International Journal of Healthcare Sciences ISSN 2348-5728 (Online)
Vol. 4, Issue 1, pp: (192-195), Month: April 2016 - September 2016, Available at: www.researchpublish.com

Effect of Septrin (Co-Trimoxazole) On Blood Glucose of Wistar Albino Rat

T.O OLADUN[1], E.O TAIWO[2]

[1,2]OLABISI ONABANJO UNIVERSITY, AGO IWOYE, IKENNE CAMPUS, NIGERIA

Abstract: **The roles of various drugs have been investigated on blood glucose. However, the effect of Septrin(co-trimoxazole) on blood glucose have not received much attention. The present study investigated the effect of Septrin (co-trimoxazole) on blood glucose in male albino Rats. A total of fifteen (15) Rats were used for this study and grouped into three (3) classes labelled A, B and C. Group A and B consist of Septrin treated Rats and group C consists of the control group. Co-trimoxazole was given for five (5) days. After five (5) days of administration, the animals were sacrificed. Blood sample of Rats were collected in Heparin bottles and biochemical analysis was carried out for the determination of blood glucose. There was a significant decrease blood glucose level among the treated group. This decrease was observed with an initial dose of 4.4mg/kg body weight of Co-trimoxazole when compared with the control. The results suggest that Septrin is safe for use for a diabetic patient or hyperglycaemic person. It also suggests that Septin should be taken postpandrially.**

Keywords**: Septrin, blood glucose, hypoglycaemia, weight loss.**

I. INTRODUCTION

Septrin infusion, tablets, forte tablets and suspensions all contain the active ingredients sulfamethoxazole and trimethoprim, which together are known as co-trimoxazole. Sulfamethoxazole and trimethoprim are both antibiotics that are used to treat infections caused by bacteria. Sulfamethoxazole is a type of antibiotic called a sulphonamide. Trimethoprim is related to the sulphonamides. Diuresis and hypoglycemia have occurred rarely in patients receiving sulfonamides [1].These two antibiotics work in synergy together against certain types of bacteria. In order to grow and multiply in numbers, bacterial cells need to produce genetic material (DNA). To produce DNA they require folic acid (folate). However, bacterial cells cannot take up folic acid supplied in the diet like human cells can. Instead, they synthesize it themselves. Sulfamethoxazole and trimethoprim act on two different stages in the synthesis of bacterial folate, preventing the bacteria from producing folate. Without folate, the bacteria cannot produce DNA and so are unable to increase in numbers. Co-trimoxazole therefore stops the spread of infection. The remaining bacteria are killed by the immune system or eventually die. Co-trimoxazole is used to treat a small number of serious infections, but serious side effects limit its use. Less serious infections such as urinary tract infections and otitis media are only treated with co-trimoxazole when there is good evidence from microscopy and culture that the bacteria are sensitive to co-trimoxazole, and there is good reason to prefer the combination to a single antibiotic.

The essential energy metabolic substrate of the body cells is glucose. It is the major source of energy production in the body. It enters the circulation either from endogenous sources (glycogenolysis and gluconeogenesis) or from external sources (via the digestive tract or intravenously) [2]. Effect of various drugs on blood glucose using different analysers [3] was studied. Effect of Buspirone on blood glucose in humans was also studied [4]. However, the effect of Septrin on blood glucose has received little or no attention. Therefore, this study is to investigate the effect of septrin on blood glucose of male wistar albino rats.

II. MATERIALS AND METHODS

Experiments were carried out on fifteen male winstar albino rats weighing between 120 and 250 grammes. They were allowed to acclimatize for three weeks. The rats were divided into three (3) experimental groups A, B and C. Group A were treated with Cotrimoxazole and sacrificed at the end of treatment. Group B were equally treated but were allowed to recover. Group C were the control group. The rats were fed with the same type of feed for two months. The experiment started at the end of eight week by taking all the blood glucose level of the rats as against their weights. The Accu-check glucometer and Accu-check strips were used. The tip of the tail of the rats was cut and the tail was pressed to ensure quantifiable amount of blood to come out. The tip of the tail of the rat was placed very close to the strip already inserted into the glucometer as the blood was dropped gently on it. The value gotten is then recorded. The strip was removed and another was inserted and the procedure is repeated for all the rats.

Their weights were taken using the weighing balance. The reading is adjusted to zero to avoid error. The rat is placed on the weighing plate and its weight is recorded. This procedure was repeated for all the rats. After this, administration of Cotrimoxazole started. It was given to them (groups A and B) twice daily for five days and the dosage was according to their weights. Administration to both groups A and B ended on the fifth day. Group A and C were allowed overnight fasting after which they were weighed again, recorded and sacrificed and blood samples were collected and their glucose levels were measured and recorded. After a week, group B were weighed and were sacrificed to get their blood samples. These values were recorded. In the course of this research, sacrifices were carried out through cervical dislocation.

Statistical analysis:

One-way analysis of variance (ANOVA) was used to compare mean values in multiple groups.

III. RESULTS AND DISCUSSION

Effect of Septrin administration on body weight:

It was observed that on administration of Septrin, the body weight was reduced in the test group, but was not significantly affected in recovery and control group. This decrease in body weight of the test group suggested that septrin decreases the eating drive and suppresses the appetite of the rats. Such was not observed with the control group. With the recovery group, it might have reduced on administration of septrin, but later during the recovery period, they gained weight.

Table 1. Effect of Septrin administration on body weight.

