

Incorporating Ultrasound Contrast in the Laboratory: A Series on Contrast Echocardiography, Article 1

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INTRODUCTION

Contrast echocardiography, in the form of agitated saline solution, has been routinely performed for more than 30 years. Because these large and fragile microbubbles do not pass through the pulmonary circulation, they are visible only on the right side of the heart and are typically used to rule out an atrial level shunt. Recent advances in second-generation agents have produced smaller and more stable microbubbles that can pass through the pulmonary circulation intact and that now can provide left ventricular (LV) opacification with a peripheral intravenous injection. As the number of Food and Drug Administration–approved ultrasonographic (ultrasound) contrast agents increases, contrast echocardiography will continue to move at an increasing pace from research laboratories to routine clinical use. There is more to the successful implementation of contrast than simply ordering a few vials of an agent. New challenges exist for the cardiac sonographer, as well as other team members, as ultrasound contrast echocardiography moves into routine clinical use. In this first in a series of articles, basic information regarding what laboratories need to integrate contrast echocardiography will be discussed in detail.

The authors gratefully acknowledge technical support for this article by DuPont Pharmaceuticals Company.

The American Society of Echocardiography (ASE) is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to sponsor continuing medical education for physicians. The ASE designated this educational activity for 1 hour of Category 1 credit of the AMA Physicians' Recognition Award. The ASE adheres to ACCME Standards regarding industry support of continuing medical education. Disclosure of faculty and commercial sponsor relationships, if any, have been indicated.

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J Am Soc Echocardiogr 2000;13:240-7.

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0894-7317/2000 \$12.00 + 0 27/1/103599

doi:10.1067/mje.2000.103599

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Subsequent articles will include topics such as Patient Examination Protocols, Optimizing the Contrast Image, Contrast Physics, Problems and Pitfalls, and Future Applications. Our hope is that at the conclusion of this series, the reader will have a comprehensive beginner's guide to ultrasound contrast echocardiography.

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OBJECTIVES

A challenge that cardiac sonographers face is the incorporation of ultrasound contrast into their routine echocardiographic examination. This article will discuss some important questions, provide some solutions, and review current experiences. Information will be presented in a format that each laboratory may consider a template for successful implementation.

Objectives:

1. Review a plan to implement ultrasound contrast into a practice.
2. Identify indications for the use of ultrasound contrast.
3. Determine the protocol for ordering an ultrasound contrast examination (eg, standing orders).
4. Review staff responsibilities and work-flow scenarios.
5. Establish a procedure for patient explanation and consent.
6. Discuss work environment, room setup and supplies.
7. Discuss the concept of the sonographer performing intravenous line (IV) insertion and the process for obtaining certification.
8. Establish a contrast echocardiography report.
9. Establish new procedural charges for billing.

DESCRIPTION OF STAFFING RESPONSIBILITIES

The incorporation of any new technique requires a re-evaluation of resources and staffing needs. The respon-

sibilities for each member of the staff must be established. The following is a list of personnel (*mandatory) and key duties that are needed for ultrasound contrast agents (USCA) to be incorporated into daily practice.

1. **Sonographer*:** Obtains cardiac ultrasound images and optimizes ultrasound settings
2. **IV therapist:** Provides expertise in IV insertion
3. **Registered nurse:** Explains procedure to patient and obtains consent; performs IV insertion, USCA preparation and administration, and monitoring for adverse events
4. **Physician*:** Explains procedure to patient and obtains consent; performs venipuncture, USCA preparation and administration, and monitoring for adverse events
5. **Exercise technician:** Coordinates stress protocol.

Similar to the dobutamine echocardiography procedure, a team approach is needed for the ultrasound contrast echocardiography examination. A team consisting of a physician and/or registered nurse and a cardiac sonographer who jointly perform the contrast echocardiography examination is the ideal and most efficient approach. The decision to perform an ultrasound contrast echocardiogram may be determined in consultation by the sonographer, physician, and nurse.

