safety issues, CARE Bill information, and our cards for further information...

Way to go Christy!

Our next stop was at Allan Nunnelee's office. He was actually leaving to go vote when we got there, so we met with Meyer Sieglman. If you recall, Mr. Nunnelee has always been our supporter...before he became a congressman...so we fully expect his support.

Our next stop was at Bennie Thompson's office. Before we walked in the building that day, I said "I bet we run into Bennie Thompson today." And guess what happened? We did! As soon as we opened the door, he was standing there. So we took pictures with him. He was proud of his new office with a grand view of the capitol. He usually waits until the last minute, but he will call and add his name as a supporter for our bill.

Our next stop was at Steve Palazzo's office. We were lucky to run into him, also. He was very polite and chatted with us for a while in the lobby of his office. He was also leaving to go vote, so we met with Hunter Lipscomb. He is still new at this, so we will need to follow up and give him more information. They did seem receptive of our bill, so we expect his support.

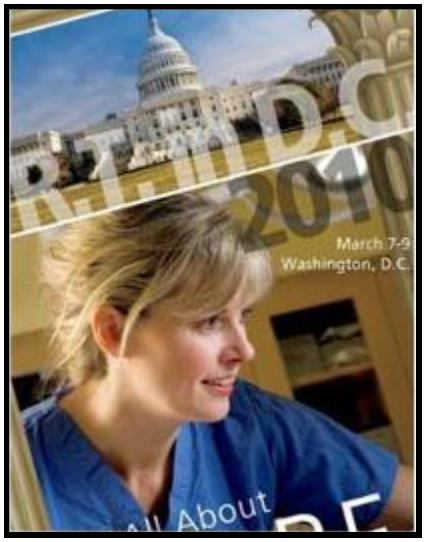
Our last visit of the day was at Gregg Harper's office. I seem to run into him a lot! I saw him in Natchez last October during our state conference, and I ran into him at the Pelahatchie Muscadine festival, where I spoke to him about the CARE Bill. I believe Diane had spoken to him also, and the following week we got the news that he would support our bill! So if you see him around town, tell him thank you!

It was great having a veteran like Diane there to help us plead our case. Thanks Diane for being faithful to our profession and for all you do! Also, thanks to Christy and the folders she made! It's looking good for us this year. So continue to email or call our legislators and mention the CARE Bill!

P.S. We talked about meeting with our legislators in their local offices and asking for their support. If you are able, please try that!

Suzanne Fisher, BSRT (R)(CT)

MSRT President



Affiliate Delegates' Report to the Membership
2011 ASRT Annual Governance and House of Delegates Meeting

We arrived in Albuquerque on Thursday, June 16, checked in for the meeting, and received our delegate handbooks. That evening we attended the welcome reception and state pin exchange, and the next day began the actual meeting activities. We attended all the required meetings which included two educational programs, the first business meeting of the House of Delegates, ASRT Update, By-laws Open Forum and Commission Hearing, the Radiography and Education Chapter Meetings, and the second business meeting of the House of Delegates.

This year's meeting was just as efficient as last year's, with the exception of some electronic voting issues that were resolved by the second business meeting. The by-laws stood unchanged this year, so the By-laws forum went very quickly. The Commission Hearing is where main motions are made. Most of those involved rescinding position statements that were addressed in the Practice Standards. The House voted with the wishes of the Commission on most of those.

The "hot topic" was on the main motion that said ASRT supports continuing education in the area of practice that includes radiation safety and methods to reduce radiation exposure. The rationale in having this position statement is that, while most modalities have specific language in the practice standards addressing this issue, continuing education management and education is not part of the practice standards and no statements exist. Also, since all of the recent news about radiation exposure, many felt that a strong statement would be necessary to convey to the public our concern and acknowledgement of the issue and our determination to ensure patient safety. After efforts to wordsmith the statement to suit everyone were unsuccessful, it finally was introduced as originally written and passed by the House.

Sandra Hayden was elected to serve as Speaker of the House. She has been Vice-Speaker for two years and is certain to do tremendously in this very demanding role. Tim Wescott was elected Vice-Speaker. He has a lot of experience and knowledge to bring to the table and will be an asset to the ASRT Board.

The Practice Standards, By-laws and Position Statements are easily accessible on the ASRT website. You should refer to them and also keep abreast of issues that may arise. As always, if you have any questions or concerns please let us know and we will try to find an answer or get you in contact with someone who can help you.

Serving in the House of Delegates is a duty we do not take lightly. We try to represent you the members to the best of our ability. Thank you for allowing us the opportunity!

Mike Ketchum, M.S.Ed., R.T. (R)
Paula Young, B.S., R.T. (R)(M)

Mike Ketchum (Affiliate), Paula Young (Affiliate), Christy Thomas (MRI Chapter Delegate), Sherrill Wilson (Bone Densitometry Chapter Delegate)

