

The Saudi Society of Endocrinology and Metabolism has accepted clinical recommendations for the management of type 1 diabetes in children in Saudi Arabia (SSEM)

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Abstract

The American Diabetes Association (ADA) and the International Society for Pediatric and Adolescent Diabetes (ISPAD) have established several standards; however, there are no particular guidelines for our region. The Saudi Society of Endocrinology and Metabolism (SSEM) established and validated clinical treatment guidelines to help patients and physicians in selecting suitable health care programmes. While these recommendations are helpful in determining acceptable procedures for children with diabetes, they are not intended to replace individual provider clinical judgement or to set a standard of treatment. This article discusses numerous insulin therapy regimens in children with diabetes in Saudi Arabia, including the management of acute complications, sick day management and follow-ups.

Keywords: Type 1 diabetes; Children; Saudi Arabia; Guidelines; Management

Introduction

Chronic hyperglycaemia is the hallmark of diabetes mellitus (DM), a group of metabolic disorders caused by malfunctions in insulin secretion, insulin action, or both. Type 1 diabetes is characterized by beta cell destruction, which typically results in absolute insulin deficiency; type 2 diabetes is secondary to insulin resistance and involves relative insulin deficiency [1]. The classic symptoms of polyuria, polydipsia, polyphagia, and weight loss are used to diagnose DM, as is one of the following biochemical findings: a plasma glucose level of 200 mg/dl (11.1 mmol/L) or a plasma glucose level of 200 mg/dl (11.1 mmol/L) two hours after an oral glucose tolerance test, or a plasma glucose level of 126 mg/dl (7.0 mmol/L) during the day. Night-time enuresis, blurred vision, ketoacidosis, vaginal candidiasis, recurrent skin infections, and irritability are additional signs and symptoms. Type 1 DM in youth and immaturity regularly advances through four stages: the pre-diabetes stage, the clinical signs and symptoms of diabetes, the partial remission (also known as the honeymoon period), and becoming permanently dependent on insulin [2]. We will go over the Saudi Arabian clinical guidelines for treating type 1 diabetes in children in this summary.

Initial DM management

Patients who have recently been diagnosed with type 1 diabetes ought to

be admitted to the hospital in order to initially confirm the diagnosis, rule out and manage DKA if it is present, provide patient and parent education, and adjust insulin doses.

Insulin therapy

The goal of insulin therapy is to replace insulin in a way that is close to physiological, which is hard to do with the insulin and delivery methods that are most commonly used. More physiological insulin replacements are now available thanks to the availability of new insulin analogs and alternative delivery systems like insulin pumps [3]. The patient's age, the metabolic control goal, patient and family education and support, family status (such as stability, age, size of the family, education of parents, and income), lifestyle factors, the duration of diabetes, and associated complications like hypoglycemia will all influence the insulin type and regimen. In order to achieve short-term and long-term metabolic goals, as well as to minimize blood glucose fluctuations, the chosen insulin regimen should aim to meet the appropriate baseline insulin requirements over the course of 24 hours. It should also provide sufficient insulin levels for meals [4].

Insulin dose adjustment

Short-acting insulin (regular insulin) and intermediate-acting insulin (NPH), which is not the recommended insulin regimen, are likely to be administered twice daily to the majority of Saudi Arabian children. Insulin portions are given in amounts of 0.5-1.0 unit/kg/day. 66% of the all-out portion is given in the first part of the day, and 33% is given at night, 66% of the portion is given as NPH, and 33% is given as standard insulin. In the hospital, patients should be watched for three to four days; the mother or caregiver ought to be instructed in both insulin administration and glucose monitoring simultaneously. If the patient's condition is stable and the mother or caregiver is well-trained (i.e., familiar with hypoglycaemia's symptoms and treatment options), With twice-daily insulin injections, frequent home blood glucose monitoring, and close follow-up, the patient can be discharged.

In this regard, it has been demonstrated that intensifying insulin therapy according to the basal-bolus concept, i.e., multiple daily injections (MDIs) or continuous subcutaneous insulin infusion (CSII), produces the best results. Insulin is only effective as part of a comprehensive diabetes management strategy that also includes psychosocial support, rules for managing sick days, education, diet therapy, and physical activity, as well as psychosocial support. In order to achieve low HbA1c levels, strict control may increase the likelihood of severe hypoglycaemia. Nevertheless, there is evidence that cognitive impairment is more strongly linked to persistent hyperglycaemia than it is to the frequency of severe hypoglycaemic attacks during intensive therapy. Insulin dose adjustment the majority of diabetic children require between 0.5 and 1.0 units of insulin per kilogram of body weight per day. Four times a day should be your blood glucose checked, according to the American Diabetes Association; e.g., before meals and before going to bed. Blood glucose monitoring is required for insulin dose adjustments if the patient is on conventional insulin therapy that includes regular insulin and NPH [5]. The evenings NPH may be raised by 10% if most morning blood glucose readings are elevated. The morning NPH may be increased by 10% if the majority of the evening blood glucose readings are elevated. If most of pre-lunch blood glucose readings are raised, the morning ordinary insulin might be expanded by 10%, and in the event that most of sleep time blood glucose readings are raised, the night standard insulin might be expanded by 10%. A similar idea can be applied if there should be an occurrence of hypoglycaemia. Without proper diet therapy that includes counting carbohydrates or at least the exchange program, insulin adjustment cannot be successful. Basal insulin (detemir or glargine) may be administered for