Image acquisition, the main goal of the examination, is the most important responsibility of the sonographer. In addition, another team member does the following tasks, which the sonographer may learn to perform:

1. Determines when to add USCA
2. Screens patients, explains procedure to them, obtains their consent
3. Performs IV procedure, including universal precautions and infection control
4. Processes the appropriate paperwork according to practice guidelines, including documentation of dosage, billing, and reporting.

After patient screening (includes obtaining history of allergies and determining other contraindications), explanation and consent, and venipuncture have been completed, the contrast echocardiography examination can now begin. During the actual image acquisition, the contrast team includes the imaging sonographer and the physician or registered nurse. The sonographer should set the tone for the examination and be the main contact/lead person for the study. While the sonographer acquires ultrasound images, the physician or registered nurse will prepare and administer the USCA. It is beneficial to have someone experienced in IV insertion available as a backup in case limited IV access is encountered in a patient. This may be an IV therapist or another person whose routine duties include frequent IV insertion. Each practice can determine its most appropriate use of personnel according to level of training, time efficiency, and institutional guidelines.

Team Scenarios

Let's look at several scenarios involving various echocardiography team members.

The sonographer and the physician. The sonographer performs a technically difficult echocardiographic examination, and after consulting with the physician, they agree that an ultrasound contrast echocardiogram is needed. The sonographer with "contrast skills" and IV certification explains the procedure to the patient, screens the patient for allergies, obtains consent, and performs the venipuncture, OR the physician does one or more of these tasks. The sonographer then performs the echocardiographic examination, and the physician prepares and administers the USCA and monitors for adverse events.

The sonographer and the registered nurse. The sonographer performs a technically difficult echocardiographic examination, and after consulting with the physician, they agree that an ultrasound contrast echocardiogram is needed. The sonographer with contrast skills and IV certification explains the procedure to the patient, screens the patient for allergies, obtains consent, and performs the venipuncture, OR the nurse does one or more of these tasks. The sonographer then performs the echocardiographic examination, and the nurse prepares and administers the USCA and monitors for adverse events.

The sonographer, IV therapist, and physician or registered nurse. The sonographer performs a technically difficult echocardiographic examination, and after consulting with the physician, they agree that an ultrasound contrast echocardiogram is needed. The sonographer with contrast skills and IV certification explains the procedure to the patient, screens the patient for allergies, obtains consent, and performs the venipuncture; OR the physician or nurse performs one or more of these tasks, and the IV therapist does the venipuncture. The sonographer then performs the echocardiographic examination, and the physician or nurse prepares and administers the USCA and monitors for adverse events.

IV CERTIFICATION

Rapid acceptance of ultrasound contrast in echocardiography requires the establishment of new responsibilities and skills for the sonographer. The knowledge and skills presently needed include the ability to know when ultrasound contrast is required, and the ability to screen patients and explain the procedure; the sonographer must also be trained and certified to perform IV insertion. These new skills will provide the optimal solution to the patient encounter, procedure time/cost, and limited staff resources.

Another important outcome is that the sonographer is allowed to assume new responsibilities and become a more versatile member of the team in the echocardiographic laboratory.

Some practices have many resources for training the sonographer as well as the registered nurse, IV therapist, nuclear cardiology technologist, radiology technologist, and emergency medical technician in the skills of IV insertion, universal precautions, and infection control. However, those practices with limited internal resources can potentially develop IV insertion training through a pilot program sponsored by the Society of Diagnostic Medical Sonographers (SDMS). This program was initiated at the annual national society meeting held in October 1999. Please contact the SDMS office for further details (800/229-9506).

Ultimately, a sonographer will need to complete a certification process in IV training. The steps include attending a training program, obtaining a certificate that can be presented to the attending physician/manager, and obtaining approval from the practice to accept this certification.

