

Content Specifications For The Examination in Vascular Sonography

INTRODUCTION

The purpose of the ARRT Examination in Vascular Sonography is to assess the knowledge and cognitive skills underlying the intelligent performance of the tasks typically required of staff sonographers practicing in this specialized area. In order to identify the knowledge and skills covered by the examination, the ARRT conducted a job analysis study involving a nationwide sample of vascular sonographers. The results of the job analysis are reflected in this document.

The table below presents the three major content categories covered on the examination, along with the number of test questions in each category. The remaining pages of this document list the specific topics addressed within each major content category. The approximate number of test questions allocated to each topic appears in parentheses.

Publication Date: January 2001

Implementation Date: April 2001

ACKNOWLEDGMENTS

A special debt of gratitude is due to the hundreds of professionals participating in this project as committee members, survey respondents, and reviewers.

CONTENT CATEGORY	NUMBER OF QUESTIONS
A. Physics & Instrumentation	40
B. Image Production & Evaluation	35
C. Vascular Sonographic Procedures	<u>85</u>
	*160

* An additional 20% of the test may be pilot questions.

A. PHYSICS & INSTRUMENTATION (40)

I. SONOGRAPHIC EQUIPMENT (4)

- A. Ultrasound Unit
- B. Transducer
- C. Display and Storage
 - 1. pre- and post-processing
 - 2. recording media

II. EVALUATION OF SONOGRAPHIC EQUIPMENT (6)

- A. Equipment Quality Control
 - 1. sensitivity
 - 2. vertical & horizontal display accuracy
 - 3. focal zone
 - 4. resolution (e.g., lateral, longitudinal)
 - 5. compensation
 - 6. dynamic range
- B. Recognition of Malfunctions

III. BASIC PRINCIPLES OF ULTRASOUND (18)

- A. Generation of Signal
- B. Ultrasound Wave Characteristics
 - 1. speed
 - 2. frequency
 - 3. geometry – reflection and refraction
 - 4. intensity
 - 5. acoustic impedance
 - 6. attenuation
- C. Pulsed and Continuous Wave Doppler
- D. Color and Power Doppler
- E. Bioeffects

IV. ARTERIAL AND VENOUS HEMODYNAMICS (12)

- A. Flow Patterns (e.g., turbulent, resistive)
- B. Pressure
- C. Velocity

B. IMAGE PRODUCTION & EVALUATION (35)

I. IMAGE PRODUCTION (12)

- A. Transducer Selection
 - 1. frequency
 - 2. type
- B. Selection and Adjustment of Technical Factors
 - 1. power
 - 2. focal zone
 - 3. depth
 - 4. TGC
 - 5. Doppler gain
 - 6. Doppler angle
 - 7. gate size/sample volume
 - 8. wall filter
- C. Patient Variables
 - 1. body habitus
 - 2. breathing instructions
 - 3. position
 - 4. preparation
- D. Image Annotation

II. IMAGE EVALUATION (23)

- A. Criteria for Diagnostic Quality
 - 1. proper demonstration of anatomical structure
 - 2. proper demonstration of pathological conditions
 - 3. artifacts
 - 4. improvement of suboptimal images
- B. Spectral Analysis

C. VASCULAR SONOGRAPHIC PROCEDURES (85)

(including PATIENT CARE, POSITIONING, TECHNICAL FACTORS, ANATOMY, PHYSIOLOGY, PATHOLOGY, AND DIFFERENTIAL DIAGNOSIS)

I. ABDOMINAL/PELVIC VASCULATURE (20)

A. Arterial

1. aorta
2. celiac
3. hepatic
4. splenic
5. superior mesenteric
6. renals
7. common iliac
8. internal iliac
9. external iliac

B. Venous

1. inferior vena cava
2. hepatic
3. portal
4. splenic
5. superior mesenteric
6. renal
7. common iliac
8. internal iliac
9. external iliac

II. ARTERIAL PERIPHERAL VASCULATURE (25)

A. Upper Extremity

1. subclavian
2. axillary
3. brachial
4. radial
5. ulnar
6. digital
7. dialysis graft

B. Lower Extremity

1. external iliac
2. common femoral
3. superficial femoral
4. popliteal
5. posterior tibial
6. dorsalis pedis
7. digital
8. graft patency

C. Stress / Pressure Testing

1. VPR (volume pulse recording) / PCR (pulse-cuff recording)
2. segmental pressures – upper extremities
3. segmental pressures – lower extremities
4. ABI (ankle brachial index)
5. reactive hyperemia / post-exercise

C. VASCULAR SONOGRAPHIC PROCEDURES continued

III. VENOUS PERIPHERAL VASCULATURE (20)

A. Upper Extremity Venous

1. jugular
2. subclavian
3. axillary
4. brachial
5. cephalic
6. basilic
7. radial
8. ulnar

B. Lower Extremity Venous

1. external iliac
2. common femoral
3. superficial femoral
4. deep femoral
5. popliteal
6. greater saphenous
7. lesser saphenous
8. calf veins
9. vein mapping
10. reflux (valve competence) testing

IV. EXTRACRANIAL CEREBRAL VASCULATURE (20)

A. Carotid Artery

B. Vertebral Artery

C. Subclavian Artery (subclavian steal)