Early Detection of Extravasation

Significance
- Over 40 million radiology procedures performed annually
  - Computed Tomography (Figure 1)
  - MR

- Over 32 million medical procedures incorporate powered injection systems
- The Bayer Stellant Injection system
  - Used in CT market
  - Completes an imaging sequence in under 15 minutes
  - Market leader in sales and performance

What is Extravasation?
- Extravasation is the accidental injection of drugs into tissue during intravenous delivery
- Extravasation causes severe pain and potentially permanent disfiguration (Figure 2)

![Figure 2: Injuries caused by extravasation](image)

- The consequences of extravasation:
  - Delay in imaging
  - Patient discomfort
  - Disfiguration
  - Liability: $14,118 for moderate extravasation, $94,056 for extreme cases
  - Cost of reconstructive surgery

- Who is at the highest risk?
  - Elderly People
  - Children
  - Unconscious patients

Research Interests
- Understanding the physics and biology behind this phenomenon
- Determining root causes of extravasation
- Designing and developing ideas to detect and prevent extravasation
- Integrate solution with clinical workflow
- Create a realistic engineering solution (Figure 3)

Current Solution
- Bayer XDS: Ultrasound detection of fluid buildup
- Bayer is seeking a lower cost and equally effective solution

References