



Oxygen Rescue Care Centers of America

**The Use of Hyperbaric Oxygen Therapy  
to Treat TBI in Iraqi/Afghanistan  
Veterans Who Sustained  
Multiple IED Blast Injuries**

 *Hope Springs, Inc.*  
*My Hope*

---

525 NE 3<sup>rd</sup> Ave, Suite 108, Delray Beach, FL 33444  
361-819-0412 361-276-9643 fax 361-276-9098  
[www.OxygenRescueCareCentersofAmerica.com](http://www.OxygenRescueCareCentersofAmerica.com)  
[www.HopeSprings.com](http://www.HopeSprings.com)



OXYGEN RESCUE CARE CENTERS OF AMERICA

8-13-2010

525 NE 3rd Avenue Ste. 10  
Delray Beach, FL 3344  
Phone: (561) 819-0411  
Fax: (561) 278-9191  
www.ORCCAHBO.com

The contents enclosed reflect the wonderful effects of Hyperbaric Oxygen treatments on several brave veterans who were discharged from the military with unrecognized, untreated brain injuries that can be traced to multiple episodes of blast exposures causing loss of consciousness often for extended periods of time. Most had moderate to severe balance difficulties because of damage to the ears (vestibular co-morbidities). Some reported bleeding from the eyes and ears after exposure to blast but were discharged with no benefits which caused negative emotions towards the military.

My team of medical specialists enjoyed the support of the Florida Brave Fund of the American Red Cross for food, transportation and lodging; GE who donated the tracer Ceretec for brain imaging and countless other civilians and veterans who gave support for our pro bono efforts to help these hopeless, suicidal, broken young men.

The reader will find the results of 6 hour forensic psychological tests, and SPECT brain images that were collected before, during and after 40 Hyperbaric treatments over approximately a one month period. All demonstrate clear and unequivocal evidence of profound neurocognitive, emotional and physical improvements. One vet was tested one year later demonstrating continued cognitive and emotional improvements to the point of being completely free of medications, maintaining a 3.7 grade point average in college. This same soldier/warrior suffered 46 IED exposures, 20 RPG exposures and several hand grenade exposures. He had attempted suicide; his parents could hardly recognize him upon discharge with a 70% disability rating that left him at 23 years of age unable to walk normally, severely depressed, cognitively impaired and no hope for the future years ahead of him.

Anyone seriously doubting these positive effects is invited to contact the undersigned, and I will arrange phone conference with any of these men to discuss how their lives have dramatically and positively been forever altered.

Sincerely,  
Raymond H. Cralle, RPT  
Principle Investigator





525 NE 3rd Avenue Ste. 107  
Delray Beach, FL 33444  
Phone: (561) 819-0412  
Fax: (561) 276-8198  
[www.ORCCAHBO.com](http://www.ORCCAHBO.com)

Acceptance of Hyperbaric Oxygen treatment suffers because not a lot of quality research has been produced, and few physicians are trained in its use. I believe the brilliant Neurologist V.S. Ramachandran, MD, PhD, speaks wisely about issues like this in commenting on his own specialty as a science still in its infancy.

Excerpt from: *Phantoms In The Brain* by V.S. Ramachandran, M.D., Ph.D. and Sandra Blakeslee

Preface xiii

'A tension exists in neurology between those who believe that the most valuable lessons about the brain can be learned from statistical analyses involving large numbers of patients and those who believe that doing the right kind of experiments on the right patients- even a single patient- can yield much more useful information. This is really a silly debate since its resolution is obvious: It's a good idea to begin with experiments on single cases and then to confirm the findings through studies of additional patients. By way of analogy, imagine that I cart a pig into your living room and tell you that it can talk. You might say, 'Oh, Really? Show me.' I then wave my wand and the pig starts talking. You might respond, 'My God! That's amazing!' You are not likely to say, 'Ah, but that's just one pig. Show me a few more and then I might believe you.' Yet this is precisely the attitude of many people in my field.

I think it's fair to say that, in neurology, most of the major discoveries that have withstood the test of time were, in fact, based initially on single case studies and demonstrations. More was learned about memory from a few days of studying a patient called H.M. than was gleaned from previous decades of research averaging data on many subjects. The same can be said about hemispheric specialization (the organization of the brain into a left brain and a right brain, which are specialized for different functions) and the experiments carried out on two patients with so-called split brains (in whom the left and right hemispheres were disconnected by cutting the fibers between them). More was learned from these two individuals than from the previous fifty years of studies on normal people.'

There is a preponderance of information, in fact vast numbers of case studies, where hyperbaric oxygen has proven beneficial and often profoundly beneficial in brain pathology of multiple causes. The contra indications are almost nonexistent as are negative side effects.

Our work with blast induced brain injuries on mostly suicidal veterans was done on a pro bono basis and illustrates what can be learned from a few to benefit the many.

Sincerely,

Raymond H. Cralle, RPT  
Owner/CEO  
ORCCA Hyperbarics



The same set of tests indicated above were administered each testing date (T1: 12 September & T2: 6 October). For the purposes of determining whether performances from examination date T1 were significantly different on T2, the following conventions were used:

Difference of between 7t and 10t points: significant difference  
Difference of greater than 10t points: very significant difference

**Mood:** Very significantly less depressed, less anxious and less severe PTSD symptoms by test date #2. BDI-II total scored decreased from a raw score of 42 points at T1 (12 September 2009) to only 8 points by T2 (6 October 2009). A raw score of 8 points represents "minimal" depression. A score of 41 points represents "severe" depression. Similarly, STAI trait score diminished 29t points and STAI state score diminished 39t indicating that Adam is now much less anxious. His PCL-C score diminished from a raw score of 74 at T1 to 43 at T2 indicating less severe PTSD symptoms. His MMP1-2 scores of T1 (F 104t, Fb 120t, Fp 48t, D 98t, ANX 90t, DEP 95t, P-K 107) were significantly reduced by T2 (F 76t, Fb 71t, Fp 48t, D 74t, ANX 82t, DEP 68t) indicating for the most part a very significantly improved mood.

**Attention:** Working Memory at T1 was 39t and at T2 was 48t for a significant improvement and Information Processing Speed was 32t at T1 and 53t at T2 for a very significant improvement.

**Memory:** Delayed recall of previously learned verbal and nonverbal material has by T2 improved by at least significantly different levels.

**Executive Functions:** Verbal fluency under both phonemic and categorical conditions had improved very significantly by T2. Switching between dual tracking tasks had improved significantly by T2. Abstract thinking had remained essentially unchanged.

**Language:** Naming and single word reading vocabulary had remained unchanged.

**Motor:** A.B. demonstrated very significantly improved motor speed, strength and dexterity for both hands by T2 generally by at least 15t.

**Visuospatial:** A.B.'s copy of a design was essentially unchanged by T2 in this, a measure of visuoconstructional ability.

Jeffrey M. Gran, Psy.D.  
Clinical Neuropsychologist

# SOUTHEAST MEDICAL IMAGING

## SPECT NUCLEAR BRAIN SCAN

Name: Veteran AB      Date of Service: 9/10/2009  
ID: BUAD062877      DOB: 6/28/1977      Referring MD: MAXFIELD  
Age: 32      Sex: M  
Indications: HEAD TRAUMA, TBI, PTSD, HEADACHE,      Technologist: GA  
DIZZINES, TINNITUS

**HISTORY:** Head trauma, T10 which caused bleeding in the left eye and from the left ear. Posttraumatic stress disorder, headache, dizziness and tinnitus.

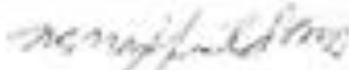
**COMPARISON:** No similar prior studies are available for comparison.

**TECHNIQUE:** Following injection of 29.8 mCi of Technetium-99m Ceretec, SPECT imaging of the brain was obtained in axial, sagittal, and coronal planes. Images are presented in black and white and in color. Also 3D images are provided.

**FINDINGS:** There is a severely abnormal pattern to both cerebral cortexes with a very patchy type of pattern with a few scattered areas of normal degree of localization predominantly in the parietal and to a lesser degree, the occipital areas bilaterally. The frontal areas particularly have decreased localization and there is more abnormality in the left frontal area than on the right frontal area. The basal ganglia area shows some decreased localization with again greater abnormality on the left than the right. There is also an unusual pattern of significant decreased localization in the cerebellum bilaterally. There is a pattern suggesting minimal enlargement of the ventricles. The study is otherwise normal.

### Conclusions

- Severely abnormal SPECT brain scan with a very patchy type pattern bilaterally with greater abnormality on the left than the right. There is also decreased localization in the basal ganglia areas bilaterally, again greater on the left than the right. The cerebellar areas also show decreased localization which is unusual with a traumatic brain injury scan. The areas of abnormal localization show peri-ischemic penumbra. There is suggestion of minimal enlargement of the ventricles. Study is otherwise normal. Correlation with previous imaging procedures is needed. Pattern is most compatible with severe traumatic brain injury with greater abnormality on the left than the right.

