Non-Contrast MRA: Fast Spin Echo/SPACE-Based Techniques
Ruth P. Lim, MBBS MMed FRANZCR
Department of Radiology, NYU Langone Medical Center, New York

In this lecture, I will review the basis of fast spin echo and SPACE-based techniques. Such techniques essentially exploit differences between fast arterial flow in systole and slow arterial flow in diastole. With FSE-based sequences, fast flow causes flow dephasing and signal loss, and conversely, slow flow, as is generally present in veins as well as arteries in diastole, will appear bright on proton-density or T2-weighted images. These techniques require triggering to define systolic and diastolic acquisitions. I will discuss points regarding protocol, potential pitfalls, clinical applications and future developments.

The following will be discussed:

1. Physics of FSE/SPACE-based techniques (from a radiologist’s perspective).
   a. Background
   b. FSE-based MRA
   c. Problems with FSE-based MRA
   d. SPACE-based MRA: potential benefits
   e. Pitfalls of FSE/SPACE-based techniques

2. Performing FSE/SPACE-based techniques
   a. Patient preparation
   b. Protocol components
   c. Determining optimal trigger delays
      i. Systolic phase
      ii. Diastolic phase
   d. Flow sensitivity
   e. Speed versus spatial resolution
   f. 1.5T or 3T?

3. Potential Applications of FSE/SPACE-based techniques:
   a. Appropriate target vascular beds
   b. SPACE MRA for peripheral vascular disease
   c. SPACE MRA for distal extremities
   d. Future developments

References: