THERAPY for GLYCEMIC CONTROL of TYPE 2 DIABETES MELLITUS in ADULTS

Hyperglycemia

- Not symptomatic
- Not Ketotic
- Not type 1 diabetes
- Not Pregnant

Consider starting metformin and Lifestyle therapy

Hyperglycemia

- Very high glucose levels or
- Substantial Symptoms or
- Ketosis or
- Possible type 1 diabetes or
- Pregnant

Consider starting insulin (with or without additional medications) and Lifestyle therapy

Glycemic goals not achieved

- Consider adding other oral or non-insulin agents
- Reinforce Lifestyle therapy

Glycemic goals not achieved

- Consider adding Insulin (typically start with basal insulin in type 2 diabetes)*
- Reinforce Lifestyle therapy

Glycemic goals achieved

Glycemic goals achieved

If glycemic goals are achieved and maintained, consider evolving to a less intense pharmacologic therapy (except in the case of pregnancy and Type 1 diabetes)**

Lifestyle Therapy

(Continue throughout treatment of diabetes)

- Self-management training and reinforcement
- Management principles and complication prevention
- Self-glucose monitoring
- Medical nutrition therapy
- Weight management
- Physical activity

***See DCC type 2 diabetes adult insulin guidelines**
****Note: If therapy has evolved to a less intense regimen and glycemic control is not maintained, revert to previous effective therapy.**

RECOMMENDATIONS FOR GLYCEMIC CONTROL

Biochemical Index	Goal
A1C	<7%***
Fasting/preprandial plasma glucose	70-130 mg/dl
Peak postprandial plasma glucose	<180 mg/dl

***NOTE according to ADA Standards of Medical Care in Diabetes -- 2012:

- "Lowering A1C to below or around 7% has been shown to reduce microvascular complications of diabetes, and if implemented soon after the diagnosis of diabetes is associated with long-term reduction in macrovascular disease. Therefore, a reasonable A1C goal for many nonpregnant adults is <7%. (B)
- Providers might reasonably suggest more stringent A1C goals (such as <6.5%) for selected individual patients, if this can be achieved without significant hypoglycemia or other adverse effects of treatment. Appropriate patients might include those with short duration of diabetes, long life expectancy, and no significant CVD. (C)
- Less-stringent A1C goals (such as <8%) may be appropriate for patients with a history of severe hypoglycemia, limited life expectancy, advanced microvascular or macrovascular complications, extensive comorbid conditions, and those with longstanding diabetes in whom the general goal is difficult to attain despite DSME, appropriate glucose monitoring, and effective doses of multiple glucose-lowering agents including insulin. (B)
- Postprandial glucose may be targeted if A1C goals are not met despite reaching preprandial glucose goals"

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Adapted from the American Diabetes Association/European Association for the Study of Diabetes Medical Management of Hyperglycemia in Type 2 Diabetes: Consensus Algorithm for the Initiation and Adjustment of Therapy, 2009.

For further information: www.diabetescoalitionofcalifornia.org or www.caldiabetes.org or (916) 552-9888

EXPLANATORY NOTES

THERAPY FOR GLYCEMIC CONTROL OF TYPE 2 DIABETES MELLITUS IN ADULTS

1. This algorithm emphasizes the need to evaluate regularly the patient's response to therapy and identify the therapy that achieves and maintains optimal glycemic control. Lifestyle therapy should continue throughout diabetes treatment.
2. Generic names, trade names, and manufacturers for classes of medications approved by the FDA are listed below.
3. Prescribing these medications requires knowledge of indications, side effects, and contraindications.

ORAL AGENTS			
Class	Generic Name	Trade Name	Contraindications
Alpha Glucosidase Inhibitors	Acarbose Miglitol	Precose Glyset	Absolute: cirrhosis (acarbose), intestinal diseases, inflammatory bowel disease, colonic ulceration partial intestinal obstruction Relative: renal impairment
Biguanides	Metformin	Glucophage*, Glucophage XR*	Absolute: renal dysfunction (SrCr >1.5mg/dl in males, >1.4mg/dl in females) Relative: concomitant use with drugs that can affect renal function, caution use with hepatic impairment and CHF
DPP-4 Inhibitors	Linagliptin Sitagliptin Saxagliptin	Tradjenta Januvia Onglyza	Relative: dose adjustment for renal insufficiency (sitagliptin), hypersensitivity, history of pancreatitis
Insulin Secretagogues Meglitinides D-phenylalanin derivative Sulfonylureas (SFU)	 Repaglinide Nateglinide Chlorpropamide Glimepiride Glipizide Glyburide Tolazamide Tolbutamide	 Prandin Starlix Diabinese* Amaryl* Glucotrol*, Glucotrol XL* DiaBeta Glynase* Tolinase* Orinase*	Absolute: co-administration with gemfibrozil (replaglinide) Relative: concomitant use with certain drugs[1] (repaglinide), caution with active liver disease (nateglinide), caution use of 1st generation sulfonyureas (tolazamide, tobutamide, chlorporpamide) in the elderly
Thiazolidinediones (TZD)	Pioglitazone	Actos	Absolute: patients with NYHA III or IV heart failure, symptomatic heart failure Relative: concomitant use with CYP 2C8 inhibitors & inducers
Oral Agent Combinations Biguanide + SFU Biguanide + Meglitinides Biguanide + TZD Biguanide + DPP-4 Inhibitors TZD + SFU	 Metformin + Glyburide Metformin + Glipizide Metformin +Repaglinide Metformin + Pioglitazone Metformin + Sitagliptin Meftformin + Saxagliptin Metformin + Linagliptin Pioglitazone + Glimepiride	 Glucovance* Metaglip* Prandimet ActoPlus Met, ActoPlus Met XR Janumet, Janument XR Kombiglyze XR Jentadueto Duetact	

EXPLANATORY NOTES

THERAPY FOR GLYCEMIC CONTROL OF TYPE 2 DIABETES MELLITUS IN ADULTS Cont.

INSULIN			
Rapid-Acting	Lispro Aspart Glulisine	Humalog Novolog Apidra	
Short-Acting	Regular (R) Human	 Humulin R Novolin R	
Intermediate-Acting	NPH (N) Human	 Humulin N Novolin N	
Insulin Mixtures	NPH/Regular (70%/30%) Lispro protamine suspension/Lispro solution (75%/50%) Lispro protamine Suspension/ Lispro solution(75%/25%) Aspart protamine suspension/ Aspart solution (70%/30%)	Humulin 70/30 Novolin 70/30 Humalog Mix 50/50 Humalog Mix 75/25 NovoLog Mix 70/30	
NON INSULIN INJECTABLES			
Amylinomimetic/amylin analog	Pramlintide	Symlin	Absolute: gastroparesis Relative: increased risk of severehypoglycemia with insulin – proper patient selection is criticalfor safe and effective use
Incretin mimetic/GLP-1 analog	Exenatide Liraglutide	Byetta Bydureon Victoza	Absolute: personal or family history of medullary thyroid carcinoma or with multiple endocrine neoplasia syndrome type Relative: caution use with history of pancreatitis, avoid with severe and end stage renal disease, gastroparesis, pregnancy

*Available generically

[1] cytochrome P-450 & 2C8 inhibitors (ketoconazole, itraconzole, erythromycin, gemfibrozil, montelukast, trimethroprim) and/or inducers (rifampin, barbituates, carbamezapine)