  
William S. Maxfield, M.D., F.A.C.N.M.  
Board Certified American Board of Radiology  
Board Certified American Board of Nuclear Medicine  
Fellow American College of Nuclear Medicine  
RP:Maxfield/b



# SOUTHEAST MEDICAL IMAGING

## SPECT NUCLEAR BRAIN SCAN

Name: Veteran AB

ID: BUAD062877

Age: 32

Sex: M

Indications: FOLLOW UP BRAIN SPECT

DOB: 6/28/1977

Date of Service: 9/24/2009

Referring MD: SCHERER, CHARLES

Technologist: GA

**HISTORY:** S/P TBI, DIZZINESS, HEADACHE, BALANCE DYSFUNCTION

**COMPARISON:** Comparison to previous SPECT brain scan from Southeast Medical Imaging dated 9/10/2009. The patient has had hyperbaric oxygen therapy in the interim.

**TECHNIQUE:** Following injection of 29.7 mCi of Technetium-99m Ceretec, SPECT imaging of the brain was obtained in axial, sagittal, and coronal planes. Images are presented in black and white and in color. Also 3D images are provided.

**FINDINGS:** There is a moderately abnormal pattern of localization in both cerebral cortexes with a very patchy type of pattern with a moderate amount of normal degree of localization predominantly in the parietal and occipital areas bilaterally. Both frontal areas show a moderate decrease in localization more on the left than on the right. There is also decreased localization in the basilar ganglia areas, again more on the left than on the right. There is a moderate decrease in localization on both cerebellar areas. The ventricular system appears to be slightly enlarged.

### Conclusions

- Moderately abnormal SPECT brain scan with a patchy type pattern of localization in both cerebral cortexes with greater abnormality on the left than on the right. There is also some decreased localization in the basilar ganglia area again greater on the left than the right. Both cerebellar areas show a minimal decrease in localization bilaterally. All areas of abnormal localization show peri-ischemic penumbra. There is suggestion of slight enlargement of the ventricle system.
- Comparison to previous study of 9/10/2009 shows improvement in both cerebral cortexes with significant improvement in the cerebellar areas bilaterally. To a lesser degree there is improvement in the basilar ganglia areas. Improvement in SPECT brain scan would correlate with the clinical improvement the patient has shown. Additional hyperbaric use is suggested.

William S. Maxfield, MD

Board Certified American Board of Radiology

Board Certified American Board of Nuclear Medicine

Fellow American College of Nuclear Medicine

RP Maxfield/WSM/b



E A

SOUTHEAST

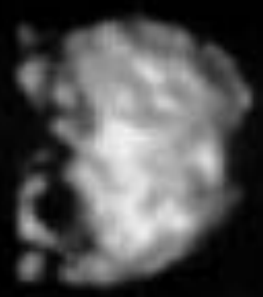
MEDICAL IMAGING

1030p2009

Anterior



1



2



3

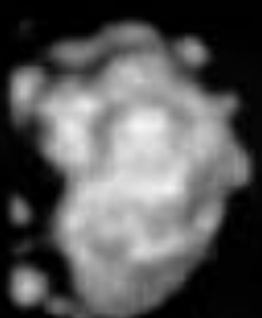


4

RC LAT



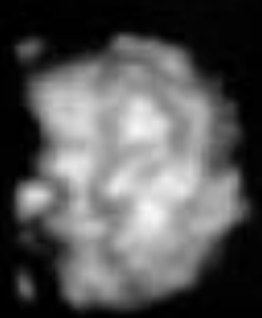
5



6



7



8

POSTERIOR



9



10



11



12

LT LAT



13



14



15



16



E A ...

SOUTHEAST

MEDICAL IMAGING

29Sep2009

Anterior



1



2



3

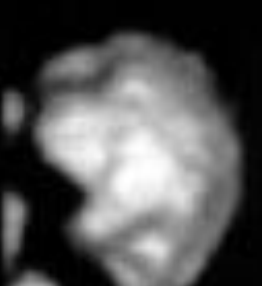


4

R: LAT



5



6



7



8

POSTERIOR



9



10



11



12

L: LAT



13



14



15



16



The same set of tests indicated above were administered each testing date (T1: 13 September & T2: 6 October). For the purposes of determining whether performances from examination date T1 were significantly different on T2, the following conventions were used:

Difference of between 7t and 10t points: significant difference  
Difference of greater than 10t points: very significant difference

**Mood:** Very significantly less depressed, less anxious and less severe PTSD symptoms by test date #2. BDI-II total score decreased from a raw score of 39 points at T1 to only 10 points by T2 (6 October 2009). A raw score of 10 points represents "minimal" depression. A score of 39 points represents "severe" depression. Similarly, STAI trait score diminished very significantly from T1 to T2 and his PCL-C (measuring PTSD symptomatology) score diminished very significantly from T1 to T2. MMPI-2 scores reflected the very significant positive changes in R.B.'s anxiety, depression and PTSD symptoms.

**Attention:** Working Memory at T1 was overall essentially unchanged from T1 to T2 but Information Processing Speed was very significantly improved by T2.

**Memory:** Delayed recall of previously learned verbal and nonverbal material was essentially unchanged by T2.

**Executive Functions:** Design fluency had improved very significantly by T2. Verbal fluency under both phonemic and semantic conditions as well as switching between dual tracking tasks and abstract thinking had remained essentially unchanged by T2.

**Language:** Naming and single word reading vocabulary had remained essentially unchanged by T2.

**Motor:** R.B. demonstrated very significantly improved right-handed grip strength and significantly improved bilateral dexterity by T2. Otherwise, all other measures here were essentially unchanged by T2.

**Visuospatial:** R.B.'s copy of a design was essentially unchanged by T2 in this, a measure of visuoconstructional ability.

Jeffrey M. Gran, Psy.D.  
Clinical Neuropsychologist

# SOUTHEAST MEDICAL IMAGING

## SPECT NUCLEAR BRAIN SCAN

Name: Veteran RB	Date of Service: 9/10/2009	
ID: 8RRO090969	DOB: 9/9/1969	Referring MD: MAXFIELD, WILLIAM
Age 40	Sex: M	Technologist: GA
Indications: PTSD, TBI, DIZZINESS, HEADACHE, TINNITUS		

**HISTORY:** Status post traumatic stress disease, traumatic brain injury, dizziness, headache, and tinnitus.


**COMPARISON:** No similar prior studies are available for comparison.

**TECHNIQUE:** Following injection of 30.5 mCi of Technetium-99m Ceretec, SPECT imaging of the brain was obtained in axial, sagittal, and coronal planes. Images are presented in black and white and in color. Also 3D images are provided.

**FINDINGS:** Very abnormal SPECT brain scan with a severely patchy pattern of localization in both cerebral hemispheres. Both cerebral hemispheres showing only a few scattered areas of localization that is normal minimally in the left frontal area, the parietal areas is to a greater degree in the occipital areas. The basal ganglia area shows decreased localization. The cerebellar areas are normal. There is a suggestion of minimal enlargement of the ventricular system. Study is otherwise unremarkable.

### Conclusions

- Markedly abnormal SPECT brain scan with a very patchy type of pattern in both cerebral cortexes with decreased localization in the basal ganglia area and suggestion of minimal enlargement of the ventricular system. All areas of abnormality show peri-ischemic penumbra. The cerebellar areas are normal. Study is otherwise normal as shown. Pattern is most compatible with severe traumatic brain injury. Previous imaging studies are needed for comparison.

  
William S. Maxfield, M.D., F.A.C.N.M.  
Board Certified American Board of Radiology  
Board Certified American Board of Nuclear Medicine  
Fellow American College of Nuclear Medicine  
RP.Maxfield/jb



# SOUTHEAST MEDICAL IMAGING

## SPECT NUCLEAR BRAIN SCAN

Name: Veteran RB

ID: BRR0090969

Age: 40

Sex: M

Indicators: FOLLOW UP BRAIN SPECT

DOB: 9/9/1969

Date of Service: 9/24/2009

Referring MD: SCHERER, CHARLES

Technologist: GA

**HISTORY:** S/P TBI, DIZZINESS, HEADACHE

**COMPARISON:** 9/18/2009 Comparison to previous SPECT brain scan from Southeast Medical Imaging dated 9/10/2009. The patient has had hyperbaric oxygen therapy in the interim.

**TECHNIQUE:** Following injection of 30.5 mCi of Technetium-99m Ceretec, SPECT imaging of the brain was obtained in axial, sagittal, and coronal planes. Images are presented in black and white and in color. Also 3D images are provided.

