Fasting Blood Glucose and Insulin Level in Opium Addict versus Non-Addict Individuals

Mohammad Hossein Gozashti MD[1], Farzaneh Yazdi MD[2], Pouria Salajegheh MD[3], Mohammad Moein Dehesh MD[4], Kouros Divsalar MSc[5]

Original Article

Abstract

Background: Many of lay person believe that opium lowers blood glucose. However some studies show the opposite results. In this study, we tried to evaluate the effect of opium on blood glucose and insulin resistance.

Methods: This comparative study including 53 addicts in case groups who used opium just in the form of smoking and 55 non-addicts in a control group, took part in the study, after proving not to be opium users. After taking blood samples, their fasting blood glucose (FBG), fasting blood insulin and lipid profiles were evaluated. Furthermore, insulin resistance index was analyzed via the homeostatic model assessment of insulin resistance (HOMA-IR) formula with the cut-off points of 7.2 and 7.1.

Findings: Age and gender were not significantly different between the groups. There was no significant difference regarding the prevalence of insulin resistance between the two groups, according to the cut-off points of 7.1 and 7.2 (P = 0.196 and P = 0.248, respectively). Mean insulin resistance index was not significantly different between the two groups (P = 0.325). In the case group, fasting blood insulin was considerably lower (P = 0.025) and fasting blood sugar (FBS) was significantly higher (P = 0.016) than the control group.

Conclusion: According to the level of insulin and FBS in addicts, it does not seem that opium has a significant effect on reducing the blood glucose and insulin resistance.

Keywords: Opium addiction, Blood sugar, Insulin resistance

Citation: Gozashti MH, Yazdi F, Salajegheh P, Dehesh MM, Divsalar K. **Fasting Blood Glucose and Insulin Level in Opium Addict versus Non-Addict Individuals.** Addict Health 2015; 7(1-2): 54-9.

Received: 03.10.2014 **Accepted:** 19.12.2014

1- Associate Professor, Endocrinologist, Neuroscience Research Center, Kerman University of Medical Sciences, Kerman, Iran
2- Assistant Professor, Department of Internal Medicine, School of Medicine, Kerman University of Medical Sciences, Kerman, Iran
3- Fellowship of Hemato Oncology, Department of Pediatrics, School of Medicine, Iran University of Medical Sciences, Tehran, Iran
4- Student of Medicine, Student Research Committee, School of Medicine, Kerman University of Medical Sciences, Kerman, Iran
5- Researcher, Neuroscience Research Center, Institute of Neuropharmacology, Kerman University of Medical Sciences, Kerman, Iran
Correspondence to: Farzaneh Yazdi MD, Email: yazdi.faeze@gmail.com

Introduction

Around the world, more than 180 million people have experienced using illegal drugs at least once and 13.5 million have become opium dependent. Addiction is one of the important issues of the 21th century in the world that is also imperative in Iran.[1] Inhalation and oral intake are two common ways of opium consumption. Opium is constituted mostly from morphine, but contains more than eight alkaloids with different effects on homeostasis.[2] After tobacco, opium is an illegal drug, which is most used in Iran.[1]

One of the common beliefs among diabetic patients is that opium can control high blood sugar, which explains why some of them turn to opium to control their high blood glucose. There are not many studies in this regard and our information about the effect of opium on improving or worsening hyperglycemia is limited. The illegality of using opium is one of the main reasons why addicts are not willing to participate in such studies, and hence there are not many samples for this study. Some studies have shown a reduction in insulin response after taking oral glucose and subsequent glucose tolerance.[3-5] Some other studies show that opium lowers blood glucose[6] and in some other studies, the glucose tolerance was normal in addicts,[7] whereas some studies showed that opium withdrawal worsened hyperglycemia.[8]

Because of the controversies in different studies, we conducted this study to analyze the effect of opium on blood level of glucose. Since one of the methods for assessing the effect of any substance on blood glucose is considering the effect of that substance on insulin resistance, in this study the insulin resistance was analyzed with the Homeostatic model assessment of insulin resistance (HOMA-IR) formula in addicts and was then compared with that of the control group. Besides insulin resistance, we also analyzed insulin serum level and fasting blood sugar (FBS) in each group. Based on our knowledge, there is no study which evaluates the relationship between opium addiction and insulin resistance.

