Brain SPECT Imaging in Psychiatry
It’s About Time!

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Disclosures

- CEO and sole owner of Amen Clinics, Inc. in Newport Beach and Fairfield, CA, Bellevue, WA and Reston, VA

- We have a database of > 63,000 SPECT scans on patients from 90 different countries

- Have SPECT licensing agreements with Sierra Tucson in Arizona, Hanley Center in Florida and Clements Clinic in Texas.
“SPECT techniques provide a powerful window into the function of the brain and promise to become an important component of the routine clinical evaluation of patients with neurological and psychiatric diseases.”

Accepted SPECT Indications

- CVD, epilepsy, dementia, TBI, encephalitis (all common issues for practicing psychiatrists)
- Devous’ 1992 paper -- promising indications include depression, OCD, anxiety and schizophrenia
- If only ordered SPECT for accepted indications psychiatrists would be ordering hundreds of thousands of SPECT scans a year!
More Accepted Indications?

- Careful reading of the APA’s 2005 report (not an APA position paper)
- Adds Tourette’s Syndrome
- 2009 EANM, “SPECT can be useful in other indications such as movement disorders and psychiatric diseases (e.g. for follow-up of depression)”

“Many SPECT indications reimbursed”

- Standard ones
- Rest vs stress valuable in ADHD
- Both also mention patterns for OCD, schizophrenia, substance abuse, depression, panic disorder, violence and toxic exposure
Myth: Not Enough Science on SPECT

Fact -- vast literature already exists

- > 2,600 abstracts on amenclinics.com
- Normal – 76 studies on 4,111 subjects
- ADHD – 56 studies on 2,010 subjects
- OCD spectrum – 99 studies on 2,155 subjects
- Autistic spectrum – 63 studies on 2,051 subjects
- Violence – 41 studies, 1,468 subjects
- Treatment effects – 107 studies, 2,695 subjects
Dr. Amen 35 Articles on SPECT

- NFL Brain trauma study 100n (2011 J Neuropsychiatry)
- NFL Rehabilitation 30n (2011 J Psychoactive Drugs)
- Hi BMI/Low PFC 36n (2011 Nature Obesity)
- SPECT in complex psych cases (2011 Open Neuroimaging J)
- Aggression/murder 46n (J Neuropsychiatry)
- Completed suicides 36n (2009 J Neuropsychiatry)
- ADHD Predicting Treatment 157n (2008 J Psychoactive Drugs)
- ADHD in Older Patients 40n (2008 J Psychoactive Drugs)
NFL Findings on Brain Trauma

Amen, et al. 2011 Neuropsychiatry
Amen 2011 Psychoactive Drugs
Elevated BMI/ Low PFC Findings

Amen, et al. 2011  Nature Obesity
Despite the evidence, psychiatrists remain the only medical specialists who rarely look at the organ they treat!

Most psychiatrists still make diagnoses like they did in 1841 when Lincoln was depressed … by using symptom clusters and mental status exams.
Why is he resistant to therapy after 3 years and $20K?

Healthy  PD/Failed marital therapy
By Not Using SPECT or Other Imaging Tools Routinely in Clinical Practice

- We hurt people
- We hurt families
- We hurt our society
- Patients are mislabeled and mistreated
- Soon I believe it will be malpractice not to use neuroimaging in complex cases
SPECT Beginnings

- Military trained, double board certified psychiatrist
- Mid-Late 1980s trained in neurofeedback/QEEG
- Unique perspective to understand SPECT
- In early 1991 lecture on brain SPECT imaging
- It changed everything I did!
Typically Scans are Rendered in 2D Slices, which Few People Understand
Adult ADHD PFC Deactivation

Lou 1984, Zametkin 1990
Violent 12 Year Old Boy

Two Strokes
69 Year Old Woman Pseudodementia

Alzheimer’s

Not Her
Unrecognized Brain Injuries
Alcohol and Cocaine

Before Treatment

After Treatment
SPECT Developments

- 1992/1993 APA provided all day training course for brain SPECT in Child Psychiatry
- Lots of debate and controversy over using SPECT in clinical practice
- It was an anxious time!
Andrew
Andrew
SPECT Developments

- 1996 Vasile, Harvard Review of Psychiatry, "The clinical utility of SPECT in neuropsychiatry is well established."

