

WELCOME

to

Steroids and Diabetes

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Reminders:

- Pre-Test, presentation, evaluation, and post-test available at www.health.utah.gov/diabetes/
- Please mute during the presentation



3rd Wednesday of Each Month
Noon - 1pm Mountain Daylight Time
11 - 12pm PDT & MST / 1 - 2pm CDT / 2 - 3pm EDT

Steroids and Diabetes

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What is a Steroid?

- Steroids are organic compounds
- Sex hormones: androgens, estrogens and progesterones
- Anabolic steroids
- Corticosteroids:
 - Mineralocorticoids – blood volume and electrolytes
 - Glucocorticoids - metabolism & immune function

Drugs that Can Cause Diabetes Or Increase Glucose in Persons with Pre Existing Diabetes

- Glucocorticoids:
 - Examples: prednisone, dexamethazone
- Immunosuppressive drugs for Transplant:
 - Examples: Tacrolimus (Prograf), Sirolimus (Rapamune), cyclosporin

Corticosteroid Agents

Agent	Duration of Action	Tmax (hours)	Equivalent dose, mg
Cortisol	S	1	20
Cortisone	S	?	25
Prednisone	I	1.3	5
Prednisolone	I	1	5
Methylprednisolone	I	1	4
Triamcinolone	I	?	4
Betamethasone	L	?	0.75
Dexamethasone	L	1-2	0.75

s= Short acting: 8-12 hrs. half life; I=Intermediate acting: 12-36 hrs. half life; L=Long acting: 36-72 hrs. life
 Equivalent dosing schedule applies only to oral or IV administration

Table compiled by Nicholas Miles , PharmD

Short Term Uses of Steroids

- Burst and Taper or short course
 - Allergy
 - Joint Injections
 - Asthma Exacerbation
 - Herniated Disc
 - Chemo pretreatment

Long Term Uses of Steroids and Immunosuppressant Drugs

- COPD
- Pulmonary Interstitial Fibrosis
- Renal, Heart, Liver Transplantation
- Rheumatoid Arthritis
- Myasthenia Gravis
- Lupus

Hyperglycemia Management Decision Making

- Short term drug use?
- Long term drug use?
- Is this new hyperglycemia/diabetes?
- Do they have pre existing diabetes?
 - What is their current control?
 - What is their current therapy?
 - Orals- non sulfonylurea vs. sulfonylurea
 - Insulin- premix vs. basal/bolus insulin

Case Study #1

- Husband calls clinic regarding his 74 y.o. wife's high blood sugars, suddenly over 200.
- Does she have pre existing diabetes?
 - DM 2 x 5 years
- Current treatment and Control?
 - Currently on metformin 500 mg bid (does not tolerate more due to diarrhea)
 - Januvia 50 mg
 - Most recent A1c was 6.5%

Case Study #1

- No, “she is not sick”
- No UTI symptoms
- “Hasn’t felt better in years”
- “She can walk again”

Do intra-articular steroid injections affect glycemic control?

- 9 patients with DM and arthritis of the knee
- Injected with 50 mg methylprednisolone acetate
- Peak BG elevation (300 mg/dl) 5-84 hours post injection
- Lasting 2-3 days
- 7 of 9 patients

Do intra-articular steroid injections affect glycemic control?

- 6 patients DM and arthritis of the knee
- Injection with Betamethasone acetate 3 mg and betamethasone acetate 3mg
- Injection produced hyperglycemia in all 6
- Ranging from 251-430 mg/dl
- Time to peak <6 hours

Kallock, Neher, St. Ann. Journal of Family Practice. December 2010
Habib BS, Safia A. Clinical Rheumatology. 2009;28;85-87

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Case Study #1

- Treatment Options
 - Temporarily increase oral meds
 - Why? or Why Not?

