Shortness of Breath: Could It Be PAH and What to Do About It? An Evolving Paradigm

Final Outcome Report for One City

Emerging Challenges In Primary Care: 2015

Report Date: 1/25/2016
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Course Accreditation

The National Association for Continuing Education is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

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This Live activity, Emerging Challenges in Primary Care: 2015, from 05/09/2015 - 11/30/2015, has been reviewed and is acceptable for up to 6.00 Prescribed credit(s) by the American Academy of Family Physicians. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

The National Association for Continuing Education is approved as a provider of nurse practitioner continuing education by the American Association of Nurse Practitioners. AANP Provider Number 121222. This program has been approved for 6.0 contact hours of continuing education (which includes 2.0 pharmacology hours).*

* This applies to the full day CME activity entitled Emerging Challenges in Primary Care.
Commercial Support

The Emerging Challenges in Primary Care: Update 2015 series of CME activities were supported through educational grants or donations from the following companies:

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Shortness of Breath: Could It Be PAH and What to Do About It? An Evolving Paradigm is supported by an educational grant from United Therapeutics Corporation.
<table>
<thead>
<tr>
<th>Date</th>
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<td>May 2, 2015</td>
<td>Miami, FL</td>
<td>June 20, 2015</td>
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<td>August 15, 2015</td>
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<td>August 22, 2015</td>
<td>St. Louis, MO</td>
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<td>June 6, 2015</td>
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<td>August 29, 2015</td>
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Translating the Advances in Evidence Based Medicine into Better Health Outcomes for People with Heart Failure
Ola Akinboboye, MD, MPH, MBA, FACP, FACC, FASNC, FSCCT, FAHA, DABSM; Jan Basile, MD; Phillip B. Duncan, MD; Icilma V. Fergus, MD, FACC; Elizabeth Ofili, MD, MPH, FACC; Anekwe Onwuanyi, MD; Laurence O. Watkins, MD, MPH, FACC; or Karol E. Watson, MD, PhD
Recognizing Peripheral Artery Disease in the Primary Care Practice
Lee Kirksey, MD, MBA

Lipid Management and Cardiovascular Risk Reduction: The Evolving Treatment Paradigm
Ola Akinboboye, MD, MPH, MBA, FACP, FACC, FASNC, FSCCT, FAHA, DABSM; Jan Basile, MD; Phillip B. Duncan, MD; Icilma V. Fergus, MD, FACC; Elizabeth Ofili, MD, MPH, FACC; Anekwe Onwuanyi, MD; Laurence O. Watkins, MD, MPH, FACC; or Karol E. Watson, MD, PhD

Transition to Insulin Therapy: Breaking the Barriers to Better Glycemic Control
Richard S. Beaser, MD or Robert S. Busch, MD, FACE or Mark Stolar, MD or Jeff Unger, MD, ABFM, FACE

Overcoming Cognitive and Residual Symptoms in Major Depression: Enhancing Patient Outcomes in the Primary Care Setting
Greg Mattingly, MD or Gustavo Alva, MD, DFAPA or C. Brendan Montano, MD

COPD & Alpha-1 Antitrypsin Deficiency: Diagnosis and Treatment Strategies to Improve Quality of Life
Franck Rahaghi, MD, MHS, FCCP or Arunabh Talwar, MD, FCCP

Shortness of Breath: Could It Be PAH and What to Do About It? An Evolving Paradigm
Arunabh Talwar, MD, FCCP
Levels of Evaluation

Consistent with the policies of the ACCME, NACE evaluates the effectiveness of all CME activities using a systematic process based on Moore’s model. This outcome study reaches Level 5.