- All psychiatry is neuropsychiatry!!

- 1996 California Medical Board investigated my work with SPECT

- After a year, no violation was found. Encouraged me to publish our findings.
Does Brain SPECT Change Clinical Management?

- 94 consecutive patients undergoing SPECT

<table>
<thead>
<tr>
<th>Condition</th>
<th># pts</th>
<th>mgmt changed</th>
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<tbody>
<tr>
<td>Dementia</td>
<td>18</td>
<td>61%</td>
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<tr>
<td>TIAs</td>
<td>16</td>
<td>81%</td>
</tr>
<tr>
<td>Stroke</td>
<td>20</td>
<td>50%</td>
</tr>
<tr>
<td>Brain trauma</td>
<td>6</td>
<td>50%</td>
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</table>
Does SPECT Change Psychiatric Practice?

- 200 random cases evaluated by board certified psychiatrists without, and then with SPECT to determine changes in care.
- Based on history, MSE, SCID and gave diagnosis and treatment plan.
- Same cases re-evaluated with SPECT.
- 75% of diagnoses and/or treatment changed with addition of SPECT.
Depression

Clearly a toxic pattern
How SPECT Changes Psychiatric Diagnosis and Treatment

- What can SPECT tell clinicians and patients that they cannot obtained through:
  - History
  - Mental status examinations
  - Physical examinations or
  - Neuropsychological testing
Better Questions

- Harold Bursztajn, MD, Harvard says, “SPECT doesn’t give you the answer, it teaches you to ask better questions!

- It helps to understand underlying physiology

- Is brain overactive, underactive, injured or toxic?”
SPECT Helps Prevent Mistakes

- Such as stimulating an overactive brain or calming one that is underactive
- Or missing toxicity or space occupying lesion
Aid in the Diagnosis and Treatment of Substance Abusers

- Break denial
- Increase compliance – “brain envy”
- Help understand co-morbidity
- Follow treatment
- Education and prevention

Amen, DG: High Resolution Brain SPECT Imaging in a Clinical Substance Abuse Practice, 2010 J Psychoactive Drugs. Volume 42(2), June 2010
WHICH BRAIN
DO YOU WANT?

2 YEARS
OF CRANK
AGE 22

4 YEARS
OF ALCOHOL
AGE 21

HEALTHY,
DRUG FREE
BRAINS
AGE 16

2 YEARS
OF MARIJUANA
AGE 16

3 YEARS
OF COCAINE
AGE 22

4 YEARS
OF INHALANTS
AGE 21

2 YEARS
OF SMOKING
AGE 16
SPECT Can Decrease Stigma

- Patients and family see problems as medical not moral
- Dramatically decrease shame, guilt, self-loathing and anger.
- Increase forgiveness and compassion
- Increase compliance
- *We have nothing else in psychiatry that is this powerful or immediate*
Common SPECT Patterns That Inform Decision Making in Psychiatry
Scalloping/Overall Decreased Perfusion

- Toxicity (drugs or alcohol)
- Chemotherapy
- Environmental toxin
- CO poisoning
- Anoxia
- Infection
- Hypothyroidism
- Severe anemia
Scalloping Interventions

- Stop the toxin!
- Brain rehab program
  - Avoid Bad
  - Do Good
- Neurofeedback
- HBOT
- Meds or supplements
Overall Increased Perfusion

- Bipolar disorder/mania
- Inflammatory process, i.e., SLE
- ADHD that is typically made worse by stimulants
Overall Increased Interventions

- Work up potential inflammation, such as SLE or food allergies
- Eliminate allergens
- Calming interventions, such as anticonvulsants
Traumatic Brain Injury: More common than most know

- Focal deficits
- Asymmetries
- Prefrontal cortex flattening
- Decrease temporal poles
- Contra-coup sites
- Crossed cerebellar diaschisis
TBI Interventions

- Brain rehab program
  - Avoid Bad
  - Do Good
- Neurofeedback
- HBOT
- Meds or supplements that are area specific
Hidden Trauma

- Researchers link past brain trauma to:
  - Alcoholism and drug abuse
  - Homelessness
  - Depression and anxiety attacks
  - Suicide
  - Learning problems
- How would you ever know unless you looked?
Hyperfrontality

- OCD spectrum
- ODD
- Autistic spectrum
- Get’s stuck, worried, rigid, inflexible
- Overfocused depression or anxiety
High PFC Interventions

