

## CASE REPORT

# Exclusively plant, whole-food diet for polypharmacy due to persistent atrial fibrillation, ischaemic cardiomyopathy, hyperlipidaemia and hypertension in an octogenarian

Andrew B Beauchesne,<sup>1</sup> Alan C Goldhamer,<sup>2</sup> Toshia R Myers<sup>3</sup>

<sup>1</sup>Tufts University School of Medicine, Boston, Massachusetts, USA

<sup>2</sup>Nutritional Medicine, TrueNorth Health Center, Santa Rosa, California, USA

<sup>3</sup>Research, TrueNorth Health Foundation, Santa Rosa, California, USA

## Correspondence to

Dr Alan C Goldhamer, dragc@comcast.net

Accepted 24 November 2018

## SUMMARY

Polypharmacy is common and associated with negative health outcomes in the elderly. We report the case of an 82-year-old man with a history of polypharmacy due to coronary artery disease, myocardial infarction, ischaemic cardiomyopathy, hyperlipidaemia, hypertension and persistent atrial fibrillation who presented with memory loss, cognitive impairment, fatigue and weakness. His treatment plan included an exclusively plant, whole-food diet and moderate physical activity which resulted in a rapid reduction of hyperlipidaemia and high blood pressure and the discontinuation of statin, antihypertensive and beta blocker drug therapy. The patient also reported reversal of impaired cognition and symptoms associated with atrial fibrillation and ischaemic cardiomyopathy, including light-headedness, fatigue and weakness. This case demonstrates that dietary and lifestyle modifications have the potential to improve symptoms of cardiovascular disease and reduce polypharmacy along with associated negative consequences in the elderly.

## BACKGROUND

Polypharmacy is commonly defined as the use of multiple or unnecessary medications. In the elderly, polypharmacy is a long-standing issue with reported rates between 30% and 70% due to multiple chronic disease diagnoses, misidentified adverse drug reactions or both.<sup>1–3</sup> Polypharmacy is associated with increased healthcare costs, adverse drug events and interactions, medication non-adherence, decreased functional ability to perform activities of daily living, falls, malnutrition, urinary incontinence, impaired cognition and mortality.<sup>1</sup> It has been reported that as many as 75% of polypharmacy-related adverse events are potentially preventable,<sup>4</sup> and there is recent interest in deprescribing or reducing the number of unnecessary medications.<sup>3,5</sup> Cardiovascular disease is the leading cause of death in the USA and globally.<sup>6</sup> According to National Health and Nutrition Examination Survey data, approximately 85% of US adults over the age of 80 have cardiovascular disease.<sup>6</sup> Current treatment guidelines for cardiovascular disease recommend both pharmaceutical therapy and lifestyle modifications, such as diet and physical activity.<sup>7,8</sup> Yet commonly used medications provide low absolute

risk reduction of cardiovascular events and all-cause mortality<sup>9,10</sup> and pose significant risk of adverse events.<sup>11,12</sup> Furthermore, most physicians feel inadequately trained to advise patients about food and eating behaviour,<sup>13</sup> and less than half of primary care physicians routinely discuss diet with patients diagnosed with cardiovascular disease.<sup>14</sup> However, intensive lifestyle modifications, including plant-based diets, have shown high rates of adherence and acceptability in multiple patient populations.<sup>15</sup>

The case reported here establishes a basis for the use of an exclusively plant, whole-food diet free of salt, oil and sugar (SOS-free) and moderate physical activity to improve cardiovascular risk biomarkers, reverse symptoms associated with atrial fibrillation and ischaemic cardiomyopathy and reduce polypharmacy in the elderly.

## CASE PRESENTATION

On 20 December 2017, an 82-year-old man with a history of coronary artery disease, hyperlipidaemia, hypertension and persistent atrial fibrillation was hospitalised with an acute myocardial infarction (MI). He had thrombotic occlusion of his right coronary artery and a stent was deployed. Left ventricular ejection fraction was calculated to be approximately 30% by echocardiogram. His medications included atorvastatin 40 mg daily, clopidogrel 75 mg daily and furosemide 40 mg daily. Aspirin 81 mg daily and carvedilol 6.25 mg two times per day were added to his regimen. The physician had advised the patient not to take anti-coagulation therapy due to concern for potential falling and traumatic injury. ACE inhibitor therapy was not taken for unknown reasons.