**FINDINGS:** There is a moderately abnormal pattern of localization in both cerebral hemispheres with a very patchy type of pattern bilaterally. There is more normal localization in the left posterior frontal and left parietal area with also more localization in the occipital areas. Frontal areas both show decreased localization but there is more on right now than on the left. The cerebellar areas appear normal. There is decreased localization in the basilar ganglia areas, less abnormality on the right than on the left. There is again suggestion of slight enlargement of the ventricles. Study is otherwise normal.

### Conclusions

- Moderately abnormal SPECT brain scan with patchy type pattern in both cerebral hemispheres. Cerebellar areas are normal. There is decreased localization in the basilar ganglia areas more on the left than the right. All areas of abnormality show peri-ischemic penumbra. Comparison to previous SPECT brain scan of 9/10/2009 shows improvement in the pattern in both cerebral cortexes which on the previous study was markedly abnormal and is now only moderately abnormal. Also there is improvement of the basilar ganglia area, more on the right than on the left. The study is otherwise stable. Improvement in SPECT brain scan would correlate with the clinical improvement the patient has shown. Additional hyperbaric use is suggested.

  
William S. Maxfield, MD

Board Certified American Board of Radiology

Board Certified American Board of Nuclear Medicine

Fellow American College of Nuclear Medicine

RP Maxfield/WSM/b



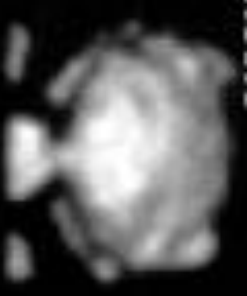
E R

SOUTHEAST

MEDICAL IMAGING

10Sep2009

ANTERIOR



1



2

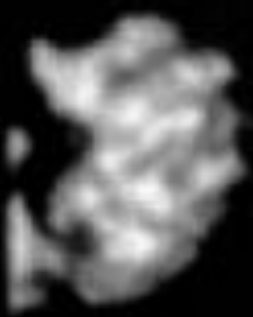


3



4

R/L LAT



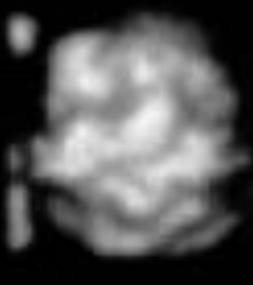
5



6

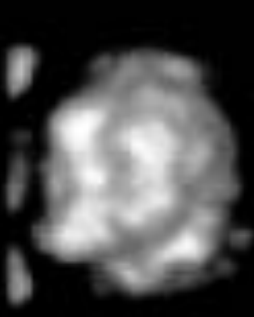


7



8

POSTERIOR



9



10

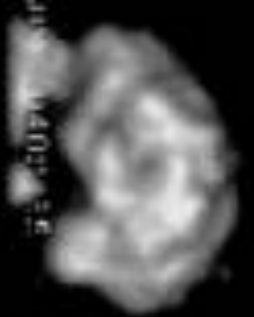


11



12

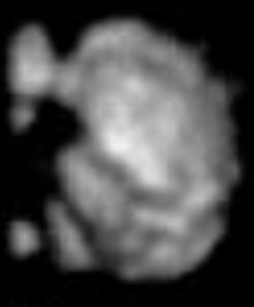
L/L LAT



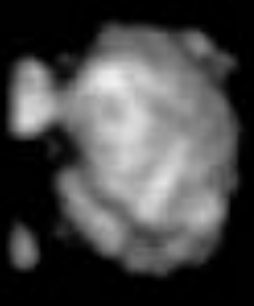
13



14



15



16

Volume: 04079338

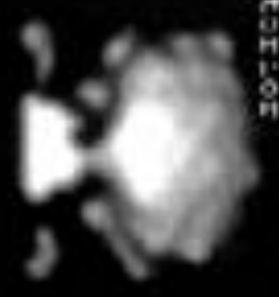
R ...

SOUTHEAST

MEDICAL IMAGING

2430p2009

Anterior



1



2



3



4

RC: LAT



5



6



7

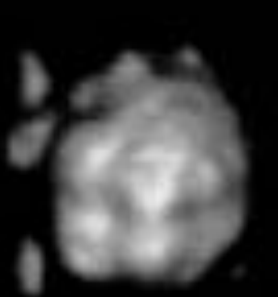


8

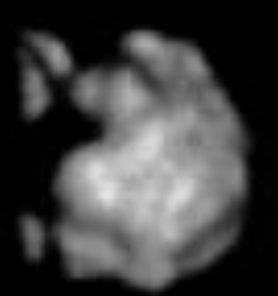
POSTERIOR



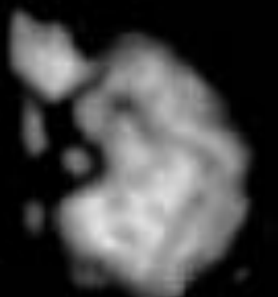
9



10

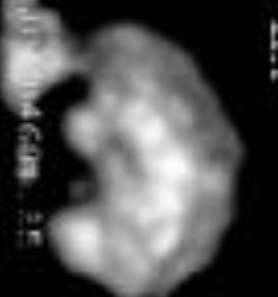


11



12

LC: LAT



13



14



15



16

Volume: 600000000





He was psychiatrically institutionalized twice while in the Army: (1) in September 2007 for hearing voices for which he spent 12 days in the psychiatric hospital and (2) in December 2008 for a suicide attempt during which he took 35 Trazadone 5 mg. J.R. stated that by December 2008 that he stopped hearing voices but that he had now gotten "tired" of his nightmares and problems sleeping and feeling worthless to his unit. He felt he was worthless as a soldier after having been put in a "Wounded Warrior" unit.

He has just begun at Houston VAMC and stated he will be neuropsychologically evaluated 17 November 2009. He stated that he had a previous neuropsychological evaluation two years ago but that he did not believe that he'd been too cooperative then because he was not in a state of mind then to do this testing. This testing was given him soon after he'd returned and before he attempted suicide. He had some suicidal ideations in our first meeting but swore then that he would not attempt again.

He was taking Effexor, Risperdal, Remeron and Topamax in both the meetings with no changes in his medication regime during this month.

On his return from Iraq he engaged in a two-month period of drinking a fifth of bourbon every day for two months eventually causing him to enter an alcohol program. He is currently in Alcoholics Anonymous.

On 13 November J.R. stated that he was now feeling better after nearly 40 Hyperbaric dives. He feels his headaches are less frequent and less painful, he feels less depressed and has not had any nightmares in three weeks. Prior to the hyperbaric treatment he had been having nightmares four times a week and half of these would "ruin a day." He feels more energetic and with better appetite.

He was to return home to Texas 14 November 2009.

**TESTS ADMINISTERED:**

Medical Symptom Validity Test (MSVT): State-Trait Anxiety Inventory (STAI); Beck Depression Inventory- II (BDI-II); PTSD Checklist – Civilian Version (PCL-C); Neuropsychological Assessment Battery Form 2 (Attention, Language, Spatial, Memory, Executive Modules); Personality Assessment Inventory (PAI)

For the purposes of interpretation and communicating results, the following descriptors will be used:

Very Superior	130 and above: above 98 <sup>th</sup> percentile
Superior	120 to 129: 91 <sup>st</sup> -97 <sup>th</sup> percentile
High Average	110 to 119: 75 <sup>th</sup> - 90 <sup>th</sup> percentile
Average	90 to 109: 25 <sup>th</sup> - 73 <sup>rd</sup> percentile
Below Average	80 to 89: 9 <sup>th</sup> - 23 <sup>rd</sup> percentile
Borderline	70 to 79: 2 <sup>nd</sup> - 8 <sup>th</sup> percentile
Extremely Low	69 and below: .01 <sup>st</sup> - 2 <sup>nd</sup> percentile

Note: standard scores have a mean of 100 and a standard deviation of 15

The same set of tests indicated above were administered each testing date (T1: 20 October & T2: 13 November). For the purposes of determining whether performances from examination date T1 were significantly different on T2, the following conventions were used:

Difference of between 10 and 15 points: significant difference  
 Difference of greater than 15 points: very significant difference

**Mood:** Very significantly less depressed, less anxious and less severe PTSD symptoms by test date #2. BDI-II total scored decreased from a raw score of 31 points at T1 to only 14 points by T2 (very significant decline). Similarly, STAI-State score diminished from a raw score of 50 points (T1) to 40 points (T2) for a significant decline and STA-Trait score declined from 65 points at T1 to 48 points at T2. His PCL-C score (measuring Posttraumatic Stress Disorder) diminished from a raw score of 68 at T1 to 40 at T2 indicating significantly improved PTSD symptoms. His PAI scores (see Appendix) indicated significant decline in depression, anxiety and posttraumatic stress scores from T1 to T2.