- Level 1: Participation
- Level 2: Satisfaction
- Level 3: Declarative and Procedural Knowledge
- Level 4: Competence
- Level 5: Performance
- Level 6: Patient Health
- Level 7: Community Health

Level 1: Participation

- 321 attendees in one city
- 63% Physicians; 31% NPs or PAs; 2% RNs; 1% Other
- 69% in community-based practice
- 80% PCPs, 2% Cardiologist; 0% Endocrinologist; 16% Other or did not respond
- 80% provide direct patient care

Did we reach the right audience? Yes!
Level 2: Satisfaction

- 100% rated the activity as excellent
- 100% indicated the activity improved their knowledge
- 96% stated that they learned new and useful strategies for patient care
- 90% said they would implement new strategies that they learned in their practice
- 94% said the program was fair-balanced and unbiased

Sample Size: N = approximately 321

Were our learners satisfied? Yes! Data was collected across two cities for the Emerging Challenges in Primary Care program.
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Patients seen each week in a clinical setting with Pulmonary Arterial Hypertension:

- None: 53%
- 1-5: 35%
- 6-10: 10%
- 11-15: 2%
- >25: 0%

Sample Size: N = approximately 321
Did Learners Say They Achieved Learning Objective?

Upon completion of this activity, I can now – identify the pathophysiology of pulmonary arterial hypertension (PAH); when PAH should be suspected and how to determine the specific etiology; the parameters that determine the severity of PAH; and the treatments and how to appropriately refer and follow patients receiving treatment for PAH:

Yes! 96% believed they did. Data was collected in 1 city.

Sample Size: N = approximately 321
Outcome Study Methodology

Goal
To determine the effect this CME activity had on learners with respect to competence to apply critical knowledge, confidence in treating patients with diseases or conditions discussed, and change in practice behavior.

Dependent Variables

1. Level 3-5: Knowledge, Competence, and Performance
   Case-based vignettes and pre- and post-test knowledge questions were asked with each session in the CME activity. Identical questions were also asked to a sample of attendees 4 weeks after the program to assess retention of knowledge. Responses can demonstrate learning and competence in applying critical knowledge. The use of case vignettes for this purpose has considerable predictive value. Vignettes, or written case simulations, have been widely used as indicators of actual practice behavior. ¹

2. Practitioner Confidence
   Confidence with the information relates directly to the likeliness of actively using knowledge. Practitioner confidence in his/her ability to diagnose and treat a disease or condition can affect practice behavior patterns.

3. Level 5: Self-Reported Change in Practice Behavior
   Four weeks after CME activity, practitioners are asked if they changed practice behavior.

4. Readiness to Change Behavior (Prochaska and DeClemente Model) 
CME activities can motivate providers to move through different stages of change which can ultimately lead them to take action and modify their practice behavior in accordance with the objectives of the education. Movement through these stages of change is an important dependent variable to consider in evaluating the impact of CME. Participants were asked to evaluate their stage of change with respect to specific topics being presented.

- **Pre-contemplation stage**: I do not manage (XXX illness), nor do I plan to this year.
- **Contemplation stage**: I did not manage (XXX illness) before this course, but as a result of attending this course I'm thinking of managing it now.
- **Pre-contemplation/confirmation stage**: I do manage patients with (XXX Illness) and this course confirmed that I do **not** need to change my treatment methods.
- **Preparation for action stage**: I do manage patients with (XXX illness) and this course helped me change my treatment methods.

Shortness of Breath: Could It Be PAH and What to Do About It? An Evolving Paradigm

Faculty
Arunabh Talwar, MD, FCCP

Learning Objectives
1. Identify the pathophysiology of pulmonary arterial hypertension (PAH)
2. When PAH should be suspected and how to determine the specific etiology
3. The parameters that determine the severity of PAH
4. The treatments and how to appropriately refer and follow patients receiving treatment for PAH
## Key Findings