On 3 January 2018, the patient followed up with his cardiologist and reported weakness, light-headedness and loss of balance. He weighed 62 kg with a body mass index (BMI) of 20.8 kg/m<sup>2</sup> and had a medication-controlled blood pressure of 110/70 mm Hg. On physical examination, his heart demonstrated irregular rhythm. He was instructed to continue all current medications and was referred for outpatient cardiac rehabilitation.

On 5 February 2018, the patient presented to our alternative health centre with an expressed interest in lifestyle changes to improve his health and discontinue medication therapy. He reported a history of



© BMJ Publishing Group Limited 2018. No commercial re-use. See rights and permissions. Published by BMJ.

**To cite:** Beauchesne AB, Goldhamer AC, Myers TR. *BMJ Case Rep* 2018;**11**:e227059. doi:10.1136/bcr-2018-227059

**Table 1** Anthropometric measurements, laboratory findings and medication use by date

Measure	6 December 2017	2 May 2018	13 June 2018	28 June 2018
Body weight (kg)	ND	63	59	60
Blood pressure (mm Hg)	ND	148/89	122/79	99/65
Total cholesterol (mg/dL)	188	138	133	129
Triglycerides (mg/dL)	68	91	112	82
HDLc (mg/dL)	59	48	37	43
LDLc (mg/dL)	115	72	74	70
Carvedilol	Yes	Yes	No	No
Atorvastatin	Yes	Yes	No	No
Furosemide	Yes	Half	No	No
Clopidogrel	Yes	Yes	Yes	Yes

HDLc, high-density lipoprotein cholesterol; LDLc, low-density lipoprotein cholesterol; ND, no data available.

coronary artery disease, MI, ischaemic cardiomyopathy, medication-controlled hypertension and hyperlipidaemia, persistent atrial fibrillation, memory loss and cognitive impairment.

## TREATMENT

On 5 February 2018, the patient's physician advised an outpatient treatment plan of an exclusively plant, whole-food, SOS-free diet, daily exercise of 30 min and regular stress relief such as mind-body practice or social engagement. These lifestyle modifications were in part recommended with the intention of reducing the need for multiple medications. The patient planned to make these lifestyle modifications and return as an inpatient in the near future.

On 30 April 2018, the patient arrived for inpatient care. A diet including ad libitum raw fruits and vegetables, steamed and baked vegetables, whole grains, and legumes was strictly implemented. Small amounts of raw, unsalted nuts and seeds were included. All animal products, added sugar, oil and salt, and other highly processed foods were excluded. He was encouraged to attend health educational classes and continue to engage in regular physical activity.

## OUTCOME AND FOLLOW-UP

On 30 April 2018, after making lifestyle modifications as an outpatient for 12 weeks, the patient's total cholesterol had dropped from 188 to 138 mg/dL (4.87 to 3.58 mmol/L) and low-density lipoprotein had dropped from 115 to 72 mg/dL (2.98 to 1.87 mmol/L) (table 1). Per physician recommendation, the patient's dose of furosemide was reduced by half. Vitals and a lipid panel were taken on 2 May 2018 (table 1).

On 17 May 2018, 17 days after arriving for inpatient care and with physician approval, the patient discontinued furosemide with no subsequent lower extremity oedema. On 27 May 2018, he discontinued atorvastatin and decreased his carvedilol dose by half. The treating physician and patient chose to not follow medical guidelines for congestive heart failure and completely discontinued carvedilol on 5 June 2018. On 7 June 2018, the patient reported that he felt 'much better' and could 'think clearly.' He denied chest pain, shortness of breath, light-headedness, fatigue, weakness and mental fog. On 12 June 2018, the patient reported increased fatigue, which was improved by increasing the caloric content and variety of his meals with more whole grains, legumes and avocado, and permitting a minimal amount of salt.

On 21 June 2018, the patient reported that his light-headedness and 'brain fog' had completely resolved. His plasma lipid improvement was sustained despite the discontinuation of atorvastatin (table 1). On 2 July 2018, the patient saw his cardiologist for follow-up. He had a weight of 59 kg, a BMI of 19.4 kg/m<sup>2</sup> and an unmedicated blood pressure of 110/70 mm Hg. On physical examination, his heart was in sinus rhythm and he had no symptoms of atrial fibrillation. An echocardiogram was not clinically indicated. The patient continues to take aspirin 81 mg daily and clopidogrel 75 mg daily but plans on discontinuing clopidogrel at 12 months post-MI as per guidelines for acute coronary syndrome.