CONTRAST ADMINISTRATION

At this time, in most laboratories a physician or registered nurse administers the contrast agents. A proposal exists that, if accepted, will allow registered sonographers to administer contrast agents. The Sonographer Coalition has drafted a policy statement on behalf of the American Institute of Ultrasound in Medicine (AIUM), SDMS, Society of Vascular Technologists (SVT), and American Society of Echocardiography (ASE) regarding IV contrast administration and has submitted it to various ultrasound organizations. Larry Waldroup, manager of Jefferson Ultrasound Institution of the Thomas Jefferson University, wrote the following draft. Ann Jones, RN, RVT, chairman of the Task Force for the Revision of Scope of Practice for the Diagnostic Ultrasound Profession, can be contacted by E-mail (jones_anne@email.msn.com) or telephone (410/987-3607) with comments.

INJECTION OF ULTRASOUND CONTRAST AGENTS And the Scope of Practice of Ultrasound Professionals

The AIUM/SDMS/SVT/ASE recognizes the starting of IVS and injecting of ultrasound contrast agents, under the direction of a physician or physician designee who is personally and immediately available, to be within the scope of practice of the ARDMS (American Registry of Diagnostic Medical Sonographers) certified ultrasound professional

who has received formal training and attained documented competency in the form of IV certification by the employer, if the practice is in compliance with institutional and state regulations. There must be prior written approval by the medical director of the ultrasound service of such individuals, and the ultrasound service or institution must maintain documentation of continuing medical education (CME) and periodic competency assessment related to the contrast agents being injected and the procedures being performed.

THE LAB SETTING AND ULTRASOUND CONTRAST

Ultrasound contrast should be considered an extension of the existing echocardiographic examination. Most practices have an appropriate laboratory setting that can accommodate ultrasound contrast with only a few additions. The standard echocardiographic procedure room typically includes a sink and counter, examination table, chairs, and ultrasound equipment. In addition, a secure supply drawer or cabinet shelf for IV supplies (gloves, tourniquet, syringes, needles, saline solution, injection caps, extension tubing, tape, gauze, alcohol pads, stopcocks), a small refrigerator for storage of the USCA, and an IV pole (and infusion pump for some agents) are needed. Also necessary in the work area are a sharps container (wall mounted or countertop) and a hazardous waste container that follow the *Universal Precaution and Hazardous Waste Guidelines*.²

Ideally, the echocardiographic examination table should be easy to move for access to either arm for IV insertion and contrast agent administration. When the practice standard is to image the patient from the left side, placement of the IV in the right arm is preferable. For right-handed scanners who position the echocardiographic system to the right of the patient, the left arm may be preferable for IV insertion and contrast agent injection. Of course, in some patients IV access will be limited to the opposite arm of choice.

Recent advances in ultrasound equipment such as harmonic imaging and gated triggering have improved image acquisition during contrast administration. It is possible, however, to demonstrate benefits from systems that do not have these features. The advantages and use of these new system features will be discussed in subsequent articles in this series.

BILLING AND CHARGES

Important components of incorporating contrast into a practice include billing and the establishment

of appropriate charges for use of USCA. Information from this section can be shared with administrators and financial officers as well as with Medicare and other insurance carriers.

The routine *Current Procedural Terminology*³ (CPT) codes for the various echocardiographic procedures are described in detail in Table 1. These codes do not include the cost of IV setup or the contrast agent and administration; therefore it is necessary to establish specific charges for these two components. First, many Medicare (Part A) intermediaries allow the use of CPT code 36000 (introduction of needle or intercatheter) to reflect the supplies and time required in starting the IV.

Second, the contrast agent can be billed under the revenue codes J3490 or 254, as drugs incident to other diagnostic services.

Tables 2 and 3 outline the cost for the USCA and other associated direct costs. The codes J3490 and 254 are for the contrast agent cost only. The patient or the insurance-card holder is billed \$100.00 for the agent only (direct procedure supplies). Each practice should provide information to state insurance agencies and establish a charge that reflects the USCA and other direct and indirect costs for the administration of the agent.

