PURPOSE

To assure that DOP inmates with Diabetes, who require insulin therapy, are receiving high quality Primary Care for their condition.

POLICY

All DOP Primary Care Providers are to follow these guidelines when treating inmates with Diabetes, requiring insulin therapy. Deviations from these guidelines are permissible only on a case by case basis. When deviations are made, they must be clearly documented in the medical record along with a clear explanation of the rationale for the deviation.

PROCEDURE

1) When to start insulin therapy
   a) Life style modification and/or oral therapy should tried first in most Type II diabetics.
   b) Insulin should be considered when the above treatment regimens fail to control hyperglycemia adequately in reasonably compliant patients.
   c) In very noncompliant patients, the decision whether or not to start insulin is a difficult one.
      i) Insulin alone or with other agents will not necessarily overcome noncompliance.
      ii) High dose insulin in a noncompliant patient can lead to severe or life threatening hypoglycemia.
      iii) Hypoglycemia kills much faster then hyperglycemia.
      iv) Insulin may encourage further noncompliance with diet.
      v) Insulin may induce further weight gain, making control even more difficult.
   d) Short term use of insulin maybe useful in newly diagnosed Type II DM with severe hyperglycemia on initial diagnosis.
      i) Short term use of insulin allows:
         (1) Faster control of hyperglycemia
         (2) The pancreas to recover
      ii) Oral agents can be and are normally started simultaneously
      iii) Insulin therapy should normally be stopped/tapered once reasonable control is maintained for 1 to 2 months with oral agents
2) General considerations when using insulin therapy
   a) Human vs. analog insulin
      i) Rapid onset analog (Humalog or Novolog)
         (1) Have no proven glycemic control advantage over regular human insulin in Type II diabetics
         (2) Can be dangerous in a setting where the inmate is not allowed to keep insulin on person. Since the inmate has to go to medical in prison for his insulin, there may be a significant delay between the time that the insulin is administered and the inmate gets his meal. The risk of severe hypoglycemia is raised significantly in these situations.
         (3) The use of these agents is restricted in the DOP
            (a) Inmates entering the DOP on rapid-acting insulins are to be changed to equivalent doses of regular insulin or changed to a different regimen.
      ii) Long-acting analogs (Lantus or Levemir)
         (1) Also offer no clear glycemic control advantage. However, they may have less symptomatic and nocturnal hypoglycemia than NPH in some patients.
         (2) Are not as cost effective as NPH
         (3) Generally should only be used when NPH causes frequent problems with hypoglycemia
   b) Sliding scales based on finger stick glucose
      i) Sliding scales were never intended for use in the outpatient setting.
      ii) Sliding scales have been shown to be less effective then standard insulin dosing in multiple studies
      iii) Sliding scales are not recommended for use in outpatient setting by any organization.
      iv) Inpatient and infirmary use should be avoided and limited.
   c) Injection site
      i) The rate of absorption of insulin varies with the site.
         (1) Absorption rates vary inversely to the subcutaneous fat thickness.

(2) Rate of absorption by site
(a) Abdomen – fastest
(b) Arm – intermediate
(c) Leg and Buttock – slowest
(3) Sites should be rotated but certain areas are preferred for different types of insulin.
(a) The same area or similar areas should be used for each dose of the same type insulin.
(b) Abdomen is best for pre-meal regular insulin.
(c) Leg may be preferred for pre-evening meal intermediate insulin to ensure that it lasts through the night.

ii) Larger doses are not as well absorbed as smaller doses.
(1) This erratic absorption may contribute to the lack of control and liability in insulin resistant patients who require large doses of insulin.
(2) Multiple injections and combination with oral agents may help improve absorption and decrease reliability and improve overall control.

3) Combination therapy with oral agents
a) Metformin (Glusophage)
i) Preferred oral agent for use with insulin
ii) Provides better control than insulin monotherapy
iii) Less weight gain than monotherapy
iv) Avoid use if creatinine clearance (or estimated GFR) is low
(1) Manufacturer generally recommends stopping when <60 ml/min.
(2) Some recent reviews have suggested that metformin can be safely given as long as > 30 ml/min
v) Avoid use in severe hepatic impairment.
b) Pioglitazone (Actos)
i) Provides better control then insulin monotherapy
ii) Increased risk of CHF and bone loss
iii) Should be avoided in patients with severe or uncompensated CHF

4) The decision to start insulin and/or to start multiple injection regimens should always take into account the patient's preferences and willingness to comply with therapy.
a) The patient's inability or unwillingness to comply with insulin therapy is a legitimate reason for the provider not to order such therapy and accept higher targets for glycemic (A1C) control.
b) Hypoglycemia needs to be avoided
i) This is particularly important in patients with known or at very high risk for CAD (i.e. all diabetics with 20 or more years history).
ii) Several studies have shown increased death rates in these patients with tight glycemic control, particularly when using insulin. (Possibly due to the epinephrine surge caused by clinical and sub-clinical hypoglycemic episodes)
iii) It may be preferable to readjust A1C goals in these patients to higher levels.
iv) When treating with insulin, A1C levels < 7.0 should be avoided (due to risk of hypoglycemia).

