Assessing Legislative Interest for a Sugar-Sweetened Beverage Tax in a Midwestern State

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Abstract

Background. This study sought to ascertain the opinions of members of the Kansas Legislature regarding pending sugar-sweetened beverage taxation legislation, including perceptions that such a tax would generate revenue or be associated with personal sugar-sweetened beverage consumption habits.

Methods. This study utilized a cross-sectional survey design and was conducted by administering an electronic or telephone survey of the 2010-2011 Kansas Legislature. Publicly-listed contact information for the 165 members in both chambers of the 2010-2011 Kansas Legislature was obtained. State legislators were invited via e-mail, telephone, or both to complete the survey. The main outcome measure was the degree of agreement or disagreement with the idea of sugar-sweetened beverage taxation.

Results. Seventy-eight legislators (47.3%) responded. Of these, 90.5% disagreed or strongly disagreed with taxation of sugar-sweetened beverages, and 86.5% disagreed or strongly disagreed with taxation of sugar-sweetened beverages if generated funds were set aside to subsidize healthy choices. Party affiliation, geographic area represented, and personal consumption of sugar-sweetened behaviors were not associated significantly with legislators' opinions of sugar-sweetened beverage taxation.

Conclusions. The majority of respondents in the Kansas Legislature reported opposing a sugar-sweetened beverage tax. While some respondents identified obesity as a problem, taxation of sugar-sweetened beverages was not a favorable option among Kansas legislators.

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Introduction

Consumption of sugar-sweetened beverages (SSBs, beverages with any added caloric sweetener) is associated with increased caloric intake, weight gain, and obesity,[1,2] which translates into strains upon health status and increased medical expenditures.[3] SSB consumption is associated with dental caries, poor oral health, type 2 diabetes, heart disease, gout, and sleeplessness.[2,4-7] SSBs contribute little toward health and high levels of consumption in the population are correlated with the rising incidence of obesity.[1-2,8]

Considering this correlation to obesity and health risks (of which the medical costs for treatment represent 9.1% of United States annual health care expenditures)[9], in a climate of state budget shortfalls, taxation on SSBs present a potential vehicle for intervention. The public health strategy is based upon prior success of tobacco taxes contributing $9.3 billion annually to fund tobacco cessation efforts nationwide.[10]

Direct benefits to reducing obesity from a national tax of 1 cent per 20 ounces could be as much as 3.8 pounds lost per year per

adult and 4.5 pounds lost per year per child due to the reduction of caloric intake from SSB.[11] Direct economic gain are dependent upon the level of taxation,[12] but the most notable estimation in annual revenue would be $14.9 billion for a national tax of 1 cent per 20 ounces.[13]

An SSB tax has the potential to generate funds for governments to enact obesity prevention initiatives. SSBs are part of taxes upon multiple categories of food and drink in 35 states.[14] Yet, these taxes have not shown meaningful effects upon SSB consumption and/or obesity.[15-18] However, the existing rates in the 35 states that tax SSBs (mean tax rate of 5.2%) are not earmarked for programs related to health.

The level of support for the concept of a SSB tax can increase if explained in such a manner that generated funds would be devoted to health improvement efforts. For instance, a 2008 poll of New York State residents suggested that 52% of respondents supported a soda tax;[12] 72% supported such a tax if the revenue would be used to support initiatives for the prevention of obesity in children and adults.[19]

Similar increases in approval, when the question is framed in such a manner as to highlight the intended usage of the funds, have been indicated in polls of New York State residents conducted by the Citizens' Committee for Children of New York (2008)[20] and the Henry J. Kaiser Family Foundation (2009).[21] This assertion has yet to be tested in the literature. However, more recent polling data suggested public opinion is divided on the issue, as over 50% of adults surveyed oppose taxes of sugary products like candy and soft drinks and just over a quarter of respondents (26%) indicated they think such taxes could reduce obesity.[22] Additionally, opinions and policies on SSB taxes not only vary from locale to locale, but based on the type, amount, and scope of the proposed taxation.[14]

The current study assessed the opinions of Kansas legislators regarding taxation of SSBs in Kansas. This study aimed to elicit opinions regarding the use of potential tax revenue and determine if support for a tax would be associated with the intended usage of the potential tax revenue. Additionally, this project assessed the SSB consumption habits of Kansas legislators, both in frequency and quantity, and whether these personal beverage choices are associated with individual opinions regarding the proposed taxation. No previous studies involving the Kansas Legislature had been conducted to assess the issue of increased caloric intake through SSBs.

Methods

For the purpose of this study, researchers defined sugar-sweetened beverages as carbonated or noncarbonated drinks that are sweetened with added caloric sugars (sucrose or high-fructose corn syrup), including non-diet soft drinks, fruit drinks, lemonade, fruit punch, energy drinks, and other sweetened beverages. Sugared beverages were defined as carbonated or noncarbonated drinks that are sweetened with artificial (non-caloric) sweeteners and excluded from the study.[23]

Participants. Kansas was selected as the state for analysis owing to geographic proximity to the researchers and the state's status as being one of 17 to fail to pass SSB tax legislation between 2009 and 2010. Senate Bill 567 was introduced into the Kansas Senate in 2010 as an excise tax on retailers and manufacturers, but failed to pass the Senate Assessment and Taxation Committee. The bill was introduced for the purpose of generating revenue to address the state's budget shortfall, as no monies were earmarked for obesity prevention and

benefits to health were secondary. The study population was the 165 members of the 2010-2011 Kansas Legislature, including the full membership of the Senate and House of Representatives.

Instrument. A 17-item, electronic survey was developed for this study. The survey included demographic items (e.g., urban vs rural constituency, political party, gender) and Likert scale items assessing support of a SSB tax as well as support contingent upon generated funds being devoted to subsidization of health initiatives. There were 15 close-ended items, one item to itemize the number of servings of various types of beverages they had consumed in the past week, and an open-ended item at the conclusion of the instrument. Two of the close-ended questions were Likert scale questions and 13 were categorical items (e.g., food recall quantities, political parties, community size). All other than the Likert scale items were used to classify respondents. The survey instrument was designed for this project and its psycho-metric properties were not measured.

The instrument included individual dietary recall items assessing beverage consumption according to frequency and typical service size. The intent of the dietary recall was to compare sugar-tax perceptions and beverage-intake patterns. The dietary recall was modeled after surveys implemented in similar studies.[24-26] The survey instrument presented legislators with five mutually exclusive beverage categories and asked them to indicate how often they consumed the each beverage in the past month, either per day, per week, or per month. The beverage categories, derived from NHANES III and NHANES 1994-2004[26-27] were: 1) milk (including milk consumed with cereal), 2) non-diet sugared soda or pop, 3) 100% pure fruit juice, 4) sweetened coffee or tea, and 5) sweetened fruit, sports, or energy drinks.

Procedures. Upon obtaining Institutional Review Board approval, researchers electronically invited all 165 current members of the 2010-2011 Kansas Senate and House of Representatives to complete the assessment. Contact information for the Kansas legislators was obtained from publicly-accessible websites, individual campaign sites, and the publicly-accessible legislative directory on the Kansas Secretary of State website. Invitations were sent via an introductory e-mail from the electronic survey host, SurveyMonkey®, with each e-mail containing an embedded link to the assessment. The invitations explained the purpose of the survey and included an explanation of the voluntary nature of study participation. An eight-week window in which to complete the survey was noted in the initial e-mail, with reminder e-mails sent out to non-responders after the first and second weeks. To ensure maximal response, all 165 potential respondents were contacted directly at their publicly-listed phone numbers at the conclusion of two weeks of electronic data collection and offered the option of completing the survey via telephone. Legislators with unlisted e-mail addresses were contacted by phone only. Data were collected from November 1, 2010 through January 1, 2011.

Statistical analysis. Upon conclusion of the data collection period, results were compiled via direct download from SurveyMonkey® and entered from telephone data into spreadsheet format. Data and descriptive statistics were calculated to define and categorize responses. Results were reported by frequency and percentage.

Results

Seventy-eight (78) of the 165 Kansas senators and representatives participated in the survey, resulting in a 47.3% response rate. Among the respondents, 82.4% (n = 61) identified themselves as Republican, 17.6%

(n = 13) identified themselves as Democrat, and 5.1% (n = 4) of participants declined to comment on their political party. Among the respondents, 57.5% identified themselves as representing urban areas, 37.1% identified themselves as representing rural areas, and 5.1% declined to comment on the type of area they predominantly represented.

The majority of participants (90.5%) strongly disagreed or disagreed with the imposition of taxes on SSBs in Kansas. Further, 86.5% strongly disagreed or disagreed with being in favor of taxes on SSBs in Kansas, even when generated funds were to be set aside to subsidize "healthy choices" (e.g., public health education/ promotion, obesity prevention programs, or provision of healthy foods).

Of the 13.5% of respondents who were in favor of a sales tax that would be used to subsidize healthy choices, 50% reported that the portion of funds ideally set aside to subsidize healthy choices should be between 51% and 75%; the other 50% suggested setting aside 76% to 100% of the funds.

Political party affiliation. Most Republicans (91.5%) and Democrats (84.6%) strongly disagreed or disagreed with taxes on SSBs. Also, 88.1% of Republicans and 76.9% of Democrats reported that they strongly disagreed or disagreed with taxes on sugar-sweetened beverages, even when generated funds were to be set aside to subsidize healthy choices.

Geographic area represented. Of the 57.7% of respondents representing urban areas, 93.0% strongly disagreed or disagreed with a tax on SSBs. Among respondents representing rural areas, 86.2% strongly disagreed or disagreed with the tax. Still, 89.7% and 83.7% of respondents who represented rural and urban areas, respectively, reported that they strongly disagreed or disagreed with the taxation of SSBs, even when generated funds would be set aside to subsidize healthy choices.

Personal consumption. Participants were asked if they had consumed milk, non-diet sugared soda or pop, 100% fruit juice, sweetened coffee or tea, and sweetened fruit sports or energy drinks within the last 30 days. Based on their responses, 80.3% consumed at least one serving of milk, 71.8% consumed 100% fruit juice, 41.9% consumed non-diet sugared soda or pop, 23.0% consumed sweetened fruit sports or energy drinks, and 20.3% consumed sweetened coffee or tea within the last 30 days (Table 1). However, participants' reported consumption of beverages was not associated significantly with their position on the taxation of sugar-sweetened beverages.

Table 1. Percent of respondents who reported beverage consumption in the last 30 days.

	None	At Least One Beverage
Milk	19.7%	80.3%
100% Fruit Juice	28.2%	71.8%
Non-Diet Sugared Soda or Pop	58.1%	41.9%
Sweetened Fruit, Sports, or Energy Drinks	77.0%	23.0%
Sweetened Coffee or Tea	79.7%	20.3%

Discussion

The majority of Kansas legislator respondents were not in favor of a sugar-sweetened beverage tax in the state. No major differences existed in opinions among legislators regarding political party affiliation or geographical area of representation. Furthermore, their own sugar-sweetened beverage consumption did not appear to be associated with opinions regarding a sugar-sweetened beverage tax.

Prior to this study, no research had assessed opinions of Kansas legislators on

an SSB tax. Additionally, no similar studies had been conducted addressing this topic in other state legislatures. Other studies focusing on SSB taxes had focused on the nature of the policies or their potential for revenue generation rather than the opinions and health behaviors of the legislators who actually vote on these policies.[12,14] As members of government representing their constituents at the state level, the views of policy-makers are important when considering public health policy interventions. An SSB tax could be used to update built environments, foster the growth and consumption of local vegetables and fruits, support community gardens, and/or subsidize the costs of vegetables and fruits.

Limitations. Non-response bias may have occurred in this study. The possibility exists that legislators who chose to participate in this study had stronger opinions on the topic, such as increased opposition to a rise in taxes. Additionally, these results are less generalizable beyond Kansas legislators, though they may be applicable in other Republican-dominated states. However, the purpose of this study was to assess opinions specifically within the Kansas legislature. Thus, the 47.3% response rate serves as an appropriate sample for this population.

