

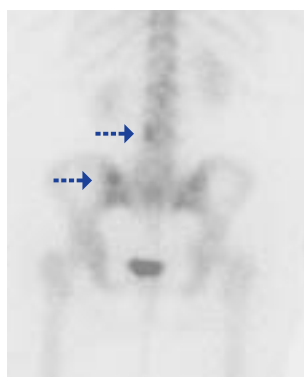
Nuclear Medicine Diagnostics, continued

**PET MSK ONCOLOGY IMAGING**

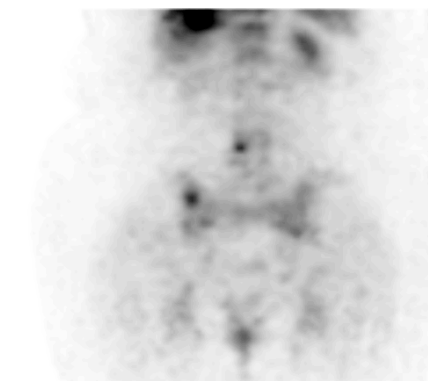
Breaking new ground for our patients—we are conducting a clinical evaluation of a new radiopharmaceutical combination which may be more effective than standard FDG-PET in evaluating bone metastases in breast and lung cancer. TRA physicians hope to publish their findings in a major subspecialty journal.

We are evaluating the possibility of combining a standard PET scan and a bone scan into a single examination. This dual isotope PET scan assesses the F-18 fluoro-deoxy-glucose (FDG) consumption by the red marrow and the F-18 sodium fluoride (NaF) incorporation into the bone matrix. Normally there is minimal, if any, FDG uptake at sites of cortical trauma or arthritis, whereas the NaF localization to the mineral substrate of newly formed bone matches that of traditional bone agents, like Tc-99m MDP or HDP. This combination should provide the best assessment of both sclerotic and lytic skeletal lesions and is likely to offer the best methodology to follow up patients with known bone metastasis.

This is currently a pilot study, offered at no cost to our patients, in the context of advanced breast carcinoma and most cases of documented lung cancer. The information provided with this technique is expected, at this stage, to confirm though not yet replace a standard Tc-99m whole body bone scan.



*<sup>99m</sup>Tc-HDP Bone Scan shows focal abnormalities within the lumbar spine and sacrum.*



*Dual isotope (<sup>18</sup>F-NaF and <sup>18</sup>F-FDG) PET Scan. The abnormalities seen with <sup>99m</sup>Tc-HDP (above) are also identified with <sup>18</sup>F-NaF.*

**TRA Imaging News**

TRA Imaging News is produced bi-monthly for referring providers of TRA Medical Imaging. It is designed to aid in the understanding of TRA and its services.

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Tacoma Magnetic Imaging & Union Avenue Open MRI

# TRA Imaging News

Printed For the Referring Providers of TRA Medical Imaging

## Leading the Region in Nuclear Medicine Diagnostics



**Anthony Larhs, M.D.**

Medical Director, Clinical PET and Nuclear Medicine

Oncology imaging has become more complex than ever before and demands a comprehensive evaluation of the available clinical, laboratory, morphological and functional data. The following vignettes describe some of the choices available to enable us to more accurately assess your patients.

**IMAGE FUSION AND UNIFYING REPORTS**

TRA is the only imaging center in Washington to offer multi-modality fusion capabilities.

All the volumetrically acquired images (CT, MRI, PET, SPECT) or the two dimensional images (planar nuclear and digital radiographs) can be co-registered in any combination of exams that have been stored in our PACS-linked system or with any exam that has been performed at another clinic or hospital.

**“TRA is the only imaging center in Washington to offer multi-modality fusion capabilities.”**

**PROSTATE CARCINOMA**

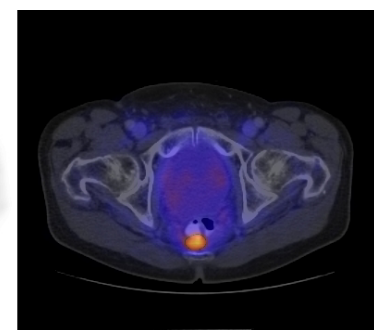
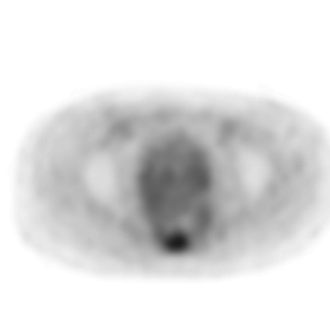
A ProstaScint™ scan is the best way to assess for local versus distant recurrence of prostate cancer. The ProstaScint™ scan is only offered at four sites in Washington, with TRA performing the greatest volumes.

