

# THE SMIL RADIOLOGY REPORT

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## Improvements in Lung Cancer Staging

*PET/CT affects staging and management of non-small cell lung cancer*



John Millstine, MD

In recent years, the development of hybrid positron emission tomography-computed tomography (PET/CT) machines that combine functional and structural imaging information for staging non-small cell lung cancer has significantly improved initial staging and produced changes in management that have been associated with better overall survival.

In a recent prospective study published in the *Journal of Nuclear Medicine*, PET/CT changed management in 69 of 168 patients (41.1 percent). In a study of 76 patients published in *Radiotherapy and Oncology* earlier this year, survival for stage IIIA who had curative radiotherapy based on PET/CT was greater than 30 percent at four years.

The experience at Scottsdale Medical Imaging (SMIL) mirrors data in the literature, says John Millstine, MD, a radiologist at SMIL.

“If you look at the data, [PET/CT] upstages patients relative to CT about 40 to 50 percent of the time, and it downstages them about 10 percent of the time. In that regard, PET/CT significantly influences management.”

The data show that PET/CT probably cuts down on the number of unnecessary thoracotomies by about 20 percent, Millstine says, which translates into a significant improvement in quality of life.

### DIGGING DEEPER

Sensitivity and specificity in determining metastatic disease is superior with PET/CT, Millstine says.

“The other thing about PET is that it is very sensitive for the detection of bone metastases,” Millstine says. “These patients

often have unsuspected metastatic disease to the skeleton that the PET picks up quite frequently. About 10 percent of patients will have bone metastases that the clinicians didn’t know about and would alter the original treatment strategy.”

Millstine says that at SMIL, PET/CT is a standard technique that is routinely used.

“We do an awful lot of them and we’ve got a strong team of people who do them,” Millstine says. “Our staff is both experienced and caring, which means we do all we can to provide each patient with as good an experience as possible.” •



### REFERENCES:

Gregory Deborah, Hicks Rodney, Hogg Annette, et al. Effect of PET/CT on management of patients with non-small cell lung cancer: results of a prospective study with 5-year survival data. *The Journal of Nuclear Medicine*. 2012;53:1007-1015.

Mac Manus Michael, Everitt Sarah, Bayne Mike, et al. The use of fused PET/CT images for patient selection and radical radiotherapy target volume definition in patients with non-small cell lung cancer: Results of a prospective study with mature survival data. *Radiotherapy and Oncology*. 2013;106:292-298.

**INSIDE:** 02  
 Interventional radiology can benefit pancreatic cancer patients

03  
 PET/CT changes the game for head and neck cancer treatment

04  
 The mammography utilization debate continues

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# Identifying Underlying Causes of Hematuria

*CT urography offers significant advantages over IVP*



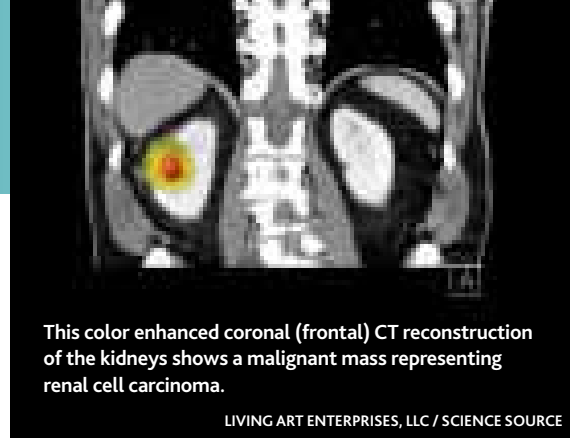
Jared Allen, MD, PhD

Imaging plays a crucial role in the investigation of the underlying causes of hematuria, and until recently the primary approach has been IV pyelography (IVP).

In a review of imaging modalities for patients with hematuria in *AJR*, O'Connor et al, noted that multi-phase CT urography offers significant advantages over IVP in sensitivity and specificity, 3D rendering and global evaluation of the entire kidney and collection system, as well as discovery of alternate causes. The major drawback, however, has been the increased radiation dose needed for the examination, but the report concluded that low-dose CT may overcome this drawback.

SMIL provides optimized protocols for patients allowing for dose-saving measures while maximizing the benefits of CT urography, says Jared Allen, MD, PhD, a radiologist at Scottsdale Medical Imaging (SMIL).

"Individuals with hematuria and a history of a known cancer or risk factors for urinary tract cancer, particularly smokers, should be scanned," Allen says. "In general, for any presentation of unexplained hematuria that is not associated with a known pattern



This color enhanced coronal (frontal) CT reconstruction of the kidneys shows a malignant mass representing renal cell carcinoma.

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of kidney disease, CT urography is the preferred imaging examination."