#### Cognitive Functioning

**NAB Index Score Summary Table at T1**

Module Index	Standard Score	Percentile Range	Confidence Interval 95%	Interpretive Category
Attention Index (ATT)	101	53	93-109	Average
Language Index (LAN)	135	99	122-148	Very superior
Memory Index (MEM)	95	39	88-104	Average
Spatial Index (SPT)	112	79	102-122	Above Average
Executive Functions Index (EXE)	113	81	103-123	Above Average

Jeffrey M. Gran, Psy.D., P.A.

Total NAB Index	115	84	109-121	Superior
<b>NAB Index Score Summary Table at T2</b>				
Module Index	Standard Score	Percentile Range	Confidence Interval 95%	Interpretive Category
Attention Index (ATT)	107	68	99-115	Above Average
Language Index (LAN)	145	99.87	132-158	Very superior
Memory Index (MEM)	116	86	108-124	Superior
Spatial Index (SPT)	105	63	95-115	Average
Executive Functions Index (EFE)	110	75	100-120	Above Average
Total NAB Index	122	93	116-126	Superior

A comparison of Module Index scores from T1 to T2 indicates that Attention improved 6 points (No Significant Difference); Language improved 10 Points (Significant Improvement); Memory improved 20 points (Very Significant Improvement); Spatial Functioning declined 7 points (No Significant Difference) and Executive Functioning declined 3 points (No Significant Difference).

A listing of specific module tests as performed and compared from T1 to T2 can be found in this reports Appendix.

#### Summary:

It is found that J.R. test performances indicate the following from the first testing to the second testing:

- \* Very significantly lessened depression.
- \* Very significantly lessened anxiety.
- \* Very significantly lessened Posttraumatic Stress Symptoms including reported absence of nightmares (had been four times a week at T1 and had been absent for three weeks at T2)
- \* Significantly improved language functioning.
- \* Very significantly improved memory functioning.
- \* Attention, spatial and executive functioning roughly equivalent to T1 baseline levels by the time of T2.

Jeffrey M. Gran, Psy.D.  
Clinical Neuropsychologist

# SOUTHEAST MEDICAL IMAGING

## SPECT NUCLEAR BRAIN SCAN

Name: <u>Veteran, JB</u>	Date of Service: 10/29/2009	
ID: RUJL062987	DOB: 6/29/1967	Referring MD: SCHERER, CHARLES
Age: 22	Sex: M	Technologist: GA
Indications: PTSD, TBI, HEADACHE, DIZZINESS		

**HISTORY:** History of exposure to 40+ blast explosions with history of episodes of unconsciousness for several minutes after several of these explosions. Dizziness. Problems with memory and also vestibular control problems.

**COMPARISON:** No similar prior studies are available for comparison.

**TECHNIQUE:** Following injection of 29.4 mCi of Technetium-99m Ceretec, SPECT imaging of the brain was obtained in axial, sagittal, and coronal planes. Images are presented in black and white and in color. Also 3D images are provided.

**FINDINGS:** There is a markedly patchy type pattern of localization in both cerebral hemispheres with the greatest abnormality in the frontal and parietal regions bilaterally with more abnormality on the right than the left. There is also a pattern of decreased localization in both cerebellar areas, again greater on the right than the left and there is also decreased localization in both basilar ganglia areas. There is a suggestion of some enlargement of the ventricular system.

### Conclusions

- Markedly abnormal study with greater abnormality on the right than the left with also abnormality in the cerebellar areas compatible with history of blast injury. Basilar ganglia areas also show significant decreased localization. All areas of abnormal localization have peri-ischemic penumbra. There is a suggestion of slight enlargement of the ventricles.

William S. Maxfield, M.D., F.A.C.N.M.  
Board Certified American Board of Radiology  
Board Certified American Board of Nuclear Medicine  
Fellow American College of Nuclear Medicine  
RP Maxfield/sy



# SOUTHEAST MEDICAL IMAGING

## SPECT NUCLEAR BRAIN SCAN

Name: Veteran JR Date of Service: 11/12/2009  
ID: RUJE062487 DOB: 6/24/1987 Referring MD: MAXFIELD, WILLIAM  
Age: 22 Sex: M  
Indications: FOLLOW UP BRAIN SPECT Technologist: GA

**HISTORY:** History of posttraumatic stress disease caused by 40+ blast explosions. The patient has completed a course of approximately 40 hyperbaric oxygen therapy treatments with rehabilitation.

**COMPARISON:** Comparison to previous SPECT brain scan of 10/20/2009.

**TECHNIQUE:** Following injection of 28.5 mCi of Technetium-99m NeuroLite, SPECT imaging of the brain was obtained in axial, sagittal, and coronal planes. Images are presented in black and white and in color. Also 3D images are provided.

**FINDINGS:** There is a minimally abnormal patchy type pattern in both cerebral hemispheres involving the frontal and parietal areas with more abnormality on the right than the left. There is also some minimally decreased localization in both cerebellar areas, again greater on the right than the left and there is decreased localization in the basilar ganglia areas bilaterally of minimal to moderate degree. There is suggestion that there is minimal enlargement of the ventricular system.

### Conclusions

- Minimally abnormal SPECT brain scan with greatest areas of abnormality being in the frontal and parietal regions greater on the right than the left. The basilar ganglia areas show minimal to moderate decreased localization and there is minimal decreased localization in the cerebellar areas, greater on the right than the left. All areas of abnormal localization have peri-ischemic penumbra. There is a suggestion of minimal enlargement of the ventricles. Comparison to previous study of 10/20/2009 shows significant improvement in both cerebral cortexes, cerebellar areas and the basilar ganglia areas with now predominantly minimal abnormality being noted, again still greater on the right than on the left. With the pattern shown would suggest additional treatment for the residual minimal abnormal pattern.

William S. Maxfield, M.D., F.A.C.N.M.  
Board Certified American Board of Radiology  
Board Certified American Board of Nuclear Medicine  
Fellow American College of Nuclear Medicine  
RP Maxfield/ty  
cc: Ray Crife





1



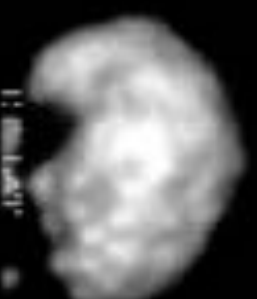
2



3



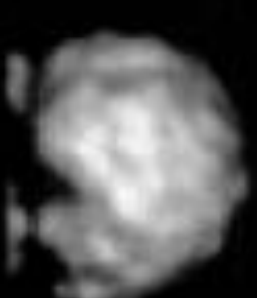
4



5



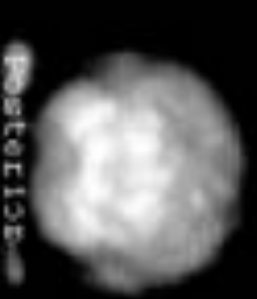
6



7



8



9



10



11



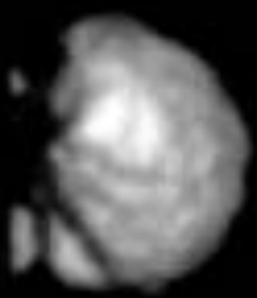
12



13



14



15



16

VOLUME 1401.35



Anterior

1



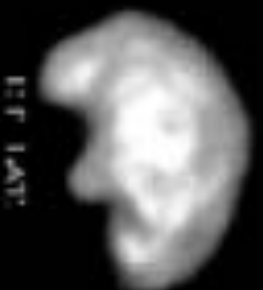
2



3



4



Left LAT

5



6



7



8



Posterior

9



10



11



12



Right LAT

13



14



15



16

VOLUME

# SOUTHEAST MEDICAL IMAGING

## SPECT NUCLEAR BRAIN SCAN

Name: Veteran NM	Date of Service: 10/4/2010
ID: MN070582	DOB: 7/5/1982
Age: 28	Sex: M
Indicators: PRE-HBOT FOR TBI AND PTSD	Referring MD: MAXFIELD, WILLIAM
	Technologist: GA

**HISTORY:** C/O HEADACHES, SLEEP APNEA

**COMPARISON:** No similar prior studies are available for comparison. Study is baseline prior to start of hyperbaric oxygen therapy

**TECHNIQUE:** Following injection of 30.5 mCi of Technetium-99m Ceretec, SPECT imaging of the brain was obtained in axial, sagittal, and coronal planes. Images are presented in black and white and in color. Also 3D images are provided.

**FINDINGS:** There is a markedly abnormal pattern with essentially absent localization in the right frontal area and some in the left parietal and occipital areas. There is a very patchy-type pattern to both cerebral hemispheres; it is a suggestion of some enlargement of the ventricular system. There is abnormal localization in both cerebellar areas, greater on the left than the right. The basilar ganglia areas are essentially normal.

