Getting to the Heart of Back and Shoulder Pain

Kathleen Bradbury-Golas, DNP, APN, NP-C, ACNS-BC
Theresa M. Campo, DNP, RN, APN, NP-C
Anthony Chiccarine, DO, FACEP

ABSTRACT

A healthy male presents to the emergency department with common musculoskeletal complaints that have shown no improvement after 10 days of conservative management. The emergency department provider notes a tachycardia and the patient confirms new onset shortness of breath for 1 day. After a comprehensive workup, the patient is admitted to the hospital. The purpose of this case presentation is to provide advanced practice nurses with information on the manifestations of what is initially felt to be musculoskeletal complaints. This article also emphasizes the need for an astute review of this patient’s “triage” vital signs and other presenting signs and symptoms that will assist the advanced practice nurse in making an accurate diagnosis so as to provide appropriate patient management. Key words: echocardiography, pericarditis, pericardial effusion, pericardial tamponade, tachycardia

Musculoskeletal complaints are commonly seen in the quick care (QC) and emergency care setting. Having a keen awareness of not only the patient’s complaint but also the vital signs and other presenting signs and symptoms are of extreme importance. In the case presented in this article, the provider’s recognition of abnormal vital signs led to a completely different diagnosis than one would expect with back and shoulder pain.

CASE FOR REVIEW

A 39-year-old man presented to the emergency department (ED) with a complaint of pain in the upper back between the shoulder blades for 1 week. He had been seen by his primary care provider 10 days before coming to the ED and was given an intramuscular injection, hydrocodone and acetaminophen (Vicodin) and cyclobenzaprine (Flexeril). The patient reported that a chest radiograph was negative for infiltrates. The patient reported increased severity of symptoms prior to the ED visit. The pain radiated to the left shoulder. This patient was assigned an Emergency
Severity Index score of four and was triaged to the QC area of the ED.

The patient’s past medical history was significant for gastroesophageal reflux disease, and current medications include lansoprazole (Prevacid) 30 mg daily, hydrocodone and acetaminophen (Vicodin), and cyclobenzaprine (Flexeril).

The patient denied any food or medication allergies, unsure of last tetanus immunization, smokes a half a pack of cigarettes daily, drinks alcohol three to four times a week, and denied illicit drug use. Significant family medical history included a father who had received a coronary artery bypass graft at 78 years of age.

**HISTORY OF PRESENTING ILLNESS**

The patient presented in no apparent distress but is complaining of increasing thoracic back pain radiating to the left shoulder. The pain was described as sharp and increased with left arm movement. There was no numbness to the left arm and fingers. The patient has experienced shortness of breath the day before arriving to the ED.

**PATIENT ASSESSMENT**

The patient presented awake, alert, and oriented. Vital signs are as follows: heart rate, 124 beats/min; blood pressure, 128/82 mmHg; respiratory rate, 20 per min; temperature, 36.9 °C (98.4 °F) orally; and pulse oximetry, 97% room air.

**Skin.** Warm, dry, and pink.

**Head, eyes, ears, nose, and throat.** head normocephalic, pupils equal, round, reactive to light and accommodation, extraocular movements intact, free of icterus and pale conjunctiva.

**Ears, nose, and throat/mouth unremarkable.**

**Neck.** Supple no masses, lesions, or lymphadenopathy. Full range of motion.

**Chest/respiratory lungs** were clear to auscultation in all fields. No rhonchi, wheeze, or rub.

**Heart.** S1–S2 with no murmurs, gallops, or rub were auscultated.

**Gastrointestinal.** No masses. Bowel sounds in all four quadrants. Nontender, nondistended abdomen.

**Genitourinary.** Unremarkable.

**Pelvis.** Unremarkable.

**Extremities.** Unremarkable.

**Musculoskeletal/Extremities.** Bilateral paraspinal tenderness—thoracic region. No spasm, costovertebral angle tenderness, or limited range of motion. Strength 5/5 bilaterally.

**Neurologic.** Motor and sensory normal. Deep tendon reflexes were 2+ bilateral ankles and biceps. Glasgow Coma Scale score = 15. Cranial nerves II–XII grossly intact.

**Psychiatric.** Unremarkable.

**Emergency department course**

The provider ordered the following:

- Cervical and thoracic spine plain radiographs—three views
- Computed tomography (CT) chest (to rule out aortic dissection)
- 12-lead electrocardiogram (ECG)
- Heart monitor
- Laboratory testing
  - Basic metabolic panel
  - Complete blood count
  - Sedimentation rate
  - Troponin
  - PT/INR/PTT
- Medications
  - Ketoralac (Toradol) 30 mg intravenous
  - Normal saline (0.9%) 500 ml/hr followed by 100 ml/hr

The results of the diagnostic testing are as follows:

**ECG.** Sinus tachycardia with nonspecific T wave abnormality in the anterior leads (Figure 1).

**Cervical and thoracic spine.** Normal examination.

**CT chest.** No aortic dissection or dilatation. Cardiomegaly with pericardial effusion up to 1.2 cm linear atelectasis or infiltrate at lung bases. Trace pleural effusions (Figure 3).

**CT abdomen.** Prior cholecystectomy and appendectomy. Abdominal aorta normal. Mild splenomegaly.
Figure 1. Initial electrocardiogram.

Figure 2. Computed tomography angiography chest emergency department.

Basic metabolic panel. Within normal limits.

Sedimentation rate. 19

PT/INR/PTT. 11.4/1.1/29.6

Consultation. A cardiology consult was initiated and stat bedside noninvasive echocardiogram was ordered. The result of the echocardiogram was circumferential pericardial effusion measuring 1.2 cm considered to be small to moderate; mild concentric left ventricular hypertrophy. The aorta, bilateral atria, and ventrical were normal size. Left ventricular systolic and diastolic functions were normal. Ejection fraction was 65% and all valves were normal.

ED Patient Management

This patient was administered levofloxacin (Levaquin) 500 mg intravenously and ibuprofen 600 mg orally. The patient was admitted to the hospital for repeat echocardiograms and further treatment.

Initial chest radiography was repeated twice during admission showing bilateral pleural effusions and cardiomegaly (Figure 3). Workup for autoimmune disease and human immunodeficiency virus was negative. Lyme titer was negative. Blood cultures were negative. Repeat echocardiogram 3 days after admission showed improvement. Medications included nonsteroidal anti-inflammatory pain medication, a proton pump inhibitor for history of gastroesophageal reflux disease and a β-blocker for tachycardia. The patient was discharged 5 days after admission with the discharge diagnoses of (1) pericarditis with pericardial effusion, resolved; (2) left shoulder pain possibly secondary to pericarditis, resolved; (3) tachycardia; and (4) gastroesophageal reflux disease.

ANATOMY AND PHYSIOLOGY OF THE PERICARDIUM

The pericardium consists of two layers that envelop the heart. The visceral layer, or epicardium, is single layer membrane composed
of mesothelial cells that adhere to the myocardium. The parietal layer is composed mainly of collagen and elastin fibers. The two layers are separated by a potential space that can contain up to approximately 50 ml of serous fluid. The parietal pericardium attaches to the diaphragm, sternum, and other structures by ligaments that ensure a relatively fixed position of the heart. The structures are innervated by the mammary artery and phrenic nerve (Braunwald, Zipes, Libby, & Bonow, 2004; Marx, Hockenberger, & Walls, 2010).

The pericardium has numerous functions. These functions include lubrication of the heart, heart position, prevention of infection and overdistention, atrial filling, and maintenance of a normal pressure-volume relationship of the cardiac chambers. Abnormal accumulation of fluid can occur with obstruction of drainage from the venous and lymphatic system (Braunwald et al., 2004; Marx et al., 2010).

**BACKGROUND**

A pericardial effusion is defined as the presence of an abnormal amount and/or character of fluid in the pericardial space. It is usually caused by an inflammatory process, in response to disease or injury. Some specific causes of pericardial effusion can be viewed in Table 1 (Strimel, Sovari, Assadi, & Kocheril, 2009; Sugiura, Kataoka, Matsymura, Takeuchi, & Doi, 2009).

In addition, pericardial effusion may also occur when the flow of pericardial fluids is blocked or when blood accumulates within the pericardium, as with cardiac surgery or trauma (Table 1). In many cases, the cause of pericardial effusion can be determined, but in others it is not apparent even with a thorough diagnostic evaluation.

Most small effusions are asymptomatic, being found only on autopsy. Malignant neoplasms have a high prevalence rate, up to 21%, with human immunodeficiency virus showing 5%-43% prevalence. The development of pericardial effusion is not specific to race, gender, or age, though it is most common to occur between 40 and 50 years of age.

**CLINICAL MANIFESTATIONS**

Clinical manifestations of a pericardial effusion are dependent on the rate of fluid accumulation in the pericardial sac. Symptoms of slow progressing effusions (even up to 2 L of fluid) may be nonexistent, with rapid accumulation of up to 80 ml causing severe symptoms. Manifestations of pericardial effusion include dyspnea, orthopnea, chest pain, cough, painful breathing, especially when lying down, and dizziness and syncope, all very nonspecific to the disease process occurring (Braunwald et al., 2004; Marx et al., 2010; Strimel et al., 2009).

The advanced practice nurse (APN) should specifically question the patient about subjective cardiopulmonary symptoms. Should a patient report any of the above symptoms, the APN should also look for the following signs on examination.

- Pericardial friction rub
- Tachycardia

**Table 1. Causes of pericardial effusion**

<table>
<thead>
<tr>
<th>Causes of pericardial effusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viral, bacterial, fungal or parasitic infections</td>
</tr>
<tr>
<td>Idiopathic inflammation (about one third of cases)</td>
</tr>
<tr>
<td>Inflammation following heart surgery or myocardial infarctions</td>
</tr>
<tr>
<td>(Dressler’s syndrome)</td>
</tr>
<tr>
<td>Autoimmune disorders, such as rheumatoid arthritis or systemic</td>
</tr>
<tr>
<td>lupus erythematosus</td>
</tr>
<tr>
<td>Uremia due to kidney failure</td>
</tr>
<tr>
<td>Hypothyroidism</td>
</tr>
<tr>
<td>Human immunodeficiency virus /acquired immunodeficiency syndrome</td>
</tr>
<tr>
<td>Metastasis from lung cancer, breast cancer, leukemia, Hodgkin’s</td>
</tr>
<tr>
<td>disease, non-Hodgkin’s lymphoma</td>
</tr>
<tr>
<td>Radiation therapy and chemotherapy</td>
</tr>
<tr>
<td>Trauma/puncture wound</td>
</tr>
<tr>
<td>Specific prescription medications, such as hydralazine, isoniazid,</td>
</tr>
<tr>
<td>phenytoin</td>
</tr>
</tbody>
</table>
• Tachypnea
• Tubular breath sounds over left lung base or axilla
• Poor peripheral pulses, edema
• Signs of impending or fulminate cardiac tamponade include the following:
  • Hypotension, jugular vein distention, muffled heart sounds (Beck’s triad)
  • Decrease in systolic blood pressure more than 10 mmHg with inspiration (pulsus paradoxus). (Braunwald et al., 2004; Marx et al., 2010; Strimel et al., 2009)

Advanced practice nurses need to recognize that patient presentation will be affected by the degree of cardiac output and therefore the severity of effusion. Besides pleural effusion, other differential diagnoses should be considered. Some examples of these diagnoses include but are not limited to cardiomyopathy, acute pericarditis, pulmonary edema, and pulmonary embolism.

Pericarditis is considered to be the most common associated diagnosis with pericardial effusion. It is associated with severe pleuritic sharp chest pain, which may radiate to the trapezius region. The pain is relieved by sitting forward and is worsened when the patient lies down. A recent history of fever, cough, dyspnea, and sometimes hiccoughs may be associated symptoms of a patient presenting with pericarditis. Physical examination may reveal patient with low-grade fever that is anxious, with tachycardia and a friction rub that can be heard. The friction rub consists of the three components of ventricular systole, early diastolic filling, and atrial contraction and is heard loudest at the left sterna border with the patient leaning forward (Braunwald et al., 2004).

