Radiology On Call

A Primer for New Residents

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Goals

1. “Put a face to a name”
2. Provide a resident’s point of view
3. Offer a basic framework of issues to consider when ordering imaging
Outline

▪ Introduction to the Radiology Residents - AKA “The Outsiders”
▪ Getting what you need on call - AKA “Mission: Impossible”
▪ Radiation – AKA “Risky Business”
▪ Contrast Reactions - AKA “Cocktail”
Western Radiology Residents

- 21 Residents
- PGY1 – rotating internship
Western Radiology Residents

- PGY?s

  Fateme Salehi
  Queens

  Euan Zhang
  Alberta

  Joel Mercer
  MUN

  Eugenia Khorachkov
  MUN

  Stacey Speer
  McMaster
Western Radiology Residents

- PGY5s
  - Sohaib Munir
    - Queens
  - Harry Marshall
    - Western
  - Klaudia Jumma
    - Queens
  - Vinod Ramlal
    - McMaster
Western Radiology Residents

- PGY4s

David Wang
UofT

Andrea Para
UofT

Caitlyn Ward
Western

Peter Lynch
UofT
Western Radiology Residents

- PGY3s

Ian Chan
Saskatchewan

Olivia Li
UofT

Arthur Wozniak
Western
Western Radiology Residents

- PGY2s

Tim Miao
Ottawa

Tyler Cossetto
Dal

Fabio Accorsi
Sask
Getting What You Need On Call

- **Basics**
  - Weekdays 5pm – 8am
  - Weekends & Holidays
  - Typically 1 resident on call, 1 on backup
  - When in doubt: page the radiology resident on call for that hospital

- **Work Load**
  - Average approximately 40 cross-sectional studies/night
  - Turn around time < 1 hour
  - Strokes/traumas subject to even stricter timelines
Getting What You Need On Call

- So, you’re ready to order a study.
  - What is the clinical question I am trying to answer?
  - Is the study indicated?
    - Do the potential benefits outweigh costs/risks?
    - Will this study change management overnight/over the weekend?
  - Is this the right test?
Getting What You Need On Call

- The Menu
  - CT, MR, US, interventional radiology, fluoroscopy
  - Radiography
  - IV Contrast
    - Yes or No?
    - Timing
    - Number of phases
  - Oral Contrast
    - Yes or No?

Without Contrast

With Contrast
Getting What You Need On Call

- Oral Contrast

Extravasated Oral Contrast

Oral Contrast in Bowel
Getting What You Need On Call

- Ordering
Getting What You Need On Call

- The Importance of a Good History

Hyperdense Dot

“R/O Bleed”

“Left-sided symptoms”

“Right MCA stroke”
Getting What You Need On Call

▪ The Importance of a Good History
Getting What You Need On Call

- Tips (take them for what they’re worth)
  - Approach every study as a consult, not an order
  - Provide an accurate and succinct history (HMHY)
  - Page, don’t call
  - We love guests
Radiation

- Ionizing Radiation $\rightarrow$ Nuclear DNA damage
  - Unrepaired or misrepaired DNA can cause mutations and carcinogenesis

- How bad is it?
  - We’re not quite sure
  - Much less than 1% but not zero
We Are Giving Ourselves Cancer

By RITA F. REDBERG and REBECCA SMITH-BINDMAN  JAN. 30, 2014

DESPITE great strides in prevention and treatment, cancer rates remain stubbornly high and may soon surpass heart disease as the leading cause of death in the United States. Increasingly, we and many other experts believe that an important culprit may be our own medical practices: We are silently irradiating ourselves to death.

The use of medical imaging with high-dose radiation — CT scans in particular — has soared in the last 20 years. Our resulting exposure to medical radiation has increased more than sixfold between the 1980s and 2006, according to the National Council on Radiation Protection & Measurements. The radiation doses of CT scans (a series of X-ray images from multiple angles) are 100 to 1,000 times higher than conventional X-rays.

Of course, early diagnosis thanks to medical imaging can be lifesaving. But there is distressingly little evidence of...
Radiation – Risky Business

• Additional Considerations
  – Pediatric Patients
    ▪ Risks are magnified
    ▪ Mortality risk for abdominal CT
      - 15 year-old 1/1400
      - 5 year-old 1/1100
      - Toddler 1/700
  – Pregnancy
  – High-risk for further imaging
Imaging overutilisation: Is enough being done globally?

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The discovery of X-rays by Roentgen in 1895 was one of the greatest discoveries with historical impact on
on each and every one of us. The ability to view anatomy
and infer function of inner organs and tissues of human
body has provided immense potential that have led
imaging to therapeutic arena through interventions and
follow-up. How much imaging is appropriate is a
legitimate question to ask. This stems from recent
emphasis on overutilization of medical imaging [1–2].
Overutilization of imaging has been defined as any
application where imaging is unlikely to improve patient
outcome. Being a probabilistic situation the uncertainties

What has not been commented on is the difference
between developed and developing countries. While
overutilization is becoming a problem for developed
countries, lack of access remains an issue in a large part
of the third world, despite the fact that there has been an
increase in the rate of growth and unnecessary radiation
dose to patients, in a number of developing countries,
undergoing computed tomography (CT) and
interventional procedures [3–10]. Even though access is
limited in developing countries, inappropriate utilization
of imaging modalities still exists. While defensive
medicine and self-referral are relatively minor or

“…a significant fraction (perhaps 20 to 50 percent in some
areas) of radiological examinations may be inappropriate.”
Radiation – Risky Business

IMAGE™ WISELY

AS LOW AS REASONABLY ACHIEVABLE
Contrast Reactions

Consensus Guidelines for the Prevention of Contrast Induced Nephropathy

AKA Contrast-Associated Acute Kidney Injury
Contrast Reactions

- **Acute Contrast Reactions**
  - For low osmolar contrast media
    - Overall prevalence - 3.13%
    - Severe reactions - 0.04%
  - Pre-medication regimens available for those with a history of previous reactions

- **How to treat?**
Contrast Reactions

- Nephrogenic Systemic Fibrosis (NSF)
  - Rare manifestation of gadolinium administration
  - Irreversible fibrosis of the skin and organs
  - Generally, not concerned unless eGFR < 30 mL/min/1.73m²

NSF involving the skin of the forearm
"...intravenous administration of GBCA is associated with dose-dependent deposition in neuronal tissues that is unrelated to renal function, age, or interval between exposure and death."
Take Home Points

▪ Imaging utilization is a complex issue deserving of continuous consideration of the potential benefits, harms and costs.

▪ We are all here to help patients. Radiology exists to help you. Let’s be good to each other.
References

- Brenner DJ. What we know and what we don’t know about cancer risks associated with radiation doses from radiological imaging. Br J Radiol 2014;87(1035):20130629.


Questions?