Recognizing PAH in the Primary Care Practice

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge/Competence</td>
<td>Learners demonstrated improvement from pre to post-testing in their answers to <em>five of five</em> of the case-based questions regarding the evaluation and management of patients with Pulmonary Arterial Hypertension, of which 4 questions achieved statistical significance.</td>
</tr>
<tr>
<td>Confidence</td>
<td>Whereas the majority of learners rated themselves as having very low confidence in their understanding of the evaluation, management and referral of patients with Pulmonary Arterial Hypertension before the education, most of the learners showed very high gains in confidence after the program.</td>
</tr>
<tr>
<td>Intent to Perform</td>
<td>As a result of this program, 14% of learners who did not participate in the evaluation, management and referral of patients with Pulmonary Arterial Hypertension before are considering doing so, while 64% who do, indicated that they will change their treatment methods.</td>
</tr>
<tr>
<td>Change of Practice Behavior</td>
<td>88% of learners who responded to our four week survey indicated that they had changed their practice behavior to implement the learning objectives of this program within four weeks after they attended the activity.</td>
</tr>
</tbody>
</table>
You evaluate a 38 year old female with unexplained dyspnea. You suspect that she has pulmonary hypertension. What is the recommended test to best determine the cause of pulmonary hypertension discovered on echocardiogram? (Learning Objective 1,3)

P Value: 0.161 - Not Significant

[Bar chart showing the percentage of responses for each test:
- Chest X-ray: Pre 4% Post 0%
- Spirometry: Pre 6% Post 2%
- Right heart catheterization: Pre 86% Post 94%
- Cardiac stress test: Pre 4% Post 5%]

Red highlight indicates no significant difference between pre and post testing.
Which of the following scenarios would be most likely associated with pulmonary arterial hypertension? (Learning Objective 2)

- Severe fatigue without dyspnea
- Progressive dyspnea, clear lungs and ankle edema
- Exertional chest pain in the absence of any other symptoms
- Dyspnea, hypersomnolence and morning headache
- Patient with known mitral stenosis, bilateral crackles on lung exam

Pre N= 54  Post N= 63

Green highlight indicates significant difference between pre and post testing.
What do currently published practice guidelines recommend for Group 1 PAH treatment? (Learning Objective 4)

- Always start with combination therapy of endothelin receptor blockers, riociguat, and phosphodiesterase inhibitors.
- Warfarin should be only considered if patient has history of deep vein thrombosis.
- Calcium channel blockers should not be tried without right heart catheterization and reversibility testing.
- Patients with mild dyspnea can just be observed and need no treatment.

Green highlight indicates significant difference between pre and post testing.
Which is the most appropriate plan to determine clinical status and response to treatment in PAH patients? (Learning Objective 3,4)

- **Case Vignette Knowledge and Competence Assessment Questions**
  (presented before and after lecture—boxed answer is correct)

**P Value: <0.001 - Significant**

<table>
<thead>
<tr>
<th>Plan</th>
<th>Pre (%)</th>
<th>Post (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 minute walk, BNP, each clinic visit with echocardiography every 6 to 12 months</td>
<td>26%</td>
<td>74%</td>
</tr>
<tr>
<td>6 minute walk and cardiac MRI every 6 to 12 months</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Cardiopulmonary exercise testing each clinic visit</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Yearly chest CTA to follow pulmonary artery diameter and right ventricular size</td>
<td>7%</td>
<td>0%</td>
</tr>
<tr>
<td>6 minute walk test and pulmonary function testing including diffusing capacity, every 6 to 12 months</td>
<td>59%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Red highlight indicates no significant difference between pre and post testing.
A 25 year old female presents to your office with progressive dyspnea. You diagnose her to have Pulmonary Arterial Hypertension (PAH). Which of the following are true regarding the etiopathogenesis of this condition? (Learning Objective 1)

- Most cases have a family history of this disease
- Has no relation to any underlying infectious process
- Can occur in patients with connective tissue disorders
- Repeated pulmonary emboli are an important cause of this condition

Green highlight indicates significant difference between pre and post testing.

Pre N= 52  Post N= 57
Change in Practice Behavior Question
(presented after the lecture)

Which of the statements below describes your approach to participating in the evaluation, management and referral of patients with PAH?

