UCDAVIS HEALTH | BETTY IRENE MOORE SCHOOL OF NURSING

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Plant Based Diet and Traditional Pharmacotherapy in the Management of Type 2 Diabetes

Introduction

Diabetes is a chronic disease depicted by elevated blood glucose levels that can eventually lead to damaged organs. Blood sugar levels can be kept within normal levels and controlled by diet, medications, or a combination of the two. An A1C test can evaluate an individual's level of glucose control by showing the average blood sugar over the last 90 days as a percentage. In our research, we reviewed literature to address the following question: Among patients with type 2 diabetes, how effective is pharmacotherapy alone vs the addition of a plant-based diet in reducing the patient's HbA1C?

Design/Sample

Design: Literature Review of pharmacological and nonpharmacological articles involving a systematic review of randomized clinical trials with meta-analysis

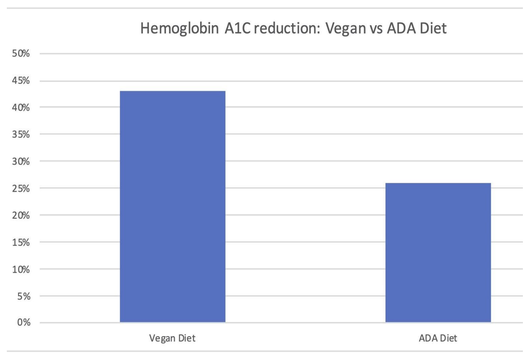
Sample: Randomized controlled trials among middle aged adults with Type II DM

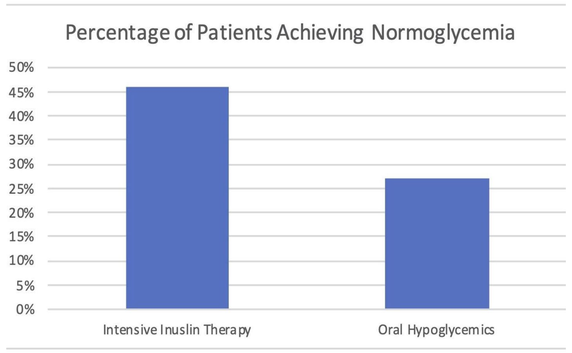
Analysis

- The gold standard for Type II DM is metformin due to effective A1C% reduction. In addition, Metformin based dual therapy had higher rates of hemoglobin A1C reduction than monotherapy.
- Alternatively, a 2-4 week early intensive insulin therapy resulted in normoglycemic levels in 46% of patients and 90% of patients achieving glycemic goals. After the 2-4 weeks, patients would discontinue insulin therapy and continue with lifestyle modifications.
- There are data suggesting lifestyle modifications can improve treatment modalities. For example, adherence to a vegan or vegetarian diet was associated with a significant reduction in HbA1C compared with a conventional diet in conjunction with insulin medication.