Methods

In this comparative study, a group of 53 opium-addicted individuals and a group of 55 non addicts were studied. Each individual had a specific number. Therefore, in this study no one was known by the name. In the first step, all the participants filled in the consent form after explaining whole of the study.

The case group subjects were selected from people who used opium in the form of smoke. They were individuals who had come to Health-care centers for check-up. Their addiction was confirmed by the morphine test RSA, rapid immunochromatography of urine samples, and the positive tests were confirmed again by thin layer chromatography (TLC) with high performance TLC device (CAMAG model, 2009, Swiss). The opium dependency of the case group was confirmed by the diagnostic and statistical manual of mental disorders-4th Edition (DSM-IV) criteria.

The control subjects were selected from the other people who came to these Health Care Centers and they are not addict. All of them had negative results for opium addiction after morphine test. Control subjects were matched for age and sex and since all of the subjects in the control group were cigarette smokers as the case subjects.

Those who had syphilis, hepatitis, human immunodeficiency virus (HIV) or other infectious diseases, malnutrition, body mass index (BMI) > 30, diabetes type 2 or even if one of the first degree relatives had those problems as well as subjects who were taking psychiatric medications or corticosteroids were excluded.

For the first step age, gender and the number of years that they use opium (just for case group) were noted. Weight and height were measured with digital scale tape. Blood samples were collected from all participants between 7 and 10 AM after an overnight fast. Then samples were centrifuged and were analyzed for lipid profiles, FBS, and fasting blood insulin, then subjects with triglyceride (TG) > 250 mg/dl was excluded because obesity and insulin resistance may have a relationship.[9-11] FBS, TG, and cholesterol with colorimetry and high-density lipoprotein (HDL) with immunoturbidimetric method was measured by parsazmon.co kit and auto-analyzer RA1000 (America/tecknion.co). Insulin was measured with radioimmunoassay method by Italian radim.co kit. After that, the insulin resistance index was calculated by the following formula:

HOMA-IR = Fast blood insulin × Fast blood glucose ÷ 22.5.[12,13]

When using the formula, we used the cut-off

points of 7.1 and 7.2 and finally, we analyzed the data between the two groups using Chi-square and Mann–Whitney tests with the statistical software SPSS (version 20, SPSS Inc., Chicago, IL, USA).

Results

There was no significant difference between two groups in age, history of addiction and BMI. There were 7 women and 46 men in the case group and 14 women and 41 men in the control group. Gender difference was not significant (Table 1).

Using HOMA-IR ≥ 2.7, just 2 (3.6%) of the subjects of the control group had insulin resistance, whereas using HOMA-IR ≥ 1.7 (P = 0.248), 5 subjects (9.1%) in the case group and 9 subjects (16.4%) in the control group had insulin resistance (P = 0.196). After analyzing with chi-square test, insulin resistant individuals in either of these two cut-off points was not significant between the addicts and non addicts.

Mean insulin resistance was not significantly different between the groups (case group 470 ± 80.0, control group 0.97 ± 0.08, P = 0.325). Fasting plasma insulin level was significantly lower and FBS was significantly higher in the addicts than the control group (Table 2). Both TG and cholesterol were lower in the case group rather than the control group. Cholesterol was significantly lower in the case group, however the difference of TG was not significant between two groups (Table 2).

Discussion

In opium-addicted subjects, fasting blood insulin levels were significantly lower and FBS levels were significantly higher than the control group and hence results of our study showed that opium may reduce the insulin resistance.

For the first time in 1936, the phrase of insulin resistance was used to describe patients who required high dose of insulin. The term resistance shows reduced sensitivity to insulin or reduced sensitivity to metabolic activity of insulin.[14] Insulin resistance plays on important role in the pathophysiology of diabetes type 2, obesity, hyperlipidemia, metabolic syndromes and cardiovascular disorders.[9-11] Reducing insulin resistance, by lifestyle modification and some medications, is one of the methods used to treat diabetes type 2.

