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Original Research

Case Studies

Knowledge and Beliefs about Smoking among Urban African Americans with Type 2 Diabetes: A Qualitative Inquiry

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Abstract

Background. Despite elevated risks of cardiovascular disease among African Americans with diabetes, few investigators have examined beliefs about cigarette smoking and smoking cessation among this underserved population.

Methods. Focus groups (n = 4) and a short survey were used to assess cigarette use patterns, perceived smoking health effects, preferences for treatment, and attitudes toward smoking cessation among low income, African American smokers with type 2 diabetes.

Results. Participants (n = 25, M = 48.5 years [±10.23], 60% female) smoked 20.9 (±12.54) cigarettes per day (CPD) and had on average 3.2 (±6.12) 24-hour quit attempts in the past year. Few had used clinic support or pharmacotherapy in their quit attempts. Participants smoked to control health-related stress, keep their appetite down, and to control their glucose.

Conclusion. The results suggested that African American smokers with diabetes may be an appropriate group to target for smoking cessation. Cessation recommendations are discussed.
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Introduction

Cigarette smoking is the single most important preventable cause of morbidity, mortality, and excess health costs in the United States, accounting for approximately 427,000 deaths each year.[1,2] Despite considerable prevention and intervention efforts, approximately 50 million US adults continue to smoke cigarettes,[3,4] including 5.2 million African Americans (AA).[5,6] Groups with high prevalence rates of smoking include AA men, and those with lower levels of education and socio-economic status.[4,7-11] While African Americans tend to smoke fewer cigarettes per day[12] and begin smoking later in life[13,14] than other groups in the US, they bear a disproportionate share of tobacco-related disease.[6,15] When compared to European Americans, AAs have the highest incidence rates for all cancers combined,[6,15] are at elevated risk for cerebrovascular[16] and heart disease,[17,18] and have twice the rates of premature death attributable to cardio-vascular disease.[4,8]

According to the National Institute of Health, the total prevalence of diabetes among non-hispanic whites is 8.7%. African Americans have disproportionately higher rates (i.e., 13.3%).[19] Diabetes is associated with a substantial increase in the risk of cardiovascular disease (CVD) and this risk is increased further by cigarette smoking. Smokers with diabetes have an estimated two- to three- fold increase in the

risk of cardiovascular complications compared to smokers without diabetes.[20,21] The cardiovascular risks of smoking and diabetes in combination are nearly 14 times higher than the risk of either smoking or diabetes alone, much greater than expected from the simple combination of smoking and diabetes.[22] Smoking also substantially increases the risk for additional diabetes-related complications including the development of hypertension and micro-vascular complications (e.g., neuropathy, nephropathy, and microalbuminuria).[21,23,24] Despite these alarming statistics, the prevalence of smoking among persons with diabetes appears to mirror that among the general population.[25]

Results from recent studies showed that smoking cessation results in substantial reduction in the risk of smoking-related morbidity and mortality; however, few smoking cessation intervention programs or research studies have focused exclusively on smokers with diabetes.[26-29] Whether this is the result of concern that smoking cessation may compromise diabetes self-management efforts, the belief that patients with diabetes may not be interested in quitting, or limited awareness of the effectiveness of smoking cessation programs, is not clear. Research to date suggested that persons with diabetes may be less likely to quit smoking on their own than other smokers and may be more likely to fail in organized smoking cessation programs.[21,25]

Recently, Hokanson and colleagues[30] completed a randomized, controlled smoking cessation trial with 114 participants with type 2 diabetes. The results indicated that an intensive cessation intervention integrating face-to-face motivational interviewing plus telephone counseling into a standard diabetes self-management training program resulted in a trend toward greater abstinence at three months when compared to standard care. Although this trend was not observed at the six-month follow-up, the integration of smoking cessation into an existing diabetes education program did not impact diabetes management negatively, including A1c values. Further, our research team recently conducted a secondary analysis of three large, randomized clinical smoking intervention trials examining cessation rates among African American participants with self-reported diabetes. Our analyses concluded that there was a doubling of quit rates among persons with diabetes as compared to those with no diabetes.[31] Thus, results of these recent investigations suggested that persons with diabetes may be highly responsive to cessation efforts and that diabetes management may not be impacted negatively when cessation is targeted.

Because the knowledge, attitudes, beliefs, and preferences of smokers facilitate maximum receptivity to programs, these are important considerations when developing effective cessation interventions.[32] Qualitative research is well-suited to provide in-depth answers to these complex issues and may suggest ways to intervene with a target group successfully. Further, focus groups are well-suited for this study because the collaborative effort of the groups stimulated participant discussion of a topic about which they did not think about individually.[33] Thus, this qualitative study employed focus groups and a short survey to assess cigarette use patterns, perceived health effects of smoking, preferences for treatment, and attitudes toward cessation interventions among urban, African American smokers with type 2 diabetes.

Methods

Participants. Eligible participants were 18 years or older, African American, self-reported as having diabetes and smoked five or more cigarettes per day. Exclusion

criteria included variables that would hinder participation in a group discussion or ability to be contacted. These criteria included homelessness, marked inappropriate affect or behavior, or impaired cognition. Participants also were excluded if they had previously participated in any prior formal smoking cessation program.

Procedures. The research protocol was approved by the University of Kansas Medical Center's Human Subjects Committee prior to implementation. Participants were recruited at a community health center (Swope Health Services) that serves under- and uninsured, predominantly African American, patients. Flyers were posted in several clinics including Internal Medicine, Nutrition, Podiatry, and the patient pharmacy. In addition, a research assistant sat at a booth and handed out flyers to interested participants in the lobby of the health center. The one-page recruitment flyer was designed to recruit African American adults who had diabetes, smoked cigarettes, and were interested in participating in a group discussion about smoking and diabetes. Potential participants who responded to the flyer were screened for eligibility by phone or in the health center lobby.

Four focus groups were held over a two-week period. A clinical psychologist, with focus group facilitation training, moderated the groups. Three research assistants, one of whom was a representative of the Swope community, greeted participants, offered snacks, completed forms, video- and audio-recorded the groups, and distributed incentives. All participants provided both written and verbal informed consent to be audio- and video-recorded.

Following the consent procedure, participants completed a brief survey documenting demographic, tobacco-related and diabetes-specific health information. The assistant moderator read all survey questions aloud while a research assistant circulated to assist individual participants as needed. The focus groups were led using a moderator's guide developed specifically for this study. Researchers with experience in smoking cessation, diabetes, and focus group methodology developed the guide.[34,35] The moderator followed a semi-structured interview format using open-ended questions to stimulate discussion about knowledge, attitudes, and beliefs about smoking and diabetes. Table 1 displays example questions from the moderators guide.

During each focus group, the moderator probed participants' responses and encouraged all members to participate. The group discussions lasted approximately 90 minutes. After the groups ended, the research assistant collected a list of participants' medications in an attempt to corroborate their self-reported diagnosis of diabetes. After medications were recorded, participants received a $30 Wal-Mart® gift card as compensation for their travel cost, time, and effort. Data collection stopped after data saturation had occurred for the majority of our topic areas (i.e., no new data would be found by conducting further focus groups).[33]

Data analysis. Survey data were double-entered and range checks were performed. Descriptive statistics were computed using SPSS Version 13.0 (SPSS Inc., Chicago, IL). Audio-recordings of the focus groups were transcribed verbatim by a contracted professional transcription service. The focus group moderator proofread each transcript and compared them to the video-recordings to check for completeness and accuracy. Three independent coders deductively categorized transcripts by hand into six major topic areas using initial codes developed by the research team based on the focus group moderator's guide. Coders then coded transcripts by hand within each major

Table 1. Sample questions from moderators guide.

