

Public Lecture by William G. Bradley, Jr, MD, PhD, FACR
“New Advances in Radiology: How they can Help You in Later Life”
November 20, 2002 at 6:00 p.m. in the Garren Auditorium, Basic Science Building
Sponsored by the Sam & Rose Stein Institute for Research on Aging, UCSD

The specialty of Radiology began just over 100 years ago with Wilhelm Conrad Roentgen’s discovery of the x-ray. Since that time it has evolved into the specialty of medical diagnosis and minimally invasive procedures. This brief overview of Radiology will discuss the following recent advances and how they can help you: MRI, CT, PET, Ultrasound, and Interventional Radiology. Magnetic Resonance Imaging (MRI) has made significant advances since it was first introduced two decades ago. We can now diagnose strokes in time to treat them. This requires that patients arrive in the hospital within 90 minutes of symptom onset.

We can diagnose cancer and pinpoint the location for surgical excision. MRI has even been installed in the operating room to make sure the surgeon gets all the tumor out. MRI can diagnose breast cancer when the mammogram is apparently normal or “indeterminate”. MRI is now the preferred technique to evaluate pain in the spine and joints. MR Angiography has evolved so that blood vessels can be imaged without inserting a large needle in the groin. This is now the primary way of imaging the carotid arteries to the brain for patients with suspected strokes and for imaging the arteries in the legs for patients who are having trouble walking. Cardiac MRI can noninvasively show which coronary artery (the ones that supply the heart) is narrowed for patients with chest pain (“angina”) obviating an invasive angiogram. It can now show how big a heart attack is better than any other imaging test. “MR Spectroscopy” can detect the major chemicals in a mass and tell if it is cancer or something else, often obviating the need for an invasive biopsy.

Computed Tomography (CT or CAT scanning) has evolved so that 16 slices can be acquired through the body during a half second. This allows images to be acquired during a breath hold so there is no motion artifact. CT Colonography is a new procedure, which will soon replace the more invasive colonoscopy for screening for colon cancer (something everyone over 50 should have). CT screening of the lungs has been shown to pick up 7 times more tumors than regular chest x-ray – which is particularly important in past smokers. CT of the lungs is also important to diagnose suspected, potentially life-threatening pulmonary emboli (blood clots in the lungs).

Ultrasound is the preferred technique to image masses in the female pelvis. Deep venous thrombosis (blood clots in the legs that can spread to the lungs) can be diagnosed noninvasively. (3D ultrasound can now image fetuses before they are born).

PET (positron emission tomography) is a sophisticated nuclear medicine technique, which has recently been approved to detect cancer. It is based on the fact that cancers have a higher metabolism than normal tissues and consume more glucose. By tagging glucose-analogs with radioactive positron emitters, tumors down to 1 cm in size can be

detected – often before they are clinically evident. This is important in detecting not only the first tumor but also metastases after the cancer has spread.

Interventional radiology accomplishes many of the same things that surgery can accomplish only much less invasively. Aneurysms in the brain (outpouchings of vessels that tend to burst) can now be treated by threading a catheter (a small tube) from the groin into the brain and releasing coils of metal to cause the aneurysm to clot, stabilizing it. (Most people would prefer this to the open neurosurgical procedure which involves taking part of the skull bone off and pushing the overlying brain to the side to get exposure to an aneurysm in order to treat it). Diseases, which previously required major surgery, can now be done percutaneously, ie, through the skin. These include draining the biliary system from the liver in pancreatic cancer or draining a urethra from the kidneys in patients with cancer of the bladder. Vessels, which are closed off in the legs, can be opened up by expanding a balloon (angioplasty) and placing a stint to keep it open.

In summary, it is exciting time for those of us in Radiology. Our technical advances on the diagnostic side allow us to diagnose disease earlier – often in time to make a difference in treatment and outcome. On the interventional side, we are replacing surgery for the treatment of many diseases leading to much shorter recovery times and much less pain. If you think radiology might be of benefit to you, just mention us to your doctor or go to our website (www.ucsd.edu/radiology).