

Testing virtual nursing education on alpha-gal allergy

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Alpha-gal allergy (AGA), thought to be linked to tick bites, can cause delayed anaphylaxis. A lack of caregiver knowledge remains a serious problem. A 36-bed adult orthopedic unit at a 434-bed Magnet®-redesignated community hospital in the Southeastern US conducted a pilot study to evaluate the effect of a virtual educational intervention on nurses' knowledge of AGA. Educating nurses on the unique presentation of AGA may enhance their ability to prevent a potentially life-threatening anaphylactic reaction.

Background

The World Allergy Organization defines anaphylaxis as a potentially life-threatening systemic hypersensitivity reaction manifested by problems involving airway, breathing, and circulation.¹ Anaphylaxis is typically associated with certain types of food, drugs, and environmental allergic reactions; however, it may also be associated with changes of the skin and mucosa.^{2,3} If not treated rapidly and appropriately, anaphylaxis can be fatal.⁴ An unknown cause of an allergic reaction such as AGA may delay timely treatment and leave the patient unaware of triggers to avoid.⁵

The tick *Amblyomma americanum*, also known as the lone star tick, is the only known vector in the US that triggers AGA.^{6,7} Fol-



lowing a tick bite, some individuals may display hives, angioedema, or anaphylaxis after eating red meat. Alpha-gal (galactose-alpha-1,3-galactose) is a carbohydrate attached to proteins, most notably thyroglobulin, found in red meat such as pork or beef. The response may present as delayed-onset anaphylaxis, occurring 3 to 6 hours after ingestion of red meat. This delay in the onset of symptoms contributes to the difficulty in diagnosis.⁶

AGA was discovered in 2009 when 24 cases were reported in the US and Australia.⁸ Current estimates exceed 5,000 cases in the US.⁹ Population prevalence and mortality are unknown, likely because a specific diagnosis rarely occurs and related deaths aren't detected. In a study of 28 patients with AGA, 21 patients rated their primary care provider as having little to no knowledge of AGA.¹⁰ Most participants identified the potential diagnosis of AGA through information from personal networks, online sources, or radio news.

Methods

A quasi-experimental design was utilized. Institutional Review Board approval was obtained from the hospital and university. Participants were recruited through an e-mail sent 1 week before initiation of the study. The unit director also announced the study at a morning huddle, clearly stating that participation was voluntary. A convenience sample of 19 nurses on the designated unit agreed to participate in the study.

Nursing knowledge of AGA was assessed using a 10-item, multiple-choice, investigator-designed questionnaire. (See *Test items and responses*.) Data on nursing experience, age, and nursing degree were also collected. Participants accessed the questionnaire by using the online survey link provided in the recruitment email or scanning the QR code on a flyer placed at the nurses' station. The informed consent screen appeared first, providing the topic of the study, participant involvement, and risks and benefits. After completion of the pretest, participants watched the video presentation and completed the posttest.

Intervention

The 2-minute educational video was developed and produced with the assistance of the hospital research team. The primary inves-

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Test items and responses

	Correct responses pretest N = 19	Correct responses posttest N = 19
1. How's alpha-gal transmitted to humans?	3 (16%)	17 (89%)
a. food contamination		
b. tick bite		
c. river water		
d. mosquito bite		
2. How long after ingestion do symptoms typically appear?	5 (26%)	15 (79%)
a. immediately		
b. 1 to 2 hours		
c. 3 to 6 hours		
d. 24 hours		
3. What food elicits an allergic reaction with AGA?	14 (74%)	16 (84%)
a. red meat		
b. fruits		
c. red vegetables		
d. peanuts		
4. What's alpha-gal?	2 (10%)	14 (74%)
a. protein		
b. fat		
c. vitamin		
d. carbohydrate		
5. What lab work does the provider order to screen for AGA?	9 (47%)	18 (95%)
a. cholesterol panel		
b. liver enzymes		
c. IgE antibodies		
d. urinalysis		
6. What symptoms can a patient present with during a reaction?	19 (100%)	19 (100%)
a. itching on palms of hands and soles of feet		
b. rash		
c. systemic hives		
d. all of the above		
7. What medications can be used to treat AGA?	19 (100%)	13 (68%)
a. diphenhydramine		
b. epinephrine		
c. broad-spectrum antibiotics		
d. both a and b are correct		
8. Can AGA produce a life-threatening allergic response?	17 (89%)	19 (100%)
a. yes		
b. no		
9. What medication could potentially elicit an allergic response in a patient with AGA?	4 (21%)	15 (79%)
a. heparin		
b. enoxaparin		
c. apixaban		
d. warfarin		
10. What's the most important task for nurses regarding patients with AGA?	11 (58%)	17 (89%)
a. obtain vital signs		
b. obtain a detailed history		
c. listen to heart and lung sounds		
d. perform a neuro exam		

Note: Correct responses are reflected in bolded italics.

tigator and research team assessed and approved content validity through an extensive review of the literature. The video described AGA, including its diagnosis and treatment, the nurse's role when caring for patients with AGA, and the importance of understanding the allergy. It also provided information on patient presentation and the importance of taking a detailed patient history, including food consumption within the last 8 hours, allergies or previous immune responses, and recent tick bites or outdoor activities. The video presentation was uploaded through YouTube and embedded into online survey software.

Results

Nursing experience ranged from 1 to 22 years (mean [M] = 8.5 years, standard deviation [SD] = 5.7). Participants ranged in age from 24 to 52 (M = 39, SD = 9.3). Four participants reported an associate degree in nursing, 14 reported a bachelor's degree, and one reported a master's degree for highest level of education.

The questionnaire items with the greatest difference between pretest and posttest were: "How's alpha-gal transmitted to humans?," "What's alpha-gal?," and "What medication could potentially elicit an allergic response in an alpha-gal patient?" A significant difference ($t = -6.954$, $P < .001$) between total knowledge scores pre (M = 5.4, SD = .9) and post (M = 8.6, SD = 1.8) intervention was found. Findings indicated that participant knowledge regarding AGA improved following virtual education.

Discussion

Total knowledge scores showed significant improvement following the educational video. An examination of individual questionnaire items suggests that education for

nurses regarding AGA should emphasize the following: route of transmission, timing from ingestion to symptoms, and the possibility of heparin eliciting an allergic response among patients with AGA.

In-person education is traditionally the preferred method of nursing education. However, many hospitals have transitioned to online learning since the start of the COVID-19 pandemic.¹¹ Recent studies reveal that virtual learning methods improve care practices, prevent unnecessary labor and work hours, facilitate the recording of information, and enhance clinical reasoning.^{12,13} The findings of this pilot study support the effectiveness of virtual education in the hospital setting, which may have implications for nursing education in the future.

Limitations

Participants in this pilot study were recruited from one community hospital (convenience sample) and one nursing specialty. In addition, the sample size was small.

Keep current

It's important for healthcare providers to remain current on research related to new diseases to respond to patients in an effective manner. This pilot study used a virtual intervention to effectively educate nurses on a condition that continues to increase in prevalence with a minimal use of hospital resources. **NMI**

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The authors have disclosed no financial relationships related to this article.

DOI-10.1097/01.NUMA.0000800396.67224.8f