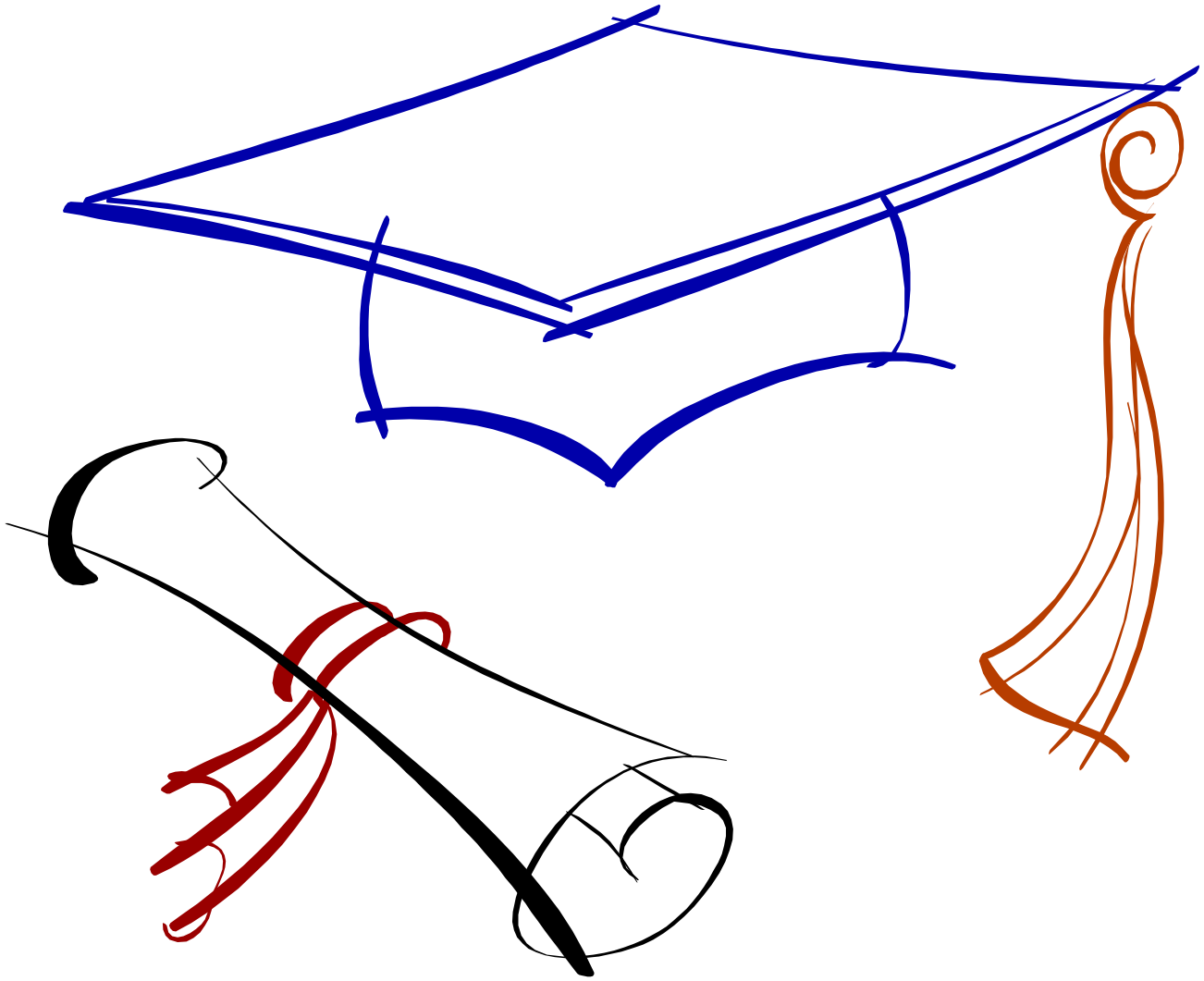
In Loving Memory of

Laura Turner Cates

2011 Graduate

MS Gulf Coast Community College

Gone…
but not forgotten



Congratulations Graduates

Class of 2011

COPIAH LINCOLN COMMUNITY COLLEGE

Front (L-R): Devin Brown, Kayla Herring, Amy Dunaway

Middle (L-R): Madalene Laird, Amber Gibson, Robbie Nettles, Zoe Sutton, Kasey Miller, Janel Jergins

Back (L-R): Britton Hinson, Leighann Douglas, Kimberly Sims, Ainsley White, Amanda Williams

HINDS COMMUNITY COLLEGE

Front (L-R): Shaina Langston, Lauren Lyle, Amber Abney, Kristen McMillan, Heather Davis

Back (L-R): Chasie Gibson, Allison Hellums, Kandis Powell, Morgan Netherland, Jeremy Harmon, Crystal Sumrall, Alyson Vinson, Candis Beard, Jennifer Griffith

ITAWAMBA COMMUNITY COLLEGE

Front (L-R): Brooke Lytal, Katie Wiygul, Mandi Bostick, Michelle Storey, Dana Swan, Katy Liles

Back (L-R): Ashley Isaac, Chase Stanford, Morgan Smith, Ashley Henley, Erin Williams, Austin Armstrong, Neely Hester

JONES COUNTY JUNIOR COLLEGE

Front: Wendy Freeman

Middle (L-R): Mallorie Bynum, Ryan Cockrell, Brooke Eddins, Adam Hinton, Brooke Dove, Kaci Lightsey, Shari Yanez

Back (L-R): Krystal English, Kim Gibson, Brittany Weatherford, Evan Boney, Kristy Johnson

MERIDIAN COMMUNITY COLLEGE

Front (L-R): Deavon Mosley, Megan Denison

Middle (L-R): Jeremy Yoder, Tracy Dean, Ranetta McClinton, Matt Daugherty

Back (L-R): Kevin Fletcher, Meagan Myrick, Steven Lacy, William Dubra, Joey Neese, Justin Harrell

MS GULF COAST COMMUNITY COLLEGE

Front (L-R): Erica Moore, Danielle Honeyman, N/A, Turwonnda Sherrod, Crystal Foster, Denise Newman (reclined in front)

Middle (L-R): Kasey Moore, Tomika Thigpen, Shannon Rice, Kelli Tackett, Dayna Brown, Katie Seymour, Brittany Henry, Lauren Wilson, Ashley Martel, Marlene Slade

Back (L-R): Tim Bahm, Katie Gennarelli, Norman Armstrong, N/A, Jelisa Tolbert, Trish Nguyen, N/A, Miranda Lamey, Steve Williams, Sara Thomas, Tuan Le, Jennifer Winstead, Laura Turner Cates, Stephanie Danis

N/A: non-completers

MISSISSIPPI DELTA COMMUNITY COLLEGE

Front (L-R): Amanda Burrus, Julie Stewart, Mary Britton Mitchell, Lindsey Lott

Middle (L-R): Whitney Carlson, Britni Stokes, Kendra Ferolito, Courtney Butler, LaQuanda Daniels

Back (L-R): Tucker Jennings, Nick Casevechia, DJ Collins, Brandon Threet, Jessica Scucchi, Adam Milam, William Davidson

