Research Article

Study on Control of Blood Sugar with Different Types of Insulin in A Tertiary Care Hospital

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ABSTRACT

The main aim of study is to check optimum control of blood sugar using Human actrapid insulin and Human mixtard insulin in a range of 100-200mg/dl at tertiary care hospital. 114 patients with Type 2 Diabetes mellitus were treated with different insulin's. The data collected is Baseline comparison of HbA1c% of two different insulin's, Random blood sugar values at different time intervals (7AM, 1PM, 7PM) and post prandial blood sugar values were recorded to show the effective insulin among them. Oral hypoglycemic drugs were also administered to few patients. The baseline comparison of HbA1c% does not showed a significant difference at p value 0.8054. The baseline values of HbA1c% were compared with patients received HAI at p value <0.0001 showed significant reduction after treatment. Likewise baseline values of HbA1c % were compared with patients received HMI at p value <0.0001 showed reduction after treatment. The GRBS in patients received HAI at different time intervals did not show a significant difference at p value 0.1506. The GRBS in patients received HMI at different time intervals was found to be significant reduction at p value 0.0038. The follow-up data of GRBS after 3 months was also studied and showed a significant reduction of sugar levels in patients received HAI (P value-0.0059) and in patients received HMI (P value -0.0028). The PPBS comparison between HMI and HAI did not show a significant difference at p value-0.1220. Human mixtard insulin showed significant effectiveness compared to Human actrapid insulin at confidence interval of 95%, hence p value of <0.05 is considered significant.

Keywords: Human mixtard insulin, Human actrapid insulin, HbA1c%, Oral hypoglycemic drugs.

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INTRODUCTION

Aim

The aim is to study optimum control of blood sugar with insulin in a tertiary care hospital.

The objective of the study is to identify the control of blood sugar between 100-200mg/dl with different types of insulin.

Diabetes mellitus

Diabetes mellitus is a condition where the glucose levels are extremely high. The arrival of the chemical insulin from the pancreas is triggered when the amount of glucose in the blood rises, like after a feast. Insulin supports muscle and fat cells to eliminate glucose from the circulation system and the liver to utilize glucose, bringing about typical glucose levels. Glucose levels in diabetics stay raised. This may be because of an absence of insulin creation, deficient insulin creation, or the insulin that isn't generally as successful as it ought to be. Type 1 diabetes (5 percent), which is an immune system sickness, and type 2 diabetes (95 percent), which is connected to heaviness are the two most regular kinds of diabetes. Different sorts of diabetes are incredibly intriguing and are brought about by a solitary quality change Pregnancy-related diabetes is known as gestational diabetes. The fundamental reason for diabetes contrasts relying upon their type. Diabetes can result in an excess of sugar in the blood regardless of the type you have. Glucose levels which are higher than the normal can cause significant well-being concerns. Type 1 and type 2 diabetes are both constant diabetic disorders. Gestational and Prediabetes are two issues that might be reversible. At the point when your blood sugar levels are higher than ordinary but not sufficiently high to be sorted as diabetes, you have prediabetes. Furthermore, except if sufficient moves are initiated to hinder movement, prediabetes is habitually the precursor to diabetes. Gestational diabetes creates all through pregnancy, despite the fact that it might disappear once the child is born[1].

Insulin

Insulin was the principal peptide chemical found[2]. In 1921, Frederick Banting and Charles Herbert Best of the University of Toronto's J. J. R. Macleod's research facility was quick to seclude insulin from a canine pancreas. Frederick Sanger sequenced the amino acid design in 1951, making insulin the principal protein to be completely sequenced. The solid-state crystal structure of insulin was identified by Dorothy Hodgkin in 1969. Using DNA recombinant technology, insulin is also the first protein to be chemically synthesized and manufactured. It's on the WHO's Model List of Essential Medicines, which contains