Topics	**Questions**
Attitudes toward smoking (positives and negatives).	What do you enjoy about smoking? What are some of the positive/negative things about smoking?
Beliefs and knowledge about smoking and diabetes.	Are there any problems associated with cigarette smoking that smokers with diabetes might face more than other people?
Change in smoking since diagnosed with diabetes.	Has anything about your smoking changed since you were diagnosed with diabetes?
Prior experiences with quitting.	For those of you who are thinking about giving up cigarettes, what are some reasons you would like to quit smoking? Tell us about the methods you have tried to help you quit smoking in the past and how it went.
Beliefs and opinions about quitting (e.g., different for diabetic patients).	How might quitting be different for people with diabetes?
Treatment preferences.	Tell us if you believe that a stop smoking program should be offered as part of your diabetes treatment program or should it be kept separate and what should it include?

topic area using an inductive approach whereby categories and concepts emerge from the text and are linked together.[33] This approach allowed the data to represent itself.

A fourth independent researcher cross-checked inductive codes and identified minor discrepancies in the coding and varying terminology used by each coder to describe the same content. Cross-checking codes provided a measure of how well the data were indexed and, thus, gave a qualitative measure of inter-coder reliability.[36] Overall, the independent researcher found high inter-coder reliability and identified major themes within the codes. The research team then met as a group to discuss the major themes and to address any discrepancies. Ten major saturated themes emerged across coders, as well as several unsaturated topics and themes that provided avenues for future research.

Results

Participants. Of the 59 people who responded to the study flyers, 50 were eligible to participate. Reasons for exclusion were not having diabetes (n = 2), being homeless or living in a treatment facility (n = 4), and previous participation in smoking cessation groups (n = 3). Of those eligible, 25 did not show for their scheduled focus group and efforts to reschedule were not successful. Thus, the final sample included 25 participants.

As detailed in Table 2, participants were on average middle-aged (M = 48.5±10.2 years) and female (60%). Most had at least a high school level education (32%) or some college (36%), were divorced (36%) or single (24%), and most did not have any health insurance (73%). Participants had been diagnosed with diabetes for an average of 12.2 years, and the average age at diabetes diagnoses was 36.8 years (SD±13.33). Forty-four percent used insulin

to manage their diabetes. The average number of cigarettes smoked per day was 20.9 (SD±12.54); participants began smoking at age 18 (SD±9.46) and reported an average of three 24-hour quit attempts (M = 3.16, SD±6.12) in the last year.

Table 2. Demographics characteristics of sample (n = 25).

Demographics	Number (%)
Mean age	48.5
Female	15 (60)
Education:	
10-12 years, no diploma	6 (24)
Diploma/GED	8 (32)
Vocational	1 (4)
Some college	9 (36)
College degree	1 (4)
Marital status:	
Married	1 (4)
Widowed	1 (4)
Separated	5 (20)
Single/Never married	6 (24)
Divorced	9 (36)
Living with someone	2 (8)
Diabetes management:	
Diet/Exercise	14 (56)
Oral agents	16 (64)
Insulin	11 (44)
No health insurance	19 (76)

Tobacco-related variables. As detailed in Table 3, many participants (68%) were considering to quit smoking in the next six months and 60% had cut down the number of cigarettes smoked to lower their health risks. Further, they moderately were motivated (M=6.04, SD±2.59) and confident regarding quitting (M=5.60, SD±3.4). Also, most participants moderately were concerned about the effects of smoking (M=6.23, SD±3.73) and weight gain (M=5.16, SD±4.0) on their diabetes complications should they quit smoking. When asked about prior quit attempts, participants reported that they relied on their own will power (76%), spirituality (62%), and support from family and friends to help them quit (32%). Fewer had used formal treatment (4%) or nicotine replacement therapy (32%) or buproprion (4%) in their prior quit attempts.

Table 3. Smoking characteristics (n = 25).

Variable	Mean (SD) or Number (%)
Age at diabetes diagnoses (years)	36.8 (13.33)
Cigarettes smoked per day	20.9 (12.5)
Age started smoking	18.3 (9.5)
Years as a smoker	26.8 (11.3)
24-hour quit attempts in the past year	3.2 (6.1)
Weight concern (1-10 scale)	5.16 (4.0)
Lives with smoker	15 (60%)
Concern about effects of smoking on diabetes (0-10 scale)	6.23 (3.73)
Motivation to quit (1-10 scale)	6.0 (2.6)
Confidence to quit (1-10 scale)	5.6 (3.4)
Number of minutes awake prior to first cigarette:	
< 5 minutes	13 (52%)
6-30 minutes	5 (20%)
31-60 minutes	6 (24%)
> 60 minutes	1 (4%)
Plans to quit in next 30 days	9 (36%)
Plans to quit in next 6 months	17 (68%)
Ever switched brands for health reasons	13 (52%)
Ever switched brands to lower smoking risks	15 (60%)
Prior cessation aids used:	
Nicotine Gum	7 (28%)
Nicotine Patch	8 (32%)
Nasal Spray	1 (4%)
Nicotine Inhaler	1 (4%)
Nicotine Lozenge	1 (4%)
Buproprion	1 (4%)
Aids used during prior cessation attempts:	
"Cold turkey"/On my own	19 (76%)
Prayer/God/Spirituality	16 (64%)
Support from family/friends	8 (32%)
Support group or clinic	1 (4%)

Thematic Analyses By Topics

Ten unique themes emerged across focus groups and reached saturation (see Table 4).

Attitudes toward smoking. The most commonly reported reason to continue smoking was to control weight through appetite suppression. Many participants also expressed the belief that smoking helped them to control their blood sugar level. They also reported that smoking helped them cope with high levels of stress related to their diabetes self-care and life stress (e.g., financial difficulties, child care). Alternately, participants reported that the most important reasons to quit smoking were the cost and the known health consequences.

Examples of participant comments were:

- "As long as I am smoking, I won't be feeding myself all the time." (male participant)
- "Sometimes if I get upset at somebody, like one of my kids, I light a cigarette – that's how I calm down." (female participant)
- "If I have five dollars and I know I need gas, I think, 'well, maybe I could put three dollars in the gas tank and take this two dollars and buy some cigarettes'…I want to quit to save money." (female participant)

Beliefs and knowledge about smoking and diabetes. Most participants endorsed the belief that smoking would increase their risk of diabetes-related negative health outcomes. However, few participants were able to articulate their understanding of the mechanism by which smoking and diabetes might interact to elevate diabetes-related risk factors.

Examples of participant comments were:

- "I'm not clear on the connection between smoking and diabetes, but they say it makes diabetes worse." (female participant)
- "Diabetes already decreases our circulation, but smoking makes that even worse because we are reducing the amount of oxygen that flows through our bodies. I think that is why we start to lose feeling in our fingers and toes." (female participant)
- "I've got diabetes, heart disease, high cholesterol, and I smoke. I shouldn't smoke and the doctors even say I need to quit smoking cigarettes, but I keep telling them I don't want to." (male participant)

Participants believed that smoking decreased their appetite and that quitting smoking would result in weight gain, a known hazard to their diabetes management. Comments included:

- "When I found out that I had diabetes, I lost weight, but then once the medicine kicked in, I gained weight. Then, I started smoking again so that I wouldn't eat as much." (female participant)
- "Since I'm a diabetic I feel that I have to watch my weight, so I don't eat that much. That is why I'm scared to stop smoking. I'll gain weight." (female participant).