Recently, a number of studies have been done on the effect of opium on blood glucose; however there are few studies about the level of blood insulin and insulin resistance. Most of these studies evaluated diabetics and some of them assessed blood factors, including blood glucose and hemoglobin A1c (HBA1c) of diabetics without considering the effects of opium.

Table 1. Background information of subjects

Variable	Mean	Maximum	Minimum
Age (year)			
Case	43.1	55	29
Control	41.7	51	30
History of addiction (year)			
Case	8.4	15	4
BMI (kg/m^2)			
Case	26.2	29	22
Control	25.8	30	23

BMI: Body mass index

Table 2. Measured indexes in groups

Index	Groups		P
	Case	Control	
Fasting serum insulin	3.96 ± 4.69	4.50 ± 2.40	0.025
Fasting serum glucose	93.03 ± 25.62	83.30 ± 17.70	0.016
Cholesterol	127.03 ± 39.77	169.47 ± 21.92	< 0.001
TG	116.21 ± 5.09	142.29 ± 8.66	0.062
HDL	35.72 ± 1.78	49.14 ± 1.25	< 0.001

TG: Triglyceride; HDL: High-density lipoprotein

Karam et al.[15] did a study on 49 opium addicts and 49 non addicts with non-insulin dependent diabetes (NIDD). In this study they reported that HBA1c levels are significantly higher in opium-addicted diabetic men rather than non-addicted diabetic men but there were no significant difference between HBA1c levels in opium-addicted diabetic women in comparison to non-addicted diabetic women. Rezvanfar et al. showed that the HBA1c levels are significantly lower in opium-addicted diabetic rather than non-addicted diabetics.[16] In a study on diabetics type 2, Azod et al.[6] showed that opium temporarily reduced FBS and postprandial glucose, however opium did not have any effect on HBA1c and long-term blood glucose, these findings were in contrast with Karam et al.[15] findings. Meanwhile, studies such as the study of Sadeghian et al.[1] on the rats and Asgary et al.[17] study in opium addicts reject any significant effect of opium on blood glucose and HBA1c of non-diabetics.

Despite different results, the traditional and still popular view on the effect of opium on reducing blood glucose to treat diabetes continues. In this study, we assessed the insulin resistance in opium-addicts and non-addicts to clarify the effect of opium on blood glucose, however our results did not show a significant difference between the groups. However, lower insulin level in opium addicted cases indicated that totally opium cannot reduce insulin resistance and improve blood sugar by this mechanism.

It seems that future studies with greater sample size and review articles will help to clarify the issue. Cigarette smoking can increase insulin resistance. One of its mechanisms is making insulin resistance by nicotine in skeletal muscles. Because of this we select all case and control subject from cigarette smokers.

In our study, we also assessed lipid profiles in opium-addicts and the control group. Total cholesterol and HDL were significantly lower in opium-addicts rather than the non-addicts. TG levels were also lower in addicts compared with the non-addicts, but not significantly. Reduction of TG and cholesterol, by opium, may be beneficial, but its effect on lowering HDL can cause many complications. Karam et al. showed that there was no difference in lipid profiles between NIDD mellitus (NIDDM) addicts and non-addict NIDDM patients.[15] The main limitation of our study was that we could not match the amount of opium used by any of our subjects.

Conclusion

Opium did not decrease insulin resistance, however increased FBS and decreased blood insulin levels. Therefore, based on the results of this study and controversial results of other studies, opium is not recommended for controlling blood glucose or diabetes.

On the other hand, because of the differences between the results of the studies that have been carried out, the effect of opium on reducing TG and cholesterol levels cannot justify its use as a therapeutic option. Opium can reduce HDL, but causes many personal and social complications.

Conflict of Interests

The Authors have no conflict of interest.

