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Efficacy of the DASH Diet in Reducing the Need for Antihypertensive Medications

Case Report

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PERMISSION

Title Case Report
Department Nursing
Degree Master of Science

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Abstract

Hypertension is a common medical condition that increases the risk of heart disease and stroke in the adult. “It is the result of the interplay of a number of genetic, environmental, and lifestyle issues” (Dunphy et al., 2015). Treatment options have relied heavily on antihypertensive medications for significant changes in decreasing blood pressure. This paper highlights a case report of a patient with an underlying diagnosis of hypertension and discusses a literature review examining the effects of the Dietary Approaches to Stop Hypertension (DASH) diet and lifestyle modifications on blood pressure reduction and whether these are viable options over pharmaceutical means. It was found that the DASH diet, in addition to lifestyle modification does reduce the need for antihypertensive medications, but is subjective to the extent of reduction based upon age, race, sex, weight and motivation to change.

Background

Hypertension is a common medical condition that increases the risk of heart disease and stroke in the adult. According to the CDC, one in three U.S. adults has hypertension. “Recent statistics show that among African Americans more women than men are hypertensive and that black women are more hypertensive than black men” (Dunphy et al., 2015). There are many risk factors that can contribute to its development. Nonpharmacological treatment options are available for the prevention and treatment of these risk factors. Weight loss, diet, and exercise have proven to be evidence based approaches for decreasing blood pressure. “The use of lifestyle modifications should be a part of every patient’s regimen to prevent or treat elevated blood pressure” (Calhoun et al., 2008).

The patient in this case report lacks exercise, has elevated lipids, is obese, African American, and middle aged, all of which contribute to her having hypertension. She has tried pharmaceutical treatment that resulted in unwanted side effects. The patient expresses personal motivation to start lifestyle modifications to assist with blood pressure reduction. These modifications could include diet and exercise.

A higher proportion of African American people, especially women, are more sensitive to the blood pressure raising effects of dietary salt intake as compared to Caucasians (Weber et al., 2014). The DASH diet, therefore, is the optimal choice of diet for her goals and may reduce the need for antihypertensive medication. It is a salt-sensitive diet focused on plants, fruits, vegetables, nuts, lean meats and grains. This paper serves to answer whether the DASH diet in addition to maintaining a healthy lifestyle reduces the need for antihypertensive medications through the means of a literature review.

Case Report

History of Present Illness

Jane Doe is a pleasant 48-year-old African American female who presents to the clinic with a chief complaint of a cough and blood pressure management follow up. The cough developed after she started her new blood pressure medication; Lisinopril 20 mg. She states that this medication was prescribed for her about four weeks ago, at her last office visit when she was diagnosed with high blood pressure. She describes the cough as dry, intermittent and nagging. It has been present daily since starting her Lisinopril. She has not taken anything to alleviate her symptoms and has continued to take her Lisinopril as prescribed. She denies any stomachache, fatigue, change in urination, or decreased libido in relation to starting her Lisinopril. Patient is a nonsmoker and denies starting any other new medications or diet, but she has questions regarding the “DASH diet” and wonders if this would be beneficial for her. The patient denies any prior diet or exercise interventions. Her cardiovascular review of systems was negative for shortness of breath, chest pain, palpitations, headaches, lightheadedness, stroke, TIA, edema, or vision changes. The remainder of her review of systems was negative.

Past Medical/Surgical History

- Hypertension
- Cholecystectomy
- Tubal Ligation

Current Medications

- Lisinopril 20 mg daily
- Tylenol 325 mg PRN

- Women's Multivitamin daily

Allergies

- None

Physical Exam

- Vital Signs: BP 142/78mm/Hg HR 72 BMI 27kg/m²
- General Appearance: Pleasant, alert, appropriate appearance for age. No acute distress
- Cardiovascular: Regular rate and rhythm. S1, S2, no murmur, click, gallop, or rubs. No carotid bruits. Pedal and radial pulses palpable without edema
- Pulmonary: Clear to auscultation with normal inspiratory effort of 18 breaths per minute, no cough elicited during time of exam
- Neurological: Alert and oriented to person, place, time and situation, Cranial nerves II-XII grossly intact
- Integumentary: normal in appearance, temperature, and texture.

Lab Tests

- Complete Blood Count: within normal limits
- Basic Metabolic Panel: BUN 28mg/dl, Glucose (non-fasting) 120mg/dl, all other results within normal limits

Diagnosis

- Cough, angiotension-converting enzyme induced
- Hypertension, uncontrolled

Treatment

The patient was instructed to stop taking Lisinopril 20mg and was reeducated about the side effect of cough development with use of an angiotensin-converting enzyme (ACE) inhibitor.