Results

Author/Date	Design	Sample	Measures	Analysis	Major Findings and Implications/Application to Clinical Practice
Jia 2018	Meta-analysis (Level I)	75 randomized controlled trials	Hemoglobin A1C reduction for monotherapies of popular antidiabetic agents.	Numeric analysis of glycemic control was favored in analysis over the side effect profiles of some drugs.	Both metformin and repaglinide had similar outcomes for glycemic control. Both should be recommended in clinical use for oral monotherapy.
Maruther et al 2016	Systematic Review (Level I)	179 trials and 25 observational studies	Participants reporting side effects from medication and long-term mortality reports. Efficacy of A1C reduction in multiple drug combinations.	Effects of medications on participants and the relative risks of each medication class.	Metformin is the best option for monotherapy management of type 2 diabetes for mortality, side effects, and efficacy. Dual therapies were similarly as effective as metformin alone.
Remde et al 2021	Systematic Review (Level I)	84 randomized controlled trials and trials of non-randomized experimental design	Assess the efficacy of plant-predominant diets in treating obesity and its main cardiometabolic sequelae (DMT2)	Scrutinized the relationship between diabetes and plant-predominant diets, assessed vegan, vegetarian and plant based whole foods	Plant predominant diet can play a major role in reversing the obesity and chronic disease epidemics. In the setting of sustained lifestyle intervention programs, they may arrest or even reverse DM2
Sumamo Schellenberg 2013	Systematic Review (Level I)	78 studies: 20 unique RCT studies with 58 associated publications	Numeric surrogate measures such as blood pressure and weight change for patients with DM2 and those at risk for DM2.	Predict the long term outcomes and mortality of patients with DM2 and risk for DM2.	While lifestyle interventions are useful for mortality prevention and preventing DM2, the outcomes are unclear in the population with DM2 already.
Tsapas et al 2020	Systematic Review (Level I)	453 trials	Participants in studies having cardiovascular side effects from oral antidiabetic agents and the A1C reduction of these drugs.	Glycemic outcomes and cardiovascular outcomes were similar among drug classes with few exceptions.	No significant cardiovascular risks are present in any one drug class of antidiabetics. This should not prevent patients with heart disease from using oral antidiabetic agents.
Weng et al 2008	Randomized Controlled Trial (Level I)	382 patients from 9 different centers	Benefits of using initial intensive insulin therapy vs. oral agents alone in newly diagnosed patients w/ T2DM.	Normoglycemia lasting 12+ months in 46% of intensive insulin group compared to 27% of oral agent group. 90% of Insulin group reached glycemic goals in 4-5.6 days compared to 84% of the oral agent group in 9.3 days.	Initial intensive insulin therapy improved long-term glycemic control in a larger percentage of patients and achieved glycemic goals in a shorter amount of time than oral agents alone.
Wallia & Molitch 2014	Clinical Practice Guideline-(Level IV)	100 scientific peer reviewed articles	Reviewed the efficacy and appropriateness of current insulin therapy practices by measuring effect on HbA1C.	HbA1C <7% reached by 2 out of 3 patients with long-acting insulin analogs combined with metformin.	Insulin therapy is recommended in patients unable to reach glycemic control with 2 or more oral agents and in patients with fasting plasma glucose levels >250 mg/dL and/or HbA1C >10%.
Kahleova et al 2020	Case Study (Level V)	one case report	Hg A1C and serum cholesterol change with the adoption of a carbohydrate-rich plant-based diet.	Subject was able to reduce her insulin dosage, her cholesterol fell to 158 mg/dl, and her A1c stabilized at 5.4%.	adopting a plant-based diet rich in whole carbohydrates led to improved glucose control in patients with insulin-dependent diabetes
Physicians Committee for Responsible Medicine. 2020	Case Study (Level V)	one case report	Weight loss and HgA1C	the patient lost weight, his A1c fell from 6.2% to 5.5%-5.8%, with the result that he required less insulin to control blood glucose.	adopting a plant-based diet can improve glucose control in insulin-dependent diabetics
Storz 2020	Literature Review (Level V)	6 Studies	HbA1C lowering plant-based diet studies are compared to determine if plant-based diets can offer the benefit of reduction of medication needs.	HbA1C lowering plant-based diet studies are compared in terms of their medication-lowering potential.	Findings suggest plant-based diets can offer the benefit of reduction of medication needs based on effects on glycemic control and weight control.





Summary

- Metformin has increased efficacy when combined with long-acting insulin analogs
- There is benefit in intensive insulin therapy at the beginning of the disease course
- Thiazolidinediones, and sulfonylureas all reduced hemoglobin A1C levels a similar amount when used as a monotherapy
- Metformin gold standard
- Plant based diet is effective at lowering HbA1C in combination with pharmacotherapy.

Conclusions/Further Study

- Metformin is the best initial pharmacologic choice for managing DM2 (Hgb A1C > 6.5%). Additional oral agents or injectable agents may be used to achieve glycemic control.
- For prediabetic patients (Hgb A1C 5.7%-6.4%) a plant-based diet could be recommended along with other healthy lifestyle modifications.
- More research is needed to confirm the efficacy of a plant-based diet in Hgb A1C reduction. Pharmacotherapy remains the most effective and most studied modality of DM2 treatment.