NORTHEAST MISSISSIPPI COMMUNITY COLLEGE

Front (L-R): Brittney Harrell, Kayla Chandler, Kayla Morton, Regina Potts, Jennifer Reno, Lisa O'Bryan

Back (L-R): Rodney Eaton, Peyton Crump, Jarett Wildmon, Rayce Timbes

PEARL RIVER COMMUNITY COLLEGE

Front Row (L-R): Amy Lee, Eva Hernandez

Second Row (L-R): Lacy Mills

Third Row (L-R): Tina Rockco, Felicia Mars, Jennifer Davion

Fourth Row (L-R): Ellen Bryant, Rainey Loper, Lauren Young

Fifth Row (L-R): Mallory Altazan Pittman, Heidi Montegut

Sixth Row (L-R): Melinda Dittman, Chelsea Adams

Back Row (L-R): Kerry Payne, Justin Brown, Derrick Brown,
instructor Hope Husband, program director David Armstrong

UNIVERSITY OF MS MEDICAL CENTER

Front (L-R): Ginny Gates, Lacey Weatherall, Simira Wrigley, Amber Covington, Olivia Faust, Roxy Bayne

Middle (L-R): Mary Frances Cannon, Megan Carver, Lindsey Lewis, Holly Stover, Callen Goode, Lauren Farris, Tyler Counts, Jon Sowell

Back (L-R): Jennifer Turner, Brandi Reid, Carol Stoufer, Dakota Wills, Dustin Wilson, Russell Sistrunk

Ryan Bostick - Deployed on Military Leave

MSRT Scholarship Recipients

Each of these students has demonstrated outstanding academic and clinical performance throughout their education. We salute them and wish them well in their future endeavors.

Mike Ketchum
Chairman of the Board — MSRT

Zoe Sutton
Co-Lin Community College

Chase Stanford
Itawamba Community College

Brittany Weatherford
Jones County Junior College

Rayce Timbes
Northeast MS Community College

Jennifer Davion
Pearl River Community College

Lindsey Lott
MS Delta Community College

Roxy Bayne
University of MS Medical Center

MSRT 70th Annual Conference

Sam's Town Hotel & Casino

October 26-28, 2011

Tunica, MS

Contact Information

1477 Casino Strip Resorts Blvd

Robinsonville, MS 38664

Phone: 662-363-0711

Toll Free: 800-456-0711

www.samstowntunica.com

Room Rate: $39.00 + tax & occupancy charge

MSRT 70th ANNUAL CONFERENCE
October 26-28, 2011
Sam's Town Hotel and Casino-Tunica
Tunica, Mississippi

It is very important that you read the information in this form thoroughly!

Incomplete forms or late postmarks will result in NO pre-registration advantages.

REGISTRATION FORM: Checks or money orders ONLY made payable to MSRT

Name:_____

Address:_____

City:_____ State:_____ ZIP:_____

Phone: _____ Amount Enclosed:_____

Email address:_____

You must check each day that you plan to attend: _____Wed _____Thurs _____Fri

REGISTRATION FEES

# of Days	MEMBER (Any Affiliate)	NON MEMBER	STUDENT MEMBER	STUDENT NON MEMBER	RETIRED MEMBER
1 Day	$110	$150	$55	$70	$55
2 Day	$130	$180	$65	$80	$65
3 Day	$150	$200	$75	$90	$75

Check your Status: _____ RT _____Student _____MSRT member _____Other

STUDENTS MUST PROVIDE PROGRAM NAME:_____

Lunch will be provided with **pre-registration only!** A limited number of meal tickets will be available for on-site registration at an additional cost.

On-site registration will be an additional $25.00 added to the above prices.

REFUNDS will be made until **October 6, 2011** less a **$50 tech or $25 student** handling fee.
NO REFUNDS AFTER THAT DATE!!!

Registration forms postmarked after September 30, 2011 will be processed as ON-SITE and the additional fee will be collected at registration.

EVERYONE will be required to check in at the credentials desk prior to proceeding to registration. To receive member benefits you **MUST** have a current MSRT card for **'11-'12**, join on-site, or provide proof of current membership in another state society.

If paying dues and registration fees, please send two (2) separate checks.

Complete this form and mail to:

