Minimally invasive surgical procedures have many benefits, but the use of fluoroscopy is problematic for operating room (OR) personnel concerned about radiation exposure. The patient’s exposure is limited to one operation. But the surgeon and the OR staff are repeatedly exposed to radiation during multiple procedures.

To determine the safety of two different fluoroscopic methods, Garrick W. Cason, MD, and his colleagues, David P. Rouben, MD, and Todd C. Bonvallet, MD, conducted a prospective study examining the safety of fluoroscopy and comparing the radiation exposure of single C-arm versus a two C-arm simultaneous fluoroscopic technique during minimally invasive lumbar spinal surgery.

Dr. Cason presented the findings of his study, “Radiation exposure to operation room personnel during minimally invasive spine surgery: A comparison of single vs. simultaneous biplanar fluoroscopy,” at the 2008 Annual Meeting of the North American Spine Society (NASS).

**Putting fluoroscopy to the test**

To compare the amount of radiation surgeons and their OR staff are exposed to during the minimally invasive single level spinal procedures, Dr. Cason and his associates established two surgical groups of 10 patients each.

Dr. Rouben used single rotating C-arm fluoroscopy during surgery, and Dr. Bonvallet used two C-arms for simultaneous biplanar fluoroscopy.

“Biplanar fluoroscopy, using two fixed positioned C-arms, is used to guide medial-lateral and cranial-caudal placement of pedicle screws,” said Dr. Cason, “while a single C-arm rotates from the anterior/posterior (A/P) to lateral planes—often requiring multiple exposures to obtain a quality image.”

Patients were placed in the prone position on the operating table. Surgeons and scrub technicians in both groups maintained approximately the same distance from the patients and the radiation source.

All patients underwent minimally invasive pedicle screw instrumentation after either anterior lumbar interbody fusion or transforaminal lumbar interbody fusion.

**Measuring radiation in the OR**

Radiation exposure was measured using duplicate thermoluminescent dosimeter badges that were strategically positioned on the surgeons’ and scrub technicians’ eyewear; on top of and underneath their thyroid shields; and at the waist—on top of and underneath—the lead aprons. Anesthesia personnel and the circulating OR nurse wore one badge on top of the lead apron.

Each badge was worn in the same position for each operation and captured the cumulative radiation exposure dose during the ten procedures. Both surgical time and fluoroscopy time were also recorded.