Change in smoking since diagnosed with diabetes. Most participants endorsed making a smoking quit attempt since being diagnosed with diabetes. However, they explained that cessation resulted in the experience of additional stress and difficulty focusing on their diabetes self-care. Because our inclusion criteria included being a current smoker, it is unknown whether other persons with diabetes who have had success in quitting met with these same barriers yet were able to overcome them.

Examples of participant comments were:

- "When I was diagnosed with diabetes, I had already been smoking for 30 years. I know that I should have quit before then, but now I am under so much more

Table 4: Focus group topics and themes.

Topics	Themes
Attitudes toward smoking (positives and negatives).	➢ Most common reasons for smoking were to cope with stress or negative emotions (calming mechanism) or to control or lose weight. ➢ Most common reasons to stop smoking were the health consequences and cost.
Beliefs and knowledge about smoking and diabetes.	➢ Participants believed that smoking increased their risk for all health outcomes, though there was not a clear understanding of how (some discussion of ties to insulin levels in blood, but this is unclear). ➢ Participants believed smoking decreased their appetite. They also thought that quitting makes you gain weight and that it would negatively affect diabetes.
Change in smoking since diagnosed with diabetes.	➢ Since diagnosis, many participants have attempted to quit, but with no success. Many participants voiced concern that quitting will result in worsened diabetes self-management.
Prior experiences with quitting.	➢ Most participants had tried to quit, with the most common method being "cold turkey." Few pharmacotherapy products were discussed, but participants agreed that insurance benefits should cover cessation products.
Beliefs and opinions about quitting.	➢ Most participants wanted to quit and believed it was important to quit, but were not motivated to quit or confident they could achieve cessation.
Treatment preferences.	➢ Participants were undecided on whether persons with diabetes should have a separate smoking cessation program from other smokers or if diabetes care should be kept separate. ➢ Ideas about what should be included in a smoking cessation program and barriers to that program are mixed and mirror a heterogeneous group of smokers.

stress, and now I have gained more weight too. I know I need to quit, but now it is even more of a crutch for me." (female participant)

➢ "I'm more aware now since I've been diagnosed with diabetes, I'm much more aware of how much I smoke." (male participant)

- "Well, I smoke more because it seems like there's an urge to smoke more since I'm taking pills. It [diabetes] is kind of threatening." (male participant)
- "As soon as I leave here, I am going to smoke a cigarette. What am I going to stop smoking for? I am already messed up anyway." (male participant)

Prior experience with quitting. Most participants had tried to quit in the past (most using the "cold turkey" method) and believed that it is important for them to quit. Few had tried nicotine replacement therapy or bupropion to quit. The few who had tried found it helpful, therefore, they focused their discussion on their disappointment that insurance did not cover these cessation aids or that they did not have insurance. Finally, participants were unaware of the existence of state-funded cessation services (e.g., quit lines).

Examples of participant comments were:

- "The pill (bupropion) mellows you out. Someone could say something very negative to me and it wouldn't bother me. I was more pleasant. So, yeah, to me, if I had it to do all over again and I could ever get that pill, yes, I would go back." (female participant)
- "The last time I was in the hospital, I was in a diabetic coma. They gave me the nicotine patch, but because I do not have insurance, I could not keep using it." (female participant)
- "I have made an honest effort to quit smoking, but I tried to get the patch along with my medicine. Since I do not have insurance and I am already using the hospital discount to get my medicine, I can't get the patch." (female participant)

Beliefs and opinions about quitting. Most subjects endorsed the belief that it is important for them to quit for their health, particularly given their diabetes, but were not ready to make that change nor confident that they could do so.

Examples of participant comments were:

- "…I have to work on one thing at a time, me, and I'd rather work on my diabetes. I know smoking's not good for us at all, so I have to focus on my diabetes, you know first, and then as time goes by I can wean myself off of smoking, but I just can't go with the whole thing. Huh-huh, it's too much on me." (female participant)
- "I've got diabetes, heart disease, high cholesterol, and I smoke. I shouldn't smoke and the doctors even say I need to quit smoking cigarettes, but I keep telling them I can't."(male participant)
- "When I was diagnosed with diabetes, I had already been smoking for 30 years. I know that I should have quit before then, but now I am under so much more stress, and now I have gained more weight too. I know I need to quit, but now it is even more of a crutch for me." (female participant)
- "Since we have diabetes, we would have so much more to gain by quitting smoking." (female participant)

Treatment preferences. Participants had mixed views on whether persons with diabetes should have a separate smoking cessation program from non-smokers with diabetes and whether smoking should be targeted if diabetes self-management is not under good control. However, most commented that they did not want their physicians to provide cessation services in addition to their diabetes care. Participants also voiced a variety of preferences for cessation treatment services including individual and group counseling, medication, 24-hour helplines, and support groups. The ideas endorsed mirror those typically requested by smokers.

Examples of participant comments were:

- "The smoking group should be separate from the diabetes group because we have different problems related to diabetes." (female participant)
- "I would prefer group-type counseling and it would be nice if you could offer medications or the patch to help us stop smoking." (female participant)
- "I would like to have a support group like this focus group. That way everyone would get to exchange personal stories about what worked and didn't work. It makes me feel less alone when I hear about what other people are going through." (female participant)

Discussion

Our qualitative findings offer insights for understanding and developing intervention strategies for smoking cessation among African American adults with diabetes. In general, our participants expressed a desire to quit smoking, but voiced concerns regarding the potential impact of quitting on their diabetes self-management. Specifically, participants were concerned about the impact of quitting on their stress level and cessation-related weight gain. In addition, several participants noted that they had increased their smoking level after receiving the diagnosis of diabetes.

The association between diabetes diagnosis and increased smoking behavior and decreased motivation to quit needs to be determined through further investigation. However, if smokers are at risk for an increase in smoking following diabetes diagnoses, then using the diagnostic visit as a potentially "teachable moment" to introduce the importance of cessation and providing treatment options may be an important preemptive strategy.

Using cigarette smoking to cope with stress and weight gain are consistent themes found in the smoking literature. However, the stress management properties of smoking may be particularly important in our sample given their substantial sources of life stress (e.g., poverty status, ethnic minority, no health insurance, and diabetes). As such, participants overwhelmingly agreed with one participant when she mentioned that "…without stress there would be no need for smoking." Previous research has focused on the stress inherent with the self-management requirements of diabetes and the negative impact of stress on diabetes care. Thus, although most diabetes programs include instruction on the importance of stress management in diabetes self-care, it is clear that if we are to address the devastating health effects of the combination of diabetes and smoking, providers must offer patients alternative stress management strategies.

Our participants frequently mentioned continuing to smoke to prevent weight gain and a few mentioned a noticeable association between smoking and glycemic control (in both "positive" and "negative" directions). Although participants recognize that weight gain may have a negative impact on their diabetes self-care, they did not seem to have the same level of awareness regarding the negative consequences of the combination of diabetes and smoking. One participant reported that she quit smoking but that when she gained weight, she returned to smoking to decrease her appetite so that she might be in more control of her eating habits.

Weight gain following cessation is indeed a risk. Iino and colleagues[37] found that in a sample of smokers with diabetes who quit, body weight at six months increased by approximately three pounds. This increase is less of a health risk than the alternative of continuing smoking. However, the weight gain is a risk with which individuals with diabetes appear to be concerned, possibly because it is physically noticeable.