Christina Thomas, MSRT Executive Secretary
108 Begonia Lane Madison, MS 39110

MSRT 70th Annual Conference
Tentative Agenda

Wednesday, October 26, 2011

8:00 am – 8:30 am……Opening Ceremonies

8:30 am – 10:00 am……..Student Manuscripts

10:00 am – 10:15 am……..Break

10:15 am – 11:15 am……..Speaker

11:15 am – 12:15 pm……..Speaker

12:15 pm – 1:30 pm……Lunch and Student Meeting

1:30 pm – 2:30 pm……...Speaker

2:30 pm – 3:30 pm……...Speaker

3:30 pm – 4:30 pm…….... Speaker

7:00 pm – until……...Student Prep Bowl

Thursday, October 27, 2011

8:00 am – 9:00 am……Speaker

9:00 am – 10:00 am……Speaker

10:00 am – 10:15 am……..Break

10:15 am – 11:15 am……..Speaker

11:15 am – 12:15 pm……..Speaker

12:15 pm – 1:30 pm……Lunch and Business Meeting

1:30 pm – 2:30 pm……...Speaker

2:30 pm – 3:30 pm……...Speaker

8:00 pm - Midnight……...Halloween Costume Party

Friday, October 28, 2011

8:00 am – 9:00 am…… Speaker

9:00 am – 10:00 am……..Speaker

10:00 am – 10:15 am……..Break

10:15 am – 11:15 am……..Speaker

11:15 am – 12:15 pm……..Speaker

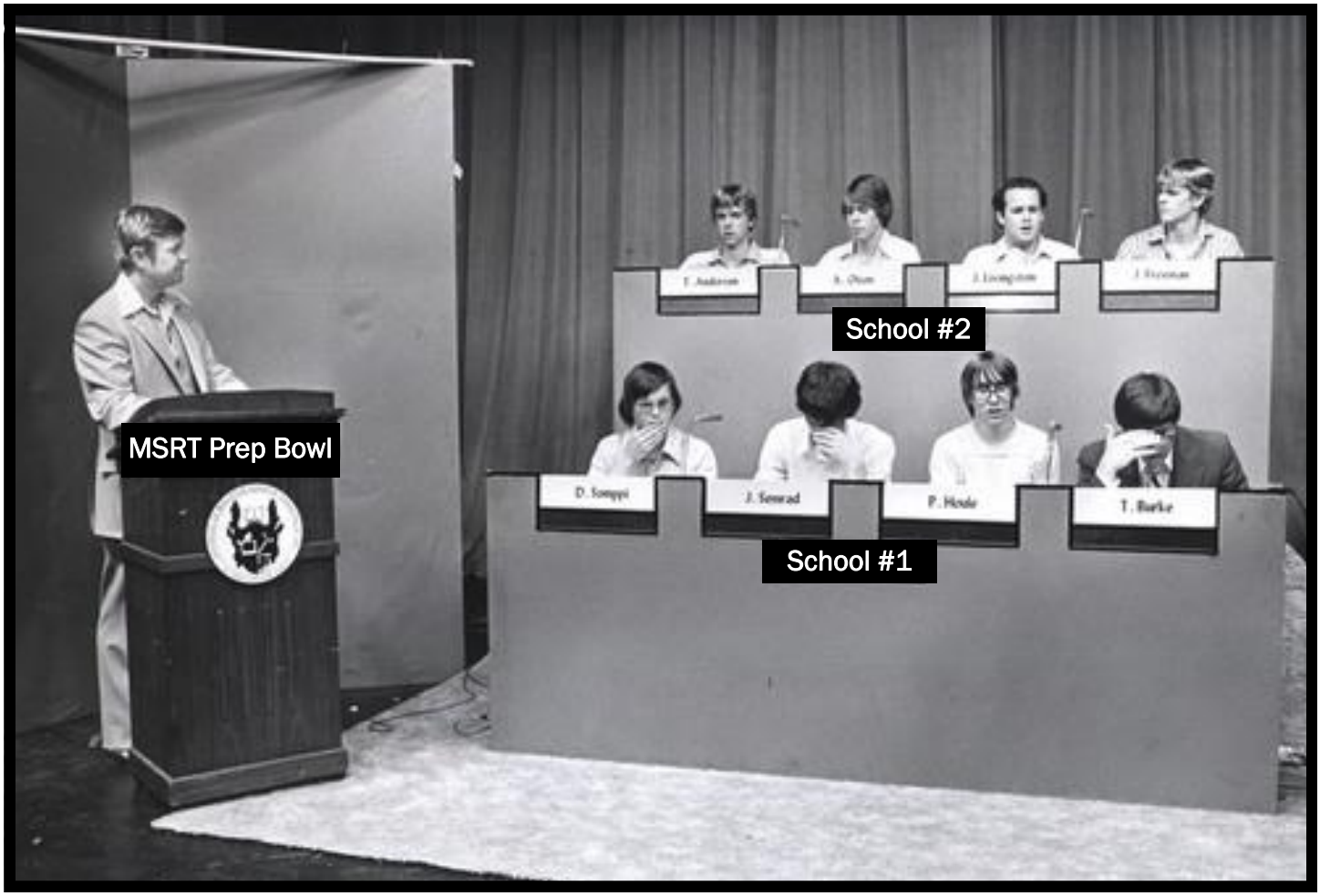
12:15 pm – 1:30 pm……..Presidential Lunch and Awards Ceremony

MSRT Board Meeting Immediately Following

Student Prep Bowl

Where: Sam's Town Hotel & Casino
When: Wednesday, October 26, 2011
from 7:00 pm until...

Please see the rules beginning on the next page



MSRT Central District Prep Bowl

Rules and Regulations

Purpose:

To review and increase knowledge of radiologic technology among students who should be preparing themselves for the ARRT Registry. This will be an excellent form of registry review.

Eligibility:

Participants in the MSRT Central District Prep Bowl must be enrolled in a JRCERT approved radiologic technology program. Each member of a team shall be in the final year of the program and all team members shall be from the same program. The students participating in the prep bowl must be a member of their state affiliate and registered for Conference in order to participate.

Team Roster:

Each school will be represented by only one (1) team. Each team will be represented by no more than five (5) senior level students from the same approved program of Radiologic Technology. Only three (3) team members may serve on the panel at any one time. Students will be allowed to rotate members during scheduled breaks only.

Officials:

Each official shall be a registered radiologic technologist or a radiologist. No faculty member or clinical instructor of a participating school shall serve as an official.

- **The Moderator:** Shall serve as competition coordinator. It shall be the duty of the moderator to present all questions, repeat each answer, and to call official breaks or time-out. The moderator must read the question only and may not elaborate in any way which might aid in the answering of the question.
- **The Panel of Judges:** Shall be available to verify all challenged questions using text references. The decision of the judges is final. If the question cannot be verified, the question will be thrown out and a new question asked.
- **The Timekeeper:** Shall keep the official response time during competition.
- **The Scorekeeper and Backup Scorekeeper:** Shall maintain a comprehensive score record of the schools in competition. The scorekeeper will keep score on a board visible to the audience, while the backup scorekeeper will keep score independently.

Competition:

Calculators, pencils, and scratch paper will be provided. Team members may only use the items provided. All schools will compete at the same time. Competition will consist of five (5) rounds of categorical questions according to the current ARRT Registry content. The rounds will proceed as follows:

Round	Category	No. of Questions
1	Radiation Protection	4
2	Equipment Operation and Maintenance	4
3	Image Production and Evaluation	4
4	Radiographic Procedures & Anatomy	4
5	Patient Care and Education	4
	Total	20

Time:

Each team will be allowed ten (10) seconds to answer each question. If the answer has not begun in ten (10) seconds or if the wrong answer is given, that question will be discarded.

Questions:

For the collection of questions, the Central District of the MSRT will seek participation from educators of the JRCERT approved radiologic technology programs in Mississippi. The Central District will verify accuracy of questions collected and will not reveal the questions to anyone outside the Prep Bowl committee. Questions will be multiple choice only. During competition, only one repeat per question will be allowed.