REQUEST FOR ULTRASOUND CONTRAST

There are several options to be considered in the establishment of a process for ordering a USCA injection to enhance an echocardiographic procedure. The order for administration of a USCA must always come from a medical doctor because federal (US) law prohibits dispensation without a prescription. The order for ultrasound contrast can be in the form of a standing order from the practice's medical director, an order from the referring physician, or an order from the interpreting physician. The sonographer performing the echocardiographic examination may recommend the need for ultrasound contrast, but a physician must always order the agent.

A reasonable approach is to have the medical director and medical staff who interpret studies define the appropriate situations in which contrast enhancement should be applied. On the basis of approved clinical uses to date, ultrasound contrast may be necessary to improve diagnostic certainty in the suboptimal transthoracic 2-dimensional, transesophageal, or Doppler echocardiography examination, and to improve evaluation of LV segments and global function in the stress echocardiography examination. More specifically, the current uses of contrast include LV opacification (improved endocardial bor-

Table 1 Current procedural terminology

Procedure description	CPT codes
Echocardiography	
2D transthoracic, adult	
Complete	93307
Limited	93308
2D transthoracic, congenital	
Complete	93303
Limited	93304
Stress	93350
Transesophageal	
Adult	93312-93314
Congenital	93315-93317
Doppler	
Complete	93320
Limited	93321
Doppler color flow	93325
Additions	
IV Insertion	36000
USCA	J3490, 254, or new
USCA administration	New

CPT, *Current Procedural Terminology*; 2D, 2-dimensional; IV, intravenous line; USCA, ultrasonographic contrast agent.

der definition for segmental wall motion evaluation and assessment of global LV function) and Doppler flow enhancement (improved imaging of aortic stenosis jet, pulmonary vein flow, mitral regurgitation, and tricuspid regurgitation [for right ventricular/pulmonary artery pressure calculation]).

Ultrasound contrast agents in echocardiography are most commonly used for the evaluation of LV function when endocardial border definition is limited. Evaluation of LV function accounts for approximately half the requests in most echocardiography practices, and of these, 5% to 25% are suboptimal in the general population. The percentage of suboptimal results is higher (up to 50%) for stress echocardiograms. About 20% of the patients screened for the Framingham Study¹ were eliminated because of suboptimal imaging. Limited echocardiographic data may be common in patients with chronic obstructive pulmonary disease, obesity, chest wall deformity, or those in intensive care units and on respirators. When more than 2 of 6 LV wall segments are not visualized, this should be considered a technically limited examination and may be markedly improved with contrast enhancement.

The protocol for endocardial border definition and other contrast applications will be described in detail in the next article in this series. There are 2 methods in practice today: bolus contrast injection with saline flush, and continuous contrast infusion with an infusion pump or a rate regulator device. For practical purposes, it may be more beneficial to incorporate contrast into the practice by first using a

Table 2 Cost analysis: IV

Direct cost analysis:	IV set up with saline flush for USCA	
CPT code:	36000	
Practice procedure code:	_____	
Example costs for staff and supplies		
Direct sonographer's time (hours):	0.20	Cost: \$4.80* (No benefits included here)
Direct support staff time (hours):	0.12	Cost: \$1.60 (No benefits included here)
Direct procedure supplies:		Cost: \$7.65 (Gloves, tourniquet, 1 10-mL syringe, 1 10-mL saline vial, 1 19G needle, 1 20G angiocatheter, injection cap and/or extension tubing, 3-way stopcock, sharps and waste containers)
Direct patient supplies:		Cost: \$0.35 (Tape, 2x2, alcohol pads, etc)
Support supplies:		Cost: \$0.10 (Pens, billing & report forms)
Equipment cost/depreciation:		Cost: NA
TOTAL DIRECT COSTS:		\$14.50

IV, Intravenous line; USCA, ultrasonographic contrast agent; CPT, Current Procedural Terminology.

