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Mastering Digital Radiography: What Every Technologist Needs To Know (8 hr)

Abstract

One of the main focuses of this talk will be to prove without a doubt that the Exposure Index (EI) numbers that come up with both CR and DR are very reliable. In fact they can barely be corrupted more than 75% regardless of the centering and collimation.

I will also cover the "new" high kVp/low mAs techniques that should be used with **all** digital equipment. This means adding a minimum of 15% more kV and cutting the maS in half over what was used with f/s systems. Since dropping the radiation dose is one of the major topics, I will prove how dose and mAs directly correlate with each other, and by increasing kV and dropping the mAs you can **always** decrease the radiation dose. We will also discuss my Universal Digital Technique Charts for both CR and DR systems as well as finding out if your facility is using the proper EI ranges according to your radiologists.

Also presented will be the amazing versatility of the different Ferlic Filters for x-table lateral hips, Swimmers views, lateral C-spines and lateral L-spines.

Additionally, there will be a section on the many ways to properly critique a digital image including level and windowing and magnification modes and of course using the EI numbers. Following that I will show how several different brands of CR and DR react when too much mAs is used in an exposure. Also included is a segment on the legal issues that concern radiographers, including properly marking an image, reprocessing images with different algorithms, using too much technique and shuttering (post process collimation).

I also have a section on adaptive radiography as well as one that focuses on shielding and scatter radiation for both the patient and the radiographer.

My goal is for you to be able to take this information back to your facility and immediately make changes in the way you shoot and critique your images.

Outline

I. Radiography Has a New Paradigm

A. Hand phantom with CR and DR 50-100 kV

B. "New" optimum kV chart

II. Differences between f/s and digital radiography

- A. What does kV and mAs do now?
- B. Explanation of Exposure Index (EI) numbers
- C. Images of Thorax and elbow phantoms showing correct and corrupted EI numbers
- D. Shoulder phantom showing wide collimation and corrupted EI numbers
- E. Monitor size
- F. Grid cut-off

III. Problems and Ways to critique digital images

- A. Level and Windowing
- B. Magnification modes

IV. Automatic Rescaling

- A. Skull phantom laterals
- B. Dose Exposure Creep

V. Art of Techniques and the AEC

- A. AEC Technique Game
- B. Plus and minus buttons
- C. How to change mAs and kV
- D. 15% and Bowman's 7½% Rules
- E. SID's

VI. Adaptive Radiography

- A. PA versus Lateral Chest anatomy
- B. Diaphragm movement on breath
- C. Double coconut experiment
- D. PA ribs
- E. Sternum
- F. Clements-Nakayama

VII. Ferlic Filter Company

- A. Filters for Swimmers and X-Table Lateral Hips, Lateral L-spines and Lateral C-Spines
- B. Special plastic bags for CR cassettes and DR detectors

VIII. Important Extras

- A. Bowman Breast Shield
- B. Marker burnout
- C. Lead shields are for scatter only
- D. Best place to put lead shield on patient
- E. Lead shields .25 vs. .375 vs. .5 mm
- F. Scatter from a AP chest patient
- G. Background radiation
- H. Midline dose
- I. DR portables

IX. Legal Issues

- A. 100% marking policy
- B. Reprocessing images
- C. Using too much technique
- D. Shuttering

X. Universal CR and DR Technique Charts

- C. CR DEI comparison charts

- D. What does kVp and mAs do?
- XI. **Is the DEI range in your department correct?**
 - A. Chart proving higher kVp and lower mAs always lowers the dose
 - B. How Low Can You Go?
- XI. **Image Gently – Image Wisely**

Objectives

1. Understand this new digital paradigm shift that has occurred in radiography.
2. Describe the differences between film/screen and digital radiography.
3. Understand how to use the Exposure Index numbers in your facility.
4. Recognize how grid cut-off occurs and what it looks like in digital radiography.
5. Describe 3 different ways to critique a digital image.
6. Understand how much mAs can be used and still have a perfectly passable image.
7. How and why would you use the 15% or 7½% Rules?
8. List 2 reasons why more SID is better for the patient.
9. Clarify the coconut experiment and how it is useful in diagnostic radiology.
10. Illustrate why PA ribs should have both obliques in the series.
11. Explain the many uses of the Ferlic Filters and the Ferlic Filter bags.
12. Clarify why the .5mm lead aprons are better than any other apron.
13. Understand how much scatter radiation is emitted from a patient during an AP CXR.
14. Explain the legal implications of not marking images, post processing collimation and changing algorithms.
15. Describe what it takes at your facility to use a Universal Digital Technique Chart.
16. Discuss the concept of "How Low Can You Go?"
17. Explain why both Image Gently and Image Wisely are so important to radiographers