Points:

Each question will be worth one (1) point for a possible total of 20 points. In the event of a tie, the competition will go into a sudden death tie-breaker, where random questions will be asked alternately until a winner is declared.

Breaks:

A five (5) minute break will be placed between each round for team member rotation only. After Round Three (3), there will be a fifteen (15) minute recess for the audience and teams.

Challenge:

A question may only be challenged by a member of the three person team participating at that time. The question must be challenged prior to the reading of the next question. **THE JUDGE'S RULING IS FINAL.**

Penalties:

Any coaching or yelling of answers from the audience will disqualify the question from competition and a new question will be asked. Continued disruption will result in removal from the competition area.

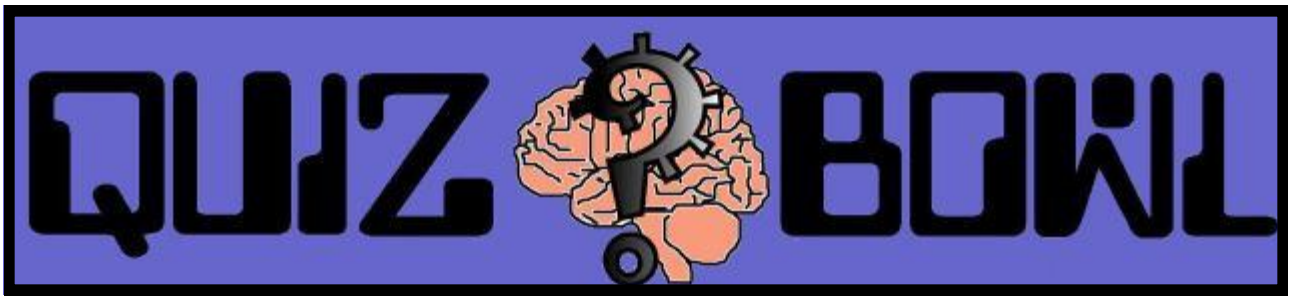
Awards:

Plaques will be awarded to First, Second, and Third place teams. The First place team will also receive a $100 cash award from the Central District of the MSRT.

Additional Rules:

Alcoholic beverages are not allowed and persons with alcohol/alcoholic beverages in their possession shall be considered disruptive and removed from the competition area.

All electronic devices (i.e. cell phones, pagers, Bluetooth, etc.) must have the power turned off and stowed away during competition.



Halloween Costume Party

Where: Sam's Town Ballroom

When: Thursday, October 27, 2011

from 8 pm until midnight

Student Manuscript: 2nd Place Recipient — Lindsey Lewis (UMMC)

Terahertz Rays

September 11, 2001, was a day that caused irreparable damage to the hearts of Americans. These works of terrorism, as well as more recent acts, have forever changed the travels of everyone in the world. Because of these happenings, many precautions have been taken in airport security over the past few years. As a result, researchers around the world have tried to find new ways to make the routine airport searches easier for passengers. Terahertz rays have been found to give enough adequate information without making passengers go through the long, drawn out process of taking off their shoes, belts, etc. A wide array of research is being done in order to understand the way terahertz signals improve airport security.

Production

Terahertz rays, or T-rays, are areas of frequencies located between microwaves and infrared waves on the electromagnetic spectrum. This gap between microwaves and infrared waves has been coined the "final frontier" because there is no simple or inexpensive way to create or measure T-rays. Sending tight bunches of electrons at nearly the speed of light through a magnetic field causes the electrons to radiate T-rays at a trillion cycles per second (Terahertz Radiation, 2006). These rays consist of wavelengths that range from 30 to 3,000 microns and frequencies that range from one-tenth to ten terahertz (Verma, 2007). T-rays do not have the potential to ionize atoms, and therefore, the people exposed will not experience any ill consequences. Many researchers have tried different ways to produce T-rays, and the machines must be made according to their specific purpose (Sagoff, 2007).

Scientists at the Boston Massachusetts Institute of Technology (MIT) developed a "laser tuning method" to produce T-rays for airport security. MIT shared with the press that the approach was similar to tuning a guitar. The lasers can be compared to changing the widths of the individual strings to produce different pitches. By doing this, the lasers will send out different frequencies to record the images. Although this is currently a great progression in technology, it is still a work in progress (Airport News, 2009).

Detection

When the new T-ray scanners are created and placed in airports, they will be able to detect just about

anything. T-rays are able to go through a human body by about a half of a centimeter. Although this is just a very small amount of penetration, that is all it takes to get the recommended image (Sagoff, 2007). Terahertz rays cannot go through any metals or water. Because there is a great amount of water in living tissue, T-rays cannot pass through and are absorbed by the water itself. However, terahertz signals are very easily transmitted through common materials, such as leather, fabric, cardboard, plastic, and paper (Pospiech, 2003). T-rays can also discern between diverse types of explosives and poisonous gases (Brown, 2006).

One positive aspect of T-rays is that they can fingerprint unknown molecules. Every molecule has a specific vibration that it is exemplified by. As each molecule is measured, the observer can identify one substance from another by its pattern. For example, if both salt and anthrax were put into envelopes, the naked eye could probably not tell the difference. If the envelopes are exposed to T-rays, seeing which frequencies were absorbed and which were not will give a distinct fingerprint. Being able to differentiate between substances is the best advantage of T-rays (Verma, 2007).

Experiments

There have been many experiments completed on identifying substances that may appear the same to the naked eye. First of all, one study dealt with "biomaterial classification." Two envelopes were used with one containing anthrax and the other enclosing separate packages of wheat flour, table salt, baking soda, and Chinese five-spice. Both envelopes were sealed with adhesive tape. After they were scanned by T-rays, the images of these molecules showed specifically different patterns. This experiment was helpful because it showed the distinction in the fingerprints of molecules (Te, Ferguson, & Abbott, 2002).

