A Practical Approach to Incorporating Contrast into a Busy Lab

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At one time or another, I have been an Funded Investigator, Ad Hoc Consultant, Or Sponsored Speaker for virtually all echo contrast companies.

A Practical Approach to Echo Contrast

• Studies indicate that about 15% of echo studies are inadequate
  • The definition of inadequate is subjective
  • Stress echoes and those in ICU are more often inadequate
• Data suggests that less than 5% of echo studies receive contrast
• Clearly, contrast echo is majorly underutilized
• Technical and procedural factors contribute greatly to underutilization
• Philosophical outlook on the role of contrast is critical
How Common Are Suboptimal Echos for LV Size and Function?

Clinically
- 5%-25% in general population
- Higher % in stress studies

Research, General Population
- Framingham 20%
- Cardiovascular Health Study 35%


Who *Must* Have Contrast LVO?

- *Indication* for echo is evaluate LV function
- Endocardial border not visualized in either apical or non-apical views
- *LV shape* difficult to determine
- *Epicardial motion* not or poorly visualized
A Practical Approach to Echo Contrast

- **It all begins at the top**
  - Physicians differ widely on what constitutes a suboptimal study
  - The definition of “noninvasive” varies
  - The tradition of “totally noninvasive” ultrasound is entrenched
  - Considerable inertia exists to expanding the examination
  - Interpretation of the studies may be more complex
  - Limited reimbursement provides a negative incentive
  - A contrast friendly philosophy must be fostered

Establish Protocols for Contrast-Enhanced Imaging Studies

- Team roles
- Patient selection protocol
- Imaging protocols
- Administration protocols
Establish Echo Lab Team Roles

• Physician
  • Establishes written orders and echo lab guidelines
  • Actively supports the training of echo lab personnel
  • Responsible for interpretation and diagnosis

• Sonographer
  • Determines need for contrast enhancement
  • Optimizes equipment settings

• Nurse
  • Prepares contrast agent for infusion
  • Inserts IV and administers contrast agent

Candidates for Contrast Echo

• Patients most likely to benefit from contrast echo include those with
  • Obesity
  • Congestive heart failure
  • Chronic obstructive pulmonary disease
  • Mechanical ventilation
  • Chest deformity (barrel chest)
  • Patients with limited acoustic windows
    • Inadequate imaging of 2/6 segments in any single view
    • Incomplete Doppler velocity profiles

How to Make Imaging Protocols More Efficient

• Patients likely to benefit from contrast can be identified in minutes: eliminate struggle time
• Incorporate contrast early in imaging protocols
• If postnatal views are poor, reduce acquisition time by
  • Advancing quickly to apical views
  • Determining if acoustic windows are optimal
• Procedures should often be sonographer-driven

The Importance of “Struggle time”

• A majority of suboptimal studies can be identified within 10 minutes
• The time required for contrast can be offset by reduced struggle time
Overcoming the IV Insertion Issue

• A capable person needs to start the IV and inject contrast
• Finding a good vein may be an epic task
• A system must exist for an experienced individual to be readily available to start the IV and inject contrast
• Traditionally this has been a nurse or fellow
Sonographer IV Insertion and Injection

• Allied Health Professionals established for IV access and injection
  • Radiology and Nuclear Medicine technicians
  • Certified dialysis technicians
  • Respiratory therapists
  • GI technicians
  • Licensed psychiatric technicians
• Licensed as part of scope of practice

IV Procedure for Medical Sonographers

• IV access and injection of ultrasound agents is included in the scope of practice by the Society of Diagnostic Medical Sonography
  • Released April 13, 2015
• “With appropriate education and training, uses proper technique for intravenous line insertion and administers intravenous contrast according to facility protocol”
• Endorsed by 16 professional societies and organizations
IV Role for Sonographer by ASE

• “in the interest of providing a timely patient diagnosis... a qualified cardiac sonographer can determine the need for a contrast agent and, if necessary, establish IV access and even potentially administer a contrast agent”
  • J AM Soc Echocardiogr 2001, 14:417-420

Factors Influencing Image Quality in ICU

• Mechanical ventilation
• Chest wounds and tubes
• Edema/anasarca
• Inotropic and vasopressor agents
• Suboptimal positioning
• ECG and other monitoring
• Dialysis
• Intraaortic balloon
Factors Influencing Image Quality in ICU

Always take a bottle of contrast agent to an ICU echo

Contrast and Stress Echo

• Contrast has unique role in stress echo
• Contrast enhances endocardial definition
• Contrast improves image quality and confidence
• Contrast improves diagnostic accuracy
• Contrast enables prognostication
• Contrast provides *myocardial perfusion*
Types of Artifacts

- Attenuation
- Swirling
- Blooming
- Rib artifacts

How to Streamline Contrast-Enhanced Echo Studies

- Establish policy and procedures
  - Standing orders
  - Departmental guidelines
  - Reimbursement (coding, coverage, carrier)

- Determine staff roles and responsibilities
  - IV training
  - Combine with stress/cath RNs
  - Involve personnel outside echo lab

- Ensure availability of supplies
- Plan ahead when performing portable studies