Acknowledgements

We are thankful to Kerman Neuroscience Research Center, Iran, for financial supports. It is necessary to say that this article is from a residential thesis.

References

1. Sadeghian S, Boroumand MA, Sotoudeh-Anvari M, Rabbani S, Sheikhfathollahi M, Abbasi A. Effect of opium on glucose metabolism and lipid profiles in rats with streptozotocin-induced diabetes. Endokrynol Pol 2009; 60(4): 258-62.

2. Karam GA, Rashidinejad HR, Aghaee MM, Ahmadi J, Rahmani MR, Mahmoodi M, et al. Opium can differently alter blood glucose, sodium and potassium in male and female rats. Pak J Pharm Sci 2008; 21(2): 180-4.

3. Passariello N, Giugliano D, Quatraro A, Consoli G, Sgambato S, Torella R, et al. Glucose tolerance and hormonal responses in heroin addicts. A possible role for endogenous opiates in the pathogenesis of non-insulin-dependent diabetes. Metabolism 1983; 32(12): 1163-5.

4. Giugliano D, Quatraro A, Consoli G, Stante A, Simeone V, Ceriello A, et al. Sodium salicylate restores the impaired insulin response to glucose and improves glucose tolerance in heroin addicts. Acta Diabetol Lat 1987; 24(3): 205-12.

5. Ceriello A, Giugliano D, Passariello N, Quatraro A,

Dello RP, Torella R, et al. Impaired glucose metabolism in heroin and methadone users. Horm Metab Res 1987; 19(9): 430-3.
6. Azod L, Rashidi M, Afkhami-Ardekani M, Kiani G, Khoshkam F. Effect of opium addiction on diabetes. Am J Drug Alcohol Abuse 2008; 34(4): 383-8.
7. Vescovi PP, Gerra G, Rastelli G, Ceda GP, Valenti G. Effect of methadone on TSH and thyroid hormone secretion. Horm Metab Res 1984; 16(1): 53-4.
8. Desser KB, Arvan S. Diabetic ketoacidosis during acute heroin abstinence. Lancet 1969; 2(7622): 689-90.
9. de Fronzo RA, Ferrannini E. Insulin resistance: a multifaceted syndrome responsible for niddm, obesity, hypertension, dyslipidemia, and atherosclerotic cardiovascular disease. Diabetes Care 1991; 14(3): 173-94.
10. Petersen KF, Dufour S, Savage DB, Bilz S, Solomon G, Yonemitsu S, et al. The role of skeletal muscle insulin resistance in the pathogenesis of the metabolic syndrome. Proc Natl Acad Sci USA 2007; 104(31): 12587-94.
11. Reaven GM. The insulin resistance syndrome: definition and dietary approaches to treatment. Annu Rev Nutr 2005; 25: 391-406.
12. Matthews DR, Hosker JP, Rudenski AS, Naylor BA, Treacher DF, Turner RC. Homeostasis model assessment: insulin resistance and beta-cell function from fasting plasma glucose and insulin concentrations in man. Diabetologia 1985; 28(7): 412-9.
13. Wallace TM, Levy JC, Matthews DR. Use and abuse of HOMA modeling. Diabetes Care 2004; 27(6): 1487-95.
14. MRCP. Its differentiation into insulin-sensitive and insulin-insensitive types. The Lancet 1936; 227(5864): 127-30.
15. Karam GA, Reisi M, Kaseb AA, Khaksari M, Mohammadi A, Mahmoodi M. Effects of opium addiction on some serum factors in addicts with non-insulin-dependent diabetes mellitus. Addict Biol 2004; 9(1): 53-8.Himsworth H, Lond.
16. Rezvanfar MR, Farahany H, Rafiee M, Kaboli S. Opium consumption challenge and diabetes mellitus control. Iran J diabetes Obes 2011; 3(2): 72-6.
17. Asgary S, Naderi GH, Soghraty M, Ahmady P, Shahrezaee JR. A study of plasma lipid peroxidation, lipids and blood sugar level in opium addicts compared with control group. ARYA Atheroscler 2005; 1(2): 72-4.

