bcdiabetes.ca
Patient Care + Research + Clinical Trials

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Principles of Type 2 diabetes management

"evidence-based interventions that improve outcomes, given once daily where possible, that preserve or enhance quality of life"

Glycemic targets

a) general

● in hospital	A1c n/a,	FBS 5.0-10.0
● nursing home, or age >85:	A1c < 9.0,	FBS 5.0-10.0
● age 75+:	A1c < 8.0,	FBS 5.0-8.0, 2hr PC prn 6.0-10.0
● age 40-75:	A1c < 7.0,	FBS 5.0-7.0, 2hr PC prn 6.0-10.0
● age < 40:	A1c < 6.5,	FBS 4.0-6.0, 2hr PC prn 6.0-10.0

b) special

● vasculopathy:	A1c < 8.0,	FBS 5.0-7.0, 2hr PC prn 6.0-10.0
● diabetes duration > 20 yr:	A1c < 8.0,	FBS 5.0-7.0, 2hr PC prn 6.0-10.0
● symptomatic. Neuropathy:	A1c < 6.5,	FBS 4.0-6.0, 2hr PC prn 5.0-8.0
● severe retinopathy:	A1c < 6.5,	FBS 4.0-6.0, 2hr PC prn 5.0-8.0

Lifestyle therapy is always #1

graded sustainable exercise program, tailored to patient (referrals to fitness coach where desirable)

recommended: well-balanced meals comprised of smaller portions & healthier high fiber carbohydrates; tell the patient "Carbohydrates or starches like white rice, white bread, white flour, baked goods, instant cereals, potatoes & tropical fruits increase blood sugars quickly. Wholegrain carbohydrates, parboiled or basmati rice, pasta, noodles, waxy or nugget potatoes, sweet potatoes/yams, split peas, lentils & beans cause a lesser rise in blood sugar. Dairy, vegetables , non-tropical fruit and proteins are also healthy choices in making balanced meals that result in improved blood sugar control.

Self Monitoring Blood Glucose (SMBG)
to be performed in all patients

exception:

needle phobia & A1c to target, no insulin or secretagogue therapy

testing schedule & frequency

Default
before breakfast daily

- reduce to M/W/F once A1c to target for 6 months
- reduce to once weekly once A1c to target for 12 months

Special cases

a) 2 hr pc testing

- for meal-planning/carb-counting
- for rapid insulin titration

b) before meal testing

- for corrections

GLYCEMIA TREATMENT

- indicated if A1c above target &/or obesity
- review healthy diet
- reinforce graded exercise program (consider referrals to dietitian/fitness coach)

Pharmacotherapy

Principle of therapy: medication is added step-wise, starting with non-secretagogue therapy until blood sugar targets reached. In general medication is only stopped if ineffective or unacceptable side-effects or if insulin therapy leads to acceptable control (exception metformin - never stopped, see below). Default drug recommendations at the time of writing are based on availability in the Canadian market, effectiveness (efficacy combined with compliance) and price. Once daily therapies are preferred over twice daily therapies. Before breakfast therapies are preferred over other time of day therapies. For a full pricing list as of 2013 see http://guidelines.diabetes.ca/Browse/Appendices/Appendix5

First line Rx

metformin is offered to all patients with eGFR > 20 & A1c > 6.0 or overweight (female BMI > 23, male BMI > 25)
Prescribe as 500 mg tabs (standard formulation given BID, SR version preferred, given once daily at breakfast (note SR version "Glumetza" is four times the cost of usual quick release metformin ($0.61 vs $0.14 per tablet)
Start at one tablet per day & increase Q4 days to max below or max tolerated

eGFR	maximum dose (given once daily if SR, otherwise BID)
> 50	2000 mg/day
40-50	1500 mg/day
30-40	1000 mg/day
20-30	500 mg/day

Second line Rx

if overweight & cost no consideration: **GLP-1 agonist (see below) or SGLT-2 inhibitor (canagliflozin 300 mg I daily $2.67, see below,** dapagliflozin (A-Z) approved by Health Canada 2014-12**)**
*empagliflozin (BI-Lilly) expected on Canadian market Q3 2015.