50% of the total insulin dose in patients receiving intensive insulin therapy with MDIs; the rapid acting insulin dose should be determined based on the patient's blood glucose levels and the amount of carbohydrates consumed. The majority of diabetic children require a meal bolus of one unit of rapid-acting insulin for every 10 to 15 g of carbohydrates and a correction bolus of one unit for every 50 to 75 mg/dl of blood glucose above the target. Pre-prandial and two-hour postprandial/correction blood glucose readings must be used to adjust these ratios. The objective reach for blood glucose control should be changed by age. Pre- and post-meal targets for older children should be between 80 and 130 mg/dl. Pre-sleep readings should be between 120 and 150 mg/dl to avoid hypoglycaemia in the late night or early morning.

Out-patient follow-up of diabetic children

Education for the patient, parent, and caregiver should be emphasized during outpatient follow-up of diabetic children [6]. Due to changes in eating and exercise habits outside of the hospital and/or during the honeymoon period, insulin dosages must be adjusted. Home blood glucose readings ought to be discussed at each visit. The dosage of insulin, the method of injection, and episodes of hypoglycaemia ought to be assessed. Recordings of vital signs, weight, and height from a comprehensive clinical examination should be made. Even if there are no classic symptoms, annual laboratory evaluations should include tests for celiac disease and thyroid function. In diabetic patients, celiac disease can result in growth failure and erratic glycaemic control. Between 2.9% and 5% of children with diabetes have celiac disease. The most dependable tests for celiac infection are the tests with against endomysial antibodies and hostile to tissue transglutaminase antibodies. Antigliadin antibodies should be utilized if these antibodies are unavailable. If the initial screening test results are negative or if there is a clinical reason to reconsider the diagnosis of celiac disease, the test must be repeated every four to five years. With time, the conversion rate to celiac disease positivity decreases. If a disorder-specific sign or symptom is observed (such as adrenal insufficiency, gastric parietal cells, or gonadal signs), other autoimmune diseases should be considered. After puberty or five years after diagnosis, tests for microalbuminuria should be used to check for renal impairment, and an eye fundal examination should be used to check for retinopathy. After the age of two, lipid profiles can be looked at. Management of sick days Concurrent illnesses can cause high or low blood sugar. It is important to anticipate all effects on patients' glycaemic control [7]. Patients under strict control are more likely to experience hypoglycaemia, whereas patients under poor control are more likely to experience hyperglycaemia. Even if the patient is unable to eat, we recommend that they continue taking insulin, particularly peak-less and intermediate-acting insulins; However, the dose can be changed. If there is a possibility of severe hypoglycemia, short-acting insulin can be stopped. The patient must be examined for symptoms that are related to the underlying cause, such as infection (such as vomiting, sore throat, cough, and urinary tract infection), appendicitis (a surgical abdomen), trauma, or other conditions. It is essential to monitor blood glucose frequently.

Check for ketones in the urine if the blood sugar is high (more than 200 mg/dl or 11 mmol/L), and if they are negative or slightly elevated, administer 0.05–0.1 units of regular insulin/K; However, the patient should be taken to the emergency room for evaluation if the urine ketones are strongly positive (+2 or greater) and the number of repeated blood glucose readings are rising [8]. The patient should consume sugar-containing fluids or easily digestible food if the RBS is less than 70 mg/dl. Hospitalization is advised if the patient refuses to eat or exhibits frequent vomiting. Please be aware that blood strips measure beta-hydroxy butyrate (BOHB) while urine strips measure aceto-acetate (AcAc). Even if the urine ketone test is negative or only shows trace ketonuria, there may be a dissociation between the concentrations of ketones in the blood (BOHB) and the concentrations in the urine (AcAc). These concentrations may rise to levels that are consistent with DKA [9]. Blood (BOHB) fixation estimation empowers prior distinguishing proof and treatment of ketosis contrasted with pee ketone testing. Blood ketones (BOHB) normalize earlier than urine ketones during ketosis resolution.