It is unclear whether providers address the risks of smoking in relation to weight gain with patients. Although this study was not designed to address this important concept, future studies are encouraged to explore physician attitudes toward smoking cessation and weight gain among smokers with diabetes. In addition, there were mixed experiences from participants on whether smoking may improve glycemic control or if glucose levels were higher following smoking a cigarette. Future research is needed to investigate the relationship between smoking and the acute impact on glycemic control.

Limitations. There are several limitations to this study that prevent generalizing results to all African American smokers with diabetes. Although we recruited a sufficient number of participants and reached saturation in our qualitative analyses, our sample size was small.

Our difficulty recruiting and retaining smokers with diabetes may be reflective of the lack of prioritization placed on cessation among those with diabetes. Although our recruitment flyers stressed that smokers did not need to be interested in smoking cessation to attend, it may be that some smokers may have felt uncomfortable attending a group focused on smoking. It also may be that our recruitment challenges may reflect a more favorable picture. That is, it is possible that smokers with diabetes are quitting.

Recent population-based studies suggested that the prevalence of smoking among patients with diabetes mirrors that of the general population. However, our study site, Swope Health Services, has been the site of two large, randomized trials enrolling African American smokers. Thus, it may be that the smoking prevalence among the subpopulation of patients using the Swope Health Center, our participants included, is lower than the national average. One follow-up approach might be to conduct qualitative research with persons with diabetes at other sites and with those who were able to quit smoking successfully.

A second limitation pertains to the exploratory nature of this project. Our focus groups were designed to be open-ended and exploratory. By using this design, we touched on several different topics and addressed the question of what to do about smokers with diabetes, and in this case, among the African American population. However, exploratory focus groups tend to ask more questions than they answer, as was the case for our groups.

From our review of the literature, there is a dearth of information about smokers with diabetes and researchers only now have begun to understand how smoking is seen by these individuals and the role it plays in their lives. Before creating a smoking cessation program targeting this population, further research is needed to understand the complexities of ethnicity, smoking, stress, weight gain, and glycemic control among smokers with diabetes.

Provider recommendations. Our qualitative analyses provided evidence that among lower income, African Americans with diabetes, smoking cessation assistance is wanted and needed by patients, but may presented unique challenges. Smoking cessation among persons with diabetes may be more difficult than for the general population due to their beliefs about the potential negative health consequences of cessation on their diabetes. Therefore, smokers with diabetes may need tailored education about the health consequences of both smoking and cessation on their diabetes.

Though our participants knew superficially that smoking increased their risk of various health outcomes, they were limited in their understanding of why or how this might occur. Some participants

acknowledged that smoking influences insulin levels, but this was by no means a majority of participants and those who mentioned it could not explain further.

Although our participants were unanimous in endorsing that smoking cessation care should be from a different provider than their diabetes care providers, the American Diabetic Association[38] recommends that diabetes care providers routinely assess and document smoking status; advise individuals with diabetes not to start smoking and provide cessation counseling as a routine component of diabetes care among smokers. Further, among patients interested in quitting, the guidelines recommended that diabetes care providers recommend nicotine replacement therapy and/or intensive counseling and provide follow-up assessment on cessation. The ADA guidelines also recommend that all diabetes health providers be trained regarding these recommendations and that systems to implement these guidelines are incorporated into clinical diabetes care.[38]

Despite these guideline recommendations, most participants chose "cold turkey" in their prior quit attempts. This finding suggested that participants either do not understand the benefits of nicotine replacement therapy and counseling for cessation or that practitioners are not following guideline recommendations. Future studies should assess the quality of cessation care provided to smokers with diabetes and investigate the possible impact of utilizing a secondary provider solely for cessation care.

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Breast Conservation Therapy with Tumor Bed Brachytherapy Alone in Stage I Breast Cancer: Results of a Phase II Trial

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Abstract

Background. Radiotherapy after breast conserving surgery increases local control. Standard radiotherapy includes whole breast irradiation delivered in a daily fashion over 5 or 5½ weeks. All patients may not require entire breast treatment. We tested the feasibility of limited surgery with limited irradiation using interstitial brachytherapy to the tumor bed in a selected group of patients with stage I breast cancer in a phase II trial.

Methods. Women aged 55 years or older with low or intermediate grade stage I tumors were treated with placement of interstitial catheters at the time of lumpectomy and axillary node dissection. The tumor bed was treated peri-operatively, using either low-dose-rate or high-dose-rate brachytherapy with Iridium-192 to deliver 16 to 25 Gy to the tumor bed over one to two days.

Results. Ninety-five breasts (94 women) were treated on the protocol. There were four (4%) local recurrences in the breast at a median follow-up interval of 66 months (range, 2.8 - 152). Cosmetic appearance ranged between good to excellent. There were no long-term radiation related complications.

Conclusions. In a selected group of patients, lumpectomy and immediate peri-operative low-dose interstitial brachytherapy to the tumor bed yielded local control equivalent, without significant morbidity, to that observed in a historical series of whole breast irradiation.

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Introduction

Several randomized trials clearly have established that breast conservation therapy with irradiation and mastectomy have equivalent survival results for early stage breast cancer.[1-6] The standard of care for breast conservation therapy includes whole breast irradiation. Over the last decade, there has been increasing interest in the feasibility of doing partial breast irradiation in selected cases with interstitial brachytherapy[7-13], external beam therapy[14,15], or intra-operative radiotherapy.[16,17] The rationale for reducing the volume of breast irradiated includes improved cosmesis, improved function, greater convenience for patients, reduced radiation dose, and decreased risk of second malignancy.

At our institution, we initiated a single arm Phase II trial in June 1993 to assess the efficacy of a low dose of tumor bed brachytherapy immediately following lumpectomy in a selected subset of patients with invasive breast cancer.[18] This report represents an update of our continued accrual into this

trial including a larger number of patients and a longer period of follow-up.

Methods

Study procedures, including obtaining informed consent, were conducted in accord with the ethical standards of the institution's Human Subjects Committee. The trial was initiated in June 1993. For enrollment in the study, prospective subjects were required to meet all four of the following criteria: patient age ≥ 60 years, tumor size ≤ 2 cm, low or intermediate histologic grade, and pathologically negative axillary nodes. Subsequently, the study was modified to include patients ≥ 55 years of age based on the finding that local recurrence rate in women over 55 years with quadrantectomy was not significantly different from those who received immediate breast irradiation.[19]

The requirement for pathologically negative axillary lymph nodes was modified to include clinically negative nodes in tumors ≤ 1 cm, if an axillary lymph node dissection was deemed medically inappropriate by the treating surgeon. However, with the advent of sentinel lymph nodal sampling, this procedure replaced axillary lymph node dissection. Tumors with the following histologic types made a patient ineligible for the protocol: infiltrating ductal carcinoma with extensive intraductal component, pleomorphic type of infiltrating lobular carcinoma, ductal carcinoma in situ, or lobular carcinoma in situ.

The primary outcome of the trial was to assess the rate of local recurrence with limited radiotherapy. The stopping rule specified that the study would be stopped if the local recurrence rate was higher than the local recurrence rate obtained at our institution in operable breast cancer treated with the conventional approach of breast conservation therapy plus brachytherapy to the tumor site and entire breast irradiation. The recurrence rate at a median follow-up of 69 months in our series was 14 of 250 breasts or 5.6%.[20]

Pathologic diagnoses were established by either excisional, incisional, mammotest core biopsies, or fine needle aspiration biopsies. Patient eligibility was determined based upon the previously outlined criteria. Eligible patients were advised about the option of partial breast irradiation following lumpectomy utilizing peri-operative brachytherapy and informed consent was obtained.