Although the original bill was an excise tax on retailers and manufacturers, the survey assessed taxation without specifying if this would be a sales or excise tax or referring directly to statutory language of Kansas Senate Bill 567. Consumers typically are unaware of sales taxes, registered at the time of payment and added onto the sale price, whereas an excise tax would affect the overall shelf price thus immediately signaling to the consumer the higher price and increasing the likelihood of impacting purchasing patterns.[14] By failing to define what was meant by tax, it was left to the respondent to deduce whether the survey was inquiring about a *sales* tax or an *excise* tax, a distinction which previous research has indicated is of critical importance.[14]

Conclusions

This study suggested that the 2010-2011 Kansas Legislature would not support implementation of a tax on SSBs. Legislators provided reasons for not supporting the tax, including not supporting any increase in taxes, uncertainty that taxation would be successful in decreasing caloric intake, volitions against interfering with individual freedoms, and a desire to support the use of corn syrup in this highly agricultural state. Additional strategies to decrease the accessibility of SSBs are necessary for the development and implementation of effective public health and economic interventions.

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Using Teaching Excellence Surveys to Evaluate Improvements in Teaching Confidence

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Abstract

Background. There are many surveys to assess teaching excellence, but few validated tools to assess improvements in teaching confidence among faculty over time. We hypothesized that previously validated surveys for learner evaluation of faculty teaching excellence also can be used as a self-evaluation tool to assess changes in faculty teaching skills confidence over time.

Methods. A cohort study was designed using a composite survey from two previously validated surveys (SETQ and CanMEDS) on teaching excellence. The composite survey was administered before and after a faculty development course on teaching excellence at the University of Kansas Medical Center in the Spring of 2012. Course "completers" attended more than 50% of the course and "non-completers" attended 50% or less of the course.

Results. The overall mean change in survey result scores on a five-point Likert scale was nearly one point for "completers" (mean difference = 0.92, SD = 0.41) as opposed to 0.34 for "non-completers" (SD = 0.34, p = 0.001). The Cronbach's alpha coefficients for the pre-course surveys were 0.83 and 0.85 versus 0.88 and 0.83 for the post-course surveys, indicating a high internal consistency for both survey instruments.

Conclusions. Measurable improvements in teaching skills confidence occur following faculty professional development courses. These improvements can be assessed more efficiently by using previously validated and reliable assessment tools in new and innovative ways.

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Introduction

Clinical educators face many challenges in their roles as teachers of medicine. The obstacles are greater given the lack of formal training in teaching offered to most faculty prior to their first faculty appointment.[1] To this end, there are a number of courses directed toward teaching faculty how to be excellent clinical teachers.[2-4] However, it often can be difficult to justify the time, expense, and use of limited resources required to provide faculty with a formalized course to improve their teaching quality, especially when few valid evaluation tools exist to assess their effectiveness.[5,6]

In the recent past, a number of studies have defined and evaluated teaching excellence using subjective surveys of learners.[1,7-10] New evaluation tools are being introduced and many of these tools have been validated.[4,11-14] We proposed that previously validated surveys for learner evaluation of teaching excellence can be used as a self-evaluation tool for educators to assess changes and improvements in their own teaching confidence over time.

Methods

Study design, participants and setting. This cohort study was conducted at the University of Kansas Medical Center from January to September 2012 in conjunction with a faculty development course on teaching skills. A total of 28 faculty

members were invited to participate in a course called "Doctors as Educators" which consisted of twelve one-hour sessions. The format incorporated lectures, small group discussions, and faculty-learner practice-teaching presentations with feedback. Twenty-three faculty members enrolled; nineteen completed a self-assessment survey at the beginning and end of the course. Surveys were distributed by email and paper and reminders to complete the surveys were given verbally and by email. Four faculty members chose not to complete both surveys. Ten were present for more than 50% of the teaching sessions and were considered course "completers". Nine were present for 50% or less of the sessions and were considered "non-completers."

Instrument development and data collection. The self-assessment survey was a composite of two previously-validated and reliable tools to assess teaching excellence: the Canadian Medical Education Directions for Specialists (CanMEDS) and the System for Evaluation of Teaching Qualities (SETQ) evaluation tools (Appendix).[4,12] The wording of some questions was modified slightly to apply to a self-assessment rather than a learner assessment of a faculty member. A five-point Likert response scale (poor = 1, fair = 2, average = 3, good = 4, and excellent = 5) was used to answer the survey. A similar format was used by the original surveys.

Demographics were collected for each faculty member enrolled in the course and included age, gender, race, years of faculty experience, graduation from a foreign medical school, completion of a chief resident year, participation in a prior faculty development course on teaching, and other formal training as a clinical educator. Faculty self-assessment questionnaires were kept confidential using random numerical identifiers during data analysis. This research project was approved by the University of Kansas School of Medicine Human Subject Committee.

Data analysis. Data were coded and simple descriptive statistics were calculated for all applicable variables. The majority of faculty demographics were discrete, dichotomous variables and the remaining variables were transformed into dichotomous versions (mean values were used as the cut-off points) for consistency and clarity of the presentation. Fisher exact tests were performed to evaluate for any statistically significant demographic percent differences between faculty course "completers" versus "non-completers". Paired t-tests also were performed to explore associations between continuous self-assessed overall improvements in faculty teaching quality (calculated as a change in the mean score for the questionnaire before and after the course).

Instrument internal consistency reliability was examined by calculating the Cronbach's alpha coefficient.

Results

Demographics. The faculty sample was comprised mainly of white providers (15/19, 79%), in their mid-thirties or beyond (11/19, 58%), with less than six years of faculty work experience (12/19, 63%). The sample was nearly gender-equal and most of the faculty were United States medical graduates (16/19, 84%). Only one (5%) faculty member of 19 had any formal training as a clinician-educator; six (32%) completed a chief residency year, and nearly half (8/19, 42%) had completed a faculty development course on teaching in the past. None of the demographic differences between "completers" and "non-completers" were statistically significant (Table 1).

Survey results. Self-confidence ratings on pre- and post-course surveys for all enrolled faculty increased by over half a point on the five-point Likert scale (mean

difference = 0.65±0.33). However, when the group was divided into "completers" and "non-completers", the overall self-confidence survey rating for "completers" changed by nearly one point (mean difference = 0.92±0.41) after the course, compared to 0.34 for "non-completers" (SD = 0.34, p = 0.001), suggesting that faculty who completed the course developed significantly more confidence in their teaching skills (Figure 1).

Table 1. Faculty demographics overall and by completers versus non-completers.

Faculty Demographics	Total N=19	Completers N=10	Non-Completers N=9	P Value
Age < 36 years old, n (%)* Age ≥ 36 years old, n (%)*	8 (42.1%) 11 (57.9%)	3 (30%)	5 (55.6%)	0.37
Faculty experience < 6 years, n (%)* Faculty experience ≥ 6 years, n (%)*	12 (63.2%) 7 (36.8%)	8 (80%)	4 (44.4%)	0.17
Male, n (%) Female, n (%)	9 (47.4%) 10 (52.6%)	5 (50%)	4 (44.4%)	1.00
White, n (%) Non-white, n (%)	15 (78.9%) 4 (21.1%)	7 (70%)	8 (88.9%)	0.58
Foreign medical graduate, n (%) American medical graduate, n (%)	3 (15.8%) 16 (84.2%)	2 (20%)	1 (11.1%)	1.00
Completion of a chief residency, n (%) No completion of a chief residency, n (%)	6 (31.6%) 13 (68.4%)	4 (40%)	2 (10.5%)	0.63
Completion of a faculty development course on teaching, n (%) No completion of a faculty development course on teaching, n (%)	8 (42.1%) 11 (57.9%)	3 (30%)	5 (55.6%)	0.37
Completion of other formal training as a clinical educator, n (%) No completion of other formal training as a clinical educator, n (%)	1 (5.3%) 18 (94.7%)	0 (0%)	1 (11.1%)	1.00

*Cut-offs for provider demographics were chosen based on the mean values where applicable.

Internal consistency of survey. The Cronbach's alpha with standardized variables was used to investigate the internal consistency of each of the condensed surveys for all participants. A Cronbach's alpha of at least 0.70 or greater is considered an indication of acceptable reliability.[15] The Cronbach's alpha coefficients for our pre-course SETQ and CanMEDS surveys were 0.83 and 0.85, respectively; the Cronbach's alpha coefficients for our post-course surveys were 0.88 and 0.83, respectively, indicating a high internal consistency for all.[4, 12]

Discussion

In academic medicine, it is crucial to train and retain clinically excellent medical educators. However, many physicians complete their residencies without any formal training on how to become a clinical educator.[1] Without training, junior faculty can be overwhelmed by the teaching expectations. In theory, this can result in

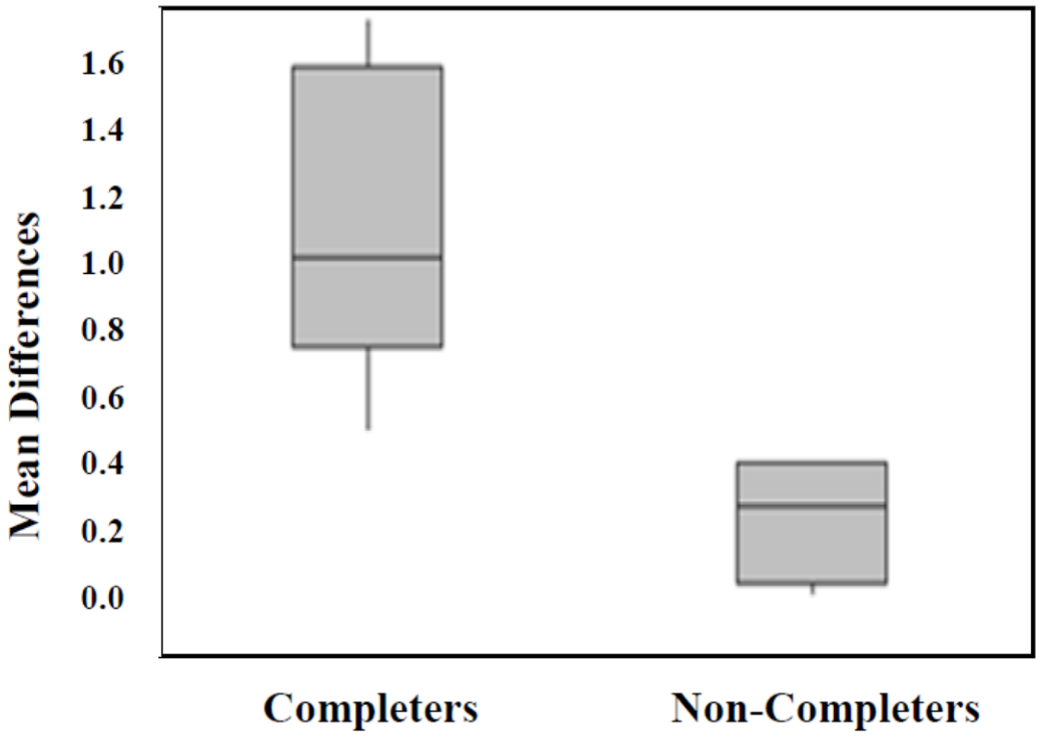

Figure 1. Boxplot of mean difference in overall survey scores for completers versus non-completers.

poor evaluations on their teaching abilities, dissatisfying instruction as a faculty member, and ultimately, poorly trained future physicians. This void can be filled by creating easily-accessible, formal training programs for clinical educators. For programs like this to be supported, evidence of their success also must be shown and therein lays the challenge.

As with others, the faculty development course showed a statistically significant improvement in teaching confidence in faculty "completers" as opposed to "non-completers", using a pre- and post-course survey. Though significant, surveys are inherently biased and few validated assessment tools have been published to evaluate improvements in teaching abilities over time in conjunction with faculty development courses.[5,6] Furthermore, although a number of "static" tools to evaluate teaching abilities have been validated, none have been translated into use for evaluating "dynamic" improvements in teaching qualities over time. This study sought to fill this void by using two previously validated "static" surveys of teaching abilities as "dynamic" evaluation tools.

These previously validated tools were used in two novel ways. First, the evaluations were used to measure dynamic improvements in teaching confidence over time (as opposed to "a moment in time" assessment of teaching abilities). Second, the faculty assessed their own teaching abilities instead of their learners. When the internal consistency of each survey was tested, the Cronbach's alpha remained high for both. These findings supported the argument that validated tools on teaching excellence can be used in a variety of ways

other than their original design to evaluate similar qualities. Future studies may focus on modifying previously validated tools to fit their needs as opposed to creating yet another survey. Another strength of this study was the use of a cohort design which allowed the authors to show a correlation between frequent exposure to a teaching skills curriculum and self-assessed improvement in teaching confidence.