5) Setting target A1C
a) Though 7.0 is the target for most patients, the target needs to be modified to higher level in a significant minority of patients.
b) Co-morbities or conditions that may indicate a need for higher target levels:
i) Advanced age
ii) History of CAD
iii) Long history of DM
iv) Medically indicated polypharmacy, (i.e. patients already taking large numbers of medications)
v) Short life expectancy
vi) Non-compliance
vii) Brittle DM and/or frequent hypoglycemia

6) Starting insulin therapy
a) Basal insulin using NPH qhs (usually in combination with Metformin) is the preferred initial insulin therapy. As an alternative can be started in AM also.
i) Initial dose of NPH: 10 units or 0.2 units/kg
ii) Check daily AM fasting blood sugar (FBS) and add 2 to 4 units of NPH q 3-5 days if mean FBS > 140

iii) If hypoglycemia develops or FBS < 80, then reduce NPH dose by 4 units or 10% whichever is greater.
iv) Decrease glucose checks to once or twice weekly after the maintenance dose is established.
(1) Studies have failed to show that more frequent checks improve control.
(2) Frequent glucose monitoring unnecessarily uses medical staff resources and interferes with the patient's participation in education/employment programs.
(3) Glucose monitoring is generally useful only for making initial adjustments in insulin therapy, not for long term monitoring.
(4) Long term monitoring is best done with A1Cs.

b) Check A1C in 3 to 4 months
i) Target met: continue the current Rx and recheck A1C in 6 months
ii) Target not met:
(1) Recheck AM FBS.
(a) If not adequately controlled, increase NPH qhs if not having significant hypoglycemia
(b) If adequately controlled (or having nocturnal hypoglycemia), consider adding a second injection.
(2) Check AC lunch and supper and qhs glucoses
(a) AC lunch elevated - consider adding regular insulin at breakfast
(b) AC supper elevated - consider adding NPH (Lantus, if already using) in AM
(c) AC lunch and supper both elevated - consider adding AM 70/30
(d) Qhs elevated - consider adding regular AC supper or changing qhs NPH to AC supper 70/30 (and adding additional units of total insulin as below)
(3) Dose
(a) Usually start with 4 units (type of insulin based on (2) above)
(b) Add 2 units q3-5 days until target glucose controlled
(c) Generally only needed to monitor target glucose (the one that was most elevated in (2) above)
iii) If unable to reach target due to hypoglycemia, consider changing to insulin glargine (Lantus)

c) Recheck A1C in 3 to 4 months
i) Target met: continue the current order and recheck A1C in 6 months
ii) Target not met: evaluate for postprandial hyperglycemia
(1) Confirm pre-prandial glucoses are controlled. If not, adjust insulin as described in 6 a) above.
(2) Check 2 hr PC levels
(a) If elevated, consider adding regular before the largest meal or meal with highest postprandial glucose.
(b) Starting dose of 4-6 units
(c) Increase by 2 units q3-5 days until postprandial control is achieved

d) Recheck A1C in 3 to 4 months
i) Target met: continue the current order and recheck A1C in 6 months.
ii) Target not met:
(1) Confirm that pre-prandial glucoses are controlled. If not, adjust the insulin dose as described above.
(2) Re-evaluate for postprandial hyperglycemia. Consider adding additional pre-prandial injections of regular insulin.

