CT Arthrography and Postoperative Musculoskeletal Imaging with Current Multichannel Computed Tomography Systems
OUTLINE

• Technical aspects
• MCCT arthrography
• MCCT postoperative imaging
• Conclusion
Features of MCCT that enhance musculoskeletal CT imaging

- Pitch <1
- Thin, submillimeter overlapping slices
- Fast
As a result of these features, MCCT scanners can:

- Generate essentially isotropic data sets (volumetric) for exquisite MPR images
- Generate high mAs
MCCT Arthrography

- Knee
- Shoulder
- Wrist
- Hip
Indications for Knee MCCT Arthrography

• Post operative meniscal evaluation

• Presence of metal

• Contraindication to MRI
<table>
<thead>
<tr>
<th></th>
<th>Negative Predictive Value</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional MR</td>
<td>71%</td>
<td>86%</td>
</tr>
<tr>
<td>Indirect MR arthrography</td>
<td>64%</td>
<td>83%</td>
</tr>
<tr>
<td>Direct MR arthrography</td>
<td>78%</td>
<td>90%</td>
</tr>
</tbody>
</table>

MCCT Arthrography of the Knee

- 0.6 mm slices at 0.2 mm intervals
- Pitch < 1
- 140 kVp
- Small focal spot
- Detail filter
- 2.5 – 3.0 mm MPR’s
- 20 – 35 cc of full strength iodinated contrast
Indications for Shoulder MCCT Arthrography

- Presence of metal
- Contraindication to MRI
MCCT Arthrography of the Shoulder

- 1 -2 mm slices at 0.5 - 1 mm intervals
- Pitch < 1
- 140 kVp
- Small focal spot
- Detail filter
- 2.0 – 3.0 mm MPR’s
- 12 – 15 cc of full strength iodinated contrast
Indications for Wrist MCCT Arthrography

- Presence of metal
- Contraindication to MRI
- Compared to MR arthrography, better spatial resolution and absence of confounding signal in ligaments?
MCCT Arthrography of the Wrist

- 0.5 – 0.6 mm slices at 0.2 mm intervals
- Pitch < 1
- 140 kVp
- Small focal spot
- Detail filter
- 1 - 2 mm MPR’s
- 3 - 4 cc of full strength iodinated contrast
- Single oblique axial acquisition
Indications for Hip MCCT Arthrography

- Presence of metal
- Contraindication to MRI
- Evaluation of chondral surfaces
- Patient body habitus
MCCT Arthrography of the Hip

• 2 - 3 mm slices at 1 - 2 mm intervals
• Pitch < 1
• 140 kVp
• Small focal spot?
• Detail filter?
• 2 - 3 mm MPR’s
• 10 - 15 cc of full strength iodinated contrast
Postoperative musculoskeletal imaging using MCCT

- Hip
- Knee
- Femur
- Shoulder
- Wrist
Trade Off

Spatial Resolution

vs

mAs
Indications for THR evaluation with MCCT

- Bone stock loss
- Loosening
- Particle disease
- Infection
MCCT for THR Evaluation

- 2 - 3 mm slices at 1 mm intervals
- Pitch < 1
- 140 kVp
- Large focal spot
- Soft tissue filter
- 2 - 3 mm MPR’s
- mAs of up to 900

Scan and acquire data sets for both hips
IU Data

- 43 patients with surgical correlation
- 39/41 for bone stock loss
- 5/5 for acetabular fracture

Evaluating liner wear, particle disease and loosening
Indications for TKR evaluation with MCCT

- Bone stock loss
- Loosening
- Particle disease
- Infection
MCCT for TKR Evaluation

- 2 - 3 mm slices at 1-2 mm intervals
- Pitch < 1
- 140 kVp
- Large focal spot
- Soft tissue filter
- 2 - 3 mm MPR’s
- High mAs technique
MCCT evaluation of fracture sites about orthopedic fixation devices

- Large body parts
- Small body parts
Large Body Parts

- Thick slices with overlap
- Pitch < 1
- 140 kVp
- Large focal spot
- Soft tissue filter
- 2 - 3 mm MPR’s
- “High mAs technique”
Small Body Parts

- Thin slices with overlap
- Pitch < 1
- 140 kVp
- Small focal spot
- Detail filter?
- 1 - 2 mm MPR’s
- “High spatial resolution technique”
Conclusion

- MCCT versatile
- Can scan large and small body parts
- Can adjust scanning parameters to specific clinical concern and body part
Conclusion

• MCCT arthrography is effective

• MCCT can evaluate post operative patients even if large orthopedic prostheses or fixation devices are present

• Certainly an adjunct, and in certain instances, perhaps a replacement for current MRI