S/N	CONTROL		TEST		RECOVERY	
	Before (grammes)	After (grammes)	Before (grammes)	After (grammes)	Before (grammes)	After (grammes)
1	230	250	200	160	220	200
2	240	240	220	180	220	220
3	240	240	250	240	200	220
4	120	140	180	160	200	200
5	160	180	200	190	220	215

Effect of Septrin administration on blood glucose:

The blood glucose values before treatment among the three groups were not significantly different. But on administration of septrin, the test group showed a marrked decrease in blood glucose. This could be because of the hypoglycaemic effect of septrin. It could also result from the loss of appetite which in effect reduces the blood glucose level. However, with the recovery group, the decrease is not as marked as within the test group. The control group showed no such changes.

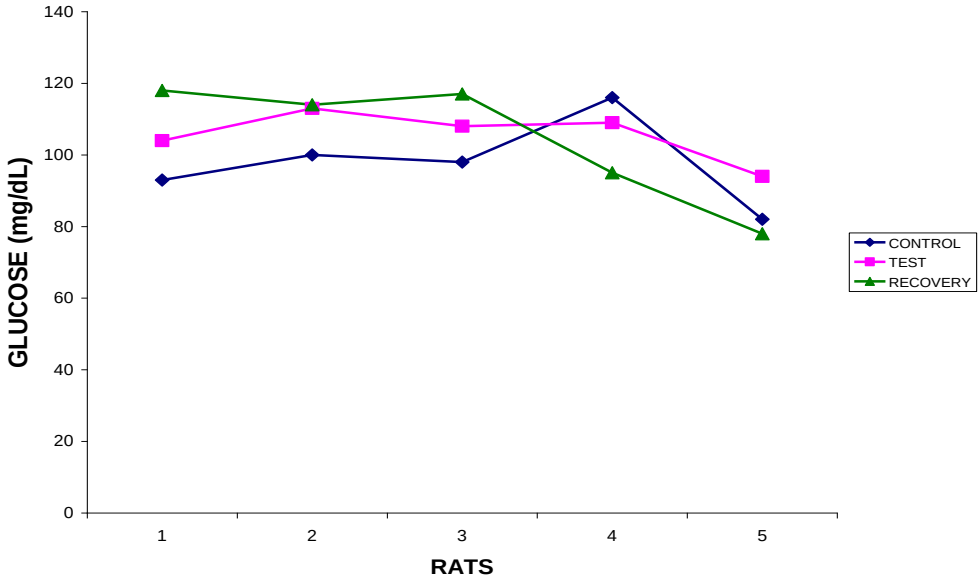

Figure 1. Initial blood glucose readings

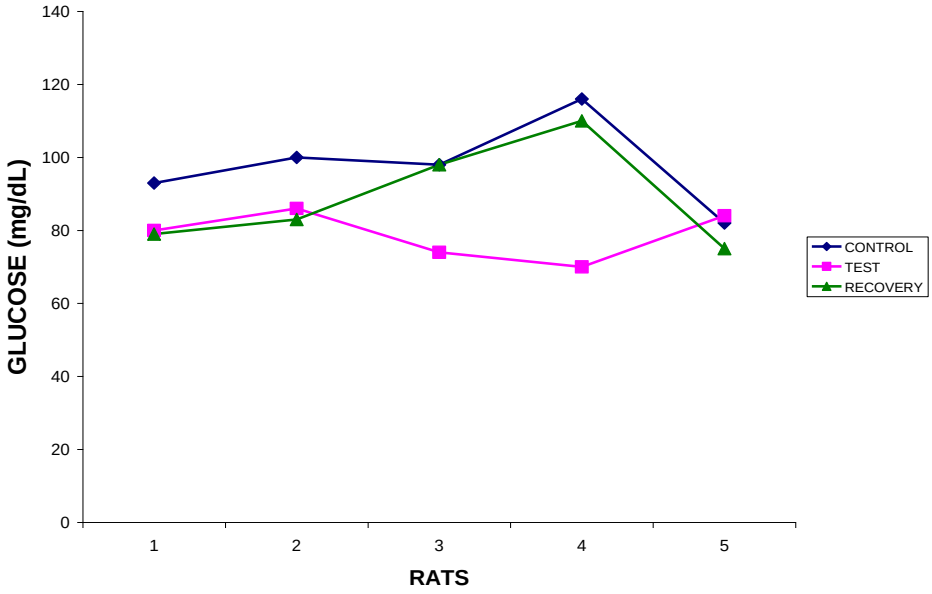

Figure 2. Final blood glucose readings

IV. CONCLUSION

Septrin could have caused weight loss by enhancing satiation signals secreted by the gut. Glucagon- like peptide-1 (GLP-1) hormone is produced in the L-cell of the gastrointestinal tract in response to nutrient intake, with secondary production in the nucleus tractus solitarius (NTS) cell bodies of the brain stem [5]. GLP-1 reduces appetite by acting on vagal afferents that reach the NTS and by directly decreasing hypothalamic adenosine monophosphate kinase (AMPK) activity, which is associated with elevated pro-opiomelanocortin (POMC) [6]. Elevated GLP-1 in turn slows gastric motility and emptying in individuals and contributes to reduced carbohydrate absorption and circulating glucose. It may also reduce food intake by decreasing the orexigenic peptides, neuropeptideY (NPY), and agouti-related protein (AgRP) in the hypothalamus. This weight loss is reversed in the recovery group.

The lowered blood glucose observed among the treated group could be as a result of loss of appetite. It could also be that beta adrenoreceptors responsible for glucose production [7] is blocked by the administration of septrin.

The results of this study suggest that septrin should be used after food as it is a potent hypoglycemic drug. Coupled with other weight reducing substances, it can be an antiobesity medication. Since it is prescribed often when infection is diagnosed, these suggestions are important to manage its side effects.

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