the most fundamental drugs for a fundamental medical services framework. Insulin is a peptide chemical secreted by beta cells in the pancreatic islets that fills in as the body's real anabolic chemical[3]. It influences starch, lipid, and protein digestion by expanding glucose ingestion into the liver, fat, and skeletal muscle cells from the course. In these tissues, glucose is changed over completely to glycogen or lipids (fatty oils) by glycogenesis or lipogenesis, or both by liver[4]. Excess insulin in the blood hinders the liver's glucose synthesis and discharge[5]. The flow of insulin influences protein production in different organs. Subsequently, an anabolic chemical advance the change of small molecule in the blood into enormous atoms inside cells. The opposing impact of low blood insulin is promoted by broad catabolism, especially of reserve body fat.

Insulins used in the study

A. Human Actrapid Insulin

Human Actrapid infusion is a short-acting insulin that incorporates human insulin. It is an anti-diabetic medication that belongs to the insulin family of drugs. Human Actrapid is a blood glucose-reducing drug[6].

Human insulin, the primary fixing in Actrapid, is made utilizing a technique known as 'recombinant technology ', in which yeast is given a quality (DNA) that permits it to produce insulin. The substitution insulin works in a similar way as regular insulin does, permitting glucose to enter cells from the circulatory system[7].

Infusion solution of Human Actrapid 40IU/ml.

B. Human Mixtard Insulin:

Mixtard is a sort of substitution insulin that intently looks like the insulin produced by the pancreas. Human insulin, the dynamic fixing in Mixtard, is made utilizing a technique known as 'recombinant technology,' in which yeast cells are immunized with a quality (DNA) that permits them to create insulin.

Human Mixtard (30/70) Suspension for Injection 100 IU/ml is a combination of two drugs: intermediate-acting insulin and short-acting insulin. It is utilized to improve glucose levels in both adult and child groups with diabetes mellitus (type 1 and 2).

MATERIALS AND METHODS

Study site

This study is conducted in Aster Prime Hospital, Ameerpet, Hyderabad- Telangana- India.

Study design

A prospective observational study.

Study period

This study is conducted for 6 months.

Study populations

All patients who have Diabetes mellitus in the Acute Medical Care Unit/Intense Medical Care Unit/ General Wards / In-patient department.

Sample size

100-120 Patients.

Data collections

Used a suitably designed data collection form, the following details was being collected like the Inpatients number, Patient name, Age, Sex, Date of admission, Date of discharge, Chief complaints (C/O), History of Present Illness (HOPI), Past Medication history, lab data. Therapeutic Management (Insulin name, type, dosage and direction, quantity administered). The glycemic goals of DM such as HbA1c (post treatment values were noted only for the patients who came for follow up after 3 months), FBS (mg/dl), PPBS (mg/dl) and RBS (mg/dl) were also recorded.

RESULTS

Table 1: Comparison of Baseline HbA1c (%)

Insulin Type	Minimum	Maximum	Mean ± SEM	P value
HAI	5.70	13.50	9.03 ±0.83	0.8054
HMI	6.50	12.90	8.78 ±0.56	

Significant difference was not found in the baseline HbA1c of two groups.

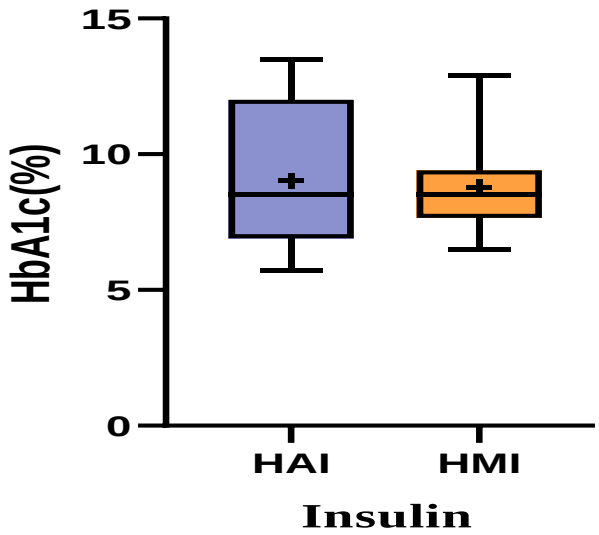

Figure 1: Comparison of Baseline HbA1c

The base line HbA1c (%) data of two groups (HMI and HAI) were collected from 114 patients. Of them HAI has a mean value of 9.03 and HMI has 8.78.This is depicted in graph and table.

