ORGINAL ARTICLE

A Retrospective Study On Commonly Prescribed Insulin Preparations and Combinations In The Management of Type-1 Diabetes Mellitus.

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Objective: To analyze pattern of drug prescriptions for insulin and oral antidiabetic drugs in type 1 diabetes mellitus patients seen in the a tertiary care teaching hospital in India.

Subjects and Methods: A retrospective study was conducted by analyzing insulin prescription pattern of type 1 diabetes mellitus patients presented during the period of July 2017 - August 2017 in a tertiary care teaching hospital.

Results: A total of 50 case records were found.32% of the prescriptions contained single insulin preparation and the remaining (68%) either had two insulin preparations or a combination of insulin and oral hypoglycemic agents. Majority (63%) of the combined insulin preparations consisted of regular insulin (short acting) and isophane insulin (intermediate acting). While using combination therapy with insulin and oral hypoglycemic drugs, metformin was used most commonly (67%) prescribed in combination with regular insulin.

Conclusion: Majority of the prescriptions consisted of two insulin preparations with Isophane insulin was the predominant preparation. Metformin was the commonest anti-diabetic drugs used together with insulin preparation.

Keywords: Insulin; Type 1 diabetes; oral antibiotic drugs; audit.

INTRODUCTION:

Type 1 diabetes is a major health problem all over the world. It is posing a huge burden particularly to middle and low income countries. Global prevalence of diabetes in 2014 is 442 million cases of which 5% are cases of type 1 diabetes. [1,2] Type 1 diabetes is characterized by hyperglycemia due to absolute deficiency of insulin. This is due to destruction of insulin producing cells in the pancreas by autoimmune mechanism.[3]

The aim of treating type 1 diabetes is to maintain normal blood sugar levels and to prevent complications due to persistent hyperglycemia such as diabetic nephropathy, diabetic retinopathy, diabetic neuropathy etc. Insulin is the mainstay of treatment for type 1 diabetes.[4] Insulin is being synthesized exogenously and is administered to patients as parenteral preparations as it is a peptide and if given orally it gets destructed by peptidases in stomach. Insulin is available in various preparations which differ mainly in onset and duration of action. Some preparations are used to maintain basal insulin requirements and some for postprandial requirement.

According to NICE (NG 17) (National institute for health and care excellence) guidelines most patients with type 1 diabetes should be treated with multiple daily injections (MDI) of both prandial and basal insulin or with continuous insulin infusion.[5] Prandial insulin is short acting insulin with a peak of action usually between 1 to 4 hours of administration. So this is given before the meal to maintain the postprandial hyperglycemia and basal insulin is long acting insulin with no peak of action and maintains basal insulin levels throughout the day. Other guidelines for the management of diabetes is called American Diabetes Association (ADA) standards of medical care in diabetes. According to this total daily starting dose of insulin is weight based, ranging from 0.4 to 1.0 units /kg of body weight. Typical daily dose in patients who are metabolically stable is 0.5 unit/kg. However, higher insulin doses are required in conditions like ketoacidosis, and during puberty. [6,7]

So to treat type 1 diabetes insulin can be prescribed in any one or more of its preparations. Even though studies have investigated prescribing patterns of insulin in type 2 diabetes mellitus, there is a paucity of evidence investigating prescribing pattern of insulin or combination therapy with oral drugs. This study is conducted to observe the prescribing pattern of insulin preparations in managing type 1 diabetes mellitus. We hypothesized that the majority of the patients are being treated according to the standard guidelines that is a combination of prandial or short acting insulin and basal insulin or long acting insulin. This study is designed to test this hypothesis.

Materials and Methods:

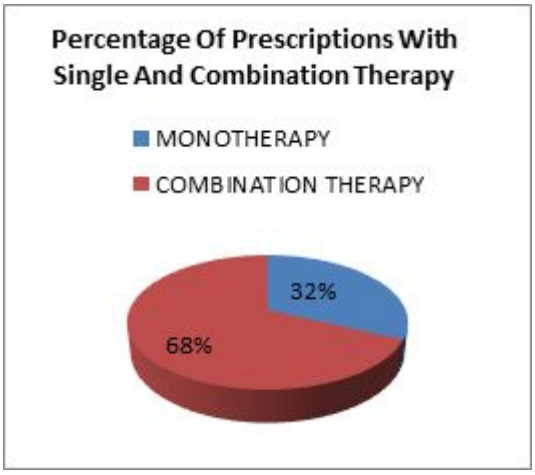
This was a retrospective study conducted to assess the prescribing pattern of insulin and its combinations in the management of type 1diabetes mellitus. 50 case record forms of type 1 diabetics were collected during the period of July 2017 - August 2017, from medical records section of a tertiary care teaching hospital. Those case records were thoroughly analyzed for the pattern of insulin prescription. The data obtained were tabulated in categories like monotherapy, combination therapy and insulin prescribed along with oral hypoglycemic agents. Appropriate

graphical representation is done. Institutional ethical committee clearance was taken prior to conduction of study.

