Effect of Gluten on the Vascular System

Senior Research Paper

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Abstract

The goal of this article is for the authors to demonstrate if there is a correlation between dietary gluten intake and the vascular system.

Introduction

The project consisted of a randomized study of 10 participants ranging from 22 years old to 29, with 26 being the average.

Methods

Ten participants maintained a gluten-free diet for two weeks, and then consumed a gluten muffin as their blood pressure was monitored.

Statistics

The pulse and blood pressure, during the hour immediately after eating the gluten-free muffin, were 69.7 and 113/66 mm Hg respectively.

Results

The results were similar to what was expected, as it showed to affect about 50% of the participants. Not enough data was achieved to comfortably make a real decision. Further studies should be performed to determine further reliability.

Introduction

For this research project we chose to study the effects of gluten on the vascular system components, pulse and blood pressure.

High blood pressure is a common condition in which the force of blood against one's arterial walls is high enough that it may eventually cause health problems, such as heart disease(2). High blood pressure affects about 1 in every 3 Americans(1). It can lead to heart disease, congestive heart failure, kidney disease, and stroke. About 33 percent of Americans are on at least one medication for controlling high blood pressure(1). Diet may play a huge role in controlling this(4). There is not much research that has been done regarding the effects of gluten and blood pressure, but a lot of conversation states that about 50 percent of people have seen positive benefits.

Based on data we have heard in conversation, we expected to see a drop in blood pressure in about half of the participants. Our objective was to determine if there is a correlation between dietary gluten content and pulse/blood pressure and to note any benefits that may accrue for modifying the gluten content of a given diet.

The experimental design allowed us to check the blood pressure of participants immediately after consuming a gluten muffin, 15 minutes after, 30 minutes after, 45 minutes after, and 60 minutes after. This design allowed us to note any lowering of pulse/blood pressure, and if so, at

what point the decrease appeared. With this design, we were able to determine if there was a benefit, how quickly the benefits take place, and if there was a point where the benefit ceased.

Methods

The experiment was a randomized study. There were 10 participants, 4 females and 6 males. The participants averaged in age from 22 to 29 with 26 years of age being the average. All participants denied having health issues, including celiac disease, hypertension, common cold, flu, and vascular issues. All female participants denied being pregnant. The idea of the study was proposed to the Logan College of Chiropractic IRB and approved in March of 2011.

For the study, participants were asked to take their pulse daily around noon. They were to obtain these numbers for two weeks. During these two weeks, the participants were to maintain a diet free of gluten. The participants were all given a sample diet, gluten free recipes, and websites to help create a gluten-free menu.

When the two-week period was up, the participants came to a room where the two researchers, who are experienced in taking pulse and blood pressure, were set up. The researchers took the pulse and blood pressure of each participant. The participants then consumed a pre-made gluten muffin, see appendix 1. After ingestion of the muffin, the patients were instructed to sit and relax. The researchers then tested the

blood pressures of all participants 15, 30, 45, and 60 minutes after the consumption of the muffins.

Statistics

For this particular study, there were several opportunities for experimental errors. Having the participant's check their own pulse daily for two weeks would allow for error, as well as the not monitoring the participants' actual diet. The study only had 10 participants, also allowing for some error due to the fact that the study wasn't broad enough and that all 10 participants were healthy with normal blood pressures. The standard deviation for the pulse came out to be 3.976.

Results

For this study, the average pulse was 69.7, while the average blood pressure was 113/66. A standard deviation of 3.976 was found for the pulse. A majority of the participants fell within 0 deviations from the mean. Some of the participants saw a minor drop in both systole and diastole blood pressure, but about half saw little to no change.

Table 1

PULSE	Day 1	Day 14	Diff from Mean	St. Dev.
1	62	61	-7.7	2
2	78	78	7.7	2
3	68	66	-3.7	1
4	72	72	2.3	0
5	68	66	-1.7	0
6	74	76	1.3	0
7	72	70	-1.7	0
8	68	68	3.3	1
9	71	70	1.3	0
10	64	63	-.7	0

Table 2

Prior to Ingestion	Pulse	Blood Pressure	Change in BP
1	62	111/58	1mm/2mm
2	79	120/74	4mm/4mm
3	68	116/76	4mm/0mm
4	72	120/78	2mm/2mm
5	68	114/64	0mm/0mm
6	72	110/58	0mm/2mm
7	70	120/76	4mm/0mm
8	72	114/60	0mm/0mm
9	74	110/60	0mm/0mm
10	70	110/58	0mm/0mm

Table 3

After Ingestion	15 Min Pulse	15 Min BP	30 Min Pulse	30 Min BP	45 Min Pulse	45 Min BP	60 Min Pulse	60 Min BP	Mean BP
1	61	112/58	60	111/58	58	112/60	58	110/60	111/59
2	78	118/74	79	120/74	78	120/74	74	116/70	119.5/74
3	75	115/78	76	115/76	76	112/76	74	112/76	113.5/76.5
4	74	121/78	74	120/78	72	118/76	72	118/76	119.25/77
5	71	112/64	72	115/64	70	115/64	70	114/64	114.25/64
6	77	110/58	78	110/58	74	110/60	70	110/60	110/59
7	74	120/80	70	120/78	70	116/76	68	116/76	118/77.5
8	68	115/60	68	114/60	66	114/60	66	114/60	114.25/60
9	71	110/60	70	110/60	68	110/60	66	110/60	110/60
10	64	112/58	66	110/58	66	110/58	66	110/58	110.5/58

Discussion

The results of the study showed that gluten affected about 50% of the participants, and all the affects were minimal. With the results obtained, we were not able to determine with confidence the true effect of gluten on blood pressure. To further get an idea of its benefits, the study should be completed again. For a more accurate study, having more participants would be of benefit. A further study should also check the affects of blood pressure in a larger span of time than the 60 minutes allotted in this study. The study did have similar results to the hypothesis, in that it showed benefits in about 50% of the participant population. The design of the study was good in the fact that it was structured, but it is

hard to make sure that the participants fully followed the agreements.

There were no adverse effects noted during the study.

References

1. CDC. *Health, United States, 2008*. Hyattsville, MD: National Center for Health Statistics; 2008.

2. Kumar, Abbas, Fausta, and Mitchell. Basic Pathology. Philadelphia, Pennsylvania: 2007. Pg. 353-355

3. Lloyd-Jones D, Adams RJ, Brown TM, et al. Heart Disease and Stroke Statistics—2010 Update. A Report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation.* 2010;121:e1-e170.

4. http://www.nhlbi.nih.gov/health/health-topics/topics/hbp/

Appendix 1

Gluten Muffin Recipe

Separate two eggs; beat the yolks; add a pint of milk. Add to this a half pint of gluten flour, a half tea-spoonful of salt. When thoroughly mixed, add a rounding teaspoonful of baking powder; stir in the well-beaten whites of the eggs. Bake in greased hot muffin pan in a moderate oven twenty minutes