Increasing Productivity in a Cardiovascular Imaging Service

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Increasing Productivity in a Cardiovascular Imaging Service
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www.nasci.org/displaycommon.cfm?an=1&subarticlenbr...
8:35 - 8:50 am, Increasing Productivity in a Cardiovascular Imaging Service,
Jacobo Kirsch, MD. 8:50 - 9:05 am, Joining Forces Between Radiology and ...

Cardiovascular imaging shares spotlight with shared services.
www3.gehealthcare.co.uk/.../GEHealthcare-Brochure_Vivid-e-...
File Format: PDF/Adobe Acrobat - Quick View
Cardiovascular imaging shares spotlight ... covers your cardiovascular needs, and provides excellent ... The Vivid e helps improve productivity by giving the user ...

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Improved efficiency, productivity and financial performance. ... education, increasing service volume by 20% in Radiology, Respiratory, Cardiovascular and Sleep Lab. ... physician contractiing. Imaging Cardiovascular Ambulatory services ...

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• Productivity:
  - A measure of the efficiency of production.
  - Productivity is a ratio of production output to what is required to produce it (inputs).
  - The measure of productivity is defined as a total output per one unit of a total input.
• Efficiency:
  - In general describes the extent to which time or effort is well used for the intended task or purpose.
  - It is often used with the specific purpose of relaying the capability of a specific application of effort to produce a specific outcome effectively with a minimum amount or quantity of waste, expense, or unnecessary effort.
Increasing **Efficiency** in a Cardiovascular Imaging Service

Savage Chickens

WE'RE GIVING YOU A BONUS. YOU'RE DOING A CRAPPY JOB, BUT YOU'RE DOING IT INCREDIBLY FAST.
Increasing **Efficiency** in a Cardiovascular Imaging Service

- Regardless of the final shape of health care reform legislation, there is little doubt that the swirling debate around that issue has highlighted an unambiguous need to reduce system costs, **increase efficiency**, and improve patient outcomes.
- This is particularly true for high-cost diagnostics in crucial areas like cardiac care.
Increasing Efficiency in a Cardiovascular Imaging Service

- ESTABLISHING A CARDIAC IMAGING SERVICE
  - The challenges facing practicing radiologists center on 4 general areas:
    1. Equipment
    2. Training and credentialing
    3. Referrals
    4. Reimbursement

Increasing Efficiency in a Cardiovascular Imaging Service

- Opportunities for Improved Efficiency:
  - Patient preparation
  - Image acquisition
  - Post-processing
  - Interpretation
Increasing Efficiency in a Cardiovascular Imaging Service

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Looking for Evidence

- Patient preparation.
Looking for Evidence

- Patient selection
Looking for Evidence

- The ACR Appropriateness Criteria® are evidence-based guidelines to assist referring physicians and other providers in making the most appropriate imaging or treatment decision for a specific clinical condition.
Looking for Evidence

- Acute Chest Pain - Suspected Aortic Dissection
- Acute Chest Pain - Suspected Pulmonary Embolism
- Acute Nonspecific Chest Pain - Low Probability of Coronary Artery Disease
- Chest Pain Suggestive of Acute Coronary Syndrome
- Chronic Chest Pain - High Probability of Coronary Artery Disease
- Chronic Chest Pain - Low to Intermediate Probability of Coronary Artery Disease
- Dyspnea - Suspected Cardiac Origin
- Known or Suspected Congenital Heart Disease in the Adult
- Suspected Infective Endocarditis
**Looking for Evidence**

<table>
<thead>
<tr>
<th>Indications</th>
<th>Percentage (number of respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusion of CAD in patients with low or intermediate pretest likelihood of disease</td>
<td>97% (164/169)</td>
</tr>
<tr>
<td>Exclusion of coronary anomalies</td>
<td>92% (156/169)</td>
</tr>
<tr>
<td>Follow-up of patients with coronary bypass</td>
<td>76% (128/169)</td>
</tr>
<tr>
<td>Simultaneous exclusion of CAD, aortic dissection, and pulmonary embolism (“triple rule-out”)</td>
<td>44% (75/169)</td>
</tr>
<tr>
<td>Analysis of cardiac function as part of CT coronary angiography</td>
<td>44% (75/169)</td>
</tr>
<tr>
<td>Exclusion of CAD in clinically healthy patients</td>
<td>34% (58/169)</td>
</tr>
<tr>
<td>Follow-up of patients with coronary stents according to stent diameter (median 3 mm; range, 2–4 mm)</td>
<td>33% (56/169)</td>
</tr>
<tr>
<td>Suspected CAD in patients with high pretest likelihood of disease</td>
<td>33% (55/169)</td>
</tr>
<tr>
<td>Acute coronary syndrome or unstable angina</td>
<td>21% (36/169)</td>
</tr>
<tr>
<td>Follow-up of patients with coronary stents regardless of stent diameter</td>
<td>21% (35/169)</td>
</tr>
<tr>
<td>Analysis of cardiac function as an independent examination</td>
<td>11% (19/169)</td>
</tr>
<tr>
<td>Analysis of myocardial viability and perfusion</td>
<td>11% (19/169)</td>
</tr>
</tbody>
</table>