<table>
<thead>
<tr>
<th>Pre-Contemplation Stage</th>
<th>Contemplation Stage</th>
<th>Preparation for Action Stage</th>
<th>Pre-Contemplation/Confirmation Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do not participate in the evaluation, management and referral of patients with PAH, nor do I plan to this year.</td>
<td>I did not participate in the evaluation, management and referral of patients with PAH before this course, but as a result of attending this course I'm thinking of doing this now.</td>
<td>64%</td>
<td>0%</td>
</tr>
<tr>
<td>22%</td>
<td>14%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N= 36</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
You evaluate a 38 year old female with unexplained dyspnea. You suspect that she has pulmonary hypertension. What is the recommended test to best determine the cause of pulmonary hypertension discovered on echocardiogram? (Learning Objective 1,3)

Key Findings
Boxed answer is correct

Four Week Case Study Questions

You evaluate a 38 year old female with unexplained dyspnea. You suspect that she has pulmonary hypertension. What is the recommended test to best determine the cause of pulmonary hypertension discovered on echocardiogram? (Learning Objective 1,3)
Which of the following scenarios would be most likely associated with pulmonary arterial hypertension? (Learning Objective 2)

- Severe fatigue without dyspnea
- Progressive dyspnea, clear lungs and ankle edema
- Exertional chest pain in the absence of any other symptoms
- Dyspnea, hypersomnolence and morning headache
- Patient with known mitral stenosis, bilateral crackles on lung exam

Pre N= 54  Post N= 63  4 week N= 22

Green highlight indicates significant difference between pre and post testing.
What do currently published practice guidelines recommend for Group 1 PAH treatment? (Learning Objective 4)

Always start with combination therapy of endothelin receptor blockers, riociguat, and phosphodiesterase inhibitors

Warfarin should be only considered if patient has history of deep vein thrombosis

Calcium channel blockers should not be tried without right heart catheterization and reversibility testing

Patients with mild dyspnea can just be observed and need no treatment

Green highlight indicates significant difference between pre and post testing.
Which is the most appropriate plan to determine clinical status and response to treatment in PAH patients? (Learning Objective 3,4)

- 6 minute walk, BNP, each clinic visit with echocardiography every 6 to 12 months
- 6 minute walk and cardiac MRI every 6 to 12 months
- Cardiopulmonary exercise testing each clinic visit
- Yearly chest CTA to follow pulmonary artery diameter and right ventricular size
- 6 minute walk test and pulmonary function testing including diffusing capacity, every 6 to 12 months.

Green highlight indicates significant difference between pre and post testing.
A 25 year old female presents to your office with progressive dyspnea. You diagnose her to have Pulmonary Arterial Hypertension (PAH). Which of the following are true regarding the etiopathogenesis of this condition? (Learning Objective 1)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Pre %</th>
<th>Post %</th>
<th>4 week %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most cases have a family history of this disease</td>
<td>6%</td>
<td>7%</td>
<td>14%</td>
</tr>
<tr>
<td>Has no relation to any underlying infectious process</td>
<td>17%</td>
<td>7%</td>
<td>5%</td>
</tr>
<tr>
<td>Can occur in patients with connective tissue disorders</td>
<td>72%</td>
<td>68%</td>
<td>37%</td>
</tr>
<tr>
<td>Repeated pulmonary emboli are an important cause of this condition</td>
<td>40%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Green highlight indicates significant difference between pre and post testing.
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On a scale of 1 to 5, please rate how confident you would be in the evaluation, management and referral of a patient with Pulmonary Arterial Hypertension (PAH):

Pre: N=44
Post: N=59

- Not at all confident: 30%
- Slightly confident: 14%
- Moderately confident: 11%
- Pretty much confident: 15%
- Very confident: 12%

Pre %:
Post %:
Describe/list any other educational activities that you attended in the last month concerning the treatment of PAH?