In another study of T-rays, absorption characteristics of different types of plastics were shown. The experiment was set up like a suitcase or backpack with clothing inside. The major materials used were two sheets of plastic, and in between, there was a cotton sheet with lactose laced into it. The six different plastics used were varying in thickness from two to five millimeters. After exposure, all of the plastics provided for adequate absorption. This study proved that T-rays can penetrate common items usually carried into airports (Ung, Balakrishnan, Fischer, Ng, & Abbott, 2007).

T-rays for Airport Security

Many airports are converting to the new whole body scanners for passengers, although they do not use T-rays. This technology is thought to help with the terrorist problems around the world, but it is only optional to passengers. As of January 2010, the Transportation Security Administration (TSA) only had 40 of these millimeter wave and backscatter scanners in United States airports. After the attempted terrorism on December 25, 2009, the TSA bought 150 more scanners to be placed in other airports around America, and within the next year, they plan to buy 300 more. The millimeter wave scans produce three-dimensional images with radio waves, and the backscatter machines produce two-dimensional images with low energy x-rays (Transportation, 2009).

On the other hand, scientists are still in the process of creating a T-ray emitting machine that is adequate and compact enough to work in airports. These machines are expected to cost more than the current scanners, as well. T-rays are more suitable for airport scanning in that they will provide vital information about unknown substances. Also, T-rays do not have the capability to ionize human cells, so they are considered safer than the backscatter scanners. T-rays do have another advantage over millimeter wave and backscatter scanners because they will be able to track substances that may be hidden into body cavities (Terahertz rays, 2009). In a recent poll, 98 percent of passengers agreed that they liked the new technology of whole body scanners in airports (Transportation, 2009).

One major concern about all whole body scanners is the controversy of each passenger's privacy. To insure that each passenger's privacy is protected for every type of whole body scan, a set of guidelines has been formed by the TSA. For instance, the passenger's scan will never be viewed by any personnel that directly assists the person. The individuals that inspect the images are to sit in a completely different area and communicate with officers through a wireless headset. Also, the images cannot be stored, shared, or sent. All scans will be completely deleted after approval by an officer (Transportation, 2009).

T-rays vs. X-rays

There are many major differences between T-rays and X-rays. First of all, T-rays are preferable in that

they can capture even some of the smallest dangers, which is an advantage over X-rays. Also, as stated before, T-rays do not have the ability to ionize atoms. X-rays, however, have the ability to knock out loose electrons from an atom. Therefore, X-rays can cause genetic effects which alter the DNA for future generations, or they can cause many types of cancer. In addition, X-rays have a lot of energy and they penetrate right through the body, so there is not much distinction in the soft tissue of the skin. With T-rays, the skin is only penetrated about a half of a centimeter, so there is great potential in evaluating soft tissue layers. Also, the fact that T-rays can differentiate between fingerprints of molecules is, by far, the most prominent difference between these two types of electromagnetic waves (Verma, 2007).

Other Uses for T-rays

In addition to the ways T-rays can improve airport security, there are numerous other fields that can be influenced by them. Besides being used in airports, T-rays can be equally used in post offices to examine packages for bioterrorism. Using T-rays as an easier way for airline pilots to see through fog is another way they could be used. Because T-rays are able to identify chemicals, they may helpful in "monitoring gas pipe-line leaks, chemical plants, and vehicle emissions." Terahertz rays can also assist in the detection of environmental dangers like "ozone, volatile organics, and cyanide compounds" (Brown, 2006). T-rays can be used to widen frequency bands to improve wireless communications, as well (Terahertz Radiation, 2006).

In the medical field, these terahertz signals can be used to identify cancers near the surface of the skin. "It turns out that somewhere between fifty and eighty percent of cancers tend to be surface cancers and so this is the niche where T-rays will win over X-rays." T-rays can also differentiate between cancerous and healthy cells by color coding. In a terahertz image, healthy cells will appear green and red, but the cancerous cells show up as a dark blue color (Verma, 2007). Also, the field of dentistry can use T-rays to get images of teeth erosion before X-rays (Terahertz Radiation, 2006). In the future, researchers hope to find a way to make a T-ray machine so compact that everyone can have one in their home to do check-ups on themselves (Te, Ferguson, & Abbott, 2002).

Disadvantages

As of this point in time, the major disadvantage of T-rays is the creation of a machine that emits the terahertz signals adequately. The process is very costly and requires a lot of research. Another downfall to T-rays is the fact that only polar (water soluble) molecules can be detected by them. "Methane, for example, cannot be detected this way because it is nonpolar." In its relation to airport security, there is some controversy with people assuming that their privacy will be violated and the images will show their entire body without any clothing. However, this is not true because the T-rays do not go deep enough into a human body to see that much detail. Although some issues may be found with the new T-ray technology, it is still a great improvement in the current airport scanners (Brown, 2006).

Conclusion

Furthermore, terahertz imaging is desired by many different parts of industry and research, and especially to the world of airport security. According to Verma (2007), "the growing awareness of T-rays' usefulness is like what happened a century ago with X-rays—only T-rays will have a much wider range of applications" (p.262). After all the many terrorist scares around the world, airport security needs a new and improved way to detect any substances that may put passengers at risk. Hopefully, with the assistance of T-rays, terrorism in airports can one day be completely avoidable.

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Student Manuscript: 3rd Place Recipient — Simira Nazir (UMMC)

Gamma Knife and the Treatment of Neurological Ailments

Gamma Knife surgery (GK) is a precise, noninvasive form of stereotactic radiosurgery, often used as treatment for brain tumors, arteriovenous malformations (AVM), and brain dysfunctions (IRSA, n.d.). There are some studies that suggest that GK could also be used as a treatment for epilepsy and Parkinson's disease, but nothing had been confirmed at the time this paper was written. The blade-less procedure has 200 sources of cobalt-60, a form of gamma radiation. Each beam alone is too weak to do any damage. However, when they are "focused precisely on a target, the beams intersect and the combined radiation is sufficient to treat the targeted areas" (Why Gamma Knife Surgery, n.d.). Because of the intensity of the radiation, a GK treatment can be administered in a single, large dose instead of multiple, smaller doses. Lars Leksell, a Swedish doctor, is credited for "the concept, terminology, and initial development of the technology" (Peterson, Meltzer, Evanson, Flickinger, & Kondziolka, 1999). The first Gamma Knife was installed in Stockholm, Sweden in 1968. However, it was not until 1987 when the first Gamma Knife was built in the United States. Since the birth of the technology, advances in engineering, robotics, and computerized treatment planning have upgraded the models used today (Why Gamma Knife Surgery, n.d.).