Looking for Evidence

- Patient selection
- Brief history should be obtained.
- Absolute contraindications to studies.
- Relative contraindications:
  - Inability to hold breath
  - Morbid obesity*
Looking for Evidence

- In my experience....
Looking for Evidence

• Patient preparation.
• Heart rate control.
  - Oral/IV β-blockers with a short half life
    • 50 to 100 mg of oral metoprolol/12 to 1 hr prior to the test
    • 5 to 20 mg of IV metoprolol immediately prior to the test
  - Calcium antagonists may be used as an alternative
Looking for Evidence

- Patient preparation.
- Heart rate control.
  - Is there evidence? Night before oral medication?
Looking for Evidence

- Patient preparation.
- Heart rate control.
  - Is there evidence? Night before oral medication?
  - No. But…
  - Most places will advice:
    - “…required to take some medication called a β-blocker the night before and the morning of your CAT scan.”
Rate Control Trends


Looking for Evidence

- Patient preparation.
- Heart rate control.
  - Is there evidence? Night before oral medication?
  - Cardiologists frequently administer the first oral β-blocker dose the day or night before the study and are more likely to supplement an oral β-blocker with an IV β-blocker

Looking for Evidence

- Patient preparation.
- Vasodilatation.
  - Is there evidence?
  - Trends:
    - Eur Radiol: 80%
    - AJR: 84%


Looking for Evidence

- **Patient preparation.**
- **Vasodilatation.**
  - **Evidence:**
    - Sensitivity, specificity, and positive and negative predictive values in the NTG group were higher than in the non-NTG group by patient-based analysis and by segment-based analysis.
    - Sublingual nitroglycerin spray significantly dilates the coronary arteries and allows more septal branches to be visualized at coronary CT angiography without diminishing image quality or increasing the number of side effects.


Increasing Efficiency in a Cardiovascular Imaging Service

- Opportunities for Improved Efficiency:
  - Patient preparation
  - Image acquisition
  - Post-processing
  - Interpretation
Looking for Evidence

- The supertechs / 3-D labs
  - Perform time-consuming tasks:
    - Reformations and segmentation of large data sets
    - Allows for consistency in image quality, results, archiving, and communication
    - Frees up radiologists
Looking for Evidence

• “Perhaps the most important consideration is the role technologists play in 3D post-processing”

Looking for Evidence

- “Perhaps the most important consideration is the role technologists play in 3D post-processing”
- “In the world of multislice CT, the scanners are so fast that the rate limiting factors in CT department productivity centers around people resources”

Many organizations are challenged to meet stakeholder demands of providing additional CT capacity and reduction of patient waiting lists. Much can be achieved through workflow redesign, the addition of key personnel, and implementation of information system platforms and databases.
Looking for Evidence

• Many organizations are challenged to meet stakeholder demands of providing additional CT capacity and reduction of patient waiting lists.

• Much can be achieved through workflow redesign, the addition of key personnel, and implementation of information system platforms and databases.
—Flowchart shows synopsis for two technologists of outpatient CT scanner.

Boland G W L AJR 2008;191:3-10

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Looking for Evidence

- 34 technologist workflow tasks were identified
- The total time to perform all tasks for 1-, 2-, and 3-technologist models was 27, 23, and 22 minutes, respectively
- CT room time per patient for 1-, 2-, and 3-technologist models was 12, 9.7, and 8.0 minutes, respectively
- The number of patients scanned per hour for 1-, 2-, and 3-technologist models was 2.2, 5.2, and 7.5, respectively

Looking for Evidence

- There was an increase of more than 12,000 potential patient CT slots made available using 2 technologists 7 days per week and 22,000 additional slots for a 3-technologist model when compared with a single-technologist model on weekdays only.

Looking for Evidence

• This study does not include complex post-processing chores in the workflow!
Training

• Both CT and MRI
  - Anatomy
  - Planes of Imaging
  - Basic ECG tracings
  - Imaging protocols
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  - Interpretation
Speech Recognition

- Decreases turnaround times
- Improves the productivity and accelerates the workflow with excellent end-user satisfaction.

Structured Reporting

• Since 2001, studies have shown that both radiologists and referring clinicians have a clear preference for structured reporting systems in radiology.

Structured Reporting

The RSNA radiology reporting initiative is improving reporting practices by creating a library of clear and consistent report templates.

Supported in part by the National Institute of Biomedical Imaging and Bioengineering (NIBIB).

Cardiac Radiology
- Cardiac MRI: Adenosine Stress Protocol
- Cardiac MRI: Function and Viability
- Cardiac MRI: Right Heart Failure
- CT Calcium Score
- CT Cardiac
- CT Cardiac Bypass Graft
- CT Coronary Angiogram (ACRIN 4005)
- CT Pulmonary Veins
- Heart MUGA
“Experts say that power napping can actually increase productivity. I want you to nap longer and harder than our competitors!”
Cleveland Clinic

Every life deserves world class care.