Several limitations should be considered. First, the number of faculty who participated in this study was small. Thus, these results may not be generalizable to a larger population. Second, the faculty self-selected for registration into the course and all who registered were accepted. Therefore, there may have been a self-selection bias present with faculty who desired to improve their teaching abilities more likely to attend the course, reflect upon their attendance positively, and note more significant improvements in their teaching confidence following the course. However, an equal number of faculty members who registered for the course did not attend a significant portion of the classes and subsequently, did not note significant improvements in their teaching confidence on the survey. Third, self-assessment surveys are inherently subjective by nature. Direct observation of teaching performance may be a better method to assess teaching abilities but the time and resources required, along with the challenge of creating a valid tool for assessing teaching in a variety of different settings and formats, make this an unrealistic way to evaluate clinical educators.

Conclusions

For well-trained physicians in the future, faculty must be educated to teach the trainees. This study confirmed that measurable improvements in teaching confidence can occur among faculty following professional development courses. We have a responsibility to create curricula that improve teaching skills and confidence and validate the tools used to assess them.

Evaluations on improvements in teaching abilities following faculty development courses serve a number of roles: to assess improvements made by its learners, to uncover educators who are less effective and who may need more intensive instruction or remediation, and to acknowledge the effectiveness of the faculty development course itself. The ability to use previously validated assessment tools in new ways allows clinician-researchers and clinician-educators to redirect their focus away from development of these tools and toward new arenas in medical education and research. Ultimately, the benefits reach far beyond the faculty themselves. Increased focus on training and effectively evaluating medical educators will serve to benefit the learners they teach by providing them with a more expansive fund of knowledge, ultimately giving our future physicians a larger arsenal from which to diagnose and treat the patients who seek their expertise.

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Keywords: teaching, education, self-evaluation programs, medical faculty

Appendix

Teaching Excellence Survey

As a teacher, I….

1. Encourage learners to participate actively in discussions.
   poor (1) fair (2) average (3) good (4) excellent (5)

2. Encourage learners to bring up problems.
   poor (1) fair (2) average (3) good (4) excellent (5)

3. Teach learners time management.
   poor (1) fair (2) average (3) good (4) excellent (5)

4. Keep to teaching goals; avoids digressions.
   poor (1) fair (2) average (3) good (4) excellent (5)

5. Motivate learners to study further on their own.
   poor (1) fair (2) average (3) good (4) excellent (5)

6. Encourage learners to read about their patients on their own.
   poor (1) fair (2) average (3) good (4) excellent (5)

7. Prepare well for teaching presentations and talks.
   poor (1) fair (2) average (3) good (4) excellent (5)

8. Present teaching material in a well-organized way.
   poor (1) fair (2) average (3) good (4) excellent (5)

9. Explain how the information being taught is applicable to patients.
   poor (1) fair (2) average (3) good (4) excellent (5)

10. Use visual aids.
    poor (1) fair (2) average (3) good (4) excellent (5)

11. Use memory tools.
    poor (1) fair (2) average (3) good (4) excellent (5)

12. Listen attentively to learners.
    poor (1) fair (2) average (3) good (4) excellent (5)

13. Am respectful towards learners.
    poor (1) fair (2) average (3) good (4) excellent (5)

14. Am easily approachable.
poor (1) fair (2) average (3) good (4) excellent (5)

15. State learning goals clearly and concisely.
poor (1) fair (2) average (3) good (4) excellent (5)

16. State the relevance of the learning goals.
poor (1) fair (2) average (3) good (4) excellent (5)

17. Prioritize learning goals.
poor (1) fair (2) average (3) good (4) excellent (5)

18. Repeat stated learning goals periodically.
poor (1) fair (2) average (3) good (4) excellent (5)

19. Offer to conduct mini-CEX (clinical examination exercise) regularly.
poor (1) fair (2) average (3) good (4) excellent (5)

20. Evaluate learners' overall medical knowledge.
poor (1) fair (2) average (3) good (4) excellent (5)

21. Evaluate learners' ability to analyze or synthesize information.
poor (1) fair (2) average (3) good (4) excellent (5)

22. Evaluate learners' ability to apply medical knowledge to specific patients.
poor (1) fair (2) average (3) good (4) excellent (5)

23. Evaluate learners' medical skills.
poor (1) fair (2) average (3) good (4) excellent (5)

24. Give positive feedback to learners frequently.
poor (1) fair (2) average (3) good (4) excellent (5)

25. Give corrective (negative) feedback to learners.
poor (1) fair (2) average (3) good (4) excellent (5)

26. Explain why learners are correct or incorrect.
poor (1) fair (2) average (3) good (4) excellent (5)

27. Offer suggestions for improvement.
poor (1) fair (2) average (3) good (4) excellent (5)

28. Am well prepared for teaching sessions.
poor (1) fair (2) average (3) good (4) excellent (5)

29. Organize time to allow for teaching and care giving.
poor (1) fair (2) average (3) good (4) excellent (5)

30. Am stimulating.
poor (1) fair (2) average (3) good (4) excellent (5)

31. Foster an environment of respect in which learners feel comfortable participating.
poor (1) fair (2) average (3) good (4) excellent (5)

32. Coach learners on their clinical reasoning or technical skills.
poor (1) fair (2) average (3) good (4) excellent (5)

33. Encourage learners to ask questions.
poor (1) fair (2) average (3) good (4) excellent (5)

34. Incorporate research data of practice guidelines into teaching.
poor (1) fair (2) average (3) good (4) excellent (5)

35. Emphasize a problem-solving approach rather than solutions.
poor (1) fair (2) average (3) good (4) excellent (5)

36. Stimulate learners to learn independently.
poor (1) fair (2) average (3) good (4) excellent (5)

37. Clearly specify what is expected of learners to know and do during a rotation.
poor (1) fair (2) average (3) good (4) excellent (5)

38. Offer feedback.
poor (1) fair (2) average (3) good (4) excellent (5)

39. Am approachable for discussion.
poor (1) fair (2) average (3) good (4) excellent (5)

40. Treat team members in a professional manner.
poor (1) fair (2) average (3) good (4) excellent (5)

41. Demonstrate compassionate patient-centered care.
poor (1) fair (2) average (3) good (4) excellent (5)

42. Interact effectively with patients and their families.
poor (1) fair (2) average (3) good (4) excellent (5)

43. Answer questions clearly.
poor (1) fair (2) average (3) good (4) excellent (5)

44. Teach effective patient/family communication skills.
poor (1) fair (2) average (3) good (4) excellent (5)

45. Point out opportunities for health advocacy.
poor (1) fair (2) average (3) good (4) excellent (5)

46. Respond to individual patient health needs as part of patient care.
poor (1) fair (2) average (3) good (4) excellent (5)

A Survey of Kansas Physicians' Perceptions of Physician Assistant Education and Qualifications

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Abstract

Background. Effective physician-physician assistant (PA) teams improve patient access and satisfaction, and increase productivity and revenue while reducing physician workload. This survey assessed perceptions of Kansas primary care physicians regarding educational requirements and qualifications of PAs, professional and legal regulations, and the most important skills and competencies for PAs to possess. Understanding these perceptions may lead to improved communication and refined expectations of physician-physician assistant teams, thereby increasing their utilization and effectiveness.

Methods. A 20-question survey was emailed to all 1,551 primary care physicians registered with the Kansas Board of Healing Arts in 2012. Descriptive data were reported as frequencies; comparisons between groups were analyzed using Chi-square.

Results. The response rate was 9.2% (n = 143). Physicians were highly accurate regarding the program's generalist/primary care educational model and moderately accurate regarding the degree awarded, average pre-program grade point average, lock-step full-time curriculum, weeks of clinical rotations, recertification and continuing medical education hours, and Medicare PA fee schedule. Physicians had low accuracy regarding program and pharmacology credit hours, strict dismissal policy, pre-program healthcare experience, and co-signatory regulations. Physicians with PA supervisory experience had higher knowledge than those without ($p = 0.001$). Physicians most commonly selected history taking and performing physical exam as the most important skill (49%) and providing patient care that is patient-centered, efficient, and equitable as the most important competency (42%).

Conclusions. Physicians often underestimated the average PA applicant qualifications, program rigor and intensity, professional regulatory standards, and co-signatory requirements. Correcting misperceptions and improving understanding of which PA skills and competencies are most valued by physicians may optimize PAs as part of the healthcare team.

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Introduction

The increasing demand for primary care providers continues to steer the healthcare system toward a shared role between physicians and midlevel providers. The demand is rising largely due to population growth, the Affordable Care Act, and the aging population.[1] In addition to an increase in the number of insured patients, health plans are required now to cover certain preventive services without cost sharing to the patient, resulting in an increased demand for primary care providers.[2] Physician assistants (PAs) can meet this increasing need; however, it seems reasonable to assume that incorrect perception of their education, qualifications, and economic benefits may hinder their full utilization. Currently, over 180 accredited programs

exist in the United States and the number of practicing PAs has doubled in the last decade.[3,4]

PAs practice medicine with delegated autonomy as part of a healthcare team with the supervision of a licensed physician. The level of autonomy is delegated by the supervising physician as appropriate, and depends upon the PA's training, experience, and scope of practice. PAs are able to make healthcare decisions and carry out responsibilities without the need for input on these decisions unless the PA determines that physician input is necessary. It is much like the relationship between a physician and resident.[5] In a primary care setting, the services that a PA can provide are close to 90% of what the physician provides.[6] Effective physician-PA teams improve patient access and patient satisfaction,[7,8] enhance day-to-day coordination of care and cost-effectiveness,[9,10] and increase productivity and revenue while reducing physician workload.[5,11]

Like many areas of the nation, most rural and some urban areas of Kansas are designated as underserved due to a shortage of primary care providers. Expanding medical schools partially will alleviate these shortages. Increased utilization of midlevel providers is also important to meet the nation's growing healthcare needs. PA education strives to develop PAs that will have a shared role, along with the physician, in providing quality care to patients. If physicians understand what is included in a PAs education, this shared role may be optimized.

The Wichita State University (WSU) PA program has been the only PA program in the state of Kansas since 1972. It is similar to other programs across the nation in length, structure, rigor, applicant qualifications, and degree awarded.[3] The program's longevity, plus the fact that students learn from over 100 preceptors scattered through-out the state, would lead to an expectation of familiarity and knowledge among the Kansas medical community of what competencies a PA can offer a patient-centered medical team. However, since many physicians have limited experience in working on a team with a PA, this expectation may not prove true. If physicians do not realize, for example, that PAs complete six graduate hours of pharmacology and are licensed to prescribe medications, this misperception could serve as a barrier and hinder their functionality as a team.

The purpose of this survey was to assess the perceptions of Kansas primary care physicians regarding the educational requirements and qualifications of PAs, post-graduate professional and legal regulations, and the most important skills and competencies for PAs to possess. Understanding these perceptions may remove barriers to the optimization of PAs as part of the healthcare team, and in turn help to meet the increased demand for primary care providers.

Methods

A cross-sectional survey was emailed to 1,551 primary care physicians registered with the Kansas Board of Healing Arts. Primary care physicians were defined as family practice, pediatric, and internal medicine physicians. The survey was open from May 2012 through July 2012. Non-responders were emailed two additional times.

The 20-question, non-validated survey consisted of five demographic questions and nine knowledge assessment questions pertaining to WSU's qualifications of accepted applicants, degree awarded, program credit hours, pharmacology credit hours, program structure, educational model, and required clinical hours. Four questions asked about PA recertification, continuing

medical education (CME) requirements, and legal aspects of PA supervision. Two questions assessed beliefs regarding essential skills and competencies for a PA to possess.

Data analysis and IRB approval. Surveys with less than 50% of the questions completed were excluded from analysis. Data were analyzed using SPSS 19.0 (Chicago, IL). Descriptive data were reported as frequencies. For ease of discussion throughout the paper, level of knowledge is categorized as either high, moderate, or low accuracy. Questions for which the frequency of correct responses was greater than 75% were classified as "high accuracy", 40-75% as "moderate accuracy", and less than 40% as "low accuracy". Physicians would not be expected to be intimately familiar with every aspect of PA education or certification/legal aspects, thus the categories were defined somewhat arbitrarily using the natural data cut-off points and an assumption that "high accuracy" should be set at what would be considered an acceptable score on an academic or CME test.

Comparisons between groups were analyzed using Pearson's Chi-square with statistical significance set at $p < 0.05$. The study was approved by the WSU Institution Review Board and completion of the survey indicated consent.