سطح قند خون ناشتا و انسولین در افراد معتاد به تریاک و غیر معتاد

دکتر محمد حسین گذشتی[۱]، دکتر فرزانه یزدی[۲]، دکتر پوریا سلاجقه[۳]، محمد معین دهش[۴]، کوروس دیوسالار[۵]

مقاله پژوهشی

چکیده

مقدمه: بسیاری از افراد عقیده دارند که تریاک قند خون را کاهش می‌دهد، اما اندک مطالعات انجام شده با این عقیده سنتی موافق نیستند. هدف از این مطالعه، بررسی تأثیر تریاک بر قند خون با رویکرد به مقاومت به انسولین بود.

روش‌ها: مطالعه مقطعی- تحلیلی حاضر بر روی ۵۳ فرد معتاد که تنها تریاک را به صورت استنشاقی مصرف می‌کردند، به عنوان گروه مورد و ۵۵ نفر از افراد معمول جامعه که معتاد نبودن آن‌ها تأیید شده بود، به عنوان گروه شاهد انجام گرفت. پس از اخذ نمونه خون ناشتا از مشارکت کنندگان، میزان FBG (Fasting blood glucose)، انسولین ناشتای سرم و پروفایل لیپید سرم آنان ارزیابی شد. همچنین شاخص مقاومت به انسولین توسط فرمول HOMA-IR (Homeostatic model assessment of insulin resistance) و دو نقطه برش ۲/۷ و ۱/۷ محاسبه و تحلیل گردید.

یافته‌ها: از نظر سن و جنس بین دو گروه تفاوت معنی‌داری وجود نداشت. مقاومت به انسولین نیز بین دو گروه با هیچ یک از نقاط برش ۱/۷ و ۲/۷ تفاوت معنی‌داری را نشان نداد (P = ۰/۱۹۶، P = ۰/۲۴۸). همچنین بین میانگین شاخص مقاومت به انسولین در دو گروه تفاوت معنی‌داری مشاهده نشد (P = ۰/۳۲۵). انسولین ناشتای سرم در گروه مورد به طور معنی‌داری پایین‌تر (P = ۰/۰۲۵) و قند ناشتای سرم به طور معنی‌داری بالاتر بود (P = ۰/۰۱۶).

نتیجه‌گیری: با توجه به سطح انسولین و قند خون ناشتا در افراد معتاد به تریاک، به نظر نمی‌رسد تریاک بر کاهش قند خون و مقاومت به انسولین تأثیر مفیدی داشته باشد.

واژگان کلیدی: اعتیاد به تریاک، قند خون، مقاومت به انسولین

ارجاع: گذشتی محمد حسین، یزدی فرزانه، سلاجقه پوریا، دهش محمد معین، دیوسالار کوروس. **سطح قند خون ناشتا و انسولین در افراد معتاد به تریاک و غیر معتاد.** مجله اعتیاد و سلامت ۱۳۹۴؛ ۷ (۲-۱): ۹-۵۴.

تاریخ دریافت: ۹۳/۷/۱۱ **تاریخ پذیرش:** ۹۳/۹/۲۸

۱- دانشیار، متخصص غدد، مرکز تحقیقات علوم اعصاب، دانشگاه علوم پزشکی کرمان، کرمان، ایران
۲- استادیار، گروه داخلی، دانشکده پزشکی، دانشگاه علوم پزشکی کرمان، کرمان، ایران
۳- فلوشیپ هماتوانکولوژی، گروه اطفال، دانشکده پزشکی، دانشگاه علوم پزشکی ایران، تهران، ایران
۴- دانشجوی پزشکی، کمیته تحقیقات دانشجویی، دانشکده پزشکی، دانشگاه علوم پزشکی کرمان، کرمان، ایران
۵- پژوهشگر، مرکز تحقیقات علوم اعصاب، دانشگاه علوم پزشکی کرمان، کرمان، ایران
نویسنده مسؤول: دکتر فرزانه یزدی
Email: yazdi.faeze@gmail.com