- Increase serotonin
  - SSRIs
  - Supplements such as 5HTP or St. John’s Wort
  - Risperdone
  - Exercise
Hypofrontality

- ADHD
- Schizophrenia
- TBI
- Medications
- Predicts relapse in alcoholics
- Lack of conscientiousness
- Forms of depression
Low PFC Interventions

- Stimulants if ADHD
- Stimulating antipsychotics if needed, Abilify
- Stimulating antidepressants if depressed
- Brain rehab if needed
- Stop any offending meds
Temporal Lobe Hypo-perfusion

- TLE
- TL dysrhythmia
- Dyslexia
- Mood instability
- Intermittent explosive disorder
TL Interventions

- AED
- Ketogenic diet
- Neurofeedback
Trial and error diagnosis will move to an era where we understand the pathophysiology of mental disorders.

We are going to have to use neuroimaging to begin to identify the systems pathology that is distributed in each of these disorders and think of imaging as a biomarker for mental illnesses.
End game is to get to an era of individualized care.

The DSM-IV has 100% reliability and 0% validity. We need to develop biomarkers to develop the validity of these disorders.

Brain imaging in clinical practice is the next major advance in psychiatry within 5 years.
Not If, But When
Sites Utilizing SPECT Today

- 4 Amen Clinics
- Sierra Tucson, AZ
- Hanley Center, Florida
- Clements Clinic, Texas
- Pavel/Best, Chicago
- Uszler, Santa Monica
- Harch, New Orleans
- Stevens, OHSU
- Newberg, Philadelphia
- Fort Carson, CO
- Chandak, SF
- Cerescan, CO
- Cohen, Vancouver, BC
- Thornton +, Toronto
- Mena, Chile
- Camargo, Brazil
10 Ways SPECT Will Change Everything You Do
1. You Will Develop Brain Envy

Age 37                         Age 52
2. You will be more careful with psychotropic medications

Healthy

Alprazolam
3. You won’t let your kids play tackle football
4. You will take sleep apnea seriously

Healthy

Sleep apnea
5. You will take environmental toxins much more seriously.
6. You will take weight more seriously.
7. Stop thinking in DSM terms only and more in brain system pathology

Low activity depression  High activity depression
8. Think about the early detection and prevention of Alzheimer’s disease
9. You will be more cautious in handing out personality disorder diagnoses.
10. You will think about the brain when seeing couples in trouble

Early Memory Problems and Marital Problems
Brain SPECT: It’s About Time

- We need to look at what we do
- Decrease stigma
- Increase compliance
- Make more complete diagnoses
- More targeted treatment plans
- We have a great opportunity to move our profession forward
- I hope you will join me!
Amen Clinics Inc.
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docamen@amenclinic.com

- Newport Beach, CA
- Reston, VA (Wash D.C.)
- Fairfield, CA
- Bellevue, WA
ASD Interventions

- Coordination exercises to boost cerebellum
- Increase serotonin
  - SSRIs or supplements
  - Risperdone
  - Exercise
One Size Does Not Fit Everyone
(Most Problems, i.e., ADD, Obesity, Substance Abuse, Depression Are NOT Single or Simple Disorders)

Depression
1. Hypofrontal
2. Hyperfrontal
3. Hypo + hyperfrontal
4. Temporal lobe
5. Toxic

Each type of problem requires its own treatment
Reasons We Don’t Look

- Imaging is not part of our training or tradition
- Many psychiatrists do not know how to read brain scan images
- Do not know what to do with the information
- DSM-IV assumes uniformity of psychiatric diagnoses, when they are dramatically heterogenous, which is, in fact, the reason to order imaging on individual patients
Two Teenager Multiple Murderers

Overall severe low activity
Two Teenager Multiple Murderers

Overall severe increased activity
Indications -- Brain SPECT Imaging

- Substance abuse
- Atypical or resistant psychiatric disorders
- Evaluating treatment response
- Helping to understand couple conflicts
- General health screening for those at risk
A Brain System Approach to Diagnosis and Treatment

- Low PFC – poor internal supervisor
- High anterior cingulate – worried and rigid
- Temporal lobe – mood instability, irritability and memory and learning problems
- Low cerebellum -- disorganization
How Do You Know Unless You Look?