Margin status of the wide excision specimens was evaluated by frozen section examination. Patients with clear margins of invasive or intraductal carcinoma underwent placement of interstitial catheters into the tumor bed by the technique described in our previous papers.[21,22] Patients were treated with low-dose-rate brachytherapy (LDRB) between December 1993 and June 1999, when the new technique of high-dose-rate brachytherapy (HDRB) became routinely available. Subsequently, all patients were treated using HDRB.

Prior to July 1999, axillary node dissections were performed and a final pathologic evaluation was obtained within 24 hours from the time of surgery. Subsequently, when sentinel lymph node sampling became the standard, a frozen section examination of the nodes was performed and node negative patients were treated according to the protocol. If the final pathology report revealed positive nodes, the patient was deemed ineligible for the protocol of brachytherapy alone and in addition received whole breast irradiation.

After the operation, simulation films were performed for localization of the catheters in the tumor bed and computation of isodose curves was carried out in the Department of Radiation Oncology. In those treated with LDRB, the catheters were after-loaded with low-dose-rate Iridium-192, varying in strength between 0.33 and 0.44 mg radium equivalent. A 20 to 25 Gy dose

was delivered to an isodose line that encompassed all the iridium ribbons and was at least one cm deep to the tumor bed over 24 to 48 hours.

In HDRB cases, a biological equivalent dose (BED) of 16 to 22 Gy was delivered in four fractions. Not all the patients received adjuvant systemic therapy; some patients were not recommended treatment and others refused treatment. Forty-eight patients received hormonal treatment, either tamoxifen or anastrozole. Three patients received adjuvant chemotherapy. The patients were followed on a regular basis and regular mammograms were obtained.

Results

A total of 94 post-menopausal patients enrolled in the protocol between December 1993 and November 2005. One African-American patient in her 60's had bilateral breast cancer with diagnoses one year apart and each breast was treated to the tumor bed with brachytherapy. Patient demographics are outlined in Table 1. Tumor characteristics are outlined in Table 2. Tumors ranged in size from a largest dimension of 0.3 cm to 2.0 cm, with a median of 1.0 cm. Sixty-five of 95 tumors were as expected, of the invasive ductal carcinoma type, not otherwise specified (Table 3). The treatment details are provided in Table 4.

Median time of follow-up was 69 months with a range of three to 152 months. Eighty of the 94 patients (85%) were alive in 2008, 78 (83%) with no evidence of disease and two (2%) with evidence of distant disease. Of the 14 deaths, there was evidence of breast cancer (distant disease but no local recurrence) at time of death for 10 of the women. Of the 95 breasts treated, a local recurrence occurred in only four women (4%; Figure 1) who were subsequently treated with mastectomy or whole breast irradiation (Table 5). With only four events, it would not be possible to identify potential prognostic factors for recurrence with any statistical power. All four patients were alive

Table 1. Demographics of 94 women treated on the protocol.

Demographics	Number of Patients	Percent
Age at Diagnosis, years		
55-59	11	12
60-69	34	36
70-79	39	41
80-89	8	9
91-100	2	2
Race		
African-American	12	13
Caucasian	82	87

Table 2. Characteristics of 95 tumors at diagnosis.

Tumor Characteristics	Number of Tumors	Percent
Detection		
Mammographic findings alone	74	78
Palpable	19	20
Bloody nipple discharge	2	2
Laterality		
Left	45	47
Right	50	53
Site of primary		
Upper outer quadrant	54	57
Upper inner quadrant	19	20
Lower outer quadrant	4	4
Lower inner quadrant	6	6
Central	1	1
Contiguous	11	12

Table 3. Pathologic characteristics of 95 tumors.

Pathologic Characteristics	Number of Tumors	Percent
Histology		
Invasive ductal carcinoma, NOS	65	68
Invasive tubular carcinoma	5	5
Invasive colloid (mucinous) carcinoma	7	7
Invasive lobular	12	13
Mixed invasive ductal and lobular	6	6
T1 Categories		
T1mic	1	1
T1a	10	11
T1b	38	40
T1c	46	48
Histological Grade*		
Grade 1	59	62
Grade 2	36	38
Estrogen Receptor Status**		
Positive	79	83
Negative	6	6
Unknown	10	11

*Tumor grade is based on the Elston and Ellis modification of the Bloom and Richardson's grading system.[24]

**Estrogen receptor status is determined by immunohistochemical analysis with expression of >10% nuclear staining considered positive.

Table 4. Treatment characteristics of 95 tumors.

Treatment	Number of Tumors	Percent
Axillary Procedure		
None	7	7
Level I dissection	1	1
Sentinel node sampling	54	57
Axillary node dissection	33	35
Brachytherapy		
LDRB; BED = 20 – 25 Gy	27	28
HDRB; BED = 14 – 22 Gy	68	72
Systemic Treatment		
None	44	46
Anti-hormone therapy	48	51
Chemotherapy	3	3

Figure 1. Freedom from local recurrence of the affected breast (n=95) as a function of time after diagnosis.

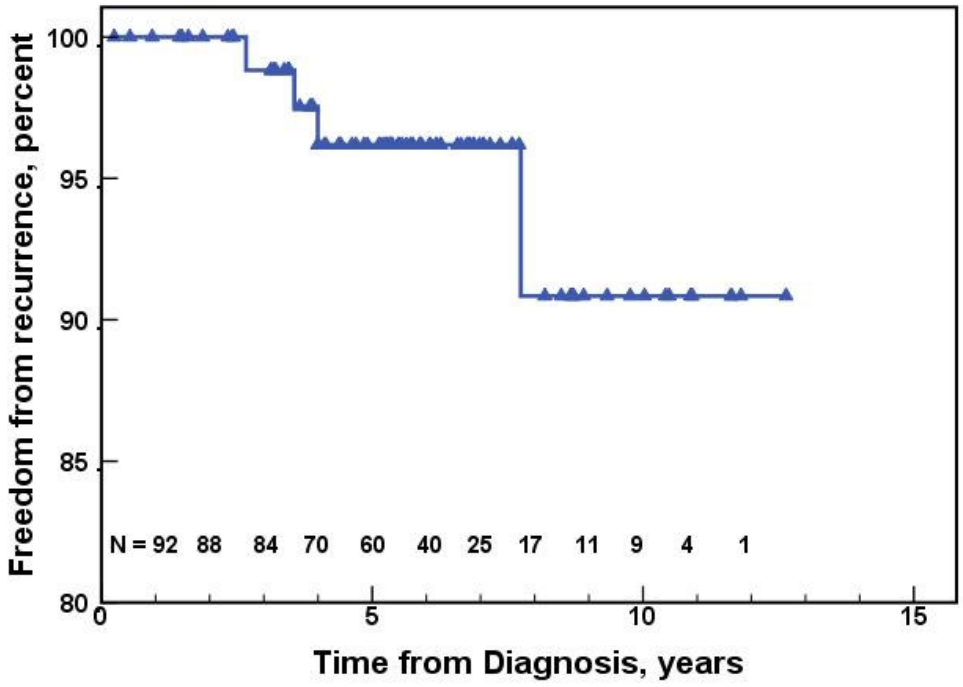

Table 5. Local tumor recurrence in four patients.