### Conclusions

- Markedly abnormal localization in both cerebral hemispheres with areas of almost no localization, right frontal, left parietal, and occipital areas. Greater abnormality on the right than the left. Abnormal localization to cerebellar areas bilaterally, greater on the left than the right. All areas of abnormal localization have peri-ischemic penumbra. There is a suggestion that there is some enlargement of the ventricular system. If available, previous brain imaging studies would be useful for comparison.

William S. Maxfield, MD, FACNM  
Board Certified American Board of Radiology  
Board Certified American Board of Nuclear Medicine  
Fellow American College of Nuclear Medicine  
RP:Maxfield/ka





# SOUTHEAST MEDICAL IMAGING

## SPECT NUCLEAR BRAIN SCAN

Name: Veteran NM  
ID: MNH070582 DOB: 7/5/1982 Date of Service: 10/29/2010  
Age: 28 Sex: M Referring MD: MAXFIELD  
Indications: POST HBOT FOR TBI AND PTSD Technologist: JC

**HISTORY:** C/O HEADACHES AND SLEEP APNEA

**COMPARISON:** Similar prior studies are available for comparison 10/04/2010. In the interim, patient has had a course of hyperbaric oxygen therapy and physical rehabilitation.

**TECHNIQUE:** Following injection of 30.2 mCi of Technetium-99m Ceretec, SPECT imaging of the brain was obtained in axial, sagittal, and coronal planes. Images are presented in black and white and in color. Also 3D images are provided.

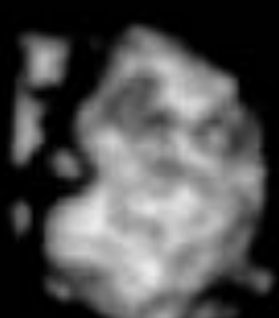
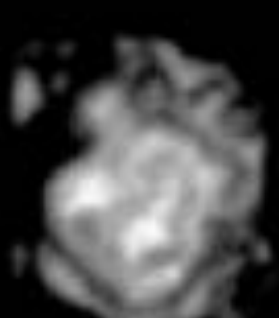
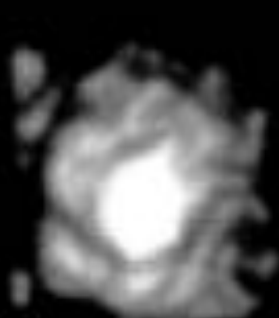
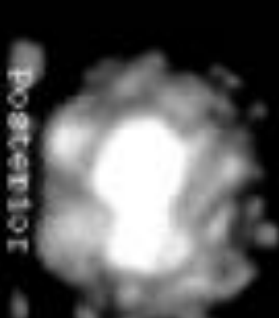
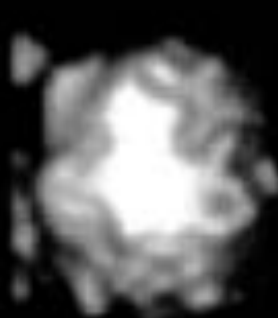
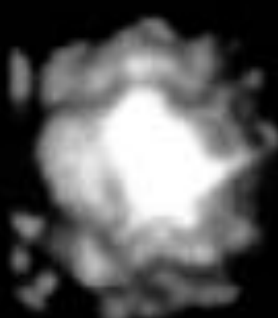
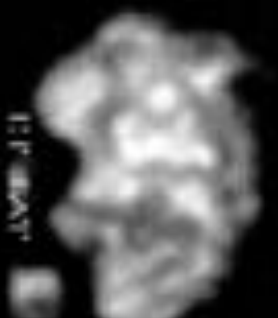
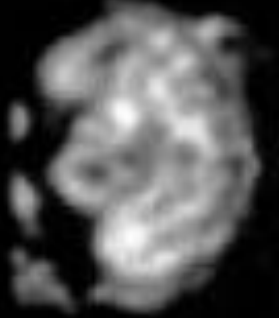
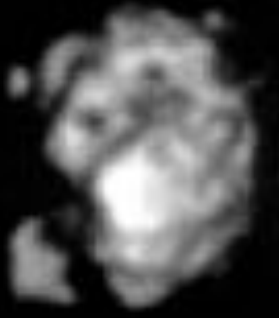
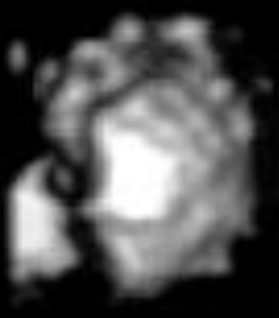
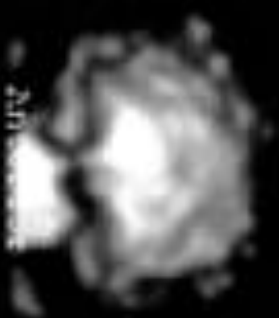
**FINDINGS:** There is a moderately abnormal pattern of localization with still areas of no localization in the right frontal and left parietal and occipital areas. The pattern of localization in both cerebral hemispheres is moderately patchy. There is also decreased localization in the cerebellar areas, greater on the left than the right, question again of some enlargement of the ventricles. The basal ganglia areas appear normal.

### Conclusions

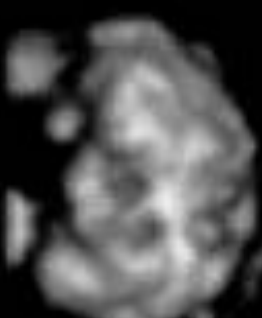
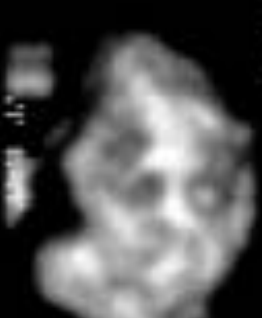
Comparison to previous study of October 4, 2010, shows improvement in the pattern of localization in both cerebral cortices and in the cerebellar area. The degree of localization still remains moderately abnormal, and there is small area of almost no localization in the right frontal and left parietal and occipital areas, with continued moderate abnormality in both cerebral cortices and in the cerebellar areas. Suggest followup hyperbaric therapy and consideration of nutritional stimulants also to stimulate brain regeneration.

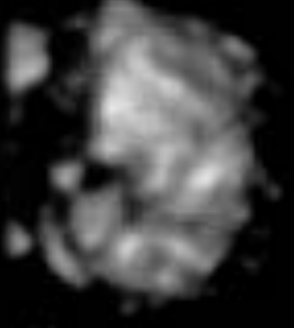
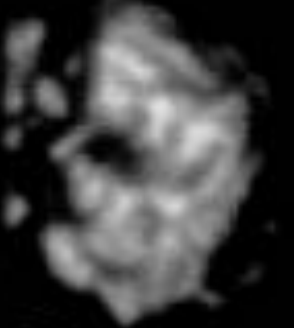
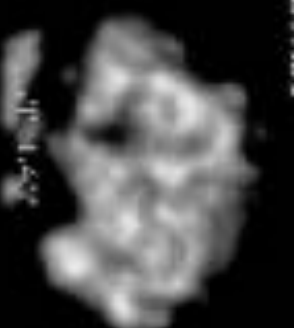
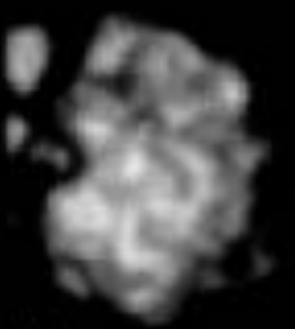
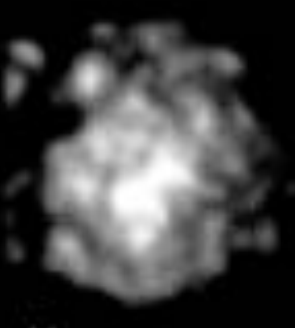
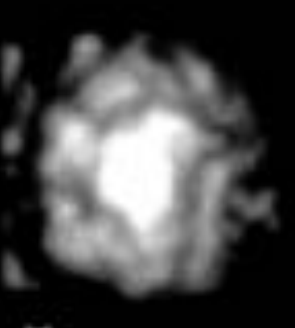
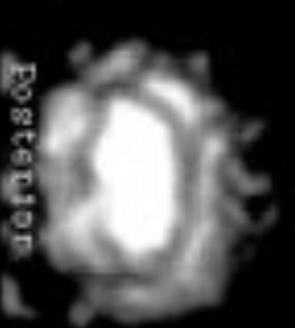
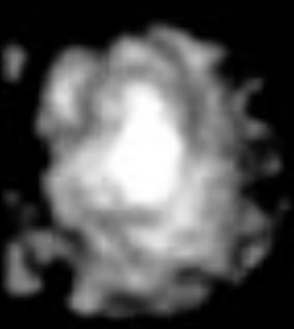
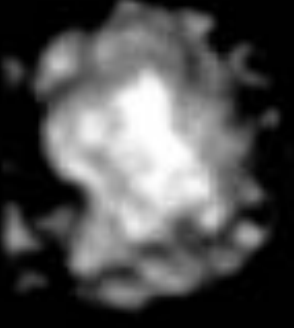
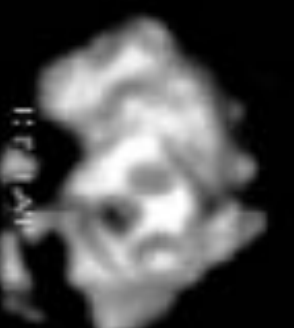
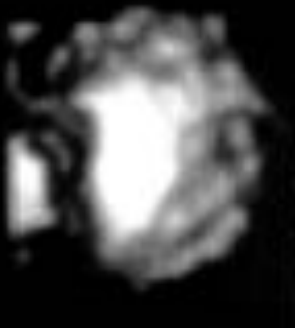
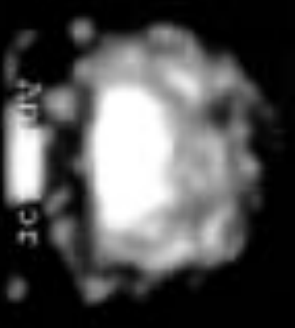
William S. Maxfield, MD, FACNM  
Board Certified American Board of Radiology  
Board Certified American Board of Nuclear Medicine  
Fellow American College of Nuclear Medicine  
RP Maxfield/ka  
cc: Ray Crafe