4 Weeks Post  N= 22
Recognized need for further research and education on PAH
More often assessing for symptoms of pulmonary hypertension
Work in cardiology - feel more knowledgeable in guiding and referring patients
More comfort with treatment plan
Recognize testing modalities
More aware of diagnosing and appropriate referral strategy
More aware of need for early dx and rx
Screening patients more frequently
Can now refer to appropriate specialist
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What specific barriers have you encountered that may have prevented you from successfully implementing strategies for patients with Pulmonary arterial hypertension since this CME activity? (Comments received from attendees at 4 week follow up)

- Insurance costs
- Insurance approval for expensive tests
- Hard to accurately diagnose PAH symptomatology in its early stage in order to properly refer patient to specialty
- Staff support
- Lack of time and equipment
Discussion and Implications
Shortness of Breath: Could It Be PAH and What to Do About It? An Evolving Paradigm

The need for continued education in the area of Pulmonary Arterial Hypertension was demonstrated based on literature reviews and surveys completed prior to the conference series. Attendee knowledge was assessed at 3 points for this program: prior to the lecture, immediately following the lecture and again at 4 weeks after the conference using the case vignettes listed above. 321 learners participated in this activity in 1 location. The results indicated improvement in knowledge in all 5 of the areas tested, of which 4 achieved statistical significance. Specifically, as a result of this lecture, more participants: recognize that clinical findings in a patient with pulmonary hypertension will include progressive dyspnea, clear lungs and ankle edema; know that calcium channel blockers should not be tried without right heart catheterization and reversibility testing in patients with Group I PAH; realize that routine monitoring of PAH includes a 6 minute walk and BNP at every visit and echocardiogram every 6-12 months; and understand that PAH may occur in patients with connective tissue disorders. Attendees had a high baseline knowledge that right heart catheterization is the best test to determine the cause of pulmonary hypertension discovered on echocardiogram but slight improvement was still noted.

Data obtained from participants 4 weeks after the program demonstrated some decline in learning from the post-test scores, but still improvement from pre-test scores. Significant declines at 4 weeks were noted in awareness of practice guideline recommendations for Group I PAH, specifically the roles of calcium channel blockers and combination therapies, and the use of BNP, PFTs and Echo in the monitoring of PAH. These results suggest that all of the learning objectives for this activity have been effectively addressed with attendees.

Persistent gaps in knowledge with additional education needed in the following areas: signs and symptoms of PAH to prompt further evaluation, practice guidelines for treatment of Group I PAH, strategies to monitor patients with PAH including BNP, PFTs and Echo, and the underlying pathogenesis of PAH.
Discussion and Implications

Shortness of Breath: Could It Be PAH and What to Do About It? An Evolving Paradigm

Participants indicated a significant overall increase in self-reported confidence levels in the diagnosis and management of a patient with Pulmonary Arterial Hypertension. Moderate to very confident levels rose from 16% to 83% by the end of the program. As a result of this program, 14% of learners who did not diagnose or treat patients with PAH before are considering doing so, while 64% who do, indicated that they will change their treatment methods. After the conference, 90% stated they would implement new strategies that they learned in their practice, and 47% of participants reported managing at least 1 patient with PAH weekly. At 4 weeks, 88% of responders indicated that they already had changed their practice behaviors in the management of patients with PAH.

Attendees indicated multiple new, specific, practice behaviors they actually implemented as a result of this program that included: recognizing the need for more research and education on PAH, more carefully assessing for signs and symptoms of PAH, having greater awareness of testing modalities, understanding the need for early diagnosis and treatment, and referring to appropriate specialist when indicated.

Barriers to care generally centered around cost of testing, insurance issues, limited time to spend with patients and the challenge of diagnosing PAH in its early stages. 78% of participants had no other educational exposures concerning PAH suggesting their behavior changes were likely due to this program.

The notable changes in post test scores signify a clear gap in knowledge and an unmet need among primary care clinicians. It continues to be an important area for future educational programs.