When interpreting a rising PSA following local therapy, the question to answer is if recurrent disease has spread beyond the prostate bed. A ProstaScint™ scan map is used to detect the local accumulation of cells that express the prostate specific membrane antigen. Accurate

interpretation of this map demands precise correlation of isotope distribution to anatomical structures. Computerized image fusion of the ProstaScint™ scan to a pelvic CT scan provides the required anatomical definition. This tool is available to TRA radiologists through a software based fusion technique we first implemented for PET image analysis.

*continued, page 2...*

**PET-CT FUSION**



*CT, PET and fusion images. Status post resection of rectal cancer, increasing serum CEA level. The fusion image (right) clearly shows that recurrent tumor corresponds to soft tissue posterior to the contrast containing bowel loop and anterior to the sacrum.*

**Also Inside...**

Howard Sun, M.D., shares how vertebroplasty offers relief for vertebral compression fractures.

**Upcoming Events**

**UFE Health Talk Slated for February 3**

TRA Medical Imaging, Franciscan Health System and Boston Scientific are co-sponsoring a free community Health Talk about uterine fibroid embolization (UFE), the minimally invasive alternative to hysterectomy.

Interventional radiologist Richard Tobin, M.D., will present “A New Fix for Fibroids,” Thursday, February 3, 6-7 p.m., in the Lagerquist Classrooms A&B on St. Joseph’s Hospital’s ground level, 1717 South “J” Street, Tacoma.

Anyone interested in attending this talk should call the Franciscan Health Line, 1-888-825-3227 to register (required).

**TRA to Host Dinner/Seminar on Vertebroplasty**

Healthcare providers are invited to join us Tuesday, February 8, at C.I. Shenanigan’s to learn more about percutaneous vertebroplasty.

TRA interventional radiologist Howard Sun, M.D., will address the procedure, including indications, contraindications, risks, outcomes and typical case studies.

Check-in and appetizers begin at 6 p.m., followed by dinner and seminar at 6:30 p.m.

**To reserve your space, please call TRA at (253) 761-4200.**

*TRA Medical Imaging is a local partnership of radiologists formed in 1943. The radiologists of TRA Medical Imaging serve Mary Bridge Children’s Hospital, St. Francis Hospital, St. Joseph Medical Center and Tacoma General Hospital and its outpatient imaging centers.*

**OUTPATIENT CENTERS**

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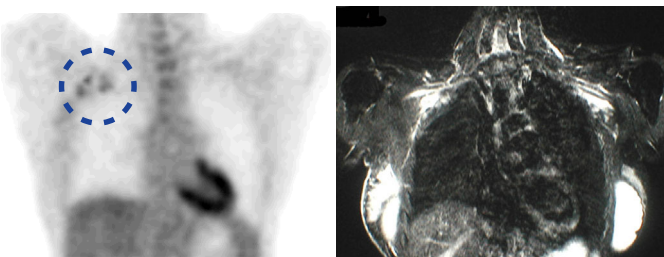
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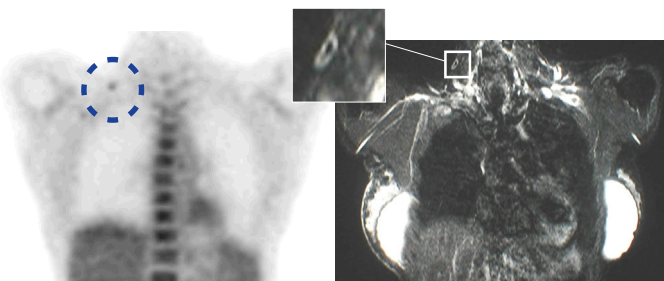
EXCELLENCE • PERSON TO PERSON

...Nuclear Medicine Diagnostics, continued

**PET-MRI FUSION**



*N<sub>1</sub>-N<sub>2a</sub> lymph nodes diagnosed on both modalities.*



*N<sub>1c</sub> lymph node definite on PET; falsely negative on MRI (ie. fatty hilum).*

**BREAST CARCINOMA**

Now Tc-99m MIBI may be used to in vivo assess drug resistance in breast carcinoma. Currently, this is practiced only in a few select centers nationwide.