Results

Of the 170 responses, 27 were incomplete resulting in a response rate of 9.2% (143/1,551). Of those, 67% were male, 79% had been practicing for over 10 years, and 58% were 50-years-old or older. Rural (population < 100,000) versus urban (population ≥ 100,000) demographics were 49% vs. 51%, respectively, and 65% stated they had supervised a PA.

Perceptions regarding the WSU PA program and typical program students. Physicians identified only one aspect of the WSU PA Program with high accuracy, the generalist/primary care medical model of education (84%). Four aspects were identified with moderate accuracy: the Master degree designation (64%), the average pre-program GPA (56%), the program's lock-step full-time curriculum (all students begin and end together; 51%), and the number of weeks of clinical rotations (49%). Four aspects were identified with low accuracy: number of program graduate credit hours (30%), number of pharmacology credit hours (26%), the program's policy that failed courses result in program dismissal (21%), and the average number of pre-program direct patient care experience hours (19%; Table 1).

Perceptions regarding post-graduate PA requirements. None of the questions were answered with high accuracy. Three aspects were identified with moderate accuracy: frequency of required recertification (60%), number of required CME hours annually (50%), and the Medicare PA fee schedule (43%). Only 37% were aware that supervising physicians in Kansas are no longer required to co-sign all patient encounter notes written by PAs (Table 2).

Comparisons between groups of physicians. There was no statistical difference between the mean knowledge score of rural versus urban physicians or between physicians under or over 50-years-old. As expected, physicians who had supervised a PA had a higher mean knowledge score than physicians who had not supervised a PA ($p = 0.001$). Physicians who had supervised a PA were more likely to identify correctly the educational model as generalist/primary care medical school model (91% vs 79%, $p = 0.001$), the lock-step full-time curriculum (60% vs 35%, $p = 0.006$), and the required annual CME hours (56% vs 37%, $p = 0.034$).

Table 1. Physicians' perceptions regarding current education of WSU PA students.

What degree is awarded to graduates of the WSU PA program?	**% (n)**
Bachelor	34% (47)
Master*	64% (88)
Doctorate	2% (2)
What is the total number of graduate credit hours obtained during the PA program?	
≤ 60 hours	40% (53)
61-80 hours	30% (40)
> 80 hours*	30% (39)
What is the number of graduate credit hours in pharmacology that PA students must complete in order to graduate from the WSU PA program?	
2-4 hours	25% (33)
6 hours*	26% (34)
8 hours	50% (65)
Which of the following do you think best describes the education model of the WSU PA program?	
Generalist/primary care medical model*	84% (111)
Generalist/primary care nursing model	8% (10)
Specialty oriented	9% (12)
Which statement regarding the structure of the PA curriculum is true?	
Lock-step, full-time curriculum*	51% (67)
Options for part-time or full-time	49% (64)
Which statement regarding the structure of the PA curriculum is true?	
Failed courses may be repeated	80% (104)
Failed courses result in program dismissal*	21% (27)
What is the total number of weeks of direct clinical experience PA students must complete while in the program?	
≤ 30 weeks	32% (42)
31-40 weeks	20% (26)
> 40 weeks*	49% (65)

*Indicates correct answer. Note: Percentages may not equal 100 due to rounding.

Perceptions regarding important skills and competencies for PAs. Figures 1 and 2 show what physicians selected as the most important skill and competency for PAs. Forty-nine percent selected history taking and performing physical exam as the most important skill for PAs. Patient care that is patient centered, efficient, and equitable was the leading competency selected (42%).

Discussion

Studies from other states[12,13] have shown mixed perceptions of physicians which include an uncertainty as to the level of care a PA can provide, such as whether a PA can take call or round at the hospital. Other uncertainties involved how a physician's workload might be affected if they took on the supervisory responsibility of a PA. These uncertainties seemed to stem from perceptions of state regulations as well as training of PAs. One study suggested that programs provide education to physicians on appropriate roles for PAs to maximize the effectiveness of both providers.[13] The authors stated that "If the use of

Table 2. Physicians' perceptions regarding PA post-graduate requirements.

How many CME hours are required annually of Physician Assistants?	% (n)
30 CME hours	34% (45)
40 CME hours	17% (22)
50 CME hours*	50% (66)
How often are PAs required to re-take national certifying examinations?	
Never	12% (16)
Every 3 years	15% (20)
Every 6 years*†	60% (81)
Every 9 years	13% (17)
Is it a legal requirement for supervising physicians in Kansas to co-sign all patient-encounter notes written by PAs?	
Yes	53% (73)
No*	37% (51)
Unsure	11% (15)

*Indicates correct answer. †National certifying examinations taken for re-certification began new requirements and schedule in 2014. PAs will transition to a new 10-year cycle over the next five years. Note: Percentages may not equal 100 due to rounding.

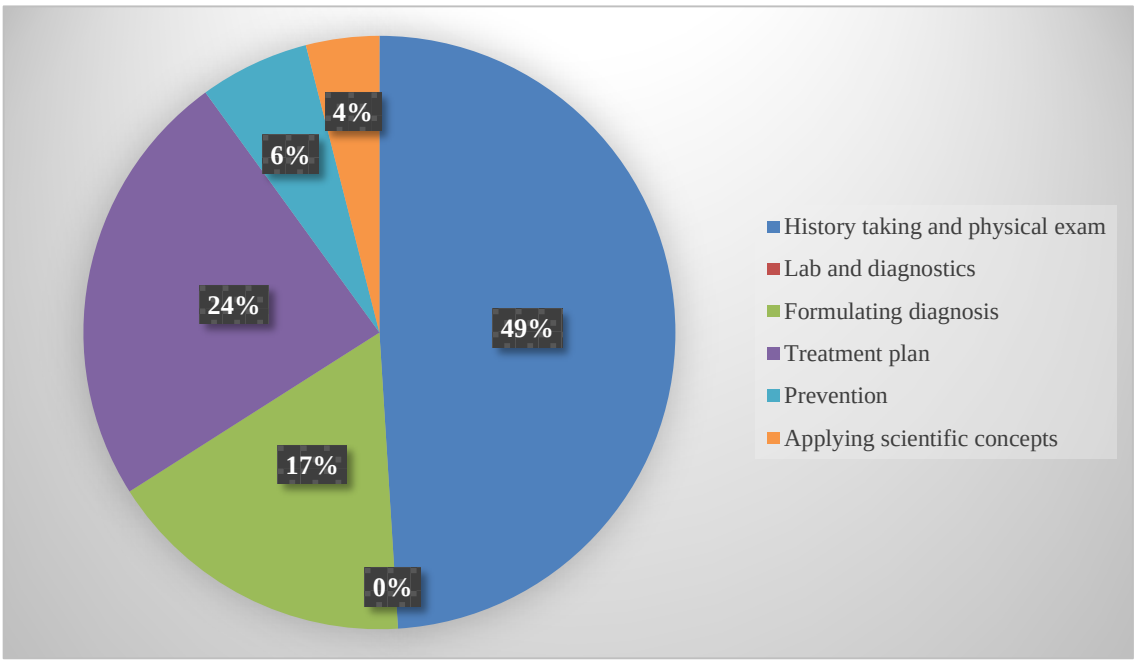

Figure 1. What do you as a physician believe is the most important skill for a PA?

non-physician providers is to be optimized … awareness and acceptance of their capabilities by rural family physicians is essential."[13] This survey evaluated perceptions of Kansas physicians regarding Kansas physician assistants and identified some misperceptions. The intent of this article was to provide some clarification regarding these misperceptions, which should allow a physician-PA team to work more freely within their appropriate boundaries.

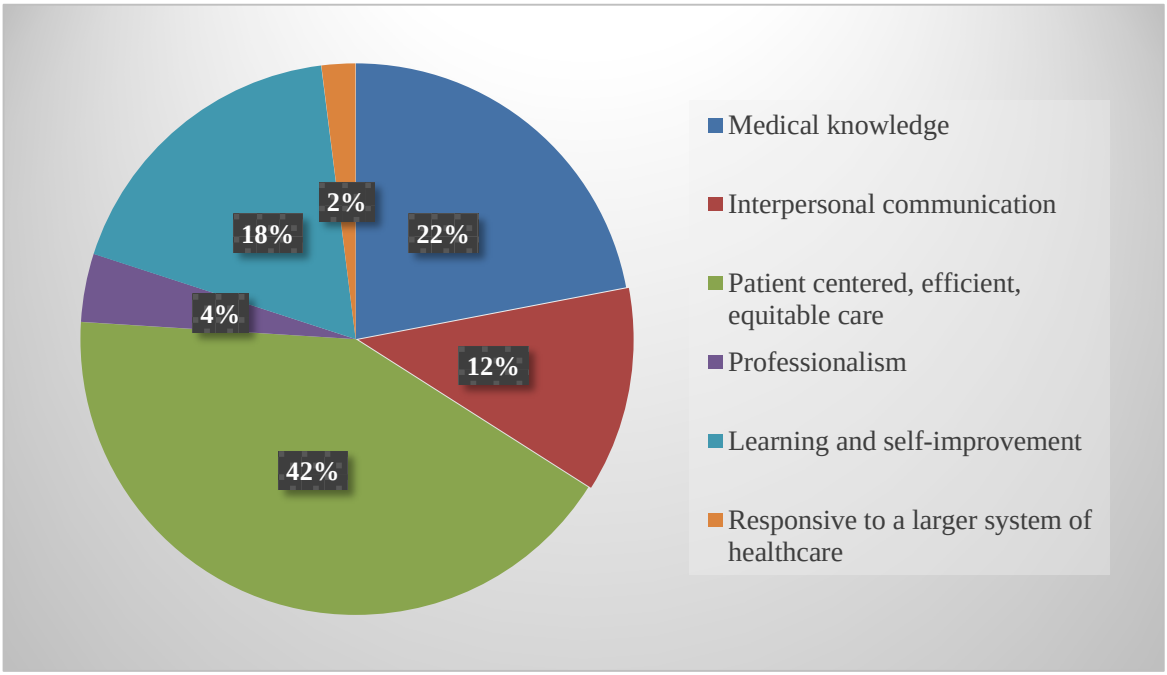

Figure 2. What do you as a physician believe is the most important competency for a PA?

Kansas physicians tended to underestimate the average PA applicant qualifications and program rigor and intensity. A better understanding of the intellectual potential, economic value, and patient care experience that a PA, even a new graduate, can bring to the healthcare team may increase their utilization. Although direct patient care experience is not a requirement for acceptance into the WSU program, it is strongly recommended.

Physicians tended to underestimate the fact that accepted applicants have completed an average of over 2,000 hours of direct patient care. Only 30% of respondents knew that over 80 graduate credit hours (currently 83 hours) are necessary to complete the WSU program. Physicians also tended to be unfamiliar with other aspects of the program's rigor and high academic expectations including its lock-step, full-time nature, that a single failed course results in program dismissal, and that in most units of study, unacceptable academic/clinical performance is defined as less than 72%. After graduation, PAs are held to high professional regulatory standards regarding mandatory national recertification every 10 years and 50 CME hours annually, often exceeding post-graduate requirements of other allied healthcare professionals and midlevel providers.

The only question to which physicians overestimated the rigor of the program was related to the number of hours of pharmacology. The WSU PA program requires six credit hours of pharmacology which was answered correctly by 26% of physicians, yet 49% believed the program required eight hours of pharmacology. The national average for PA programs is around five credit hours.[14]

Kansas regulations state that, during the first 90 days of employment, supervising physicians are required to review and authenticate all medical records of patients cared for by the PA. This requirement allows the physician time to assess the PA's skills and competency adequately within the practice setting and develop an informed

decision regarding the appropriate level of delegated autonomy within which the PA will practice. After the first 90 days, supervising physicians are required to complete a periodic review and evaluation of the PA's performance.[15] Over 63% of physicians were unaware of these legal requirements regarding co-signatures. Even though physicians with experience supervising PAs had higher overall knowledge scores than physicians who had not, there was no statistically significant difference between the groups regarding their understanding of this regulation. The incorrect assumption that all medical notes documented by a PA must be co-signed by a physician could make some physicians hesitant to form a physician-PA team.

