

# Diagnostic Spinal Angiography Variability and Accuracy of Non-Invasive Imaging

Tim E. O'Connor MD; Brian M Corliss MD; Brian Hoh MD; Adam J. Polifka MD; Paul Kubilis MS; Lara Hagle; W. Christopher Fox MD

University of Florida

#### Introduction

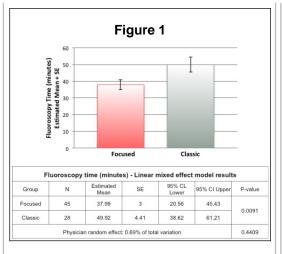
As endovascular indications expand and advanced noninvasive imaging evolves, classic techniques may require updating. "Classic" spinal angiography requires evaluation of the cranial vessels, including carotid and vertebral arteries, plus spinal segmental branches. Variability exists among physicians regarding indications for classic versus focused spinal angiography.

## **Methods**

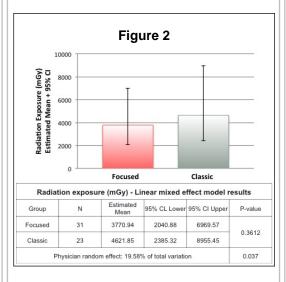
Patients who underwent diagnostic spinal angiography from 2006 to 2016 were identified and operative reports reviewed to determine use of classic versus focused angiogram. For each angiogram, fluoroscopy time, radiation dose, contrast load, and complications were documented. A linear mixed effect model was used to analyze the data and sub-group analysis used to quantify variability between endovascular surgeons.

## **Results**

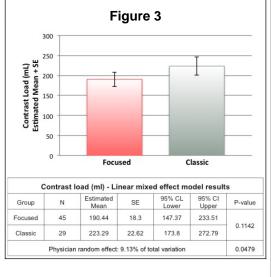
Between 2006 - 2016, 154 spinal angiograms were performed, including 94 diagnostic angiograms (45 classic and 49 focused). Fluoroscopy time was significantly increased in the classic versus focused angiogram. Physicians did not significantly contribute to fluoroscopic variability (figure 1).



There was no significant difference in radiation exposure or contrast load between groups. However, there was a significant degree of variability in both radiation exposure and contrast load due to the surgeons performing the angiograms (figure 2, 3).



A vascular lesion was identified in 36 patients (38%) undergoing diagnostic spinal angiography. Of the patients with an abnormal MRI prior to spinal angiography, the positive predictive value for an underlying vascular lesion was 41%. In one patient with a thoracolumbar intradural hemorrhage, classic angiography revealed a ruptured PICA aneurysm. In 4 patients who underwent CTA or myelogram prior to spinal angiography, none accurately predicted the presence of a vascular lesion.



#### **Conclusions**

Spinal angiography plays a valuable role in the diagnosis of vascular lesions as noninvasive imaging remains relatively inaccurate. In many patients, focused angiography is sufficient for diagnosis. Physician technique is a major contributor to radiation exposure and contrast load during spinal angiography.

## **Learning Objectives**

By the conclusion of this session, participants should be able to:

- 1) Discuss differences in radiation exposure, fluoroscopy time and contrast load using different spinal angiography techniques.
- 2) Discuss the variability of noninvasive imaging in patients with spinal vascular pathology.
- 3) Understand the advantages and disadvantages of classic versus focused spinal angiography.