

SUBCUTANEOUS INSULIN PULSE THERAPY

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Introduction

Attempts to achieve glycemic control preoperatively in subjects with Non-Insulin Dependent Diabetes Mellitus (NIDDM) may be an ordeal at times. Not uncommonly NIDDM subjects hitherto well controlled with diet and oral hypoglycemic agents on being switched over to insulin prior to major surgery, escape control and require hospitalisation and energetic steps to restore euglycemia. In the present study, the efficacy of Subcutaneous Insulin Pulse Therapy (SIPT), a mode of insulin administration in achieving glycemic control in subjects with NIDDM is analysed.

Materials and Methods

Eight NIDDM subjects (5 males and 3 females) with mean age 59 ± 9.83 years and mean duration of diabetes mellitus 13.85 ± 10.2 years with poor glycemic control with conventional insulin treatment and waiting for elective surgery were taken up for the study. SIPT consisted of administration of small dose of regular insulin hourly or two-hourly through a sub-cutaneously inserted scalp vein needle over one quadrant of the anterior abdominal wall for a period of 48-72 hours. The eight subjects prior to SIPT were receiving insulin by conventional regimen (pre-meal mixed and split). After SIPT, patients were switched back to conventional insulin therapy. Glycemic

control was assessed by estimating fasting blood sugar before, during and after SIPT.

Results

The mean insulin dose of the eight subjects with poor glycemic control before SIPT was 48.13 ± 12.79 units/day. During SIPT, the mean insulin requirement was almost the same 49.38 ± 20.04 units/day (P=NS), nevertheless resulting in good glycemic control; following SIPT the mean insulin requirement was 35.38 ± 10.81 units/day. The post SIPT insulin requirement was significantly lower than the pre-SIPT requirement ($p < 0.05$). The mean fasting blood sugar over a week prior to SIPT was 305.25 ± 90.45 mg% with conventional pre-meal insulin therapy while during SIPT the value was 140 ± 53.7 mg%, significantly lower than the former ($p < 0.001$). The mean post SIPT fasting blood sugar value of 164.87 ± 49.84 mg% was also significantly lower than the pre-SIPT value ($p < 0.05$).

Discussion

Glycemic control prior to major surgery is extremely essential in diabetic subjects to avoid post operative morbidity and stabilisation with insulin is mandatory for subsequent manipulation and for ensuring adequate glycemic control intra and post operatively. Subcutaneous twice daily administration of insulin fails to ensure euglycemia in some diabetic

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subjects and a host of factors contribute towards the increased insulin requirement. In the present study, all the eight subjects were in poor glycemic control as revealed by the fasting blood sugar value of 305.25 ± 90.45 mg% and a reasonable degree of glycemic control was achieved with institution of SIPT for 48-72 hours. It should be appreciated that the mean insulin requirement prior to SIPT and during SIPT was not different ($p = NS$), yet significant reduction in fasting blood sugar was achieved. In the absence of an insulin assay, it has not been possible to document defective insulin absorption or excessive degradation of subcutaneously administered insulin by conventional regimen as a possible aetiological factor towards poor glycemic control. To attribute better absorption of small dose of subcutaneously administered insulin by SIPT, although speculative, sounds more logical on clinical grounds, comparable to low dose insulin therapy in the treatment of diabetic keto-acidosis. The reduced insulin requirement by conventional method following institution of SIPT emphasises the frequent observation that glycemic control once achieved is

relatively easily maintained. The use of purified insulin both before, during and after SIPT negates any possible contribution by immunological factors. There is paucity of information in the literature with respect to the efficacy of this easy means of insulin administration for a brief period. The procedure of SIPT enables the subjects to save many in-patients days for pre-operative glycemic control and the consequent economic burden.

It is concluded that SIPT forms an effective and safe means of insulin administration for initiating glycemic control without the need for administering very high dose of insulin in NIDDM subjects pre-operatively, in whom insulin may not otherwise be indicated. Moreover, institution of SIPT for a brief period makes subjects respond to conventional insulin regimen to which they were previously refractory. Having been impressed with this mode of therapy, SIPT is recommended for ensuring glycemic control in any subject with diabetes mellitus refractory to conventional premeal insulin administration schedules.