The procedure starts with the patient under local anesthesia. Then, a special, three-dimensional head frame is screwed to the patient's skull. While immobile, imaging studies are conducted, such as computed tomography (CT), angiography, and magnetic resonance imaging (MRI) (RSNA, 2010). Doctors prefer a single MRI to pinpoint the problem area instead of dose-contributing CT scans. The frame adds the stability needed for a more accurate image. Other systems that do not require a head frame have to use continuous CT imaging while the treatment is going on to ensure the correct part of the body is being radiated (Why Gamma Knife Surgery, n.d.). The images are analyzed to determine where to treat, and the computer calculates the position of the head frame and amount of gamma radiation needed. After this planning period, the frame is attached to the GK machine, and the patient will undergo the radiosurgery. The accuracy of the beams is more than 0.5 millimeters, and the machine can also move the patient in very small increments. In every GK

treatment, a group of professionals is needed to operate the machine. A radiation oncologist, a medical radiation physicist, and a neurosurgeon are the trained personnel for the GK equipment. The physicist ensures the computers and software for the GK and imaging modality are all working correctly. Support staff, which includes nurses and radiation therapists, are also in the room to help with patient care (RSNA, 2010).

Gamma Knife is often used for tumor control of brain metastases. "Metastatic lesions are particularly well suited for treatment with stereotactic radiosurgery because they are usually small (<3cm), well circumscribed, spherical, and have radiographically distinct enhancing margins" (Peterson et al., 1999). Peterson, Meltzer, Evanson, Flickinger, and Kondzoilka (1999) conducted a study on the effects of GK on brain metastases. MRI images were used to show the initial response in 20 weeks from GK surgery and long-term control in follow-up sessions after that period. Within 20 weeks, 90% of patients showed local tumor control. In 56% of these patients, the tumors either disappeared or shrank a considerable amount. In the long-term assessment, those that showed a good response in the first 20 weeks still showed good tumor control in later MRI exams. A small percentage of patients' tumors actually increased in volume before shrinking. Peterson et al (1999)'s conclusion stated, "Although an initial good response after radiosurgery is predictive of long-term local control, lesion growth does not always indicate tumor progression." The study also found that the type of primary tumor influenced the survival rates. Patients with breast cancer had the longest survival times after GK, while those with melanoma and renal cell carcinoma (RCC) had the shortest. The original volume and initial response rate had nothing to do with survival (Peterson et al., 1999).

In another study, the tumors of the brainstem were closely studied after Gamma Knife surgery. Metastatic lesions are represented in the brainstem in patients with lung cancer, melanoma, and breast cancer. Because of the high survival time in breast cancer patients, these tumors can be detected more frequently compared with lung cancer and melanoma patients. In this study, 53 patients were examined, all with different primary cancers. The average tumor volume in the brainstem was 2.8 cm^3. However, only 37 patients returned within 25 months following GK for an MRI checkup. In seven patients, the tumors disappeared completely, and in 22, they shrank. Three patients had no change in tumor volume, and the remaining five

showed some growth. The authors also found that patients with breast cancer had the highest percentage of brainstem metastases. Ovarian cancer, RCC, lung cancer, and melanoma followed, respectively (Yen, Sheehan, Patterson, & Steiner, 2006).

Meningiomas are also being treated by Gamma Knife techniques. Ganz, Reda, and Abdelkarim (2008) formed a study with 98 participants to explore meningioma shrinkage by GK. Instead of these target areas being small, as in the metastases studies, the tumors reached from 10 cm^3 to 43 cm^3. Such a high tumor volume has not been presented before this study came out. Usually GK is used for much smaller areas. By looking at MRI images, they confirmed shrinkage if it was shown in two different planes of the brain. Their results were that 30 tumors shrank, 68 remained the same, and zero showed any growth. The common method of treating meningiomas currently is stereotactic fractionated radiotherapy, which is done in small doses over time. Ganz, Reda and Abdelkarim (2008) concluded GK is just as safe and less time consuming, as long as the appropriate dose is given to fit the tumor size.

Any treatment comes with the possibility of side effects. The most common reactions from GK include "headache, nausea, vomiting, brain edema, and seizure due to radiation-induced injury or intratumoral hemorrhage" (Yen et al., 2006). Radiation necrosis can develop anywhere from three months to two years after treatment (Chin, Lazio, Biggins, & Amin, 2000). Acute complications can occur but are hard to pinpoint as caused by GK or the cancer itself. Chin, Lazio, Biggins and Amin (2000) looked into the "overall risk to patients receiving [GK] in the immediate post-treatment period (7 days)." They believed it would be a rare occurrence. Out of 835 patients treated by Gamma Knife for various neurological problems, 18 experienced a complication or death within seven days of treatment. Twelve had seizures, five had neurological deficits, and three died. The nonpermanent deficits included an alteration in consciousness, diplopia, and transient ischemic attacks. It was hard to make a clear relationship between the alternation of consciousness and GK. The cause of the diplopia was never determined to be because of GK, and could have been the disease running its course. The transient ischemic attacks were definitely not related to radiosurgery. One death occurred after cardiac and respiratory arrest following a seizure, while the other two died because of their primary cancer. Since

these percentages were extremely small, Chin et al. (2000) concluded the immediate risk after GK is low and the usual side effect is a seizure.

