



EFFECT OF QUALITY OF FAT AND PROTEIN ON POST PRANDIAL BLOOD GLUCOSE LEVEL

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ABSTRACT

Background: It is known that the elevation of postprandial glucose (PG) level after the digestion of fat and protein rich food cannot be controlled by carbohydrate counting (CC). Some reports focused on the additional insulin for dietary proteins and lipids. FPU method was proposed by Pańkowska E¹⁾. So far, few studies have examined the influence on postprandial blood glucose given by the difference in type of dietary lipid and protein.

Aim: To see the influence of dietary protein and fat types on postprandial blood glucose.

Methods : In type 1 diabetes patients, postprandial glucose profile was analyzed by CGM or FGM after eating various kinds of test foods

Results: The PG profile was stable after taking Sushi dishes (high carbo, low fat and protein) without additional insulin to CC. The PG profiles were variable among the subjects after taking grilled meat dishes and carbonara spaghetti (high fat and protein) with additional insulin according to FPU to CC. Boiled Chicken meat and boiled Puffer elevated PG. On the other hand, the boiled Squid and boiled Whitebait did not elevate PG level. The oil did not too.

Discussion

Additional insulin was not needed for high carbohydrate foods such as Sushi dish. Insulin dose calculated by FPU method for high fat and high protein food, sometimes induced hypoglycemia several hours after meals. Furthermore, this study showed that there were differences among the influences on PG profile was greatly dependent on the type of protein.

METHODS

- 1.The Sushi study.
- The subjects were 7 type 1 diabetes patients (4males, 3 females, median: age 24 years old, HbA1c 6.8%, 5 pump/ 2 MDI). The subjects ate the sushi as supper at 4 hours or more after the last meal and additional insulin administration. The PG level profile during 6 hrs after Sushi supper was analyzed by FGM.
2. The fat or protein rich foods study.
- The subjects were 4 type 1 diabetes patients (1 males, 3 females, median: 33 years old, HbA1c 6.4%, all pump) . Basal rate was adjusted by the fasting test. Carb ratio was adjusted by the bread test. The subjects ate the various experimental foods as lunch at 4 hours or more after the last meal and additional insulin administration. The PG level profile during 6 hrs after Sushi supper was analyzed by FGM.

The experimental foods

Pure fats: Olive oil, Butter, Canola oil

Protein rich foods:

Boiled Chicken



Boiled Blowfish,



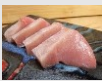
Boiled Squid,



Boiled Whitebait,

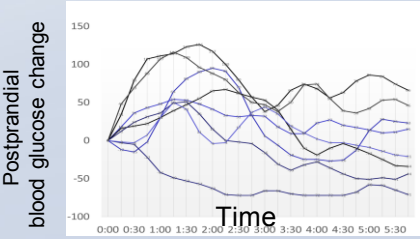


Raw Yellow Tuna



RESULTS

1. Sushi Study



Subjects ate sushi freely. As the result, the calories of their sushi were 657 to 1418 kcal, the intake of protein was 25-29 % calories, fat 15-19 % calories (80-160 g) , carbohydrates 45-49 % calories. Subject injected insulins only for carbohydrate. No significant effect of fat and protein was observed.

Sushi seemed to be controlled by bolus insulin only for carbohydrate.

2. Fat or Protein Rich Foods Study

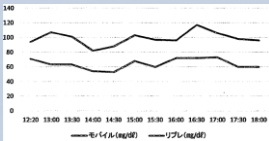
Subjects ate 35g Olive oil with boiled vegetables without bolus insulin.

Oil did not elevate PG itself for 6 hours.

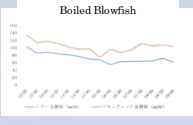
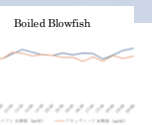
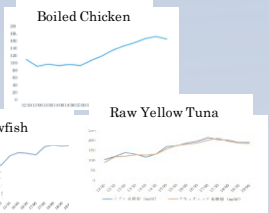


Subjects ate 35g Olive oil, Canola oil or Buffer with Bread with normal bolus insulin only for carbohydrate.

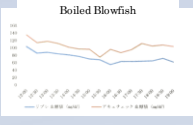
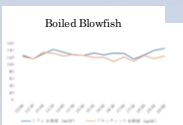
In the case of carbohydrates and oil-rich foods, bolus insulin was needed only for carbohydrate.



Subjects ate 300g Boiled Chicken Boiled Blowfish, or Raw Yellow Tuna without bolus insulin.



Subjects ate 300g Boiled Squid or Boiled Boiled Whitebait, without bolus insulin



In the case of protein-rich food, the quality of protein seemed to affect the PG profile,

CONCLUSIONS

Pańkowska’s FPU method is very easy and useful for the many case. However, high carbohydrate food like Sushi seemed to be controlled by CC. Furthermore, the effect of oil on PG elevation was small. The quality of protein in protein-rich food seemed to be considered. We don’t know the reason why the quality of protein affect the PG profile yet. In the case of dishes that use diverse ingredients like Japanese food, it may be necessary for the calculation of bolus insulin to consider the type of ingredients and cooking methods

Limitations of this study:

1. The number of subjects is too small.
2. There is no statistical analysis.
3. We have to study the mechanisms of PG elevation more.,

REFERENCES

1. Pańkowska E1, Blazik M, Groele L.Does the Fat-Protein Meal Increase Postprandial Glucose Level in Type 1 Diabetes Patients on Insulin Pump: The Conclusion of a Randomized Study DIABETES TECHNOLOGY & THERAPEUTICS Volume 14, Number 1, 2011