*Calculated by using an average salary for registered diagnostic cardiac sonographer (RDCCS) from the 1998 Sonographer Salary Survey. Executive summary report available through the Society of Diagnostic Medical Sonographers.

Table 3 Cost analysis: USCA

Direct cost analysis:	USCA and administration	
Drug code:	J3490/254 and/or NEW	
Practice procedure code:	_____	
Example costs for staff and supplies		
Direct sonographer or registered nurse's time (hours):	0.20	Cost: \$4.80 (No benefits included here)
Direct support staff time (hours):	0.12	Cost: \$1.60 (No benefits included here)
Direct procedure supplies:		Cost: \$100.00 (Contrast agent)
Direct patient supplies:		Cost: \$7.13 (3-way stopcock, syringes, extension tubing, 50-mL bag of saline, dial-a-flow gauge, alcohol pads, gloves, sharps and waste containers)
Support supplies:		Cost: \$0.15 (Consent form, etc)
Equipment maintenance/depreciation:		Cost: \$2.35 (Refrigerator, etc)
TOTAL DIRECT COSTS:		\$116.03

USCA, Ultrasonographic contrast agent.

“bolus-and-flush” protocol for enhancement of endocardial border definition. The staff can concentrate on developing efficiency in all aspects of this method before moving on to other ultrasound contrast protocols. The next application may be to perform Doppler studies as the concentration of contrast dissipates. Finally, the contrast, by bolus or infusion method, can be added to the stress echocardiography examination.

PROCEDURE EXPLANATION AND PATIENT CONSENT

The process of explaining contrast echocardiography to a patient begins with the staff member becoming knowledgeable about the agent and its applications. The sonographer should review the package insert and other available materials. This documentation will typically include necessary information such as the

makeup of the agent, indications, contraindications, adverse reactions, dosage and administration, and product handling. The package insert is typically very detailed; however, it is important to realize that extensive clinical trials and follow-up studies have demonstrated minimal side effects with the use of these agents. The staff should be familiar with the agent and any contraindications to its use. Patients should always be screened for allergies and contraindications.

Four functions should be performed when educating a patient before ultrasound contrast administration:

1. Explain ultrasound contrast applications and procedure (verbal and/or written explanation by trained staff member).
2. Review patient's history of allergies and determine any contraindications to the contrast agent.
3. Answer patient's questions/concerns.
4. Obtain verbal or written patient consent.

A sample consent form is provided in the Appendix. The decision to use or not use a written consent form will depend on practice policy. Because many practices do not obtain written consent from the patient for a routine echocardiographic examination or IV insertion and saline flush, most of these groups have chosen not to formalize a written consent form for the addition of a USCA. However, documentation on a procedure work sheet that indicates the patient has "no known contraindications to this ultrasound contrast agent" (per manufacturer package insert) is an alternative to a formal consent statement.

ECHOCARDIOGRAPHIC REPORT WITH ULTRASOUND CONTRAST

The typical echocardiographic report should include the interpretation of procedures performed, such as 2-dimensional, Doppler, color Doppler, stress, and transesophageal echocardiography. To this list, ultrasound contrast may be added when clinically indicated according to established practice guidelines. The final report should include one or more of the following statements of interpretation:

1. This is a technically difficult 2-dimensional echocardiogram that was improved by additional images acquired after administration of a USCA.
2. The USCA allowed visualization of all, or most, of the left ventricular wall segments.
3. Evaluation of segmental wall motion abnormalities is possible because of the enhancement of the endocardial border with the use of a USCA.
4. For an accurate assessment of the left ventricular ejection fraction, the endocardial borders were enhanced with the use of a USCA.
5. This is a technically difficult Doppler echocardiogram that was improved by additional images acquired after administration of a USCA.
6. The peak jet of aortic stenosis Doppler flow pattern was recorded and accurate calculations performed after administration of a USCA.
7. After administration of a USCA, the Doppler flow pattern of the pulmonary veins, or the recordings of mitral or tricuspid regurgitation were optimized.