## DISCUSSION

Adherence to an exclusively plant, whole-food, SOS-free diet and moderate physical activity improved this elderly patient's lipid profile and blood pressure to the point that he could safely discontinue statin, antihypertensive and beta blocker drug therapy. The patient reported improvement in several symptoms associated with both polypharmacy and his cardiac diagnoses, including fatigue, weakness, light-headedness and cognition.

This case is consistent with literature showing that plant-based diets effectively improve plasma lipids<sup>16</sup> as well as reduce body weight,<sup>15 17 18</sup> blood pressure<sup>19-21</sup> and polypharmacy.<sup>17 19 22</sup> Reduced polypharmacy further decreases the risk for falls, adverse drug events, mortality and other negative outcomes in the elderly.<sup>1 23</sup>

Overall, this case demonstrates that dietary and lifestyle modifications can potentially improve hyperlipidaemia, high blood pressure and symptoms associated with atrial fibrillation and ischaemic cardiomyopathy, which can subsequently reduce

## Patient's perspective

In December 2017, I suffered a near-fatal heart attack and was rushed to the hospital. I immediately had a stent put in. The following day, I was prescribed a number of drugs to manage my condition. My brain fog got worse and I felt tired all the time. During the hospital cardiac treatment programme, my physical therapist told me about TrueNorth Health Center (TNHC) and the idea of food as medicine. I decided enough was enough. I had already lost four years of my life to medication-induced brain fog. I wasn't going to sacrifice more.

I had been eating a wholesome Mediterranean diet including meat and cheese. In an outpatient consultation, my physician at TNHC educated me on the benefits of strict vegetarianism. I immediately cut out the cheese, meat, oil, and wine, and ate more fresh vegetables at meals.

I eventually checked into TNHC as a resident to further clean up my diet. My physician and I made a plan to gradually reduce my medications, which brought back my sense of well-being. I extended my stay several times because I continued to feel better. I now have the strength to lift weights and walk and run on the treadmill an hour every day. I feel more alive than I have for years. I wake up each morning with a clear head and happy heart, grateful to not have to take a handful of drugs.

Even though I'm not perfect with my diet, I've seen huge benefits from eating this way. My blood tests have shown remarkable improvement, which keeps me motivated to stay on track. Because of my improvement, my cardiologist suggested I could let go of the Clopidogrel in three months.

Eating this food gave me an opportunity to reclaim my health.

the need for polypharmacy. Additional research is necessary to determine whether or not this approach can significantly improve rates of cardiovascular disease, impaired cognition and polypharmacy in the elderly.

### Learning points

- ▶ Polypharmacy is a growing concern due to its negative consequences, especially in elderly patients.
- ▶ An exclusively plant, whole-food, SOS-free diet and subsequent reduction in polypharmacy in an 82-year-old patient:
  - Improved hyperlipidaemia and high blood pressure, despite discontinuation of statin, antihypertensive and other medications.
  - Appeared to reverse impaired cognition and symptoms associated with atrial fibrillation and ischaemic cardiomyopathy, including light-headedness, fatigue and weakness.
  - Decreased risk for falls, adverse drug events, mortality and other negative outcomes associated with polypharmacy.
- ▶ Intensive lifestyle modifications for heart disease may be underused, especially in the very elderly.

**Contributors** ABB and TRM contributed to the conception and design and analysis and interpretation of data. ABB contributed to the acquisition of data and drafting of the article. ACG and TRM contributed to revising the article critically for important intellectual content. All authors approved the final version and agree to be accountable for the article and to ensure that all questions regarding the accuracy or integrity of the article are investigated and resolved.

**Funding** The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

**Competing interests** None declared.

**Patient consent for publication** Obtained.

**Provenance and peer review** Not commissioned; externally peer reviewed.

### REFERENCES

- 1 Maher RL, Hanlon J, Hajjar ER. Clinical consequences of polypharmacy in elderly. *Expert Opin Drug Saf* 2014;13:57–65.
- 2 Dagli RJ, Sharma A. Polypharmacy: a global risk factor for elderly people. *J Int Oral Health* 2014;6:i-ii.
- 3 Machado-Alba JE, Gaviria-Mendoza A, Machado-Duque ME, et al. Deprescribing: a new goal focused on the patient. *Expert Opin Drug Saf* 2017;16:111–2.