Allen says that SMIL's dose-saving measures include a hematuria protocol that reduces the number of scans for younger patients, as well as physician monitoring to eliminate unnecessary delayed phases that can accompany multi-phase CT scans.

"For our CT urogram, we do a non-contrast phase using a lower dose," Allen says. "This is followed by a split contrast dose that allows for simultaneous evaluation of both the nephrographic phase, that shows us the outer tissue of the kidney, and the excretory phase, highlighting the entire collecting system."

Allen adds that CT urography often catches alternate causes of hematuria. "We can see alternative diagnoses with CT that would never be picked up with conventional IV pyelography," Allen says. •

#### REFERENCES:

O'Connor Owen, Fitzgerald Edward, Maher Michael. Imaging of hematuria. *AJR*. 2010;195:263-267.

# Interventional Radiology's Role in Pancreatic Cancer

*SMIL's services can help improve patients' quality of life*



John Neil, MD

Despite the poor prognosis for pancreatic cancer, interventional radiology can benefit many patients suspected of or diagnosed with the disease.

John Neil, MD, medical director of radiology at Scottsdale Healthcare and chairman of the board of Scottsdale Medical Imaging (SMIL) says that as part of the team that works with Daniel Von Hoff, MD at the Virginia G. Piper Cancer Center, SMIL radiologists see between 50 and 100 pancreatic cancer patients per year. As such, the interventional radiology group at SMIL provides diagnostic, palliative and occasionally ablative therapies to a subset of these patients.

"Most patients we see, we can help," Neil says. "We can help prolong their lives or improve their quality

of life, but unfortunately at this time many of these patients aren't curable."

Relieving pancreatic patients of the complications associated with malignant biliary obstruction is an effective palliation that can both improve quality and prolong life. A study published in *AJR* showed that 73 percent of those treated with percutaneous internal stenting for malignant bile duct obstruction had their percutaneous external biliary drain removed after stenting. Of those, the large majority were catheter-free for their remaining survival.

"In situations where endoscopic drainage is not possible, we do percutaneous transhepatic cholangiography to study the biliary system and confirm the obstruction," Neil says. "Then we have a variety of temporary, and in some cases permanent, in-dwelling bile duct stents that allow appropriate drainage into the duodenum. Where appropriate, we go to great lengths to achieve effective internal stenting so that the terminal patient can live without an external drainage catheter." •

#### REFERENCES:

Thornton Raymond, Frank Benjamin, Covey Anne, et al. Catheter-free survival after primary percutaneous stenting of malignant bile duct obstruction. *AJR*. 2011;197:W514-W518.

# New Imaging Options for Head and Neck Cancer

Positron emission tomography-computed tomography assists in organ-preserving treatment



Nishant Verma, MD

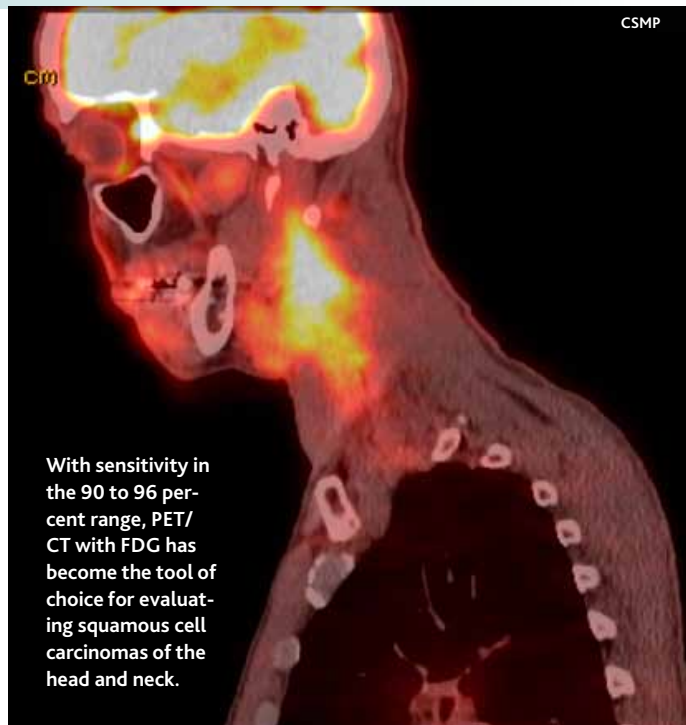
The management of head and neck cancers has been transformed in all phases from diagnosis to staging, radiation treatment planning and response evaluation with the adoption of fluorine 18 fluoro-deoxyglucose (FDG) positron emission tomography-computed tomography (PET/CT).

PET/CT has dramatically changed the primary treatment from surgery to organ-sparing approaches, says Nishant Verma, MD, oncology and nuclear medicine specialist at Scottsdale Medical Imaging (SMIL).