Tc-99m MIBI, a radio-pharmaceutical, is routinely used in nuclear cardiology and for the detection of parathyroid adenomas. This agent can also be used in breast cancer imaging. In an already detected lesion on PET and/or CT, the early tracer uptake reflects the status of intracellular mitochondria. For example, breast carcinoma which fails to accumulate Tc-99m MIBI has an altered response to therapy due to the over expression of the anti-apoptotic protein Bcl-2.

Furthermore Tc-99m MIBI has been validated as a P-glycoprotein transport substrate and tracer efflux from a known lesion reflects the kinetic behavior of anti-cancer drugs of the MDR1 (multi-drug resistance) spectrum. The appropriate selection of patients based on the mechanism primarily involved in the development of a MDR1 resistant phenotype would improve the

efficacy of individually-tailored therapeutic strategies.

**GENERAL MSK FUNCTIONAL IMAGING**

Nuclear medicine adds a different dimension to the evaluation of musculoskeletal pain when it has not been fully accounted for with MR or CT imaging. These hybrid-imaging protocols aim to refine our detection and localization of pathology. Several of the protocols below are only available at TRA.

We perform a wide variety of specific protocols for nuclear musculoskeletal (MSK) assessment. We offer:

- A four-phase bone scan to increase the specificity in patients with diabetes mellitus
- Delayed 18-24 hour imaging to increase the sensitivity in elderly patients with

peripheral vascular disease

- Double or triple isotope protocol studies to increase accuracy when evaluating painful prosthesis
- FDG-PET imaging for difficult or inconclusive cases of hip infection
- NaF-PET imaging for the evaluation of neck pain following surgical fusion
- SPECT imaging for the evaluation of TMJ and knee pain

Additionally, TRA's Nuclear Medicine department now has the ability to provide fusion analysis for the optimum evaluation of hand and foot pathology. Computerized fusion performed between planar nuclear medicine images and digital radiography provides the anatomical localization for sites of abnormal bone reactivity. These examinations are limited to specific indications and should be discussed with a nuclear medicine specialist at the time they are requested.



*Digital x-ray is fused with Nuclear Medicine Bone Scan to pinpoint the source of pain. (ie. lunate bone and not the capitate-lunate joint that shows sclerosis on the x-ray).*

**BRAIN IMAGING**

For dementia evaluation, the highest standards anywhere are available in our community. In Washington, BRASS™ is available only at TRA.

For the differentiation of Alzheimer's disease from fronto-temporal dementia, CMS has recently approved the use of PET brain imaging after a comprehensive clinical evaluation with formal documentation of cognitive decline occurring over at least six months, as well as structural imaging such as MRI or CT to exclude alternative pathology. To aid in our ability to identify the earliest changes of AD, we now utilize BRASS™ (Brain Registration and Analysis) software. This is an automated analysis that co-registers a PET brain scan to a normalized data base and quantifies the regional functional differences between the two data sets. The program analyzes 31 distinct regions within the deep nuclei and the cortical mantle of each cerebral hemisphere. This technique has applications beyond the diagnosis of dementia and will be offered when a scan is performed for the diagnosis of Huntington, Parkinson, epilepsy and schizophrenia and for the evaluation of brain trauma.

*continued, page 4...*

#	Region Name	Normal %
1	R Cerebellum	105.1
2	L Cerebellum	106.1
3	R G. frontalis sup.	99.1
4	L G. frontalis sup.	98.1
5	R G. frontalis med.	104.8
6	L G. frontalis med.	103.1
7	R. G. frontalis inf.	101.3
8	L G. frontalis inf.	100.1
9	R Lobulus par. inf.	82.1
10	L Lobulus par. inf.	80.0
11	R Lobulus par. sup.	82.0
12	L Lobulus par. sup.	78.0

*Sample of BRASS™ analysis that confirms decreased function within the parietal lobes versus the normal population. This abnormality is most commonly seen in Alzheimer's dementia.*

**Quick Pain Relief for Vertebral Compression Fractures**



*Howard Sun, M.D.*

Interventional Radiologist

In recent years, percutaneous vertebroplasty (PV) has come to play a vital role in the treatment of painful vertebral compression fractures. This minimally invasive procedure has gained acceptance as it is performed with conscious sedation on an outpatient basis. It has a low complication rate, is cost effective, and can offer the patient immediate pain relief.