In one study, radiosurgery and open surgery were compared. Patients from the surgery group experienced hydrocephalus, acute psychosis, and pneumonia. After radiosurgery, patients suffered from seizures, nausea, and headaches from intratumoral hemorrhages. The "morbidity and mortality rates were similar in both groups" but had different symptoms. All patients recovered from the side effects completely (Muacevic et al., 1999). In the brainstem metastases study, no complications were seen because of the Gamma Knife surgery (Yen et al., 2006). Peterson et al. did not discuss any side effects from GK in their paper.

There are multiple advantages to radiosurgery over open surgery. First, there is no incision, hence, no surgical complications. With this in mind, it makes sense the "mortality and morbidity rates are lower for radiosurgery" (Why Gamma Knife Surgery, n.d.). The patient does not feel the radiation and does not have to be put under anesthesia. In a single session, multiple areas can be radiated. GK is typically done as an outpatient procedure or one overnight stay. The patients hardly need any recovery time, allowing them to return to normal life immediately, enhancing their quality of life. A major benefit for patients and insurance companies is the cost for Gamma Knife. Because there is no invasive surgery or months of recovery, the treatment can be up to half the cost of surgery and mostly paid by healthcare providers. There are 125 Gamma Knife centers and counting in the United States, making at least one in driving distance for most patients. Finally, Gamma Knife surgery is the only radiation therapy system approved by the Food and Drug Administration (FDA) to treat brain metastases (IRSA, n.d.; Why Gamma Knife Surgery, n.d.).

In the studies presented in this paper, authors agreed Gamma Knife was a safe and effective treatment compared to surgery. Patients with brainstem metastases prolonged the normal symptom course of the tumors from one to sixteen months after GK (Yen et al., 2006). Stereotactic radiosurgery has become a standard procedure and results in longer survival and higher tumor control rates (Peterson et al., 1999). There is little risk of developing new symptoms after undergoing GK (Yen et al., 2006; Muacevic et al., 1999). Nausea, seizures, and headaches are all possiblities, but occur in only a small percentage of people. The cost is much

smaller than open surgery, making it easier on the patient's pocket. Gamma Knife also increases the patient's happiness. As they might be bed ridden or told to slow down until everything could heal from surgery, someone leaving a Gamma Knife treatment can return to normal life after walking out of the hospital. If you qualify for gamma knife surgery and open surgery, how could you possibly choose the latter? The advantages outweigh the risks by far.

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Student Paper: Amanda Knight (Jim Wood Award Candidate)

Carpenter Syndrome

Carpenter Syndrome is also known as ACPS type II. It is a syndrome of genetic birth defects involving the skull, face, fingers, toes, and sometimes the heart. It is a form of acrocephalopolysyndactyly, which is a group of rare genetic disorders that includes Carpenter syndrome. The syndrome was named after the researcher who first described the condition. It is very similar to Pfeiffers and Apert Syndrome.

George Carpenter was a British physician who first noticed the unique set of physical characteristics in the early 1900s. He described two sisters and a brother with "acrocephaly, peculiar faces, abnormally short finders, and extra fingers or toes."

It is estimated that the syndrome occurs in one in 1,000,000 live births; however, it is not known exactly how often Carpenter syndrome occurs. Only about 100 cases have been described in the worldwide medical literature. With 300 million people living in the United States now, that means there are only about 300 cases in the entire country. Carpenter syndrome affects both males and females.

It is inherited in an autosomal recessive manner, which means that an individual has to receive two copies of the defective gene (one from each parent) in order to develop the syndrome. When two carriers procreate, each has a 50% chance of passing on the defective gene to their child. The baby will have a 25% chance of Carpenter's syndrome. There is also a 50% chance that the baby will be a carrier, but be unaffected themselves, and a 25% chance that the child will inherit "normal" copies of the gene from each parent and end the cycle.

Carpenter syndrome is typically evident at or shortly after birth. Some symptoms include craniosynostosis which means early fusion of the cranial sutures of the skull. This causes the skull to grow abnormally and the head may seem short and broad or cone-shaped. Other symptoms involve facial features such as low-set, malformed ears, flat nasal bridge, wide upturned nose, down-slanting eye folds, and small underdeveloped upper or lower jaw. More physical symptoms are short, stubby fingers and toes, webbed fingers or toes, and some may actually have extra fingers or toes.

Individuals with Carpenter syndrome are also known to struggle with congenital heart defects, abdominal hernia, undescended testes in males, short stature, a single horseshoe shaped kidney instead of two separate ones, and mild to moderate mental retardation. Congenital heart defects occur in 33 to 50% of individuals and mild to moderate mental retardation in about 75% of individuals. Diagnosis is based on the symptoms as a child, such as appearance of the skull, face, fingers, and toes. No specific test has been developed for a confirmed diagnosis. A genetic specialist makes the diagnosis based upon observations of the physical manifestations.

Treatment of Carpenter syndrome depends on the symptoms the individual has. Surgery may be needed if a life-threatening heart defect is present. Surgery may also be used to correct craniosynostosis by separating the abnormally fused skull bones to allow for growth of the head. This is usually done in stages starting in infancy. Surgical separation of the toes and fingers may provide a better appearance but not necessarily better function. Physical, occupational, and speech therapy can help an individual with Carpenter syndrome reach his or her maximum development potential.

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Nominations

It is time for nominations for the elected offices of the MSRT.

If you have someone you would like to nominate, please place your nominee's name in the appropriate space and mail to:

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Radiography Education Sonography CT MRI Bone densitomery
CIT Mammography Dosimetry Radiation therapy Nuclear medicine
Quality management Military Management RA RPA

Letter from the Editor:

I hope everyone has had a great summer so far! I am looking forward to October...I am so excited about Conference! I want to encourage students to participate in the Prep Bowl. This is a great way to prepare for the Registry. I also want to encourage students to participate in the exhibit competition. Exhibit forms can be found on the website. Forms must be submitted to both the MSRT President and Conference Coordinator no later than September 28 if you choose to compete. I hope you enjoyed this edition of The BEAM! The deadline for the next issue of The BEAM is tentatively set for November 10, 2011.

~Kristi Moore

See ya'll soon…
Conference 2011
(Tunica, MS)

Please be sure to check out the MSRT website in December for the next issue of The BEAM!!!

Kristi