Management of diabetes during surgery

About half of all diabetics will need surgery at some point in their lives

[10]. The goal of diabetes management for children undergoing surgery is to provide enough calories and insulin to prevent hypoglycaemia and catabolism. As a result, frequent blood glucose monitoring and optimal pre-operative blood glucose control are recommended. When HbA1c is greater than 9%, fasting glucose is greater than 180 mg/dl (10 mmol/L), or post-prandial glucose is greater than 230 mg/dl (13 mmol/L), major surgery should be delayed as much as possible. Screening for complications that may affect surgical risks is crucial if DM lasts longer than five years. Blood glucose levels should be between 110 and 180 mg/dl (6.0 and 10 mmol/L). Activities are best booked from the beginning the rundown, ideally in the first part of the day [11]. If the patient is on an NPH/regular regimen, we recommend giving the evening dose of NPH as usual, half of that dose in the morning without the morning regular insulin, or half of the long-acting insulin without the rapid-acting insulin if the patient is on an MDI regimen. Continuous intravenous insulin and fluid infusion are recommended for long-term surgeries. Management of hypoglycaemia Diet therapy The goals of nutrition therapy for type 1 diabetes are to improve nutritional status and encourage normal weight and growth and development; to control diabetes in order to avoid prolonged hyperglycaemia and severe hypoglycaemia; and to improve blood lipid management [12].

Healthy eating guidelines that are appropriate for both children and adults should serve as the foundation for dietary recommendations, with a focus on avoiding sucrose and highly refined sugar. The following should be the distribution of your total daily energy intake: 50–55% carbohydrates with a moderate amount of sucrose (up to 10% total energy); 30 to 35% fat, less than 10% saturated fat; and 10 to 15% protein. Patients taking ultra-short-acting insulin with peak-less insulin benefit greatly from carbohydrate counting [13].

Achieving optimal metabolic glycaemic control, normal growth and development, eliciting the best psychosocial adjustment, and customizing diabetes care plans are all goals of diabetes management. A multi-disciplinary diabetes team approach is the most effective way to achieve these objectives.

Conclusion

Diabetes is a serious life-threatening disease and must be constantly monitored and effectively subdued with proper medication and by adapting to a healthy lifestyle. By following a healthy lifestyle, regular check-ups, and proper medication we can observe a healthy and long life.

Acknowledgement

None

Conflict of Interest

None

References

1. American diabetes association diagnosis and classification of diabetes mellitus. *Diabetes Care*. 2004; 27: 5-10.
2. Craig M, Hattersly A, Donaghue K. ISPAD clinical practice consensus guidelines 2006–2007. Definition, epidemiology and classification. *Pediatr Diabetes*. 2006; 7: 343-351.
3. Bin-Abbas BS, Sakati N, Raef H, Al-Ashwal AA. Continuous subcutaneous insulin infusion in type 1 diabetic Saudi children: a comparison with conventional insulin therapy. *Saudi Med J*. 2005; 26: 918-922.
4. Bin-Abbas BS, Sakati N, Al-Ashwal AA. Continuous subcutaneous insulin infusion in type 1 diabetic Saudi children. 2-year follow-up. *Curr Pediatr Res*. 2006; 10: 1-2.
5. Bin-Abbas BS, Al-Aga AE, Sakati N, Al-Ashwal AA. Multiple daily insulin regimen using insulin Detemir in type 1 diabetic Saudi children. *Saudi Med J*. 2006; 27: 262-263.
6. Bin-Abbas BS, Sakati N, Al-Ashwal AA. Comparison of insulin pump therapy with multiple daily insulin injection regimen in type 1 diabetic Saudi children. *Curr Pediatr Res*. 2006; 10: 37-39.

7. Smart C, Aslander-van VE, Waldron S. Nutritional management in children and adolescents with diabetes. *Pediatr Diabetes*. 2009; 12: 100-117.
8. Robertson K, Adolfsson P, Scheiner G, Hanas R, Riddell MC. Exercise in children and adolescents with diabetes. *Pediatr Diabetes*. 2009; 12: 154-168.
9. Swift PG. Diabetes education in children and adolescents. *Pediatr Diabetes*. 2009; 10: 51-57.
10. Brink S, Laffel L, Likitmaskul S. Sick day management in children and adolescents with diabetes. *Pediatr Diabetes*. 2009; 12: 146-153.
11. Delamater AM. Psychological care of children and adolescents with diabetes. *Pediatr Diabetes*. 2009; 12: 175-184.
12. American Diabetes Association. Diabetes care in the school and day care setting. *Diabetes Care*. 2009; 32: 68-72.
13. Ford-Adams ME, Murphy NP, Moore EJ, Edge JA, Ong KL. Insulin lispro: a potential role in preventing nocturnal hypoglycaemia in young children with diabetes mellitus. *Diabet Med*. 2003; 20: 656-660.