PV is effective in treating acute and subacute symptomatic compression fractures secondary to osteoporosis or neoplasm. Interventional radiologists at TRA perform more than 100 PV procedures a year and have been performing them since 2000.

In certain patients, conventional therapy of bed rest, external bracing, and narcotic analgesia can be effective. However, despite these measures, some experience protracted pain. In these patients, PV may be extremely valuable, as extended bed rest can actually promote additional bone loss. Therapy should center on both eliminating the pain and arresting osteoporosis, which includes early mobilization and administering inhibitors of bone resorption (hormonal therapy, biphosphonates, calcitonin).

PV is well suited to play a major role in this treatment regimen. It is 90 percent effective in eliminating or reducing the pain associated with acute or subacute compression fractures. For many, pain relief is immediate, while for others relief occurs within a week of the procedure. Either way, patients are mobilized early, allowing for a faster recovery and reducing disability days spent in the hospital, nursing facility or in home health care.

Initial workup typically includes an MRI to evaluate age and severity of fracture. The procedure then is performed in the hospital on an outpatient basis using conscious sedation. Procedure time is typically 30 minutes for a single level and 10-20 minutes for each additional level. Post-procedure observation time is between two and four hours.

Under imaging guidance (usually fluoroscopy), a needle is placed into the vertebral body and orthopedic cement (polymethylmethacrylate) is injected to create an internal splint within the fractured vertebra.

PV complication rates for osteoporotic fractures are reported as one to three percent and slightly higher for neoplastic compression fractures. Given PV is a relatively new procedure, complication rates are highly dependent on the quality of the imaging equipment and operator experience. At TRA, we have a 100 percent technical success rate and have yet to have a clinically significant complication.

PV should not be performed for chronic compression fractures, asymptomatic fractures, fractures with significant fracture retropulsion, vertebra plana with greater than 90 percent collapse, and patients improving with conventional management.

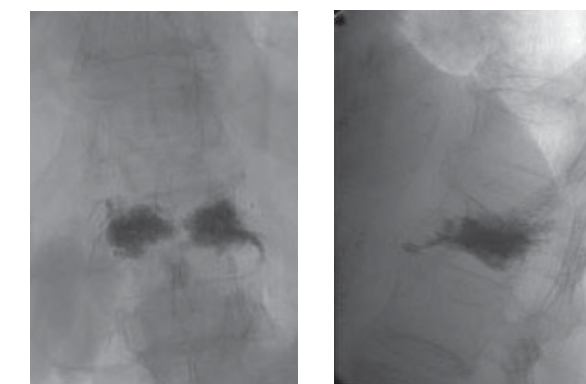
*If you have patient who might be a vertebroplasty candidate, they can schedule a free consultation by calling TRA's Scheduling department at (253) 761-4200.*

**VERTEBROPLASTY CASE**

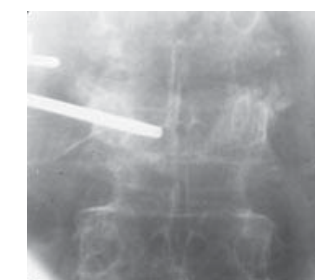
*81 year old patient with debilitating mid/low back refractory to narcotic analgesics. He had point tenderness over mid-lower back without radicular or myelopathic symptoms.*



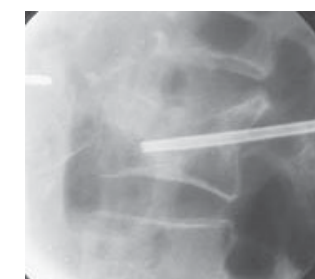
*Sag. T1 MRI (left) shows mild L1 anterior compression fracture with fracture plane near superior endplate. Sagittal STIR (right) shows abnormal marrow signaling an acute fracture.*



*Flouro spot images during vertebroplasty. AP and lateral views. After bipedicular vertebroplasty patient reported immediate pain relief and all analgesics were discontinued.*



*AP fluoroscopic view during transpedicular placement of guiding needle.*



*Lateral fluoroscopic view during transpedicular placement of guiding needle.*

TRA's Nuclear Medicine department has expanded its hours to better serve your patients. We are now scheduling patients Monday through Friday, 7 a.m. – 5:30 p.m.