Interval from Diagnosis (in months)	Quadrant	Initial Treatment	Treatment of Recurrence	Status
32	Different	HDRB 22 Gy	Whole Breast Radiotherapy	NED* 57 months
43	Same	HDRB 16 Gy	Mastectomy	NED 13 months
48	Different	HDRB 22 Gy	Whole Breast Radiotherapy	NED 43 months
93	Same	LDRB 20 Gy	Mastectomy	NED 25 months

*NED: No evidence of disease.

at last follow-up, ranging from 13 to 57 months after time of recurrence. Cosmetic appearance of the breast, judged according to our criteria,[23] was deemed to be good to excellent in all patients. Radiation-related complications were evaluated during follow-up and no long-term sequelae were observed.

Discussion

Several randomized studies have established the validity of breast conservation surgery followed by irradiation in early stage breast cancer.[1-6] The National Surgical Adjuvant Breast and Bowel Project (NSABP) B-06 clearly demonstrated that omission of radiotherapy leads to an

unacceptably high local recurrence rate.[5] Other trials have attempted to identify subsets of patients who could be at a low risk for breast relapse without breast irradiation.[25-27] In each such trial, the local recurrence rate without irradiation was significantly higher than with irradiation.

Pathological analysis of local breast recurrences following lumpectomy in the NSABP B-06 trial determined 86% of local recurrences to be in the same quadrant as the initial primary.[28] Gump et al.[29] noted 90% of multicentric foci in 657 mastectomy specimens to be in close proximity to the primary. Similarly, Holland et al.[30] determined that in 43% of 282 invasive cancers tumor foci were present within two cm from the reference tumor.

A viable compromise between full-scale radiation and no radiation would be radiation restricted to the tumor bed. There are several such trials published in this respect. The doses of radiation to the tumor bed have varied among the different investigators from 30 to 55 Gy. The results of the current on-going NSABP protocol which randomized patients with tumors less than three cm to tumor bed irradiation versus whole breast irradiation would probably standardize radiotherapy in particular subsets of women who desire breast conservation therapy.

When we initiated our phase II trial, we decided on a dose of 20 to 25 Gy to the tumor bed with LDRB on a very conservative principle. Our previous work had revealed that peri-operative irradiation to tumor bed, accomplished by placement of implant catheters under direct visualization, enhanced local control.[20-22,31,32] The dose was prescribed to the periphery of tumor bed. The center of the tumor bed would receive at least 150% of the dose (i.e., 30 to 37.5 Gy) which yielded a radiobiological equivalent of approximately 40 to 45 Gy of external beam radiation given at 1.8 Gy per fraction.[33,34]

When we replaced LDRB with HDRB, equivalent doses were calculated and delivered in four fractions to facilitate delivery within two days of surgical excision. Further, if any of our patients suffered a recurrence in the breast, at that point, wide excision with external beam radiotherapy to the entire breast could still be offered as an option versus a mastectomy, without risk of tissue necrosis or rib fractures. If the recurrence happened to be in another quadrant, an interstitial boost to the tumor bed in addition could be offered.

In summary, the results presented in this study supported our original preliminary review.[18] Our local recurrence rate at 66 months was 4%, which was comparable to results reported by other investigators.[7-13] In addition, this rate was lower than the 5.6% obtained in our series with standard radiotherapy.[20] The doses used in our trial were lower than those used by other investigators.[7-13] However, our trial was in a selected group of patients, who were 55 or older, with stage I tumors with low or intermediate grade.

Our results may be due to the close collaboration between the surgeon and radiation oncologist, meticulous attention to margins, placement of interstitial catheters into the open surgical bed under direct visualization, generous coverage of the tumor cavity, and the biological advantage of immediate (within 24 to 48 hours of surgery) brachytherapy to the tumor bed.

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Keywords: breast conserving surgery, brachytherapy, breast cancer, radiotherapy

Why It Is Important To Know The Diabetes Type?

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Introduction

The distinction between type 1 and type 2 diabetes mellitus should be straight forward, based on age, body habitus, and type of presentation. A specific diagnosis is important since treatments, associated abnormalities, and outcomes differ. Unfortunately, the distinction is not always that simple. We present a case of a patient with features of both types.

Case Report

A 57-year-old obese female patient presented with polyglandular failure manifested by early ovarian failure, growth hormone deficiency, autoimmune diabetes since age 18, and alopecia totalis. Her Body Mass Index was 45. She manifested features of type 1 and type 2 diabetes.

Table 1. Features of diabetes observed in the patient.

Type 1 features	Type 2 features
Positive Anti-Glutamic Acid Decarboxylase (GAD) 65 antibodies	Persistent C-peptide for 38 years
Diabetic ketoacidosis (several times)	Hypertension
Polyglandular autoimmune disease	Dyslipidemia
Intolerance to oral hypoglycemic	Obesity

Discussion

Characteristics of the two diabetes entities can overlap as demonstrated by our patient. Age is not as helpful anymore, since 10 percent of elderly diabetic patients have evidence of an autoimmune process[1]; conversely the incidence of type 2 diabetes accounts for 30% of new adolescent diagnoses.[2] Presentation can be misleading. Diabetic ketoacidosis, the hallmark of type 1 diabetes, also can be the presenting symptom in patients with type 2 diabetes.[3] Obesity is present in over 90% of adolescents and the majority of adults with type 2 diabetes, whereas only 25% of patients with type 1 diabetes are overweight.[4] Approximately 30% of patients with type 2 diabetes have hypertension at presentation,[5] but it is rare at presentation in patients with type 1 diabetes.

C-peptide concentrations are usually high in patients with type 2 diabetes; hyperglycemia can cause transient insulin deficiency ("glucose toxicity") and a low initial plasma insulin level. In patients with type 1 diabetes, the decline in insulin level is steady over time.[6] Our patient maintained unexplainable normal to high C-peptide levels 38 years after diagnosis of type 1 diabetes. No sufficient data were found in the literature that explained the persistence of insulin secretion for such a long period.

Antibodies are present in 75 to 90% of patients with type 1 diabetes at presentation.[7] Adults who are thought to have type 2 diabetes and who have positive antibody tests eventually become insulin-dependent

and are considered to have latent autoimmune diabetes.[8]

In the absence of reliable diagnostic markers greater emphasis must be placed on the findings in the individual patient. This case demonstrated some type 2 features in a patient with type 1 diabetes. In daily practice, diagnoses often are generalized. Accurate diagnosis is important because the treatment and complications of type 1 and type 2 diabetes are distinct. Unfortunately, some cases of diabetes clearly cannot fit under a specific diagnosis.

The ultimate goal of treatment for type 2 diabetes is correction of the underlying insulin resistance through weight reduction, exercise, and medications. Patients with type 1 disease are at risk for other autoimmune disorders, such as thyroid, celiac, and Addison's disease. Whereas, patients with type 2 disease are at risk for hypertension, dyslipidemias, and macro-vascular disease. The genetic implications for other family members also differ for the two disorders.

Conclusion

Proper diagnosis of type 1 and type 2 diabetes mellitus is crucial to the treatment that an affected patient is likely to receive. Type 1 and type 2 diabetes are two different entities although they may overlap. Some patients manifest features of both types at the same time. In the absence of specific markers between the two types, further evaluation with C-peptide levels and auto immune markers are appropriate to evaluate many adults with diabetes mellitus.