STANDARDS AND PRACTICES

The following organizations serve to review medical practice standards: the Intersocietal Commission for the Accreditation of Echocardiography Laboratories (ICAEL), the Joint Commission on Accreditation of Health Care Organizations (JCAHO), and the Health Care Finance Administration (HCFA). For those facili-

ties that have ICAEL, JCAHO, and/or HCFA accreditation, an infection control policy, hazardous waste disposal program, and emergency protocol will be in place. It is important to have echocardiographic laboratory-specific guidelines to ensure that patients, visitors, and staff members are protected from infection and injury at all times. Any of these three organizations have excellent resources from which necessary information can be obtained to establish safe practice guidelines.

Items to be included in standards and practices documents are training, skill level, and CME requirements. Continuing medical education credit is available through the ASE for the first time with this series of articles. Within the ASE, there are standing committees given the task of standardizing nomenclature, practice issues, and training/certification. We expect to hear from these dedicated groups over the next year. Other resources can be obtained from programs sponsored by the American College of Cardiology (ACC), SDMS, Alliance of Cardiovascular Professionals, and ultrasound contrast and equipment manufacturers on national, regional, and local levels. In addition, preceptorship or mini-fellowship programs are being developed or are available at this time. These are typically designed to provide background and training in a clinical environment.

CONCLUSION

Many issues must be considered and discussed and solutions for which must be established when introducing ultrasound contrast to a practice. We have presented some tasks that can serve as a "start-up" checklist for the incorporation of contrast echocardiography:

1. Establish billing and charges through Medicare and other insurance carriers and through echocardiography practice administration and financial officials.
2. Identify indications for ultrasound contrast. Develop the request process; patient explanation, screening, and consent process; and report standards.
3. Assure standards are in place and specific for the echocardiography practice (infection control, emergency practice protocol, hazardous waste).
4. Establish CME opportunities for all staff involved in ultrasound contrast.
5. Establish a description of present roles of staff, and determine cross-training possibilities: Who will do what?
6. Develop a plan to train and certify sonographers or others in IV insertion and (potentially) contrast administration.

7. Organize work environment to include
 - a. easy access to the patient from both sides of the examination table,
 - b. work space for IV supplies and contrast agents,
 - c. refrigerator,
 - d. IV pole and/or infusion pump,
 - e. appropriate cardiac ultrasound equipment features for application of USCA.
8. Begin with bolus-and-flush injections for endocardial border definition.
9. Add Doppler enhancement imaging with contrast.
10. Perform stress echocardiography examinations enhanced with contrast by "continuous infusion."

APPENDIX

Example Patient Consent Form

Your physician has requested that we carefully evaluate your heart anatomy and blood flow. Due to some limitations in echocardiography, the images from your heart are not as clear as needed. This is not uncommon and may occur in up to 20% of patients. We have a tool that will greatly improve your images.

There are many questions regarding the implementation of contrast echocardiography into a practice. The next article in this series will focus on patient selection, detailed protocols, and equipment considerations.

REFERENCES

1. Vasan RS, Larson MG, Benjamin EJ, et al. Left ventricular dilatation and the risk of congestive heart failure in people without myocardial infarction. *N Engl J Med* 1997;336(19):1350-5.
2. Standard precautions by CDC. *Am J Infect Control* 1996;24:24-36.
3. Current procedural terminology. CPT, 1999. Standard ed. Chicago: American Medical Association.

This product is an ultrasound contrast agent called _____ (name product). The contrast agent is made up of tiny microbubbles (as small as your red blood cells) and is administered through an intravenous line (IV). This agent will improve our ability to see _____ (a) the inner borders of your heart muscle or _____ (b) the Doppler flow patterns.

We have asked about allergies or other contraindications and have answered your questions.