If she does not notice alleviation of her cough after discontinuation of this medication she is to follow up in clinic prior to her next scheduled appointment. After further discussion about the management of her hypertension, we decided to try a calcium channel blocker, Amlodipine (Norvasc) 5 mg daily, in addition to lifestyle modifications, with plans to discontinue antihypertensive medication therapy if blood pressure goals are met through nonpharmacological management alone. The patient's current BMI is 27kg/m²; she expressed the desire and motivation to lose weight and asked for information regarding the "Dash Diet". A referral was made to the dietitian in addition written material was provided regarding the DASH diet. A detailed discussion on personal goals and the patient's ability to meet these goals was conducted at this visit. She has plans to enroll herself in a formal walking program that meets four days a week.

Follow Up

A follow up appointment was made a week from today to assess for side effects of her new medication, to monitor her progress with the DASH diet and walking program and to answer any further questions that may arise regarding her hypertension. A four week appointment was also made for continuity of care.

Literature Review

The DASH diet has many potential health benefits that can target specific cardiovascular risk factors. For the purpose of this literature review, gathered data was focused on the effects of blood pressure reduction specifically. As stated previously, this paper serves to answer whether the DASH diet, in addition to maintaining a healthy lifestyle reduces the need for antihypertensive medications. The patient above represents a prime subject for lifestyle changes such as reduction in weight to maximize reduction in blood pressure. A literature review was

conducted using a computer search of the University of North Dakota Harley French library website in order to find evidence for this report. CINAHL, PubMed and Cochrane databases were searched for current literature pertaining to the DASH diet as a means for hypertension management. A total of 12 articles were selected using the combined databases that best supported the clinical question for this case report in addition to their diversity on the subject matter.

It was found that the intervention of the DASH diet resulted in significant reduction in systolic and diastolic blood pressure, and prevention of future development of hypertension. However, the length of time it reduced hypertension, the setting, the population and the level of reduction in blood pressure all varied per article. Several studies had additional factors that were measured in creating positive outcomes that were complimentary to the DASH diet. Two studies focused on supportive measures for maintaining the DASH diet successfully.

A systematic review with meta-analysis compiling research from 1997-2015 found responses in blood pressure reduction was greater in patients that had higher blood pressures and/or higher BMI at the baseline when using the DASH diet as a primary intervention (Siervo et al., 2015). Jane Doe with a BMI of 27kg/m² would have a less significant reduction in blood pressure than if her BMI had been 35kg/m². Because Jane Doe's blood pressure is bordering the line of hypertension at 142/78 mm/Hg while on Lisinopril, lifestyle changes would be an optimal choice for her in decreasing her blood pressure without the use of medication. Weight reduction could be seen in as little as 4 weeks' time (Sacks, 2015). Weight reduction alone lowers blood pressure by 5-10mm/Hg (Dunphy et al., 2015).

Weight reduction, although more desirable, is not the only way to decrease blood pressure; "the effect (of the DASH diet) on blood pressure can be independent of weight change"

(Lima, da Silva Nalin, França, Filho, & Sichieri, 2013). Another cross-over random control trial purposely modified the DASH diet to maintain its subject's current body weight; in this trial it was found that only diastolic blood pressure elevation was reduced in this situation (Saneei, Hashemipour, Kelishadi, Rajaei, & Esmailzadeh, 2013). Without modifications, the specific foods included and excluded in the DASH diet have been linked to its' beneficial effects on blood pressure, especially in obese populations to lose weight and decrease their blood pressure (Salehi-Abargouei, Maghsoudi, Shirani, & Azadbakht, 2013). The DASH diet lowers blood pressure on average by 14-18mm/Hg; Jane Doe not only aspires to follow this diet for the blood pressure reduction benefit but to lose weight by doing so as well (Dunphy et al., 2015).

Many of the effects of hypertension can go unnoticed to the patient with this diagnosis due to its tendency to be symptomless. Jane Doe had no complaints or symptoms noted in her exam when questioned. This can create a challenge for primary care providers to treat hypertensive individuals if they do not come into the clinic setting for a regular physical. Hypertension is often associated with other comorbid diseases such as diabetes that may bring them into a primary care clinic but it is not guaranteed (de Paula et al., 2012). In Jane Doe's case, she has no other comorbid diseases at this time, but has potential for the development of them if her hypertension is not managed appropriately. Currently, her non-fasting blood glucose is slightly elevated at 120mg/dl; with diet modifications it may be possible to help her avoid further elevation. A proper patient and provider partnership is vital for the successful management of hypertension with the DASH diet intervention, since it is a lifestyle modification. In the literature, "the most successful approaches to therapy to achieve this is to incorporate a personalized, patient-centered self-management plan, while giving the patient the necessary tools to implement these behaviors and thus control their disease" (Ae, Fritschi, & Kim, 2012).