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Keywords: diabetes mellitus type 1, diabetes mellitus type 2

Systemic Lupus Erythematosus, Immune Thrombocytopenic Purpura, and Autoimmune Hemolytic Anemia

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Introduction

Thrombocytopenia in patients with acute systemic lupus erythematosus (SLE) frequently presents to the clinician with considerable diagnostic and therapeutic difficulties. SLE patients with thrombocytopenia are more likely to have significant organ damage such as in the heart, kidneys, or the central nervous system.[1]

Case Report

A 62-year-old Vietnamese woman was admitted to the hospital with a one-month history of high-grade fever (up to 104°F), decreased appetite, nausea, postprandial vomiting, and worsening abdominal pain. She previously had two days of mucus-like diarrhea. Her past medical history included primary hypothyroidism.

This patient visited Vietnam on a number of occasions, most recently returning two months prior to admission after a six-month stay. While in Vietnam, she developed fatigue. Upon her return to the US, she was progressively more tired and weak with diminished appetite. She reported progressive shortness of air beginning about four to five weeks prior to her hospital admission with associated chills, fever, severe diaphoresis, and a dry cough. She was given a week of antibiotic therapy at that time without relief.

Ten days prior to admission, she was admitted to another hospital, where an esophagogastroduodenoscopy and a *Camplyobacter*-like organism (CLO) test for *Helicobacter pylori* were negative. An echocardiogram revealed moderate mitral and mild tricuspid insufficiency and a normal ejection fraction of 51%. A CT scan of the abdomen and pelvis was negative. CT angiography of the chest revealed bibasilar scarring, pleural thickening, and atelectasis. She had scattered axillary lymph nodes at the upper limits of normal size (right greater than left), breast nodules, and a positive Antinuclear Antibody test (ANA). She was dismissed on acetaminophen, sucralfate, and a proton pump inhibitor with recommendations for outpatient colonoscopy and follow-up with her primary care physician. Her symptoms persisted and increased over a one-week period. Thus, she presented at our hospital.

At the time of admission, she was pyrexial (100.6°F) and tachycardic (105 beats per minute). Her respiratory rate was 18, her oxygen saturation was 94% on room air, and her blood pressure was 153/93 mmHg. She had very dry mucous membranes with poor dentition. She had mild rhonchi on her right lower lobe with no wheezes or crackles. She had normal S1 and

S2 heart sounds with no murmur. Her abdomen was soft with positive bowel sounds. She had positive peripheral pulses without lower leg edema. She had a few small petechiae on her lower extremities.

The initial investigation revealed a normocytic anemia with a platelet count of 133,000. Over a few days, the platelets decreased to 21,000. She had a high erythrocyte sedimentation rate (ESR of 90), hematuria, proteinuria, a positive ANA (anti-histone, anti-Sm, and anti-Sjögren's syndrome A and B were high) along with a low C3 and C4, positive platelet antibodies, a positive direct Coomb's test, positive IgM and IgG for *Helicobacter pylori*, and a small pericardial effusion on the 2D echocardiogram.

During her hospitalization, she received the following medications:

- two pulse therapy IV methyl-prednisolone, 125mg every six hours for two days and 1g daily for three days,
- oral prednisone, 60mg daily,
- mycophenolate mofetil, 500mg twice daily,
- hydroxychloroquine, 200mg twice daily,
- intravenous immunoglobulin (IVIG), 400mg/kg for five days,
- rituximab, three doses,
- triple therapy for *H. pylori* (clarithromycin, amoxicillin, and a proton pump inhibitor),
- iron IV, 4 doses,
- erythropoietin, 10,000 IU subcutaneous three times per week,
- sulfamethoxazole and trimethoprim, double strength three times per week, for pneumocystis carinii prophylaxis (started after thrombocytopenia).
- tube feeding.

After administration of steroids, the fever resolved. Her hospital stay was marked by one episode of volume overload, following the transfusion of two packed red bloods cells, which resolved with diuretics.

The patient's course was complicated by hemoptysis, attributed both to underlying thrombocytopenia and lupus-related alveolar hemorrhage. A bronchoscopy revealed a diffuse alveolar hemorrhage. The bronchial washing was negative for *Pneumocystis carinii* pneumonia; a fungal culture revealed a small amount of candida. She received platelet transfusions and a Bilateral Positive Airway Pressure device. The urine culture grew *Escherichia coli* and she was treated with ciprofloxacin.

Twenty-five days after admission, the patient was discharged home in stable condition with no hemoptysis and decreased of shortness of air. Thrombocytopenia had stabilized. The diffuse alveolar hemorrhage on chest x-ray and perimyocarditis on 2D echo were stable and unchanged. She was discharged on 60mg/day of prednisone, 500mg of mycophenolate mofetil daily with a plan to increase the dose to twice daily, hydroxychloroquine sulfate 200mg twice daily, a fourth dose of rituximab, erythopoetin 10,000 IU subcutaneous three times per week, and pioglitazone hydrochloride 15mg daily with diabetic education for steroid-induced hyperglycemia. One month after receiving her fourth dose of rituximab and while taking prednisone 40mg/day, her platelet count had risen to 150,000.

Discussion

Diagnostic issues. Our patient satisfied 5 of 11 American College of Rheumatology criteria for systemic lupus erythematosus (4 or more being required for a diagnosis).[2] Conventional laboratory markers (a raised ESR and C-reactive protein hypocomplementemia, high-titer ANA, and multi-organ damage) indicated that her lupus was active at the time of presentation with her acute illness.[3-5]

A severe immune thrombocytopenic purpura (ITP) was associated with her lupus. She had no history of drug-induced

thrombocytopenia, and a negative blood smear and bone marrow biopsy. Other causes of thrombocytopenia (HIV, HCV) also were negative. She also had positive antiplatelet antibodies.[6,7]

Several potential causes of thrombocytopenia in patients with SLE are noted. The major mechanism is immunoglobulin binding to platelets followed by phagocytosis in the spleen, as in ITP.[8] Membrane glycoproteins (GP) are most often the target of such antibodies (e.g., GP IIb/IIIa), but anti-HLA specificity also occurs.[9] Antigen-dependent B cell development in lymphoid tissues is influenced by binding of CD40 on B cells to CD40-ligand on activated T cells. The finding of autoantibodies to CD40-ligand in patients with SLE, ITP, and Antiphospholipid Antibody Syndrome, but not in the serum of healthy blood donors suggests that interference with T cell and B cell interaction may play a role in the development of thrombocytopenia.[10] SLE patients with thrombocytopenia are more likely to have associated significant organ damage to the heart, kidneys, and the central nervous system.[1]

An autoimmune hemolytic anemia (AIHA) can be associated with SLE and ITP.[11] Our patient had a high LDH and a positive direct Coomb's test, but she did not have low haptoglobin and her peripheral blood smear did not show spherocytosis.[12] The possibility of Evans syndrome also was suggested with both autoimmune thrombocytopenia and autoimmune hemolytic anemia, which may precede the onset of SLE[5], but our patient presented simultaneously with SLE, ITP, and possible AIHA.

Implications for treatment. Among patients with co-existent SLE and ITP reported in the literature, the most commonly employed treatment was prednisone (1 mg/kg per day in divided doses).[13,14] Most patients responded within one to eight weeks.[15] High-dose dexamethasone and high-dose methylprednisolone also are being investigated.[16-19] If there is no significant increase in the platelet count within one to three weeks or side effects are intolerable, the following options may be considered. The order in which they are used depends in part upon the severity of the thrombocytopenia and the presence or absence of other manifestations of SLE.