Understanding what is valued most by physicians can help PAs form more effective teams with their supervising physicians. In this set of questions, respondents were allowed to select the one skill and one competency they felt was most important. The six skills on the survey were the six categories of questions found on the PA national certifying exams. For PA educators, understanding that history taking and performing physical exams ranked highest as the most important skill for a PA to possess, can lead to an appropriate emphasis of this skill in the WSU curriculum, allowing students to be well prepared for their role in the health-care team.

The six competencies on the survey were the same six areas in which students are evaluated by their clinical preceptors during the second year of the WSU PA program. The most important competency was efficient, equitable, patient-centered care, with few respondents choosing professionalism or a responsiveness to the larger health-care system. Again, this understanding can guide PA educators in their efforts to prepare students for team-based care and enhanced coordination between the physician and the PA.

Study limitations. Due to the low response rate, survey results must be interpreted with caution. The survey only evaluated primary care physicians and cannot be generalized to physicians in specialty practices. Although most questions regarding the WSU PA Program are reflective of PA programs across the nation, several were specific to the WSU PA Program, therefore, may not be generalizable to other programs. It is, however, a first step in evaluating the perceptions of Kansas physicians regarding PA education and qualifications, post-graduate professional and legal regulations, and important skills and competencies for PAs to possess.

Conclusions

Kansas physicians often underestimated the average PA applicant qualifications, program rigor and intensity, and post-graduate professional regulatory standards. Responses also indicated a misunderstanding of new co-signatory requirements. This underestimation may cause the physician to limit the care a PA can provide in prescribing medications unnecessarily, for example, taking call or rounding in the hospital. The misunderstanding of co-signatory requirements may cause physicians to feel unnecessarily burdened by their supervisory role.

Correcting misperceptions may optimize PAs as part of the healthcare team and help to meet the increased demand for primary care providers. The findings from this survey will be utilized by the WSU Physician Assistant Program to educate their students, their physician contacts, and health care administrators as to how PAs can be utilized appropriately to maximize the

effectiveness of a health care team and provide quality patient outcomes.

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Keywords: physician assistants, education, primary care access, primary care health, primary care physicians, Kansas

Probable Famotidine-Induced Thrombocytopenia

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Introduction

Thrombocytopenia is defined as a decrease in platelet count to less than 150 $x10^9$/L.[1] It can result in increased length of hospital stay and risk of death. Drug-induced thrombocytopenia (DITP) can result from a decrease in platelet production through a direct toxic effect on the thrombopoietic mechanisms in the bone marrow or an increase in platelet destruction through immune-mediated mechanisms.[2] In DITP, the platelet count typically falls from 50 to 80% of the normal value on exposure to the offending drug and returns to normal after drug withdrawal.[3]

Thrombocytopenia is a rare adverse effect of famotidine therapy.[4-7] Few cases of famotidine-induced thrombocytopenia have been reported. Case reports have suggested two potential mechanisms of H2 antagonist-induced thrombocytopenia. The first is bone marrow suppression secondary to inhibition of DNA synthesis. The second mechanism occurs rarely and is the development of platelet antibodies during H2-antagonist administration.[8] The diagnosis of this critical condition is based on clinical suspicion and is a diagnosis of exclusion.

We report a case of a male presenting with nausea, vomiting, and abdominal pain diagnosed with small bowel obstruction.

Case Report

A 56-year-old Caucasian male weighing 35 kg (77 pounds) with a history of human immunodeficiency virus (HIV), hypothyroidism, chronic obstructive pulmonary disease, chronic kidney disease and hypertension was hospitalized due to vomiting and abdominal pain. His vital signs on admission were within normal limits. He denied melena, hematochezia, or hematemesis. His home medications were sodium bicarbonate, furosemide, alendronate, L-thyroxine, emtricitabine-tenofovir, potassium chloride, lopinavir/ritonavir, and tiotropium bromide. All were taken orally and continued during hospitalization. Metronidazole and heparin were added. Routine admission labs revealed a white blood count of 4900 cells/mm^3 and platelet count of 275 x 10^9 platelets/L. Hemoglobin was 13.8 g/dL. An abdominal x-ray showed multiple air-fluid levels and he was diagnosed with small bowel obstruction.

On day three in the hospital, total parenteral nutrition (TPN) containing famotidine was initiated. The dose of famotidine was 40 mg daily. On day four, a complete blood count revealed a platelet count of 169 x 10^9 platelets/L. On day five, the platelet count dropped to 157 x 10^9 platelets/L. The patient was on heparin and heparin-induced thrombocytopenia (HIT) was suspected. After stopping all forms of heparin on day five, his platelet count continued to drop, a trend which continued on days six, seven, and eight: 119 × 10^9 platelets/L, 100 × 10^9 platelets/L, 80 × 10^9 platelets/L, respectively (Figure 1).

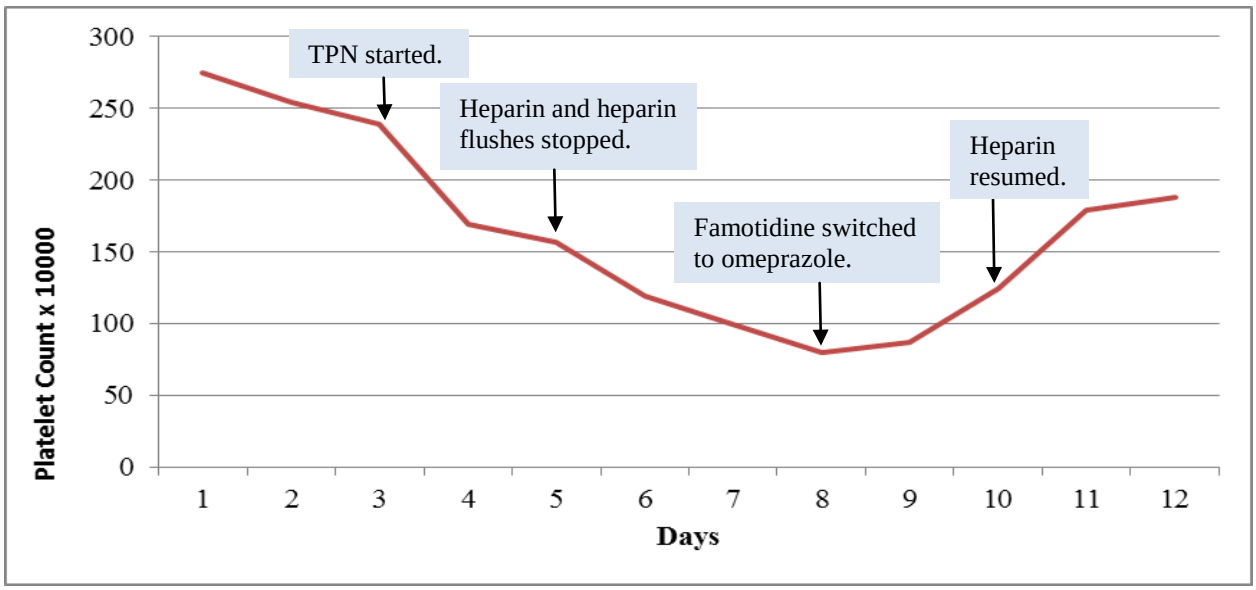

Figure 1. Platelet count changes over twelve hospital days.

Work-up for thrombocytopenia included a blood smear which showed platelets to be of normal size and no schistocytes. PT/INR, TSH, vitamin B12, serum and RBC folate levels, transaminases, haptoglobin, fibrinogen, and partial thromboplastin time (PTT) were within normal ranges. Further workup revealed a negative ANA and minimally elevated d-dimer (3.3; normal, 0.0-0.5). Hepatitis C was negative and HIV viral load was stable with no thrombocytopenia since 2009. The patient's heparin-induced antibody result by enzyme-linked immuno-sorbent assay (ELISA) was negative.

After reviewing his medications, famotidine was stopped on the eighth day. A significant improvement in the platelet count was noticed. Heparin was thought to be safe to reintroduce and the platelet count continued to improve. The patient had an uneventful recovery and was discharged four days later with normal platelet counts.

Discussion

Our patient was diagnosed with thrombocytopenia while hospitalized. The differential diagnosis included thrombotic thrombocytopenic purpura (TTP), disseminated intravascular coagulation (DIC), liver disease, hepatitis C infection, heparin-induced thrombocytopenia (HIT), thyroid disease, autoimmune disease, and DITP. TTP was ruled out because there was no evidence of microangiopathic hemolytic anemia, evidenced by the absence of schistocytes in the peripheral blood smear and normal lactate dehydrogenase and bilirubin levels. There was no evidence of disseminated intravascular coagulation, as fibrinogen and activated PTT were within normal limits. Liver function test values were normal and hepatitis C antibody was negative. TSH was normal. HIT was ruled out after negative HIT antibody and platelet counts continued dropping after stopping heparin. Re-challenge with heparin was done after the platelet count returned to normal and continued to rise.

Since other causes of thrombocytopenia were ruled out, it was possible that the patient had DITP. DITP often is suspected in patients with acute thrombocytopenia unexplained by other causes, but documenting that the drug is the cause of thrombocytopenia can be challenging.

Several drugs have been implicated in the cause of acute thrombocytopenia, such as quinine, quinidine, trimethoprim/ sulfa-methoxazole and vancomycin.[9,10] The estimated incidence of DITP is around 1-2 per 100,000 per year.[11,12] There are three possible mechanisms by which a drug causes a decrease in platelet count: failure of production by bone marrow, immune destruction, and platelet aggregation in circulating blood. Antibodies that bind to normal platelets in the presence of a drug have been implicated for drugs like cinchona, quinine, and sulfa.[13,14] The median time for daily drug exposure before thrombocytopenia is six days (range 1 to 10),[15] but it may appear within 12 hours of drug intake in a sensitized individual.[16,17] Typically, the platelet count falls to 80% of the normal and thrombocytopenia may be associated with neutropenia and anemia.

Famotidine was the most likely cause of our patient's thrombocytopenia. After the patient was switched to omeprazole, his platelet count improved within 24 hours, reached the normal range on the third day off famotidine and remained in the normal range thereafter. There is an association between the elimination half-life of a drug and the time to platelet recovery; recovery takes longer with drugs that have longer elimination half-lives.[1] The average elimination half-life of famotidine is three hours. With four half-lives (i.e., 12 hours) approximately 94% of the drug is eliminated from the body. Therefore, it was reasonable to expect some improvement in platelet count within 12-24 hours after stopping famotidine.

In our case, there was a temporal relationship between the initiation of famotidine and the onset of thrombo-cytopenia, and reasonable exclusion of other potential causes, making famotidine the probable cause. According to the Naranjo adverse drug reaction probability scale,[18] the probability that famotidine caused thrombocytopenia in our patient is probable. The famotidine product label includes thrombocytopenia as a rare hematologic side effect. Re-exposure to famotidine was not done in our case for patient safety. Also, serum was not sent to demonstrate drug-dependent platelet reactive antibodies in vitro. This rare drug reaction due to famotidine is more common in critically ill neurosurgical and trauma patients.[19,20] Hence, precaution should be taken to put these patients on other medications for ulcer prophylaxis.

Conclusion

In cases of severe thrombocytopenia unexplained by other causes, a pharmacological cause must be suspected, particularly famotidine. Other alternate drug regimens for prophylaxis of stress ulcer should be considered, especially in critically ill patients.

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Keywords: thrombocytopenia, famotidine, drug-induced abnormality

Thromboembolic Disaster after Atrial Ablation: Use of Novel Anticoagulation

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Introduction

Atrial fibrillation (AF) may result in thromboembolism often from a thrombus in the left atrium or atrial appendage accounting for nearly 15% of all strokes in the US,[1] with an annual incidence of stroke of up to 6% or higher in some patients.[2] Atrial fibrillation ablation, if successful over the long-term, may reduce the risk of future stroke. New anticoagulants, such as dabigatran, rivaroxaban, and apixaban, have been shown to be superior to warfarin to reduce the risk of stroke in non-valvular atrial fibrillation **(**NVAF), but no solid data are available to show if they are appropriate to utilize as an alternative to warfarin in patients undergoing catheter ablation procedures. Our case illustrated that such therapy may not be efficient.

Case Report

A fifty-year-old male underwent catheter ablation for symptomatic paroxysmal atrial fibrillation. He is known to have dyslipidemia, hypertension, and coronary artery disease. He was diagnosed with paroxysmal NVAF and despite the use of several antiarrhythmic mediations, including dronedarone and propafenone, normal sinus rhythm could not be maintained. Hence, he underwent atrial ablation with a pre-procedural transesophageal echocardiogram that did not reveal any intracardiac thrombus. Prior to the ablation procedure, he had been anticoagulated with warfarin for more than four weeks with an international normalized ratio (INR) documented above two. He was discharged on warfarin and sotalol with a one-week follow-up.