VOLUME





VOLUME1

Posterior

Anterior

# SOUTHEAST MEDICAL IMAGING

## SPECT NUCLEAR BRAIN SCAN

Name: Veteran DL	Date of Service: 8/23/2010
ID: LADA122884	DOB: 12/28/1984
Age: 25	Sex: M
Indications: TRAUMATIC BRAIN INJURY	Referring MD: MAXFIELD, WILLIAM
	Technologist: JCC

**HISTORY:** History of blast exposure and diagnosis of TBI and PTSD. MRI of the brain several years ago was reported as normal.

**COMPARISON:** No similar prior studies are available for direct comparison.

**TECHNIQUE:** Following injection of 30.2 mCi of Technetium-99m Ceretec, SPECT imaging of the brain was obtained in axial, sagittal, and coronal planes. Images are presented in black and white and in color. Also 3D images are provided.

**FINDINGS:** There is a markedly abnormal pattern of localization in both cerebral hemispheres with only a small number of areas that have a fairly normal localization. The areas of abnormality are greater and more severe on the left than the right. There is a pattern suggesting enlargement of the ventricles. There is also decreased localization in both cerebellar areas that is approximately equal. The basal ganglia areas are not well delineated and appear to be abnormal.

### Conclusions

- Markedly abnormal SPECT brain scan with greater abnormality on the left in comparison to the right. Abnormalities are particularly noted in the left frontal parietal area, the occipital areas, and frontal area on the left. All areas of abnormal localization have peri-ischemic penumbra. Pattern is that shown with blast injury and/or traumatic brain injury. Suggest followup SPECT brain scan after completion of the course of hyperbaric oxygen therapy. If available, previous brain images would be useful for direct comparison.

William S. Maxfield, MD, FACNM  
Electronically signed to expedite report  
Board Certified American Board of Radiology  
Board Certified American Board of Nuclear Medicine  
Fellow American College of Nuclear Medicine  
RP Maxfield/ka



# SOUTHEAST MEDICAL IMAGING

## SPECT NUCLEAR BRAIN SCAN

Name: Veteran DL	Date of Service: 9/20/2010	
ID: LADA122884	DOB: 12/28/1984	Referring MD: MAXFIELD, WILLIAM
Age: 25	Sex: M	Technologist: GA
Indications: FOLLOW UP BRAIN SCAN AFTER COMPLETION OF HYPERBARIC OXYGEN THERAPY TREATMENTS		

**HISTORY:** PREVIOUS SCAN ON 08/23/2010; S/P 39-02 TX

**BASIC DIAGNOSIS:** TBI and PTSD

**TECHNIQUE:** Following injection of 30.5 mCi of Technetium-99m Ceretec, SPECT imaging of the brain was obtained in axial, sagittal, and coronal planes. Images are presented in black and white and in color. Also 3D images are provided.

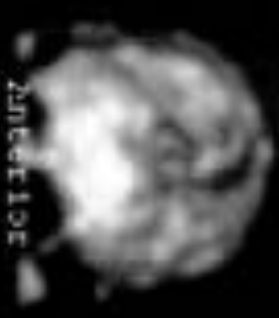
**FINDINGS:** There is a moderately abnormal pattern to both cerebral hemispheres with greater degree of abnormality in the left cerebral hemisphere, particularly in the frontal, frontoparietal, and occipital areas bilaterally. The ventricles appear to be enlarged. Basilar ganglia areas are poorly delineated but appear normal as shown cerebellar areas appear normal.

### Conclusions

- Improvement in comparison to the previous study of August 23, 2010, when the pattern was markedly abnormal. There are less large areas of absent localization on the current study in comparison to the previous study. There continues to be a greater degree of abnormality in the left side in comparison to the right side. All areas of abnormality show a peri-ischemic penumbra. There is again a pattern suggesting enlargement of the ventricles.
- Improved localization of the cerebral hemispheres bilaterally in comparison to the previous study of August 23, 2010, but the cerebral cortex of both remains moderately abnormal. I would suggest additional hyperbaric oxygen treatment and/or consideration of a glyconutrient.

William S. Maxfield, MD, FACNM  
Board Certified American Board of Radiology  
Board Certified American Board of Nuclear Medicine  
Fellow American College of Nuclear Medicine  
RP.Maxfield/ka