In a review of the impact of PET/CT on organ-sparing treatment of head and neck cancer published in *Seminars in Nuclear Medicine*, Garg, et al, noted the technology has significant advantages in sensitivity and specificity, in tumor location, target volume and nodal involvement over CT and MRI. With sensitivity in the range of 90 percent to 96 percent for PET/CT with FDG at the primary site, compared to 68 percent to 95 percent for CT and MRI, PET/CT has become the tool of choice for evaluating squamous cell carcinomas of the head and neck. PET/CT is especially valuable in cases where the primary site is not evident amid nodal metastasis.

## PET/CT OFFERS BIG BENEFITS

“PET shows us where there is increased metabolic activity and shows the oncologists, surgeons and radiation oncologists where to target,” Verma says. “Where the real benefit of PET comes in is with follow-up, specifically mid-therapy response evaluation and post-treatment surveillance. We can see a



dynamic change in tumor metabolism throughout all phases of treatment.”

But perhaps the biggest benefit for patients is that PET/CT has changed the primary head and neck cancer treatment dramatically from surgery to what is considered organ-sparing treatment, Verma says. He adds that saving patients from surgery means avoiding undesired outcomes of surgery including mortality. While radiation and chemotherapy do have side effects, they are not as severe, Verma adds.

“PET/CT allows us to identify exactly where the bulk of the tumor is and the extent,” Verma says, “which helps the medical oncologist and radiation oncologist treat the patient optimally without causing excessive or undue side effect, so the patient walks away healthier, happy and hopefully has a much more rapid and successful recovery.” •

## REFERENCES:

Garg Madhur, Glanzman Jonathan, Kalnicki Shalom. The evolving role of positron emission tomography-computer tomography in organ-preserving treatment of head and neck cancer. *Seminars in Nuclear Medicine*. 2012;42(5):320-327.

“PET/CT allows us to identify exactly where the bulk of the tumor is and the extent, which helps the medical oncologist and radiation oncologist treat the patient optimally,” says *Nishant Verma, MD*.



## SMIL on the Cutting-Edge of Theranostics

Newly developed theranostics are ushering in a new era of personalized medicine. With approaches ranging from molecular imaging agents to nanoparticles, the goal is detection and treatment based on the cellular characteristics of disease.



Ronald Korn, MD, PhD

SMIL is preparing for theranostics by being actively engaged in clinical trials using special MRI agents to predict who will respond to nanoparticle therapy, says Ronald Korn, MD, PhD, medical director of the research institute and a radiologist and nuclear medicine specialist in oncology imaging at Scottsdale Medical Imaging (SMIL). *Continues online* ▶

## Lung Cancer Screening Recommendations



Christopher J. Salmon, MD

Researchers concluded that low-dose CT (LDCT) screening can reduce lung cancer deaths.

Based on those findings, the National Comprehensive Cancer Network (NCCN) developed guidelines for LDCT screening programs that include

criteria for patient selection, dose acquisition, image storage, interpretation and an algorithm for evaluating and following up detected nodules. The guidelines recommend that only centers with considerable expertise in lung cancer screening should do LDCT programs.

“We can offer highly specialized interpretation of the lung screening studies by radiologists fellowship-trained in chest and body imaging,” says Christopher J. Salmon, MD, chest radiology specialist at Scottsdale Medical Imaging. *Continues online* ▶

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## CT Colonography versus Colonoscopy

CT screening for colorectal cancer remains controversial. While the initial costs for CT colonography and optical colonoscopy are comparable, additional costs for evaluation and follow-up of colonic and extra-colonic findings have hindered acceptance of CT screening for colorectal cancer.



Mark Kuo, MD

Mark Kuo, MD, radiologist at Scottsdale Medical Imaging, says the controversy regarding cost effectiveness has made Medicare and other payers hesitant to reimburse for screening CT colonography for colorectal cancer.

“The vast majority of colonoscopies are negative or there are no significant findings,” Kuo says. “What a lot of people think would be cost effective is if there are lesions (shown on the CT colonography) the patient should then go for a colonoscopy.” *Continues online* ▶

## Mammography Debate Continues

A pair of studies of mammography utilization recently published online ahead of print, showed that women who missed mammograms tended to be diagnosed at a later stage, thus reigniting the controversy first sparked by the U.S. Preventive Services Task Force in 2009.

Denise Hartoin Reddy, MD, a radiologist at Scottsdale Medical Imaging, says that, from her perspective, the studies highlight some of the consequences of later stage diagnoses and misperceptions about risk.

“The majority of women do not have an accurate understanding of their personal risk of breast cancer, often underestimating or overestimating their risk,” Reddy says *Continues online* ▶



Denise Reddy, MD



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