At the follow-up visit, the patient's post-ablation anticoagulation regimen was changed from warfarin to apixaban per the patient's request not to take warfarin anymore. Approximately two weeks later, the patient presented to the emergency department due to the sudden onset of weakness and dizziness. He also had a fever of more than 101^{o}F and cough.

A chest x-ray revealed a left lower lobe infiltrate. His electrocardiogram showed normal sinus rhythm. Other laboratory values were unremarkable except for leukocytosis and elevated troponin at 7.91 ng/ml (normal range less than 0.05 ng/ml). A CT scan of the brain showed a small subarachnoid hemorrhage in the right upper precentral sulcus. A transthoracic echo-cardiogram showed a 3 cm mobile thrombus in the left atrium.

His initial blood culture results were suggestive of gram positive cocci in a

streptococcal arrangement. Vancomycin and cefepime were started. Later, the final culture results were positive for streptococcus mitis and oralis.

A transesophageal echo on the following day showed an ejection fraction of 30% and a 3.7 cm long mobile thrombus attached to the roof of the left atrium (Figure 1). He also had recurrent episodes of atrial fibrillation during his hospital course.

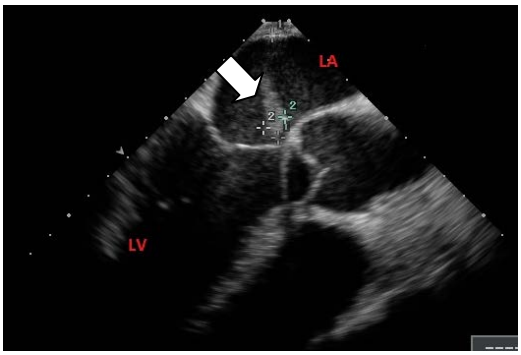

Figure 1. A transesophageal echo showed a 3.7 cm long mobile thrombus attached to the roof of the left atrium (arrow), LA: left atrium, LV: left ventricle.

Unfortunately, his neurological status deteriorated and he became unresponsive with a fixed and dilated left pupil. A repeat CT of the brain revealed thromboembolic lesion of disastrous proportions, "every area of the brain was involved with too many new lesions to report" (Figure 2). The CT scan also was significant for air bubbles over the top of the left parietal lobe. The patient was provided comfort care and subsequently expired immediately after extubation.

Discussion

Several complications are associated with catheter ablation in the left atrium. Our patient developed a post-procedure thrombus in the left atrium which we strongly feel became infected with secondary septic thromboembolism. This likely caused a mycotic aneurysm and hence the initial

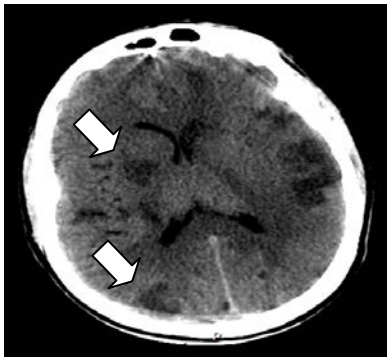

Figure 2. A CT of the head revealed multiple thromboembolic lesions (arrows).

small subarachnoid hemorrhage was seen on the first CT scan of the brain. There also was fistula, a known but rare complication of ablation. There is also the suggestion of a developing atrioesophageal fistula, a known but rare complication of ablation. While this diagnosis could not be confirmed, as the patient was unstable to have any additional tests, the blood cultures showing streptococcus viridans and the air seen over the left parietal lobe on the final CT scan strongly supported our suspicion.[3,4]

NVAF patients are at increased short-term risk of thromboembolism after their ablation.[5] Several factors are implicated: the trans-septal sheath placement can precipitate thrombus formation on the catheter or sheath during the procedure or in the left atrial appendage,[6,7] delivery of radiofrequency energy during the ablation disrupts the endocardium activating the clotting cascade,[8] "char" (hard coagulum) from tissue heating and denaturation and aggregation of plasma proteins[9] may form and systemically embolize,[6] and the atrial tissue may be stunned post-procedure leading to impairment of normal contraction.[10]

To minimize this risk, anticoagulation is initiated as part of the ablation procedure. Current practice involves pre-ablation anticoagulation with warfarin, then anti-coagulation with heparin during the procedure without discontinuation of

warfarin, followed by post-procedural anticoagulation, usually with warfarin for three to six months.[11,12]

Our patient, anticoagulated with apixaban, developed a thrombus nearly four centimeters in length on the roof of the left atrium that resulted in fatal neurologic complications. Apixaban is an oral direct factor Xa inhibitor. The initial studies for apixaban have been promising, both in the context of NVAF as well as anticoagulation for cardioversion, with none of the over 300 patients on apixaban undergoing cardio-version in the ARISTOTLE trial having stroke over the next 30 days.[13]

Winkle et al.[14] demonstrated dabigatran as safe and well tolerated after AF ablation. On the other hand, a larger multicenter study[15] reported that peri-procedural dabigatran use significantly increases the risk of complications compared with uninterrupted warfarin therapy. Due to the novelty of the oral anticoagulants, the studies are limited and there are likely many factors in the equation not yet recognized or explored. Our case is the first reported case that shows using apixaban following ablation may not be appropriate.

Conclusion

Despite the recent studies that showed apixaban to be a safe and effective anticoagulant in the prevention of stroke in a patient with NVAF compared to warfarin, physicians should be careful in extrapolating these data to a patient undergoing NVAF ablation. One can only speculate on how the use of apixaban, instead of warfarin, affected our patient's outcome. Our case illustrated the need for caution and further studies on the use of the new factor Xa inhibitors in such patient populations.

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*Keywords***:** thromboembolism, atrial fibrillation, ablation techniques, apixaban

Hydroxycut Induced Hepatitis and Pancreatitis: Weight Loss at a High Cost

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Introduction

Obesity continues to be a major health care problem in the US and adults spend over $30 billion yearly in weight loss products and services.[1] The use of dietary supplements (DS), including herbal constituents such as Hydroxycut, has become a major health trend in affluent societies. Consumption of DS in the USA has doubled between 1999 and 2004 with 18.9% of adults admitting their use.[1] DS are expected to meet the standards outlined in the Dietary Supplement and Health Education Act of 1994 which allows distribution without prior approval of their efficacy and safety by the Food and Drug Administration (FDA).[2] This simplified licensing practice does not ensure efficacy and safety in the same strict way as with the approval of conventional medications and treatments. Therefore, risks of these drugs causing potentially life threatening side effects may go unreported.

Case Report

A 28-year-old male with no known medical problems presented with a two-day history of abdominal pain, nausea, and vomiting. The pain was made worse with meals. He denied fever, chills, diarrhea, and constipation. He did not have any risk factors for hepatitis infection and denied any recent travel, alcoholism, or drug overdose.

The initial exam essentially was normal, except for epigastric and right upper quadrant tenderness. Initial pertinent laboratory showed a white blood count of $8.1x10^3$/L, an aspartate aminotransferase (AST) of 567 IU/L, alanine amino-transferase (ALT) of 281 IU/L, alkaline phosphatase of 586 IU/L, international normalized ratio of 1, total bilirubin of 5.4 mg/dL, conjugated bilirubin of 4.4 mg/dL, lipase of 103/µL, C-reactive protein of 48 mg, and acetaminophen was less than 2 mcg/ml. Hepatitis B surface antigen, hepatitis C antibody, and hepatitis A IgM were negative.

The patient improved with conservative management and was discharged. However, he presented three days later with similar symptoms. Laboratory work was consistent with hepatitis (ALT of 380 IU/L and AST of 283 IU/L) and pancreatitis with lipase of 722 U/L. His right upper quadrant ultrasound showed no evidence of cholelithiasis. Further workup was negative for blood alcohol level, varicella zoster virus, herpes simplex virus, autoimmune hepatitis, hemochromatosis, and Wilson's disease.

Magnetic resonance cholangiopancreatography did not show any filling defects in the bile ducts. Liver biopsy showed steatosis, necrosis, and eosinophilic infiltrates (Figures 1 and 2). These findings were non-specific, but suggestive of drug-induced liver injury. On further inquiry, the patient revealed taking Hydroxycut over the preceding three weeks. He was advised to stop taking Hydroxycut and his AST and ALT normalized in 6 to 8 weeks.

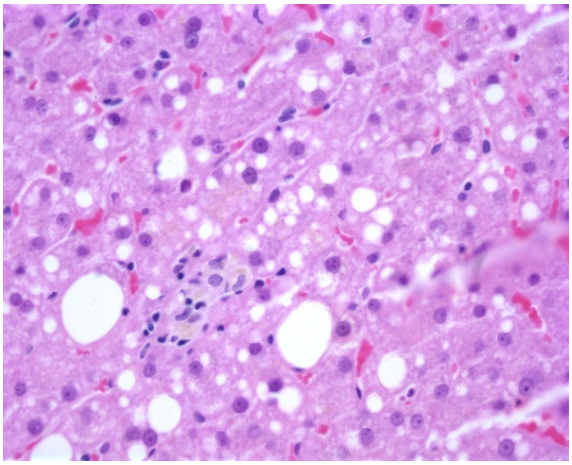

Figure 1. Liver biopsy showing steatosis.

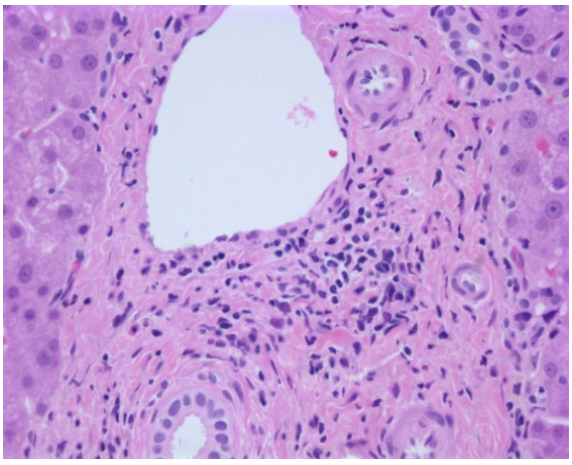

Figure 2. Liver biopsy showing intact portal triad and eosinophilic infiltration.

Discussion

Hydroxycut is an herbal dietary supplement used for weight loss. Hepatotoxicity is a well-established side effect of Hydroxycut. The exact incidence of Hydroxycut induced hepatitis is unknown with over 23 cases reported in literature to our knowledge.[3-4] Other rare but recognized side effects of Hydroxycut, such as atrial fibrillation, also have been reported in the literature.[5] However, to our knowledge, this case is the first reported patient with both hepatitis and pancreatitis induced by Hydroxycut.

Our patient's biopsy showed mixed hepatocellular and cholestatic liver injury. However, liver injury is nonspecific and can be of either pattern.[6] The temporal relationship of exposure to the offending agent and resolution of symptoms is the most reliable marker for the diagnosis of drug-induced hepatitis. As in most of the reported cases with Hydroxycut, the liver function tests improve after drug cessation. Our patient did not have evidence of gallstones or positive blood alcohol level on admission and was not taking any medications known to cause acute pancreatitis other than Hydroxycut.[7-10] Our case was unique in that the patient presented with both hepatitis and pancreatitis.

Due to the increasing use of alternative medicines, it is important that they are safe. We encourage further investigation of the ingredients of Hydroxycut and similar weight loss supplements to avoid adverse outcomes and establish a safety profile.

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Keywords: hydroxycut, hepatitis, pancreatitis, weight loss drugs

Single Agent Therapy with Bevacizumab for the Treatment of Atypical Choroid Plexus Tumor

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Introduction

Choroid plexus tumors are rare tumors of the brain. They account for 0.3-0.6% of all brain tumors.[1] Fifty percent of these tumors occur in the lateral ventricle, 40% in the fourth ventricle, 5% in the third ventricle, and 5% are multifocal.[1,2] Grading of choroid plexus tumors is based on World Health Organization (WHO) classification.[3] Choroid plexus papilloma is grade I, atypical choroid plexus papilloma is grade II, and choroid plexus carcinoma is grade III.