POST-REVIEW QUESTIONS FOR CME CREDIT

1. Billing codes (CPT codes) for new procedures may be authorized by:
 - A. local Medicare and other insurance carriers.
 - B. a physician.
 - C. a hospital financial officer.
 - D. an office administrator.
2. When payment for an existing CPT code is denied, a letter to the insurance carrier should include all EXCEPT which of the following comments?
 - A. The specific diagnosis for which the patient had the procedure
 - B. The procedure name and/or correct CPT code
 - C. An alias patient name to assure patient confidentiality
 - D. Date and place of service
3. Which of the following staff members have NO authority to request an ultrasound contrast examination?
 - A. Referring physician
 - B. Echocardiography practice medical director, by "standing order"
 - C. Echocardiogram interpreter, physician
 - D. Receptionist
4. An explanation of ultrasound contrast to the patient should NOT include which of the following statements?
 - A. Even though your echocardiogram is of excellent quality, I want to practice using a contrast agent.
 - B. Because of some technical limitations in your echocardiographic examination, your physician has requested that we enhance your images with the use of an ultrasound contrast agent.
 - C. The contrast agent is made up of tiny microbubbles that are as small as your red blood cells.
 - D. The ultrasound contrast agent will be administered through an intravenous line.
5. Which of the following scenarios demonstrates clinical appropriateness for the addition of contrast to an echocardiographic procedure?
 - A. A patient sent for evaluation of left ventricular segmental wall motion abnormalities where 2 or more of the wall segments do not clearly demonstrate endocardial border definition
 - B. A request for pulmonary venous flow in a patient who has 4-chamber enlargement and a limited Doppler spectral waveform

- C. A patient sent for a stress echocardiogram for evidence of coronary heart disease who has a suboptimal echocardiogram of the left ventricle in 2 or more views
- D. All of the above
- 6. Which of the following organizations does NOT provide support for echocardiographic contrast?
 - A. American Society of Echocardiography
 - B. Society of Diagnostic Medical Sonographers
 - C. Department of Agriculture
 - D. American College of Cardiology
- 7. Of the following professionals, who is most likely NOT to be trained in IV insertion?
 - A. Support person
 - B. Sonographer
 - C. Physician
 - D. Registered nurse
- 8. Ultrasound contrast can only be used with which type of echocardiographic system?
 - A. A system with harmonic imaging capabilities
 - B. A system with fundamental imaging capabilities
 - C. A system with color Doppler or dual triggering
 - D. All of the above
- 9. Which echocardiographic protocol may be similar to that for ultrasound contrast echocardiography?
 - A. Dobutamine echocardiography
 - B. Agitated saline contrast echocardiography
 - C. Both A and B
 - D. None of the above
- 10. Contrast administration techniques include:
 - A. bolus with flush.
 - B. continuous infusion.
 - C. both A and B.
 - D. Techniques need to be established.

JASE CME TEST ANSWER FORM

The estimated time for this CME activity is 1 hour. Please read the following instructions carefully.

1. Each question has only one correct answer. Answer all of the questions.
2. **Return this form accompanied by a stamped, self-addressed envelope.**
3. The processing fee is \$5.00 for ASE members and \$10.00 for nonmembers. (Note: US funds drawn on a US bank only.) Check, international money order, and cash are accepted.
4. All tests must be postmarked on or before October 1, 2000.
5. An ungraded test will be returned to the sender for one or more of the following reasons: received after the expiration date, without the processing fee, without the stamped, self-addressed envelope, or without membership documentation.
6. Send to ASE Executive Office, ATTN: JASE-CME, 4101 Lake Boone Trail, Suite 201, Raleigh, NC 27607.

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Article title					Volume					Issue
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This answer form will be returned and will be your proof of earning ASE CME credit. The processing fee is nonrefundable. Allow 3 to 4 weeks for processing. A score below 70% is unsatisfactory, and ASE CME credit will not be issued.