if not overweight & cost no consideration: DPP-4 inhibitor Choices: linagliptin ($2.43/day), saxagliptin ($2.73/day) & sitagliptin ($2.96/day), given once daily at 5 mg, 5 mg & 100 mg respectively (half tablet if eGFR < 50 for

sitagliptin & saxagliptin). Linagliptin & saxagliptin are Pharmacare benefits (with Special Authority, though not a benefit if insulin co-administered). Sitagliptin to be delisted as Pharmacare benefit 2015-02

If cost a consideration **Basal insulin** (see Rx below)

if needle phobia: **sulfonylurea**
default is glyburide 5 mg ($0.07) started at ½ tab at breakfast, increasing to i at breakfast then i BID prn.
Alternative gliclazide MR 30 mg ($0.15, Special Authority required) started at i daily increasing to ii daily prn
and/or

Third line Rx (injectables)

if FBS elevated start with

- basal insulin, or
- GLP-1 agonist (if BMI > 25.0 & A1c < 9.0)

if FBS to target but A1c elevated start

- GLP-1 agonist (if cost not a factor & BMI > 26.0), or
- rapid insulin

Basal insulin

Insulin glargine (or detemir) 6+ units given once daily starting at 8 U daily (or 0.1 U/kg whichever is less), increasing by 1-2 units per day until target FBS met. Do not split dose unless > 80 units per day or patient has day-time or evening lows with morning highs.
or
NPH 8 units HS (or 0.1 U/kg HS, whichever is less), increasing by 1-2 units per night until target FBS met. Do not split dose unless > 60 units per day or FBS to target but A1c high.
Note: NPH is the basal insulin of choice for prednisone-caused or prednisone exacerbated diabetes. NPH should be given at the same time as prednisone & the dose of NPH titrated against the sugar 8-10 hours later.

Price note per unit: glargine $0.061, NPH $0.022

Rapid insulin

Insulin glulisine 2+ units immediately before largest meal of day (or meal with highest post-prandial reading), increasing by 1 units per day vs 2hr pc 6-10. Introduce carb-counting early if patient amenable & motivated. Starting carb-ratio 10:1 (15:1 in Type 1s).

Price note, using cartridges: per unit: glulisine $0.033, regular insulin $0.027 unit

GLP-1 agonist Rx

liraglutide 0.6 mg acb increasing over the course of 2-4 weeks to 1.8 mg or maximal tolerated dose: default recommendation is to increase to 1.2mg after one week & then to 1.8 mg after a further 10-14 days. For weight loss the dose may be pushed, GI side-effects permitting, to 3.0 mg/day. Liraglutide at 1.8 mg/day costs $9/day.

exenatide 5 ug BID (before breakfast & dinner) for one month increasing to 10 ug BID if tolerated. Exenatide at 10 ug BID costs $5.50/day.

*note: two new once weekly GLP-1s expected by Q3-2015: exenatide LA (A-Z) & dulaglutide ((Lilly).

Management Scenarios

Scenario #1: obese, third party insurance
lifestyle therapy personal diet coach & personal trainer
metformin SR 500→1000→1500→2000 mg/day, + prn
canagliflozin 300 mg I daily. If polyuria++ reduce dose to ½ tab daily. If eGFR < 40 start with 100 mg formulation once daily, +prn
liraglutide 0.6→1.2→1.8 mg/day, + prn
gliclazide MR 30→60 mg/day, + prn
insulin glargine, + prn
insulin glulisine

Scenario #2: non-obese, third party insurance
lifestyle therapy & personal trainer
metformin SR 500 i daily→ ii daily→ iii daily → iv daily, + prn
linagliptin 5 mg I daily (or saxagliptin 5 mg i daily or sitagliptin 100 mg I daily) +, prn
(consider combination drug sitagliptin/metformin LA 50/1000 mg once daily)
gliclazide MR 30→60 mg/day, + prn
insulin glargine, + prn
insulin glulisine

Scenario #3: no third party insurance
lifestyle therapy, gym membership
metformin 500 mg ½ BID→i BID → ii BID, + prn
glyburide 5 mg ½ daily → i daily→ ii daily, + prn
linagliptin 5 mg i daily (or saxagliptin 5 mg I daily, both require Special Authority), + prn
(consider combination linagliptin/metformin or saxagliptin 2.5/1000 mg I BID)
insulin glargine (requires Special Authority) + prn
insulin glulisine