For both choroid plexus papilloma and choroid plexus carcinoma, age at presentation correlates with the location of the tumor.[4] Lateral ventricle tumors are more common in children less than 10 years old, while fourth ventricle tumors are distributed evenly up to 50 years of age. Choroid plexus papilloma is well-differentiated and usually has a benign course and carries a good prognosis after complete resection. Occasionally, there can be a malignant transformation to a choroid plexus carcinoma at recurrence. These are aggressive tumors characterized by brisk mitotic activity, increased cellularity, nuclear pleomorphism, focal necrosis, loss of papillary architecture, and invasion of neural tissue. Presenting symptoms often are related to cerebrospinal fluid obstruction, such as headache, diplopia, and ataxia.

We present a rare case of atypical choroid plexus papilloma in an adult who was treated with single agent chemotherapy.

Case Report

A 52-year-old woman was referred for chemotherapy of recurrent atypical choroid plexus papilloma. She initially was diagnosed with choroid plexus papilloma and underwent resection. The tumor recurred on multiple occasions and the patient was treated with surgery (three resections) and stereotactic radiosurgery. The last surgery was thirteen years post diagnosis. The pathology result was positive for atypical choroid plexus papilloma (Figure 1). Her last MRI (Figure 2) showed the recurrence of the tumor in the pons area. Due to the location of the tumor, she was not recommended for surgery and referred to medical oncology for systemic chemo-therapy. At relapse, the patient complained of headaches and neuropathic pain in the right neck when rotated. She also had right facial nerve palsy with numbness secondary to previous surgeries.

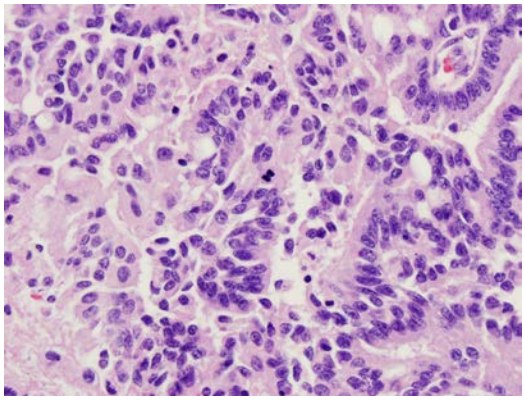

Figure 1. Atypical Choroid Plexus Papilloma shows nuclear pleomorphism (with increased mitotic activity).

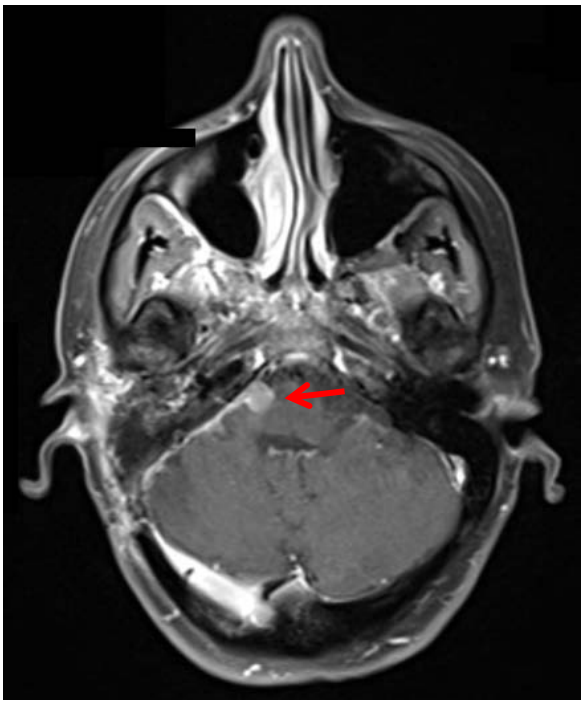

Figure 2. T1 contrast-enhanced image shows a right cerebellopontine angle papilloma (red arrow).

Bevacizumab was started as a single agent therapy, as per recommended dosing and schedule used to treat other brain tumors (e.g., glioblastoma multiforme). On a 28 day cycle, bevacizumab was administered on day one and day fifteen. The only appreciable adverse event the patient developed was grade 2 hypertension managed with oral anti-hypertensives. MRI was repeated after completion of two cycles of bevacizumab and showed stable disease.

During treatment, the patient had surgery for her right facial nerve palsy. Bevacizumab was held after four and one-half cycles (almost two months before surgery) and was restarted 45 days after surgery. MRI after surgery showed stable disease. After eight cycles of bevacizumab, a follow-up MRI showed a minimally decreased enhancing lesion involving the right cerebellopontine angle cistern near the inferior pons. The patient was maintained on single agent bevacizumab without evidence of progression.

Discussion

Choroid plexus is the neuroepithelial tissue that produces cerebrospinal fluid. Choroid plexus tumors are intraventricular, papillary neoplasms derived from choroid plexus epithelium and are supported by well vascularized connective tissue.[5,6] In 2007, an intermediate entity called atypical choroid plexus papilloma was introduced in the WHO classification of tumors of the central nervous system.[7]

Atypical choroid plexus papilloma is distinguished from choroid plexus papilloma by increased mitotic activity of two or more mitoses per ten randomly selected high power fields.[8] Up to two of the following features may be present: increased cellularity, nuclear pleomorphism, blurring papillary pattern (solid growth), and areas of necrosis.[8] Clinical features and treatment outcomes of atypical choroid plexus papilloma have not been well established in the literature. Bevacizumab acts by binding and inhibiting vascular endothelial growth factor and decreasing microvascular growth and metastatic progression.[9]

Bevacizumab's mechanism of action and the vascular nature of this tumor need further evaluation. Given the rarity of this cancer, this case report illustrated one possible therapeutic strategy if resection and/or radiation are no longer options.

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*Keywords***:** bevacizumab, choroid plexus tumor, antineoplastic agents

Septic Arthritis due to *Neisseria meningitidis* in the Absence of Meningitis

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Introduction

Septic arthritis is an inflammation of a joint space usually secondary to a bacterial infection.[1] The route of infection is usually hematogenous, however, it may occur through direct inoculation from an adjacent site of infected tissue or during trauma. *Staphylococcus aureus* is the most common organism, affecting 44% of patients, followed by streptococcal and other staphylococcal species. *E. coli* and *Pseudomonas* also have been described, but are more common in neonates and in people with immunodeficiency. *N. gonorrhea* presents mainly in young adults.[2]

Meningococcal arthritis associated with meningitis has been reported since the 19th century.[3] Primary meningococcal arthritis is rare with only 1% being isolated from synovial fluid. Most cases usually involve the knee.[4] This case is a female patient who presented with right elbow arthritis with *N. meningitides* as the infecting pathogen.

Case Report

A 46-year-old female patient presented to the emergency department with a 24-hour onset of painful swelling of the right elbow with decreased range of motion. She denied any recent febrile illness, headache, or sick contacts. She had no history of trauma to the elbow. In the emergency department, she had low grade fever of 100.6°F. Physical examination of her right upper extremity revealed a minimal effusion, with swelling and warmth around the elbow. No ecchymosis or abrasion was noted. Her lateral epicondyle was tender to palpation. Neurological exam was intact and no meningismus was noted. Her skin examination was normal with no notable rash.

A complete blood count showed leukocytosis at 17,900 with 74% neutrophils. She had an elevated sedimentation rate (56 mm/hr) and C reactive protein (7.1 mg/L). Plain film of the right elbow revealed a small anterior fat pad sign indicative of effusion but no fracture or dislocation (Figure 1). An arthrocentesis revealed 96,000 nucleated cells and 50,000 red blood cells, with 60% neutrophils and 20% bands but no crystals. Gram stain revealed innumerable white blood cells and few gram negative diplococci.

She underwent an arthrotomy with irrigation and debridement of the right elbow. Intraoperative cultures as well as synovial fluid cultures grew *N. meningitides*. Blood cultures taken prior to antibiotic administration remained negative. Human immunodeficiency virus antibody was negative and complement levels were normal. The patient received a four week course of ceftriaxone one gram daily. She had complete resolution and full range of motion of her elbow.

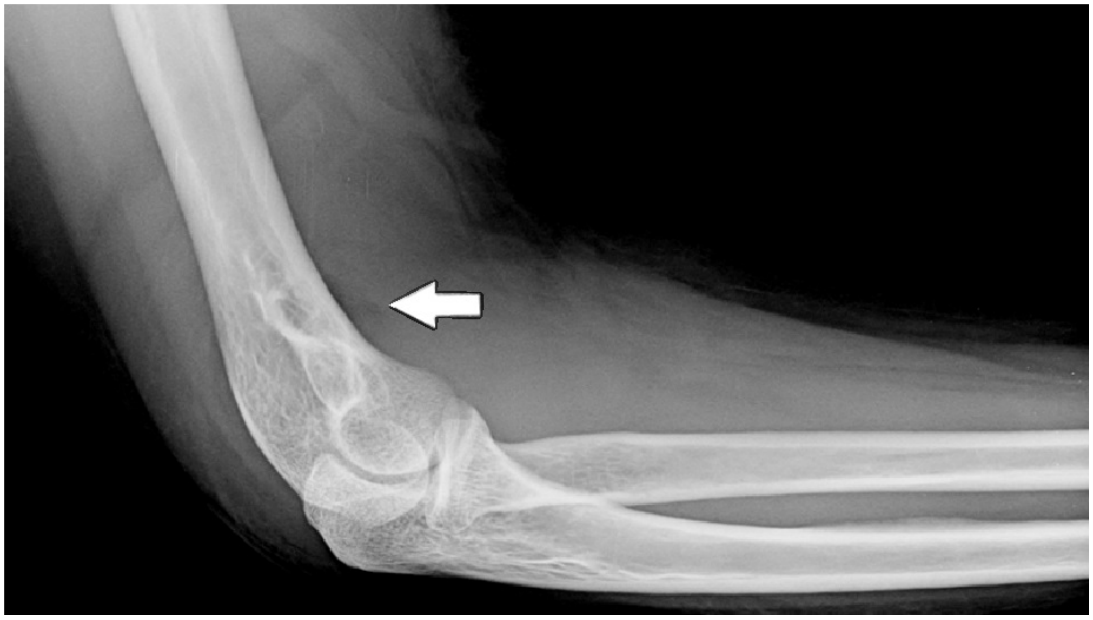

Figure 1. A small anterior fat pad sign is indicative of effusion but no fracture or dislocation.

Discussion

Incidence of meningococcal disease is low, ranging from 2.5 to 6 per 100,000 in developing countries.[5] *N. meningitides* most commonly presents as meningitis in 50% of patients, followed by meningococcemia. Less common presentations include pneumonia, epiglottitis, otitis media, conjunctivitis, urethritis, pericarditis, and arthritis.[6]

Meningococcal arthritis occurs via direct inoculation to the synovium or a hypersensitivity reaction where an antigen antibody reaction results in a sterile effusion.[5] It can present in three clinical scenarios. One presentation would be a complication of acute meningitis. It can lead to either a septic or aseptic arthritis, secondary to deposition of immune complexes. It also could be associated with chronic meningococcemia, a rare entity that presents with rash and fever, and leads to migratory arthritis or arthralgias. Primary meningococcal arthritis is a joint infection without any evidence of meningitis or meningococcemia.[4-6]

A review of literature revealed 46 cases of patients with meningococcal joint infection without meningeal signs. Of those, only 19 patients had an isolated joint infection with 10 cases being children less than four years old. In addition, three other patients had an associated immune suppressive state: lupus, multiple myeloma, and leukemia. The remaining seven were healthy men with ages ranging from 50 to 60.[3]

A multilingual review of literature revealed seven cases of females with an isolated joint infection (Table 1). They were young with a median age of 19 and the knee was the most commonly infected joint.[2, 7-11] Those cases easily can be misdiagnosed as disseminated *gonococcus* prior to final culture results. *Neisseria gonorrhea* is the most common cause of septic arthritis in sexually active young adults, with four times preponderance in females.[8] It is difficult to separate the two *Neisseria* species on microscopy as both are morphologically indistinguishable.[11] Differentiating the two species is important, especially in regards to

Table 1. Multilingual review of literature resulting in seven cases of females with isolated joint infection.