**DIAGNOSTIC EVALUATION**

In order to determine the cause of the patient’s clinical manifestations, a complete workup should be obtained (Table 2). A baseline chest radiograph should be obtained, which shows an enlarged cardiac silhouette (water bottle or flask-shaped). Cardiomegaly is apparent with a minimum of 200–250 ml of pericardial fluid but will usually have normal pulmonary vasculature. Another reliable sign that can be viewed on chest radiography is a pericardial fat pad sign. The pericardial fat pad sign represents separation of the parietal pericardial fat from the epicardium and is visualized as a linear lucency between the anterior surface of the heart and chest wall (Braunwald et al., 2004). However, radiography is not the most reliable method of establishing a diagnosis.

**Imaging**

Echocardiography is the noninvasive modality of choice for confirming the diagnosis of pericardial effusion. This modality differentiates pericardial fluid from increased heart chamber size and evaluating wall motion abnormalities. Small effusions may begin over the left ventricle and progress anteriorly, laterally, and behind the left atrium becoming circumferential. The increase in fluid circumferentially can lead to cardiac tamponade (Braunwald et al., 2004). Cardiac tamponade is distinguished on echocardiogram as diastolic collapse usually beginning at the right

**Table 2. Laboratory and imaging studies for pericardial effusion diagnosis**

<table>
<thead>
<tr>
<th>Laboratory studies</th>
<th>Imaging studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrolytes</td>
<td>Chest radiography</td>
</tr>
<tr>
<td>Complete blood count with differential</td>
<td>Electrocardiography</td>
</tr>
<tr>
<td>Cardiac enzymes</td>
<td>Transesophageal echocardiography</td>
</tr>
<tr>
<td>Thyroid stimulating hormone</td>
<td>Computed tomography</td>
</tr>
<tr>
<td>Specific rheumatologic studies, such as rheumatoid factors</td>
<td>Magnetic resonance imaging</td>
</tr>
<tr>
<td>Pericardial fluid analysis: lactic dehydrogenase, total protein, cell count, gram stain, culture, hematocrit</td>
<td></td>
</tr>
</tbody>
</table>
ventricular wall. Overall sensitivity in identifying pericardial effusion may be as high as 96% (Wills, Young, & White, 2010).

Computed tomography and magnetic resonance imaging can also be used for technically difficult echocardiogram but are not first-line diagnostic studies. Both modalities are useful adjuncts to echocardiography giving more detailed information on the nature of the pericardial fluid. However, neither CT nor resonance imaging is recommended in patients requiring prompt management and treatment decisions. (Braunwald et al., 2004; Goldman et al., 2007; Marx et al., 2010).

Electrocardiography

The ECG typically exhibits reduced voltage and in severe cases electrical alternans. Electrical alternans is reflective of the heart swinging anterior and posterior with each heart beat. When pericarditis is associated with pericardial effusion, ECG findings may be consistent with pericarditis with widespread ST elevation, T-wave abnormalities, and PR depression (Braunwald et al., 2004; Strimel et al., 2009).

Pericardiocentesis can be performed diagnostically or therapeutically but can have complications of cardiac dysrhythmias, pneumothorax or perforation of the myocardium, or coronary vasculature. Gross appearance of the pericardial fluid can help differentiate the cause (Marx et al., 2010).

CLINICAL MANAGEMENT

Initial management of the patient with pericardial effusion includes volume augmentation with intravenous fluids, which increases the filling pressure with hopes of overcoming the pericardial constriction. Pericardiocentesis is the treatment of choice when imminent or actual pericardial tamponade is present.

Serial echocardiograms are recommended to assess the effects of treatment modalities and to evaluate extension of effusion and development of tamponade (Saito et al., 2008). The incidence of pericardial effusion resulting in tamponade has been estimated to be 3 per 100,000 patients per year (Wills et al., 2010). Other treatment modalities are geared toward the actual cause of the pericardial effusion (i.e., pericarditis, autoimmunity, neoplasm, or trauma; see Table 3).