- 4 Scott IA, Anderson K, Freeman CR, et al. First do no harm: a real need to deprescribe in older patients. *Med J Aust* 2014;201:390–2.
- 5 Simões PA, Santiago LM, Simões JA. Deprescribing in primary care in Portugal (DePil17-20): a three-phase observational and experimental study protocol. *BMJ Open* 2018;8:e019542.
- 6 Benjamin EJ, Virani SS, Callaway CW, et al. Heart disease and stroke statistics-2018 update: a report from the American heart association. *Circulation* 2018;137:e67–492.
- 7 Eckel RH, Jakicic JM, Ard JD, et al. 2013 AHA/ACC guideline on lifestyle management to reduce cardiovascular risk: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation* 2014;129:S76–99.
- 8 Stone NJ, Robinson JG, Lichtenstein AH, et al. 2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol* 2014;63(25 Pt B):2889–934.
- 9 Trewby P, Reddy A, Trewby C, et al. Are preventive drugs preventive enough? A study of patients' expectation of benefit from preventive drugs. *Clin Med* 2002;2:527–33.
- 10 Ho CLB, Breslin M, Doust J, et al. Effectiveness of blood pressure-lowering drug treatment by levels of absolute risk: post hoc analysis of the Australian National Blood Pressure Study. *BMJ Open* 2018;8:e017723.
- 11 Bays H. Statin safety: an overview and assessment of the data—2005. *Am J Cardiol* 2006;97(8A):S6–26.
- 12 Golomb BA, Evans MA. Statin adverse effects: a review of the literature and evidence for a mitochondrial mechanism. *Am J Cardiovasc Drugs* 2008;8:373–418.
- 13 Vetter ML, Herring SJ, Sood M, et al. What do resident physicians know about nutrition? An evaluation of attitudes, self-perceived proficiency and knowledge. *J Am Coll Nutr* 2008;27:287–98.
- 14 Kolasa KM, Rickett K. Barriers to providing nutrition counseling cited by physicians: a survey of primary care practitioners. *Nutr Clin Pract* 2010;25:502–9.
- 15 Turner-McGrievy G, Mandes T, Crimmaro A. A plant-based diet for overweight and obesity prevention and treatment. *J Geriatr Cardiol* 2017;14:1671–5411.
- 16 Ferdowsian HR, Barnard ND. Effects of plant-based diets on plasma lipids. *Am J Cardiol* 2009;104:947–56.
- 17 Wright N, Wilson L, Smith M, et al. The BROAD study: A randomised controlled trial using a whole food plant-based diet in the community for obesity, ischaemic heart disease or diabetes. *Nutr Diabetes* 2017;7:e256.
- 18 Huang RY, Huang CC, Hu FB, et al. Vegetarian diets and weight reduction: a meta-analysis of randomized controlled trials. *J Gen Intern Med* 2016;31:109–16.
- 19 Lindahl O, Lindwall L, Spångberg A, et al. A vegan regimen with reduced medication in the treatment of hypertension. *Br J Nutr* 1984;52:11–20.
- 20 Chuang SY, Chiu TH, Lee CY, et al. Vegetarian diet reduces the risk of hypertension independent of abdominal obesity and inflammation: a prospective study. *J Hypertens* 2016;34:2164–71.
- 21 Yokoyama Y, Nishimura K, Barnard ND, et al. Vegetarian diets and blood pressure: a meta-analysis. *JAMA Intern Med* 2014;174:577–87.
- 22 Ornish D, Scherwitz LW, Billings JH, et al. Intensive lifestyle changes for reversal of coronary heart disease. *JAMA* 1998;280:2001–7.
- 23 Gómez C, Vega-Quiroga S, Bermejo-Pareja F, et al. Polypharmacy in the elderly: a marker of increased risk of mortality in a population-based prospective study (NEDICES). *Gerontology* 2015;61:301–9.

Copyright 2018 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <https://www.bmj.com/company/products-services/rights-and-licensing/permissions/> BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact [consortiasales@bmjgroup.com](mailto:consortiasales@bmjgroup.com)

Visit [casereports.bmj.com](http://casereports.bmj.com) for more articles like this and to become a Fellow