Author/Year publication	Age	Joint	Treatment	Outcome
Giamarellos-Bourboulis et al.[7]	16	Knee	IV Penicillin G	Resolution
Bonsell[8]	18	Knee	IV Ceftriaxone	Resolution
Cartolano et al.[9]	19	Knee	IV Ceftriaxone, IV Amoxicillin, PO Ofloxacin	Resolution
Christiansen[10]	19	Hip	IV Penicillin G	Resolution
Harwood et al.[2]	29	Knee	IV Ceftriaxone	Resolution
Garner et al.[1]	75	Shoulder	IV Ceftriaxone	Resolution
Joyce et al.[11]	19	Knee	IV Benzylpenicillin	Resolution

antimicrobial prophylaxis of close contacts; airborne for *meningococcus* and sexual for *gonococcus*.

The knee joint is affected most commonly, followed by the ankle.[3,5] The patient described in our report was immunocompetent and presented with elbow involvement which had not been described previously. The yield of culture specimens is highest from the synovial fluid (70 to 90%), followed by blood and pharynx. These numbers highlight the importance of performing an arthrocentesis to establish a diagnosis, preferably prior to antibiotic administration.[5]

Treatment is challenging due to lack of evidence based literature. Intravenous penicillin or cephalosporins have been used with good outcomes. The duration of treatment varied from 7 to 42 days.[8] Surgical debridement should be considered as part of the treatment plan due to the high rate of complications associated meningococcal arthritis where bone and joint destruction has been described. *N. meningitides* also may lead to serious systemic manifestations such as meningitis, pericardial effusion, ventricular enlargement, and acute respiratory distress. This is in contrast to *N. gonorrhea* that has been associated with only small damage to joint surfaces and has less frequent end organ complications.

Our case highlighted the systemic nature of *N. meningitidis* infection, causing disease in a native joint of an immunocompetent patient. The elbow being the infected joint is rare. Obtaining fluid or tissue culture prior to administration of antibiotics is critical for diagnosis. Surgical debridement should be an adjunct to antibiotic therapy. Microbiology support is essential to differentiate from *N. gonorrhea*, as approach and duration of treatment is affected.

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*Keywords***:** neisseria, bacterial meningitis, infectious arthritis, elbow

CLINICAL INQUIRY

Utility of Plasma D-dimer in Decision to Continue Anticoagulation Therapy Following Idiopathic Venous Thromboembolism

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Clinical Question

In patients with a history of idiopathic venous thromboembolism (VTE), is plasma D-dimer helpful in evaluating the risk of recurrence to determine whether oral anticoagulation therapy (OAT) is appropriate beyond the standard 3-6 months of therapy?

Evidence-Based Answer

A single normal D-dimer at the time of the standard oral anticoagulation therapy (OAT) treatment period of 3-6 months is insufficient to predict recurrence of venous thromboembolism (VTE) because OAT may suppress D-dimer levels even in individuals at risk for recurrence (Strength of Recommendation (SOR) B). A negative D-dimer one month after discontinuation of OAT has a high negative predictive value for recurrent VTE, and supports the decision to permanently discontinue treatment (SOR A). Elevated D-dimer levels, either at the end of the recommended course of OAT or upon repeat in one month if the initial level is normal, predict recurrence of VTE and support the decision to resume OAT (SOR A).

Methodology

The relevant literature was obtained through a PubMed search using the following keywords simultaneously: venous thromboembolism, anticoagulation, D-dimer, and duration. Inclusion criteria for articles were that they be randomized control trials, prospective cohort studies, or meta-analyses, published over the past 12 years, and in English.

Evidence Summary

Several studies supported the above recommendations. A prospective 21-month study that included 599 subjects with a previous idiopathic VTE episode showed that a negative D-dimer measured at one month following therapy cessation had a high negative predictive value (over 92%) for VTE recurrence.[1] A second prospective study involving 396 subjects showed a similar result with a negative predictive value over 95%.[2] Furthermore, in a randomized controlled trial (the PROLONG study), patients with an elevated D-dimer result one month after stopping OAT had a significantly increased risk of VTE recurrence.[3] The authors recommended that OAT be restarted in individuals with an elevated D-dimer.

A 2003 prospective cohort study of 610 adults addressed the differing levels of risk based on the magnitude of an abnormal D-dimer.[4] The results showed a significantly increased risk of VTE at two-years post-OAT cessation for individuals with a D-dimer level of more than 750 ng/ml measured three weeks following cessation of OAT compared with those with a level of less than 250 ng/ml (11.5% vs 3.7%). A meta-analysis of randomized controlled trials and prospective cohort studies demonstrated an almost 3-fold recurrence risk increase when the D-dimer is positive following at least three months of anticoagulation.[5] A meta-analysis of four studies and over 1500 patients found a two-fold increase in risk of VTE recurrence during the follow-up period when a D-dimer level was abnormal.[6] Cosmi et al.[7] published a prospective cohort study that showed similar results and that an abnormal D-dimer was an independent risk factor for VTE recurrence.

An extension to the PROLONG study showed that there was a significant reduction in VTE recurrence up to approximately 2.5 years with a negative D-dimer.[8] There also was a significant decrease in VTE risk if OAT is restarted and continued during this period. This study also showed that the risk of a major bleeding episode due to OAT is greater than the risk of recurrent VTE, which needs to be considered carefully in each clinical situation. A prospective cohort study from 2008 followed 861 patients and showed elevated D-dimer to be an independent risk factor for recurrent VTE.[9] The PROLONG II study found that a persistently negative D-dimer for one year after cessation of OAT signified an almost 10-fold decrease in the relative risk of VTE recurrence within a mean of 10-11 months following OAT cessation.[10] Finally, a recently published study of 1010 patients with either idiopathic or low-risk factor VTE showed that serial measurement of a D-dimer both at the time of stopping OAT and at intervals for the three months following cessation was effective at identifying patients at low risk of recurrence.[11]

Conclusions

Evidence supports the use of D-dimer testing to determine the risk of VTE recurrence in patients with first episode of idiopathic VTE when OAT is discontinued following the standard 3-6 months of therapy. Based on the studies reviewed, it is reasonable that OAT be discontinued after 3-6 months to be followed-up with D-dimer testing at a one-month interval. An elevated D-dimer at that time raises significant concern for recurrence, prompting the physician and patient to weigh the risks and benefits of restarting OAT. There are unfortunately few trials that compare the risk of life-threatening VTE to risk of a life-threatening bleeding episode, therefore, more data on the comparative risk of a life-threatening OAT bleeding event during prolonged treatment for VTE should be collected before determining the final OAT treatment period. From the available data at this time, it is reasonable to use a non-elevated D-dimer result one month following the standard treatment period for idiopathic VTE to identify low-risk patients in whom OAT should not be resumed.

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Keywords: venous thromboembolism, anticoagulants, D-dimer, therapy

Appendix
(Adapted from American Family Physician*)

Strength of recommendation	*Basis for recommendation*
A	Consistent, good-quality patient-oriented evidence**
B	Inconsistent or limited-quality patient-oriented evidence**
C	Consensus, disease-oriented evidence** (usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening)

*http://www.aafp.org/dam/AAFP/documents/journals/afp/sortdef07.pdf

**Patient-oriented evidence measures outcomes that matter to patients: morbidity, mortality, symptom improvement, cost reduction, and quality of life.

Disease-oriented evidence measures intermediate, physiologic, or surrogate end points that may or may not reflect improvements in patient outcomes (e.g., blood pressure, blood chemistry, physiologic function, pathologic findings).

CLINICAL QUIZ

Importance of a Thorough Physical Examination!

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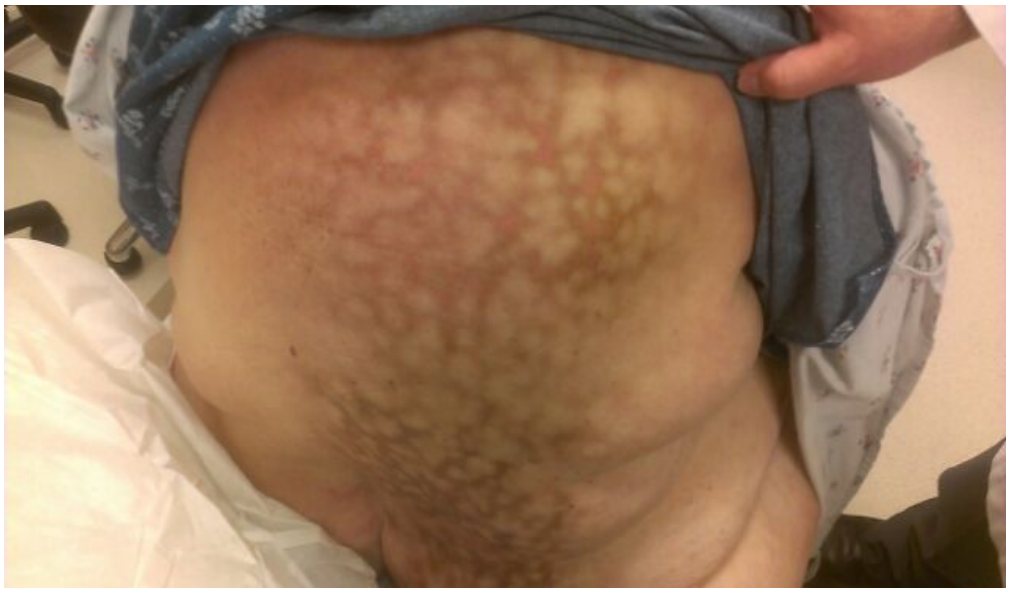
A 73-year-old white female presented for management of her tophaceous gout, pyoderma gangrenosum, and chronic back pain. On exam, there was an incidental finding of reticular, reddish-brown, non-tender, macular, non-blanching discoloration on her entire back, with a few superficial erosions (see Figure). The patient did not know the duration of her rash. It was neither pruritic nor painful. She denied arthralgia, fever, chills, or other constitutional symptoms. She did not have a history of insect bites, recent foreign travel, falls, or trauma. She frequently used a heating pad to alleviate her chronic back pain. Complete blood count, comprehensive metabolic panel, urine analysis, and inflammatory markers were within normal limits.



What is most likely diagnosis?

A. Vasculitis
B. Livedo Reticularis
C. Erythema Ab Igne
D. Cutaneous Lupus
E. Actinic Keratosis

Correct Answer: C. Erythema Ab Igne

Erythema ab igne (EAI), also known as ephelis ignealis or toasted skin syndrome, is an unintentional, unperceived, and self-induced condition, which occurs in individuals who persistently use topical or conventional heat to relieve localized pain or cold.[1] It is characterized by chronic, localized, erythematous or hyper-pigmented, reticulated, and net-like skin patches in the affected area. It is usually asymptomatic, but burning and pruritus are reported by some patients. While all body surfaces are susceptible, classically EAI develops on the shins and inner thighs of patients who sit close to fireplaces, heaters, or radiators.[2] It also can develop on the lumbar region and abdomen in patients who use heat sources, such as heated reclining chairs, heating pads, blankets, or hot water bottles to treat chronic back and abdominal pains. Although the condition is typically benign, chronic heat exposure can induce dysplasia, and rarely, squamous and Merkel cell carcinoma. The pathophysiology is unclear. Skin biopsy usually is not required since the diagnosis of EAI is usually made on the clinical presentation and corresponding history.[3] The differential diagnoses include livedo reticularis, actinic keratosis, vasculitis, squamous cell carcinoma of skin, and skin hyperpigmentation. Treatment of EAI is the immediate removal of heat source from the skin, which may result in resolution of the lesion. Chronic exposure often results in permanent hyperpigmentation and may increase the risk of malignant transformation. Overall prognosis is good.

The cutaneous lupus rash is found mostly on sun exposed areas and photosensitive. Usually it is erythematous, raised with papules or plaques. In some types like discoid lupus, the rash heals with a scar.[4] Vasculitis rash is due to inflammation of the blood vessels. The rash is commonly palpable purpura but can be macules, papules, plaques, and urticaria and may lead to necrosis. Usually, it is associated with systemic symptoms. Vasculitis is rare, can be mild or disabling but may lead to death.[4] Actinic keratosis (also called solar keratosis) is a precancerous, rough, scaly, or crusty patch of skin, caused by chronic sun exposure.[4] It is more common in fair-skinned people and usually accompanied by solar damage. Untreated lesions have a risk of progression to squamous cell carcinoma.[5] Livedo reticularis is a mottled reticulated vascular pattern which appears as a lace-like purplish discoloration of the skin. This may be a normal finding but may be related to an underlying pathology. It may be aggravated by exposure to cold and occurs most often in the lower extremities.[6]

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Keywords: erythema, skin rash, hyperpigmentation, vasculitis, livedo reticularis