1



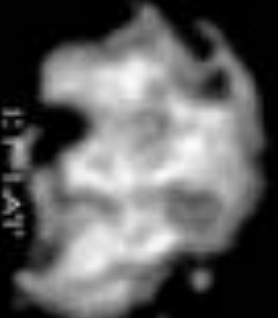
2



3



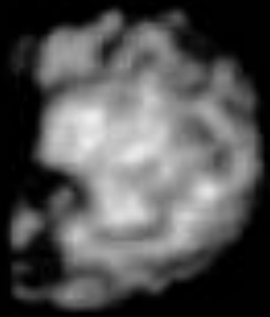
4



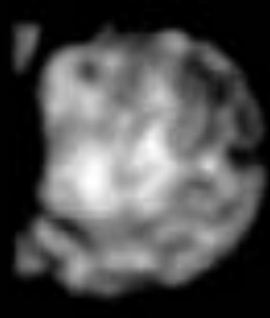
5



6



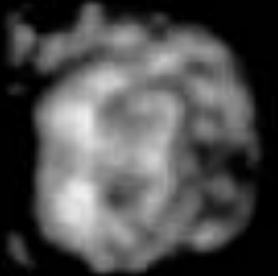
7



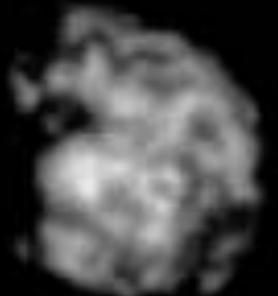
8



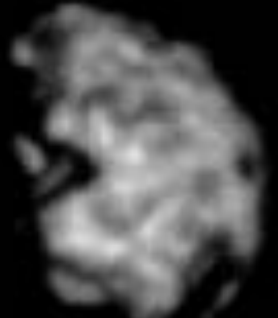
9



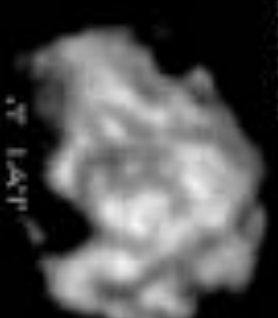
10



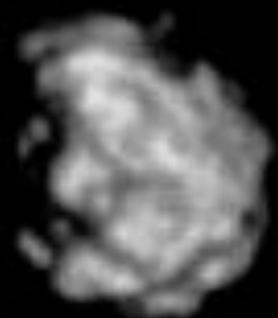
11



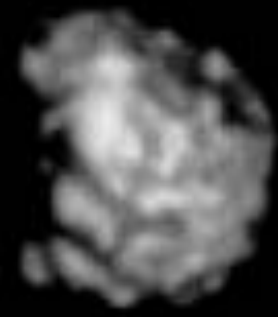
12



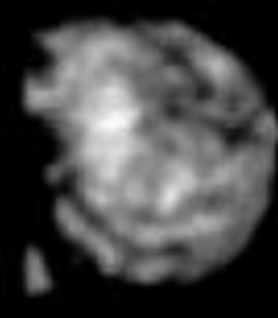
13



14



15

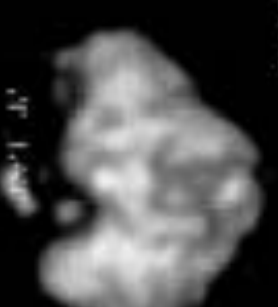
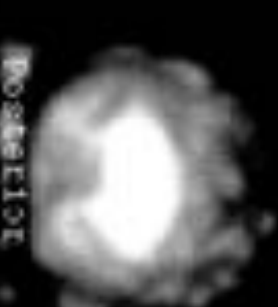
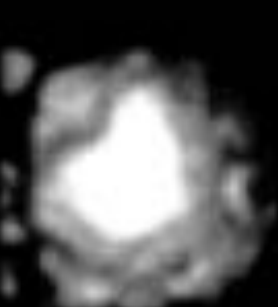
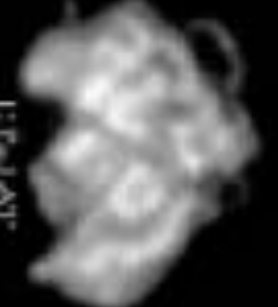
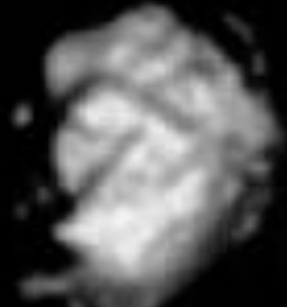
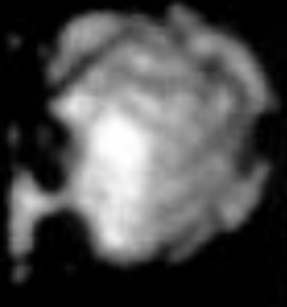
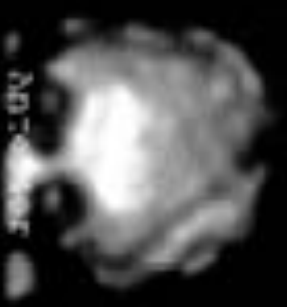


16

VOLUME 01

POSTERIOR

ANTERIOR



VOLIMS

Posterior

Left/Right

AP/PA

# SOUTHEAST MEDICAL IMAGING

## SPECT NUCLEAR BRAIN SCAN

Name: <u>Veteran JC</u>	Date of Service: 8/31/2018	
ID: CAJE102080	DOB: 10/29/1980	Referring MD: MAXFIELD, WILLIAM
Age: 29	Sex: M	
Indications: TBI,		Technologist: GA

**HISTORY:** PTSD, HEADACHES, LOWER BACK PAIN, S/P O2 TX X 2, MEMORY LOSS

**COMPARISON:** No similar prior studies are available for comparison.

**TECHNIQUE:** Following injection of 30.4 mCi of Technetium-99m Ceretec, SPECT imaging of the brain was obtained in axial, sagittal, and coronal planes. Images are presented in black and white and in color. Also 3D images are provided.

**FINDINGS:** There is a very patchy type of pattern in both cerebral hemispheres, with the greatest abnormality being in the frontal lobes bilaterally, with a greater degree of abnormality in the left frontal in comparison to the right frontal. There is also significant abnormality in the superior parietal areas as well. The basal ganglia area and the cerebellar areas appear normal. There is a suggestion that there may be some enlargement of the ventricular system.

### Conclusions

- Markedly abnormal SPECT scan with greatest abnormality in the frontal lobes bilaterally, greater on the left than the right. Also abnormal areas in the superior parietal areas. All areas of abnormality have peri-ischemic penumbra. Study is otherwise normal as shown. Correlation with previous imaging procedures would be of value since there is suggestion of some enlargement of the ventricular system.

William S. Maxfield, MD, FACNM  
Electronically signed to expedite report  
Board Certified American Board of Radiology  
Board Certified American Board of Nuclear Medicine  
Fellow American College of Nuclear Medicine  
RP Maxfield@ka





# SOUTHEAST MEDICAL IMAGING

## SPECT NUCLEAR BRAIN SCAN

Name: Vetsaris, JG	Date of Service: 9/27/2010
ID: CAJE102080	DOB: 10/20/1980
Age: 29	Sex: M
Indicators: FOLLOW UP AFTER HBOT	Referring MD: MAXFIELD
	Technologist: JC

**HISTORY:** Posttraumatic stress disorder, headaches, low back pain, memory loss. Followup study after hyperbaric oxygen therapy.

**COMPARISON:** Similar prior studies are available for comparison. 08/31/2010

**TECHNIQUE:** Following injection of 30.8 mCi of Technetium-99m Ceretec, SPECT imaging of the brain was obtained in axial, sagittal, and coronal planes. Images are presented in black and white and in color. Also 3D images are provided.

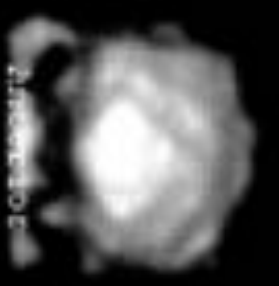
**FINDINGS:** There is a minimally abnormal pattern of localization in both cerebral hemispheres, greater on the left than the right with the greatest area of decreased localization being in the left posterior frontoparietal area, decreased localization in the superior parietal area more on the left than the right. The basal ganglia and the cerebellar areas appear normal. There is a suggestion of minimal enlargement of the ventricular system.

### Conclusions

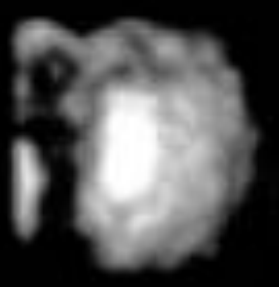
- Comparison to previous study of August 31, 2010, shows that there is now a minimally abnormal pattern in both cerebral hemispheres, again greater on the left than the right, with the greatest degree of abnormality being in the left posterior frontoparietal area and in the left superior parietal area. All areas of abnormality have periventricular ischemic changes. There is again suggestion of slight enlargement of the ventricular system. Study is otherwise unremarkable showing significant improvement since the prior study of August 31, 2010.

William S. Maxfield, MD, FACNM  
Board Certified American Board of Radiology  
Board Certified American Board of Nuclear Medicine  
Fellow American College of Nuclear Medicine  
RP Maxfield/ka

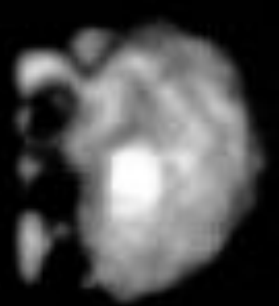




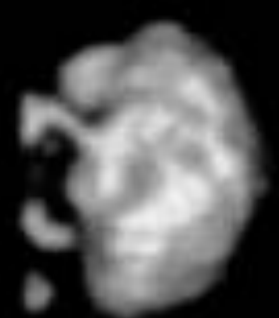
1



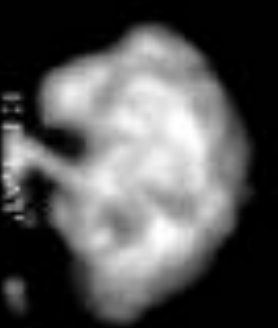
2



3



4



5



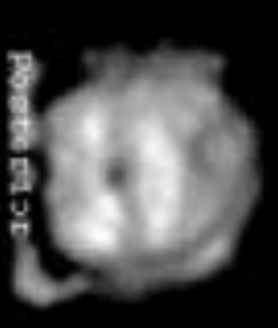
6



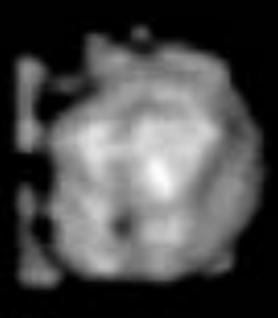
7



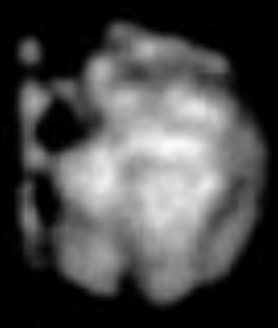
8



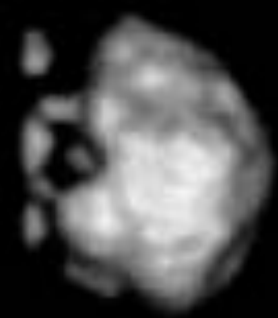
9



10

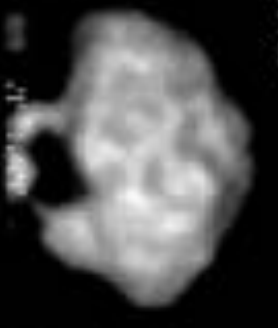


11

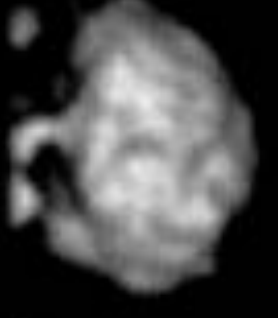


12

VOLUME



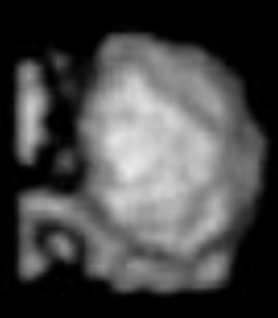
13



14



15



16

C J

SOUTHEAST MEDICAL IMAGING

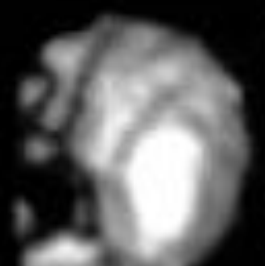
2706P(13)