Table 3. Treatment modalities for underlying pericarditis

| Aspirin/nonsteroidal antiinflammatory agents |
| Colchicine                                    |
| Steroids                                      |
| Antibiotics                                   |

IMPLICATIONS FOR PRACTICE

The patient discussed in this article presented with upper back and shoulder pain and shortness of breath the day before presenting to the ED. One sign that alerted the provider to conduct an extensive workup was a heart rate of 124 beats/min. It is a basic measurement taken by the triage nurse and can have a great impact on the course of evaluation, diagnosis, and treatment by the provider.

Tachycardia is easy to overlook. Anxiety and pain are common upon entrance to the ED and can induce a mild tachycardia. Abnormal vital signs can also be caused by fever, pulmonary embolism, pericardial effusion, pneumothorax, and numerous other diagnoses. Vital signs should always be the first objective sign providers review. They can be the difference between a simple and more complex workup.

It is important for APNs to always review and consider reasons for abnormal vital signs. Commonly, patients are sent to the QC area of the ED with “minor” complaints. However, we must all be astute to the zebra among the horses.

REFERENCES


EARN CE CREDIT ONLINE
Go to http://www.nursingcenter.com/CE/AENJ and receive a certificate within minutes.

Getting to the Heart of Back and Shoulder Pain

Test Instructions
To take the test online, go to our secure website at http://www.nursingcenter.com/CE/AENJ.

- On the print form, record your answers in the test answer section of the CE enrollment form on page 136. Each question has only one correct answer. You may make copies of these forms.
- Complete all registration information and course evaluation. Mail the completed enrollment form and registration fee of $21.95 to: Lippincott Williams & Wilkins CE Group, 2710 Yorktowne Blvd, Brick, NJ 08723, by June 30, 2012 (Exp. Date). You will receive your certificate in 4 to 6 weeks. For faster service, include a fax number and we will fax your certificate within two business days of receiving your enrollment form.
- You will receive your CE certificate of earned contact hours and an answer key to review your results. There is no minimum passing grade.
- Registration deadline is June 30, 2012.
- Registration deadline is June 30, 2012.
- Discounts and Customer Service
- Test Instructions
- On the print form, record your answers in the test answer section of the CE enrollment form on page 136. Each question has only one correct answer. You may make copies of these forms.
- Complete all registration information and course evaluation. Mail the completed enrollment form and registration fee of $21.95 to: Lippincott Williams & Wilkins CE Group, 2710 Yorktowne Blvd, Brick, NJ 08723, by June 30, 2012 (Exp. Date). You will receive your certificate in 4 to 6 weeks. For faster service, include a fax number and we will fax your certificate within two business days of receiving your enrollment form.
- You will receive your CE certificate of earned contact hours and an answer key to review your results. There is no minimum passing grade.
- Registration deadline is June 30, 2012.

CE TEST QUESTIONS

General Purpose Statement: To provide professional registered nurses with information about pericardial effusions and pericarditis.

Learning Objectives: After reading the article and taking this test, the learner should be able to:

1. Discuss the incidence, pathophysiology, and symptoms of pericarditis and pericardial effusion.
2. Identify diagnostic and imaging tests for pericarditis and pericardial effusion.
3. Describe treatment/management options for pericarditis and pericardial effusion.

1. Causes of pericardial effusion include all of the following except
   a. human immunodeficiency virus.
   b. malignancy.
   c. hypothyroidism.
   d. coronary artery disease.

2. One third of pericardial effusion cases are due to
   a. idiopathic inflammation.
   b. trauma/penetrating wounds.
   c. uremia due to kidney failure.
   d. radiation therapy and chemotherapy.

3. Small pericardial effusions are usually
   a. asymptomatic.
   b. intermittently symptomatic.
   c. more prevalent in Caucasians.
   d. fatal in symptomatic patients.

4. Symptoms of pericardial effusion include all of the following except
   a. cough.
   b. syncope.
   c. tachycardia.
   d. orthopnea.

5. Physical assessment of the patient with pericardial effusion may reveal
   a. tachycardia.
   b. inspiratory wheezing.
   c. poor peripheral pulses.
   d. an 5th heart sound.

6. The most common diagnosis associated with pericardial effusion is
   a. cardiomyopathy.
   b. pericarditis.
   c. pulmonary edema.
   d. pulmonary embolism.

