Radiography and Imaging Technology

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Contrast Agents

- Substances used to improve visibility of internal organs
- Enhance contrast between tissues
- Route: oral, rectal, intravenous

Types of Contrast Agents

- Iodinated (CT, X-ray, Angiography)
- Non-iodinated (Barium, Air)
- Gadolinium-based (MRI)
- Microbubble (Ultrasound)

Iodinated Contrast

- Used in: CT, X-ray, Angiography
- High atomic number (absorbs X-rays)
- Given IV or orally
- Risks: allergy, nephrotoxicity

Non-Iodinated Contrast

- **Barium Sulfate**
- Used in GI studies (X-ray, Fluoroscopy)
- Opaque to X-rays
- Given orally/rectally
- **Air / Gas**
- Used in double-contrast GI studies
- Provides negative contrast

Gadolinium-Based Contrast (Gd)

- Used in MRI
- Alters magnetic properties of tissues
- Highlights blood vessels, tumors, inflammation
- Safer but risk of NSF in renal failure

Ultrasound Contrast (Microbubbles)

- Tiny gas bubbles in liquid
- Used for blood flow, liver, heart imaging
- Real-time enhancement

Contrast in X-ray

- Barium sulfate (GI tract)
- Iodinated contrast (IV urography, angiography)
- Air (double contrast studies)

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Contrast in CT

- Iodinated IV contrast (angiography, tumors)
- Oral contrast: barium or dilute iodine
- Improves organ & vessel differentiation

Contrast in MRI

- Gadolinium-based IV contrast
- Highlights lesions, inflammation, vascularity

Contrast in Ultrasound

- Microbubbles IV
- Improves liver & cardiac imaging
- Safe, real-time

Key Points

- **X-ray/CT:** Iodine, Barium, Air
- **MRI:** Gadolinium
- **Ultrasound:** Microbubbles
- Always check **renal function & allergy history**