1



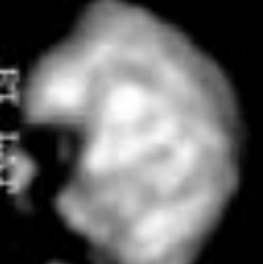
2



3



4



5



6



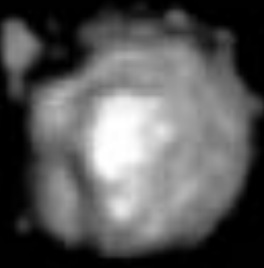
7



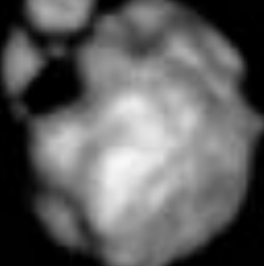
8



9



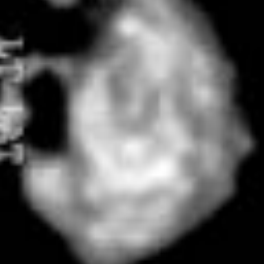
10



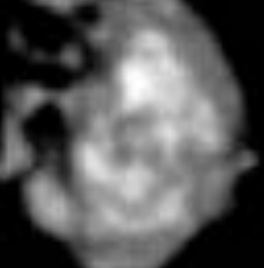
11



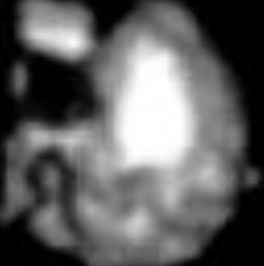
12



13



14



15



16

# SOUTHEAST MEDICAL IMAGING

## SPECT NUCLEAR BRAIN SCAN

Name: <u>Veteran TG</u>	Date of Service: 8/5/2010
ID: CATT031783	DOB: 3/17/1983
Age: 27	Sex: M
Indications: BASELINE SPECT SCAN FOR HBOT	Referring MD: MAXFIELD
	Technologist: JC

**HISTORY:** Veteran that suffered TBI and posttraumatic stress disease. The patient has just been started with hyperbaric oxygen therapy. Essentially baseline study is being performed.

**COMPARISON:** No similar prior studies are available for comparison.

**TECHNIQUE:** Following injection of 30.4 mCi of Technetium-99m Ceretec, SPECT imaging of the brain was obtained in axial, sagittal, and coronal planes. Images are presented in black and white and in color. Also 3D images are provided.

**FINDINGS:** There is a markedly patchy type pattern of localization in both cerebral hemispheres with the greatest abnormality being on the left, particularly in the left posterior, frontal and parietal area. There is also abnormal localization in the cerebellar area, greater on the left than the right. Basilar ganglia areas appear normal. There is a suggestion there may be some enlargement of the ventricular system. Study is otherwise normal.

### Conclusions

- Markedly abnormal SPECT brain scan with greater abnormality on the left in both the cerebral cortex and also in the cerebellar area. All areas of abnormality have peri-ischemic penumbra. If available previous imaging procedures would be of value for comparison.

William S. Maxfield, MD, FACNM  
Board Certified American Board of Radiology  
Board Certified American Board of Nuclear Medicine  
Fellow American College of Nuclear Medicine  
RP Maxfield/sy  
cc: Ray Cralle



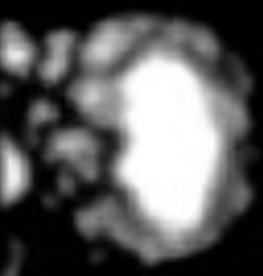
C  
CATY051743 T

SOUTHEAST MEDICAL IMAGING

20aug2013



1



2



3



4



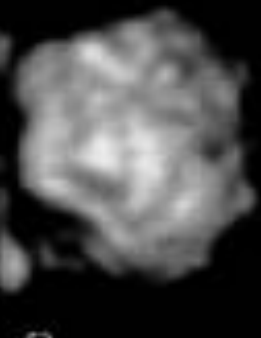
5



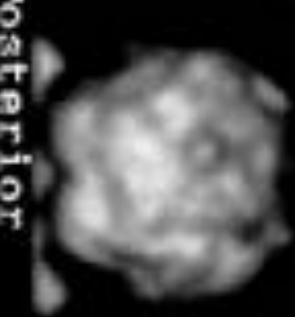
6



7



8



9



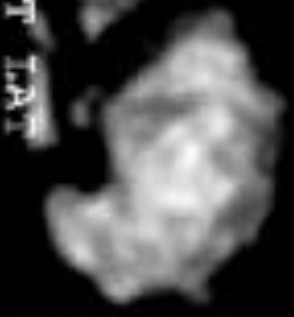
10



11



12



13



14



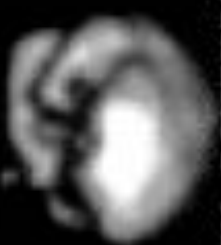
15



16



1



2



3



4



5



6



7



8



9



10



11



12



13



14



15



16

POSTERIOR

JD-LEVEL-RB300R2  
L1 LAY

Abstract #

SPECT Brain Scan in Evaluation of Traumatic Brain Injury (TBI), Post-Traumatic Stress Disorder (PTSD) and Cognitive Defect Post-Surgery

Southwestern Chapter of The Society of Nuclear Medicine  
March 19-21, 2010, Ft. Worth, Texas

William S. Maxfield, MD, FACNM and Raymond H. Cralle, RPT

**BACKGROUND:**

Several Hyperbaric Oxygen Therapy (HBOT) Centers have used SPECT brain scans for many years to document various types of CNS injury before treatment. The SPECT brain scan has been able to provide objective demonstration of the clinical improvement with HBOT in these patients.

**CURRENT CASES:**

We recently have used SPECT brain scans in four patients with history of TBI, PTSD or cognitive defect post-surgery and have followed up on two additional TBI cases. The SPECT brain scan has been able to confirm brain damage in these patients. Two of the vets with TBI and blast exposure were told by their military physicians their symptoms were all mental with no organic brain dysfunction. The third vet, with no TBI, but who was exposed to forty plus blast explosions, was told the same information. Blast exposures are now recognized to cause, with the rapid pressure changes, air bubbles in the vascular system which occurs in the bends after a bad scuba dive or in Casson's disease. The fourth patient developed symptoms of severe cognitive defect post-surgery after a six-hour cardiac surgery.

These four patients all had significantly abnormal SPECT brain scans on initial evaluation. An increased incidence of suicide is documented in our vets. One of the vets we treated had attempted suicide three times. There is documentation of an increased incidence of suicide in those with Casson's disease.

All four patients were treated with HBOT and aggressive rehabilitation. The three vets also had extensive psychological testing before and after treatment. Post-treatment, the four patients showed marked clinical response. The post-treatment SPECT brain scans documented improved brain function that correlated with their clinical improvement. The three vets post-treatment also had marked improvement in their psychological test score.

A fifth patient who had severe TBI and was bed-confined requiring 24-hour care received HBOT and rehabilitation over a number of years. This patient, with HBOT and rehabilitation, still cannot drive, but can now walk with a cane, is verbal, and can travel by himself. His SPECT brain scans have markedly improved correlating with his clinical improvement.

A sixth case demonstrates that HBOT response is reproducible and does work in TBI. A young girl, 14, had severe TBI from a horseback riding accident. Unfortunately, we were not able to obtain SPECT brain scans on this patient. Her neurologist told the family they should consider

removing the feeding tube as she would never improve. With HBOT at HOC in Vancouver, Canada, the young girl is now back in school and considering applying for her driver's license. This case, treated at a different hyperbaric facility, shows that HBOT for TBI does work and is reproducible in multiple centers.

**CONCLUSION:**

Based on our current experience with these three military, three civilian cases and past use of SPECT brain scans in CNS injury, SPECT brain scans, in our opinion, should be used to evaluate all CNS injury and to document objectively clinical improvement after treatment.