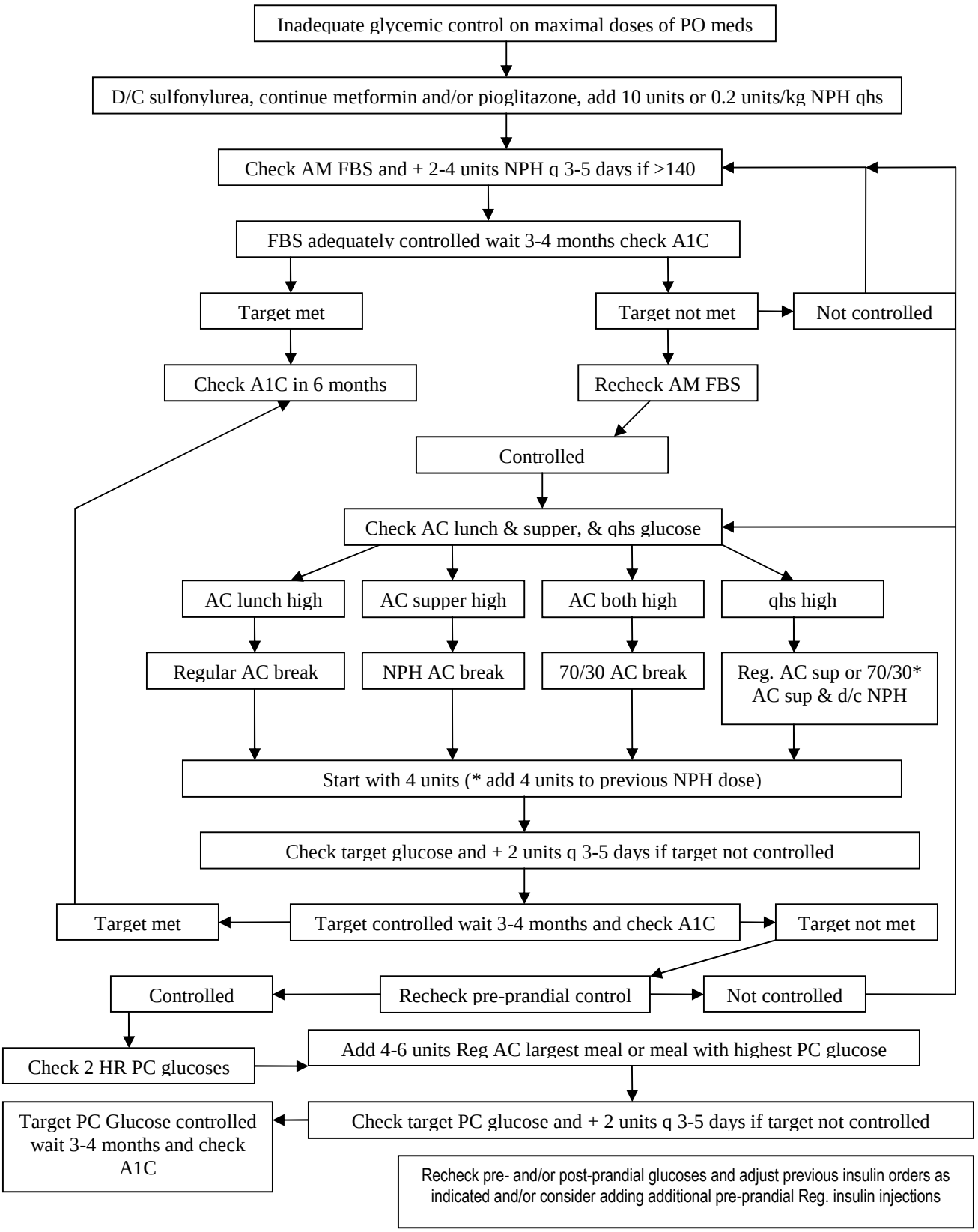
e) Continue to recheck A1C q3-4 months until target A1C is achieved, then monitor q6 months

Paula Y. Smith, M.D.

6/15/12

Paula Y. Smith, MD, Chief of Health Services Date

SOR: Dental Director


Inadequate glycemic control on maximal doses of PO meds
D/C sulfonylurea, continue metformin and/or pioglitazone, add 10 units or 0.2 units/kg NPH qhs
Check AM FBS and + 2-4 units NPH q 3-5 days if >140
FBS adequately controlled wait 3-4 months check A1C
Target met
Target not met
Not controlled
Check A1C in 6 months
Recheck AM FBS
Controlled
Check AC lunch & supper, & qhs glucose
AC lunch high
AC supper high
AC both high
qhs high
Regular AC break
NPH AC break
70/30 AC break
Reg. AC sup or 70/30*
AC sup & d/c NPH
Start with 4 units (* add 4 units to previous NPH dose)
Check target glucose and + 2 units q 3-5 days if target not controlled
Target met
Target controlled wait 3-4 months and check A1C
Target not met
Controlled
Recheck pre-prandial control
Not controlled
Check 2 HR PC glucoses
Add 4-6 units Reg AC largest meal or meal with highest PC glucose
Target PC Glucose controlled
wait 3-4 months and check
A1C
Check target PC glucose and + 2 units q 3-5 days if target not controlled
Recheck pre- and/or post-prandial glucoses and adjust previous insulin orders as indicated and/or consider adding additional pre-prandial Reg. insulin injections

References

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