1. Azathioprine (0.5 to 2 mg/kg per day).[15]
2. Cyclophosphamide, given as daily oral or intravenous pulse therapy. Intravenous pulse cyclophosphamide is preferred in patients who also have severe active lupus nephritis. In one report of six such patients, all had normal platelet counts within 2 to 18 weeks after the onset of pulse cyclophosphamide.[20]
3. Intravenous immunoglobulin. This treatment is effective and may be preferred to azathioprine or cyclophosphamide when a rapid rise in platelet count is necessary (as in the patient who is actively bleeding or requires emergent surgery).[21]
4. Mycophenolate mofetil. This treatment may be useful in the patient refractory to other medical therapy.[22] Due to the fact that our patient had proteinuria and an active urine sediment, but was not a candidate for renal biopsy due to thrombocytopenia, mycophenolate mofetil was chosen due to the published literature demonstrating efficacy in treating lupus nephritis.[19]
5. Rituximab 375 mg/m^2 IV approximately once weekly for four consecutive weeks.[23] Rituximab has been used to treat ITP in patients without SLE who were refractory to other treatments and this B lymphocyte depleting approach

may be beneficial for other manifestations of lupus.[24]

6. Splenectomy. Splenectomy can raise the platelet count, but it does not produce a durable remission of thrombocytopenia reliably. Relapse following splenectomy may occur and has been noted at varying times up to 54 months after surgery.[25] Patients with persistent thrombocytopenia after splenectomy subsequently may respond to azathioprine, cyclophosphamide, rituximab, IVIG, danazol[26,27], or vincristine[28].

Conclusion

In summary, our patient had active SLE with hypocomplementemia, ITP, and possible AIHA. Therapy with high-dose corticosteroids, mycophenolate mofetil, hydroxychloroquine, IVIG, and four doses of rituximab were effective in stabilizing her nephritis, perimyocarditis, transaminitis, and thrombocytopenia.

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Ossification of the Posterior Longitudinal Ligament Misdiagnosed as Multiple Sclerosis

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Introduction

Ossification of the posterior longitudinal ligament (OPLL) has been recognized as "Japanese Disease". However, OPLL has been well-documented in the United States affecting non-Asian patients as well.[1-4] The prevalence among the African-American population is very low.[5] Magnetic resonance imaging noninvasively provides the most useful information about the degree and extent of spinal cord compression.[6]

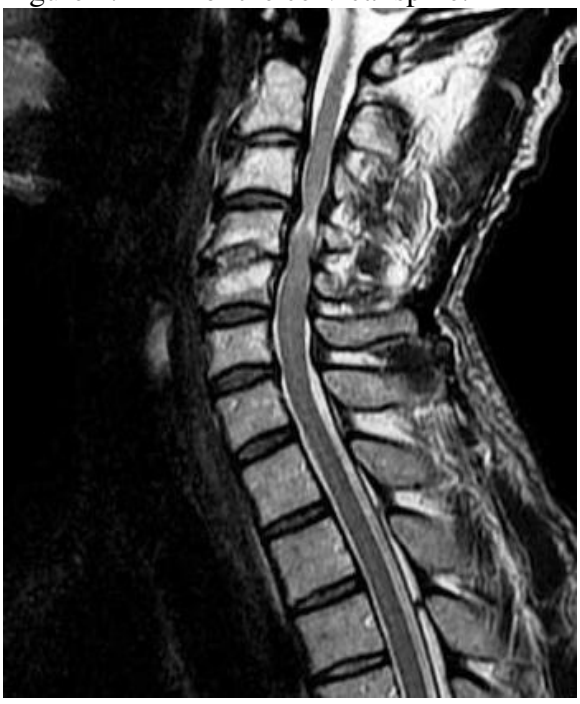
Case Report

A 55-year-old African-American male was admitted to the hospital for left lower limb and right upper limb weakness. The patient had walking difficulty mainly due to the left foot drop. A CT scan of the brain showed an old one centimeter left peri-ventricular left infarct. An MRI of the brain showed advanced demyelinating plaques scattered in his brain.

The patient was started on pulse steroids for suspicion of multiple sclerosis (MS) and was discharged after partial relief of his symptoms. He was re-admitted, after being lost to follow-up, four months later for the same weaknesses described above in addition to poor balance and staggering gait. Again, the patient was started on pulse steroids for MS based on the findings of the first MRI of the brain, while the report of the new MRI was pending. With minimal resolution of his symptoms on steroids and the new brain MRI report of no active MS, an MRI of the cervical spine was obtained (Figure 1).

Neurosurgery confirmed the presence of OPLL along with complex osteophytes formation and probable congenital cervical canal narrowing. According to the neurological, clinical, and radiological findings, the patient had Grade IV myelopathy according to the Nurick Scale. The patient underwent an anterior cervical decompression. The patient's neurological symptoms were relieved dramatically in the 48 hours post-operation.

Figure 1. MRI of the cervical spine.



Discussion

Ossification of the cervical posterior longitudinal ligament (OPLL) represents a continuum of disease beginning with hypertrophy of the posterior longitudinal ligament (PLL) followed by progressive coalescence of centers of chondrification and ossification. Initial hypertrophy of the PLL due to fibroblastic hyperplasia is followed by increased collagen deposition and progressive mineralization and cartilaginous in-growths leading to ossification centers that eventually mature into Haversian canals.

A genetic locus for OPLL most likely is located close to the human leukocyte antigen (HLA) site on chromosome 6-p.[4,7] Patients with diffuse idiopathic skeletal hyperostosis (DISH), half of whom have OPLL, test positive for that HLA antigen.[8] An autosomal-dominant mode of OPLL inheritance frequently is inferred as one quarter of the siblings of OPLL patients manifesting the disease and demonstrating two concurrent strands of HLA.[9-11] The pathophysiological similarity between DISH and OPLL and the fact that both are linked to HLA antigen make this antigen an area of intense investigation.

One quarter of North American and Japanese patients with cervical myelopathy exhibit OPLL.[12-15] OPLL is found in C2–4 70% of the time, 15% in T1–4, and 15% in L1–3. Neural injury occurring in the presence of OPLL stems from direct mechanical or indirect ischemic compromise. Cervical OPLL also appears twice as often in males as in females.[12,16-18]

OPLL in the African-American population has scarce data on its true incidence in that population.[19] Even in DISH, the more diffuse variant, the demographics in the United States showed a much higher incidence in the white rather than the African-American or Native American population.[20]

Two myelopathy grading scales are used: the Nurick Scale and the Japanese Orthopaedic Association (JOA) Scale. The Nurick Scale includes:

- Grade 0: intact, mild radiculopathy without myelopathy
- Grade I: mild myelopathy
- Grade II: mild-to moderate myelopathy
- Grade III: moderate myelopathy
- Grade IV: moderate to severe myelopathy
- Grade V: severe myelopathy, quadriplegia.[13,14,16,21-23]

The JOA Scale catalogues the severity of myelopathy by using a 17-point scale.[24-26]

Direct anterior resection of OPLL results in improved postoperative outcomes. In the study by Fessler, et al.,[27] Nurick grades improved 86% of the time following anterior surgical approaches. These patients improved an average of 1.24 Nurick grades, whereas those undergoing laminectomy improved only 0.07 Nurick grades. Better clinical outcomes are encountered following anterior resection rather than posterior decompression of OPLL.[12,14,19,28] This approach was adopted in our patient with satisfactory results.

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