DISCUSSIONS

Our study examined the effectiveness of Human mixtard insulin compared to Human Actrapid insulin in Type 2 diabetes patients and recognizing the importance of insulin therapy to control blood sugar levels.

The data was collected from 114 patients who were on insulin therapy. Among them 57 (50%) patients were treated with HMI and 57 (50%) patients were treated with HAI. Among 114 patients 56 % (64) of them were males and 44 % (50) of them were females. Majority of patients were found in the age group of (61-70). Data was collected from different departments of hospital i.e. from general medicine, cardiology, diabetology, gynecology, nephrology, neurology, orthopedics, Gastroenterology, podiatry and pulmonology. Majority of patients were hypertensive 75% (85).

Oral hypoglycemic drugs were also administered for few patients on insulin therapy for the better management of glycemic control.

The parameters like HbA1c %, random blood sugar at 3 different time intervals (7AM, 1PM, 7PM) and post prandial blood sugar were collected and compared between HMI and HAI.

After statistical analysis by dependent T-test and one way ANOVA the results were as follows: There was significant difference found between Human actrapid insulin and Human mixtard insulin that showed effective at confidence interval of 95% with p value <0.05 for HMI.

CONCLUSION

The present study provided detailed estimates of control of blood sugar with Human mixtard insulin and Human actrapid insulin at tertiary care hospital. The results are relevant for prevalence. It was found that Human mixtard insulin is effective than Human actrapid insulin. It was also noted that the GRBS values were significantly decreased with Human mixtard therapy with a confidence interval of 95% with p value of <0.05 is considered. Proper insulin therapy helps in management of type 2 diabetes mellitus and glycemic control which helps in delaying the long term complications. Patient's concerns and misconceptions were appropriately addressed to promote the acceptance of better insulin. This study highlights the better patient outcomes and better quality of life with prescribed insulin therapy.

REFERENCES

1. Kasper DL, Diabetes mellitus: Diagnosis, classification and pathophysiology. In: Harrison's Principles of Internal Medicine. 19th ed. New York, N.Y.: McGraw-Hill Education; 2015.
2. Avilés-Santa L, Sinding J, Raskin P. Effects of metformin in patients with poorly controlled, insulin-treated type 2 diabetes mellitus. A randomized, double-blind, placebo-controlled trial. *Ann Intern Med*. 1999;131(3):182–188.
3. Berhanu P, Perez A, Yu S. Effect of pioglitazone in combination with insulin therapy on glycaemic control, insulin dose requirement and lipid profile in patients with type 2 diabetes previously poorly controlled with combination therapy. *Diabetes ObesMetab*. 2007;9(4):512–520.
4. Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Report of the expert committee on the diagnosis and classification of diabetes mellitus. Diabetes Care 26:S5-S20; 2003. [PubMed]
5. Stratton IM, Adler AI, Neil HA, Association of glycaemia with macro vascular and micro vascular complications of type 2 diabetes (UKPDS 35): prospective observational study. BMJ. 2000;321(7258):405–412.
6. April Hazard Vallerand, Cynthia A. Sanoski. Sixteenth Edition. Philadelphia, China: F. A. Davis Company; 2019: Page No 693-695.
7. KD Tripathi. Seventh Edition. New Delhi, India: Jaypee Brothers Medical Publishers; 2013: Page No 265.

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