بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

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Comparative Study of the Effectiveness of Long- and Intermediate-Acting Insulins in Children with Type 1 Diabetes Mellitus

Thesis

Submitted for Partial Fulfillment of
Master Degree in ***Pediatrics***

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رسالة الكلية

تقوم كلية طب جامعة عين شمس بإعداد طبيب مدرب ذو مهارة تنافسية على المستوى المحلي والإقليمي، وقادر على التعليم والتعلم والتدرب مدى الحياة وملتزم بمعايير الخدمة الطبية والأخلاق المهنية، وتدعم الكلية التطوير المستمر للبرامج والمقررات والبحث العلم مع الحرص على التوسع في الأبحاث العلمية التطبيقية وبرامج الرعاية الصحية لخدمة احتياجات المجتمع وتنمية البيئة

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Abstract

Background: Achieving glycemic control without risking hypoglycemia imposes a major challenge among young children with type 1 diabetes (T1D). **Objectives:** To compare the effectiveness of insulin degludec to insulin glargine and NPH insulin among toddlers and preschoolers with T1D in terms of glycosylated hemoglobin (HbA1c) and frequency of hypoglycemic episodes. **Methods:** This randomized-controlled trial included 60 toddlers and preschoolers with T1D aged 2-6 years, with disease-duration 0.07-6 months. They were 27 males (45%), 33 females (55%). According to basal insulin, they were randomly assigned into three groups; Group-A received insulin degludec, group-B insulin glargine and group-C NPH insulin. The three groups were followed-up for 6 months with assessment of insulin daily-dose (IDD), frequency of hypoglycemia and severe hypoglycemia/week and HbA1c. **Results:** The three groups were well-matched regarding baseline clinical and laboratory parameters ($p>0.05$). After 6 months, the insulin degludec group had significantly lower IDD ($p=0.015$), frequency of hypoglycemia ($p=0.006$) and severe hypoglycemia ($p=0.029$), and HbA1c ($p=0.002$) than the other two groups. The frequency of hospital admissions was significantly higher in the NPH group than the other two groups

(p=0.034). Insulin degludec and insulin glargine resulted in significant decrease of HbA1c than baseline (p=0.001 and p=0.024, respectively). Moreover, insulin degludec resulted in significant decrease in the frequency of hypoglycemia (p=0.003) and severe hypoglycemia (p=0.017). The insulin glargine group showed significantly lower IDD at the end of the study than baseline (P=0.032). No significant difference was found between toddlers and preschoolers as regards IDD, frequency of hypoglycemia and HbA1c. **Conclusion:** The use of insulin degludec and insulin glargine significantly improves glycemic control and reduces the risk of hypoglycemia with a lower insulin dosage among toddlers and preschoolers with T1D.

Keywords: Insulin glargine; insulin degludec; NPH insulin; toddlers; preschool children; type 1 diabetes.

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Abb.	Full term
Arg	Arginine
Asn	Asparagine
ATG	Anti-thymocyte globulin
AHSCT	Autologous hematopoietic stem cell transplant
BG	Blood Glucose
BI	Basal insulin
BMI	Body mass index
Bp	Blood pressure
CD3	Cluster of differentiation 3
CGM	Continuous glucose monitoring
CTLA-4	Cytotoxic T-lymphocyte-associated protein 4
DCCT	Diabetes Control and Complications Trial
DKA	Diabetic ketoacidosis
ENDIT	European Nicotinamide Diabetes Intervention Trial
Fiasp	Faster-acting insulin aspart
GAD65	Glutamic acid decarboxylase 65
GCSF	Granulocyte colony stimulation factor
GLP-1	Glucagon-like peptide-1
Gly	Glycine
HbA1c	Hemoglobin A1c (glycosylated hemoglobin)
HLA	Human leukocyte antigen
IA-2	Insulinoma-associated 2
IAA	Antibodies to insulin
ICA	Islet cell cytoplasmic antibodies
IDD	Insulin daily dose
IDeg	Insulin Degludec
IDF	International Diabetes Federation
IGlar	Insulin Glargine
INIT II	Australian intranasal insulin trial II
JDRF	Juvenile Diabetes Research Foundation
MDI	Multiple daily injections

List of Abbreviations cont...

Abb.	Full term
MODY	Maturity onset diabetes of the young
NDM	Neonatal diabetes mellitus
NGSP	National Glycohemoglobin Standardization Program
NPH	Neutral protamine Hagedorn insulin
OGTT	Oral glucose tolerance test
PADU	Pediatric and adolescents diabetes unit
PD	Pharmacodynamics
PG	Plasma glucose
Ph	Negative logarithm of the hydrogen ion concentration
PK	Pharmacokinetic
RCTs	Randomized controlled trials
SC	Subcutaneous
SMBG	Self-monitoring blood glucose
T1D	Type one diabetes
T2D	Type two diabetes
TINIA	Turbidimetric inhibition immunoassay
ZnT8	Zinc transporter8