The DASH diet can be a manageable tool for Jane Doe if used through the support and guidance of her primary care provider. It has been shown “where PCPs can endorse and deliver brief interventions to support the kind of intensive interventions required for more than minimal to moderate influence and that can be delivered by other allied health professions” (Lin et al., 2013). For this patient, the dietitian has been consulted for their expertise and collaboration of care without the need of pharmaceuticals. Jane Doe can also be monitored closely through her follow up appointments with objective documentation of her blood pressure and physical examination as well as assessment of her subjective symptoms through her providers questioning. Compliance can also be encouraged and assessed at these visits, giving Jane Doe ample opportunity to ask questions and receive timely constructive feedback on her progress. The empowerment offered to Jane Doe through her plans for a formalized four day a week walking program can be highly effective in meeting her initial exercise needs (Ae et al., 2012). “Brisk walking as regular aerobic activity at least 30min per day, most days of the week can lower blood pressure by 4-9mm/Hg” (Dunphy et al., 2015). All of the above demonstrate the optimal effect a team approach can bring for the DASH diet and lifestyle modification interventions.

Several studies emphasized the DASH diet in addition to other measures for blood pressure reduction. In a cross sectional study by de Paula et al., the DASH diet with an emphasis on fruit and vegetable intake, was associated with reduced blood pressure values for diabetic patients, even with a lower percent compliance pattern (2012). Jane Doe does not have the diagnosis of diabetes but does have elevated non-fasting blood glucose as seen above. Further work up is needed to assess her for the risk factors for the development of diabetes. A recent article in the American Journal of Clinical Nutrition found that pork was substituted for chicken

and fish with similar blood pressure lowering effects (September 2015 new in review., 2015).

This demonstrates that there are options and variety for the patient to choose from when implementing diet changes. Another study showed blood pressure lowering effects in addition to a blood pressure protective role, with the use of the DASH and a low gastrointestinal diet (Lima et al., 2013). The patients in this study were mainly Brazilian females being monitored through a primary care facility. Jane Doe would have monitoring and follow up through her primary care provider much like the patients in this study.

In contrast, a prospective study was conducted to evaluate the long term effects of blood pressure reduction in adults with a mean age of 52.5 years old. It was found that “long-term concordance with the DASH diet was not associated with a decreasing blood pressure trajectory over time, or with decreased incidence of hypertension” (Jiang & Liu, 2015). This suggests that the blood pressure lowering effects initially seen with the DASH diet are not permanent. This study, however, focused primarily on Caucasian individuals who started out with blood pressure means of 120 mm/Hg and had self-rated DASH scores. Jane Doe is a middle age African American woman who has hypertension as a diagnosis. This single study should not deter her from choosing this intervention as a means of blood pressure reduction. The initial blood pressure effects should not be discarded; she still has time to prevent further organ damage. The age related effects on blood pressure such as arterial stiffening also need to be considered as a rationale for gradual increase in systolic blood pressure among other age related physical changes (Sacks, 2015). More research needs to be conducted with a diverse population regarding lasting effects of maintaining the DASH diet as an effective intervention without pharmacodynamics. This study also did not have the intensive support measures for follow up that Jane Doe will have.

Conclusion

In conclusion, the DASH diet is not a means to an end, but a tool to help support an individual meet certain health maintenance goals. If Jane Doe were able to follow the DASH diet and commit to her exercise program she could potentially lower her blood pressure to an acceptable range without the need of pharmaceuticals as supported by this literature review. Supporting her through collaboration with other allied health professionals, like the dietitian, would help make the successfulness of this tool more probable (Lin et al., 2013). It is unknown as to the length of time that her blood pressure could be maintained without the need for antihypertensive medications, but the benefits would outweigh the risks for a trial. The benefits would also meet her personal goals and contribute to a healthier lifestyle and prevention of other comorbid diseases (Effects of comprehensive lifestyle modification on blood pressure control: Main results of the PREMIER clinical trial., 2003). According to Sacks, the DASH diet can actually be superior to drug treatment since hypertension is multifactorial it is only appropriate to respond in kind with its treatment (2015).

Learning Points

- Lifestyle modifications should be used as a part of every patient's regimen to prevent or treat elevated blood pressure.
- The DASH diet is an effective treatment option for hypertensive individuals, especially if their BMI is greater than 27kg/m² and they are of African American descent and female.
- Best practice for optimal effect of the DASH diet intervention for hypertension management would be a multidisciplinary team approach with willingness to collaborate with the patient in a joined decision making process.

- The DASH diet in addition to lifestyle modifications does reduce the need for antihypertensive medications.

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