Applications of Diagnostic Imaging
Magnetic Resonance Imaging

Gerald R. Aben, MD FACR
Department of Radiology
College of Osteopathic Medicine
Magnetic Resonance Imaging

- No ionizing radiation
- Utilize magnetic fields and radio waves
- Contraindication: implanted devices, ferromagnetic metals
- Relative contraindication: claustrophobia
- Differentiation of distribution of Hydrogen ions as impacted by adjoining molecules
- Ability to do spectral analysis (remember organic chemistry)
Magnetic Resonance Imaging

- Primary applications:
  - First line evaluation of suspected neurologic abnormality
  - First line evaluation of soft tissue mass/neoplasm
  - First line evaluation of joint disarrangements
  - First line evaluation of bone neoplasm
Magnetic Resonance Imaging

- Primary applications:
  - Head
    - Neoplasm
    - Infection
    - CVA
    - Developmental anomalies
    - Trauma
    - MR angiography
  - Neck
    - Effect of arthritis and degenerative changes
    - Neoplasm
    - Trauma
    - MR Angiography
Magnetic Resonance Imaging

• Primary applications:
  • Thorax
    • Spine – cord, roots, bodies
    • Heart – function, perfusion
    • MR angiography
  • Abdomen
    • Liver – mass, iron content, biliary tree
    • MR Cholangiography
    • Kidneys
    • MR Urography
    • MR Colonography
    • Retroperitoneum
Magnetic Resonance Imaging

- Primary applications:
  - Pelvis
    - Prostate
      - Neoplasm
      - Hypertrophy
      - CAD
  - Uterus & Ovaries
    - Masses
    - Leiomyoma
  - Spine
    - Cord
    - Roots
    - Foramina
    - Stenosis
    - Arthritis
Magnetic Resonance Imaging

• **Primary applications:**
  • **Bones & Joints**
    • Tendons and ligaments injury
    • Articular cartilage evaluation
    • Muscle abnormality
    • Trauma – fracture, contusion
    • Mass/ Neoplasm – appearance and extent
  • **Soft tissues**
    • Mass/ Neoplasm
    • MR angiography