7. Chest pain due to pericarditis is relieved by
   a. walking.
   b. standing.
   c. lying down.
   d. sitting forward.

8. Which statement is true about friction rubs?
   a. They consist of three components.
   b. They are due to late diastolic filling.
   c. They are heard loudest in a supine position.
   d. They can best be heard at the right sternal border.

9. Which laboratory study aids in diagnosing pericarditis?
   a. Varicella titre
   b. Rheumatoid factor
   c. Uric acid
   d. Spinal fluid analysis

10. Imaging studies to assist in diagnosing pericarditis include
   a. Tc-99m sestamibi echocardiogram.
   b. Cardiac computed tomography.
   c. Myocardial perfusion SPECT imaging.
   d. Cardiac magnetic resonance imaging.

11. Cardiomegaly on chest radiograph is apparent with a minimum of
   a. 50–100 ml of pericardial fluid.
   b. 100–150 ml of pericardial fluid.
   c. 150–200 ml of pericardial fluid.
   d. 200–250 ml of pericardial fluid.

12. An echocardiogram showing diastolic collapse starting with the left ventricular wall is characteristic of
   a. pericarditis.
   b. cardiac tamponade.
   c. ventricular dysynchrony.
   d. an isolated left ventricular pericardial effusion.

13. Computed tomography and magnetic resonance imaging studies can be used in pericarditis for
   a. treatment decisions.
   b. prompt management.
   c. first-line diagnostic studies.
   d. technically difficult echocardiogram.

14. Electrocardiogram findings in pericarditis with pleural effusion would include all except
   a. ST elevation.
   b. PR depression.
   c. increased voltage.
   d. T-wave abnormalities.

15. Which complication is least likely to result from pericardiocentesis?
   a. Pneumothorax
   b. Pulmonary edema
   c. Myocardial perforation
   d. Cardiac dysrhythmias

16. The treatment of choice for pericardial tamponade is
   a. chest tube insertion.
   b. pericardiocentesis.
   c. intravenous diuretics.
   d. Intravenous fluids to increase cardiac filling pressures.

17. The annual incidence of pericardial effusion resulting in tamponade is estimated to be
   a. 3 per 100,000 patients.
   b. 10 per 100,000 patients.
   c. 17 per 100,000 patients.
   d. 23 per 100,000 patients.
18. One treatment modality for underlying pericarditis is
   a. clonidine.
   b. colchicine.
   c. β-blockers.
   d. antihistamines.

19. Which aspect of the initial patient assessment do the authors identify as easy to overlook but can make the difference between a simple and more extensive workup?
   a. Family history
   b. History of presenting symptoms
   c. Vital signs
   d. Emergency Severity Index

CE Enrollment Form
Advanced Emergency Nursing Journal, April–June 2010
Getting to the Heart of Back and Shoulder Pain

A Registration information:

Last name________________________________________
First name_______________________________________
MI_____________________________________________
Address_________________________________________
City________________________State_________________
Zip________________________Telephone______________
Fax________________________Email__________________

Registration Deadline: June 30, 2012
Contact Hours: 2.0
Fee: $21.95

B Test Answers: Darken one for your answer to each question.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td>6.</td>
<td></td>
<td></td>
<td></td>
<td>11.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td>7.</td>
<td></td>
<td></td>
<td></td>
<td>12.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td>8.</td>
<td></td>
<td></td>
<td></td>
<td>13.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td>10.</td>
<td></td>
<td></td>
<td></td>
<td>15.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C Course Evaluation

1. Did this CE activity’s learning objectives relate to its general purpose? Yes No

2. Was the journal home study format an effective way to present the material? Yes No

3. Was the content relevant to your nursing practice? Yes No

4. How long in minutes did it take you to read the article, study the material, and take the test?_____?

5. Suggestion for future topics______________________________

D Two Easy Ways to Pay:

- Check or money order enclosed (Payable to Lippincott Williams & Wilkins)
- Charge my __________________________ ___________ Exp. Date________

Signature_________________________________________________

AENJ0410

Need CE STAT? Visit www.NursingCenter.com for immediate results, other CE activities, and your personalized CE planner tool!