RESULTS:

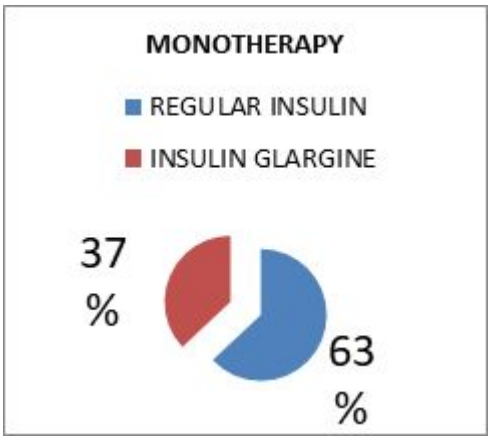
50 case record forms were assessed to know the insulin preparations prescribed and also the various combinations used in managing the patients. The case record forms were of patients aged 18 to 75 years and 60% of the prescriptions were of female patients.

In the present study, 32% of the prescriptions contained single insulin preparation and the remaining (68%) had either two insulin preparations or combination of insulin and oral hypoglycemic agents. (Graph 1)



Graph 1 showing percentage of prescriptions with single and combination therapy.

Of the 32% (n=16) prescriptions containing single insulin preparation, majority (n=10) of them were regular insulin (short acting insulin) while the remaining (6 prescriptions) were insulin glargine(long acting insulin).



Graph 2 showing percentage of regular insulin prescribed as monotherapy

Among 48% of prescriptions consisting of two insulin preparations, regular insulin constituted 48% of them. In addition to regular insulin, insulin glargine and Isophane insulin were also prescribed. Among Isophane and glargine preparation, Isophane (63%) was most commonly prescribed in combination with regular insulin.

In 12% of prescriptions metformin is given along with insulin preparation. Of all the preparations, regular insulin is mostly combined with metformin, rest of the prescriptions contained insulin glargine.

And 8% prescriptions contained a combination of regular insulin, isophane insulin and metformin.

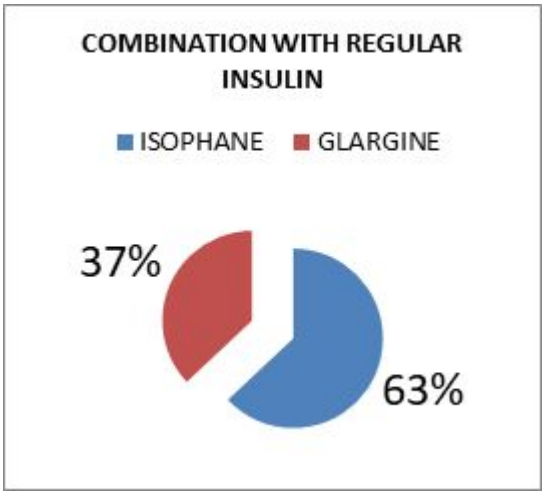
DISCUSSION:

In this study, we found that insulin is prescribed mostly (68%) with a dual insulin preparation, demonstrating a prevalence of dual insulin therapy use in type 1 diabetes mellitus. Out of total prescriptions, majority of the combined insulin preparations consisted of regular

	Categories	Number of prescriptions	Percentage
1	Single insulin preparation (monotherapy)	16	32%
2	2 insulin preparations(combination of insulin glargine or isophane with regular insulin)	24	48%
3	Insulin and metformin (regular insulin or insulin glargine with metformin)	6	12%
4	2 insulin preparations and metformin(regular or Isophane insulin with metformin)	4	8%
	Total prescriptions	50	

Table 1 depicts the various categories into which we classified the insulin prescriptions.

insulin (short acting) and Isophane insulin (intermediate acting), but various standard guidelines recommended a combination of short acting and long acting insulin compared to short acting and intermediate acting insulin. It was also observed that regular insulin which is short acting insulin is mostly prescribed either in monotherapy or in combination therapy. Prescriptions contained metformin along with regular and Isophane insulin. Insulin is being given in various combinations for reducing blood glucose concentration to a level which reduces the risk of complications.



Graph 3 showing percentage of other insulin combinations with regular insulin.

Conclusion: Majority of the prescriptions consisted of two insulin preparations with Isophane being the predominant preparation. Metformin was the commonest anti-diabetic drugs used together with insulin preparation. The study did not stratified prescription patterns based on chronicity of diabetes, associated and glycemic control of the patients. Long term studies with increased sample size and specific consideration to chronicity and associated comorbid conditions are imperative.

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