Case Study #1

- What to Do?
- Offer reassurance
 - Overall control is good with A1c of 6.5%
 - Glucose effect likely to last about one week
 - Oral agents
 - Not able to tolerate more metformin
 - Januvia

Case Study #2

- Mr. G. is a 58 y.o. male calls clinic concerned that his glucoses are running in the 225-300 range
- He “threw his back out” and was seen in the Intsta Care
- He was started on a new medication that he will only take for about a week

Case Study #2

- Does he have pre existing diabetes?
 - DM type 2 x 7 years
- Current Control and Medications?
 - Last A1c 7.0%
 - Current medications:
 - Metformin 1000 mg bid
 - Januvia 100 mg qd
 - Glimiperide 2 mg Q AM

Case Study #2

- Control was OK
- Prednisone is intermediate acting
- Effects will resolve within days of stopping prednisone
- Could do nothing
- Can increase glimiperide

Case Study #3

- MS. P is a 42 year old female with Type 2 diabetes and Myasthenia Gravis
- She has been on a long term prednisone dose of 5 mg.
- She has had a recent exacerbation of symptoms and her prednisone dosage has been increased to 20 mg. BID
- She calls because her “BG is Hi, Hi, Hi”

Case Study #3

- What is her current control?
 - Current A1c 7.3%
- What is her current therapy?
 - Metformin 1000 mg BID
 - Glimiperide 4 mg QD
 - Lantus 35 units HS

Case Study #3

- How long is she likely to be on increased dose?
- What are her glucoses running?
- Is she high fasting, ac, pc, or all of the above?
 - FBS are >200
 - AC/PC glucoses 250-300 and higher

Case Study #3

- What steps to take?
- Step 1- Increase Lantus by 5-8 units
- Step 2- Start meal time (bolus) insulin + correction dose for highs

Case Study #3

- Lantus Titration Schedule

3 day Fasting Average	Change in Lantus
More than 180 mg/dl	+ 8 units
140-179 mg/dl	+ 6 units
120-130 mg/dl	+ 4 units
110-119 mg/dl	+2 units
100-110 mg/dl	Same Dose
If Fasting below 70 can decrease dosage	

Case Study #3

- Bolus Insulin
 - Start with set dose at meals 5-8 units
 - Increase dosage based upon ac glucose and amount of correction needed
 - Add Correction dose to meal bolus using rule of 1800

Case Study #3

- Rule of 1800
- Basal Insulin = 40 units
- Bolus Insulin = 15 units
- $1800 \text{ divided by } 55 \text{ units} = 32.7$
- 1 unit of insulin is expected to lower glucose 32.7 points (a very impractical number!)

Case Study #3

Correction Dosing

- Pick a glucose goal
 - Usually 100-120 pre prandial glucose
 - To determine correction insulin dose, subtract goal glucose from current glucose and divide by correction factor
 - Current glucose is 225
 - Goal or target glucose is 100
 - $225 - 100 = 125$
 - $125 \text{ divided by } 35 = 3.5 \text{ units (would probably round up in this case)}$
 - This correction dose is added to meal dose. Dose taken before meal would be 9 units

Case #3

- This patient needs to be referred to diabetes education
- It is often easier for patients to have a “scale” of correction doses to add to their meal insulin
- @135 +1
- 136-170 +2
- 171-203+3
- etc

Case #4

- Nurse Practitioner from Cancer Hospital calls regarding 70 y. o. female under going chemotherapy
- Out patient infusion regimen includes pretreatment with IV dexamethasone and 3 days oral prednisone post infusion

Case # 4

- Pre existing diabetes? Drug induced diabetes?
- Fasting glucose on pretreatment labs
130 mg/dl. Random >250 post tx.
- Diagnostic criteria:
 - FBS>126 (should be repeated)
 - Hemoglobin A1c > 6.5%

Case Study #4

- A1c 7%
- No current diabetes treatment
- Which treatment?
 - Orals
 - Premix
 - Basal/bolus
 - Correction dosing only

Case Study #4

More Questions

- Appetite?
 - Poor
- What glucose goal is realistic?
- Orals – why not?
- Pre mix – why not?
- Basal/bolus- why not?
- Correction only – why and how much
- She needs a meter!

Case Study #5

- 33 y. o. female referred by renal 6 months post renal transplant for ESRD r/t polycystic kidney disease
- Current immunosuppressant medications
 - Prednisone 7.5 mg BID
 - Tacrolimus 0.1 mg /kg Q12 hours
 - Multiple meds for HTN, Lipids

Case Study #5

- Does she have diabetes?
- A1c done per renal = 7.2%
- Oral medication options
 - Metformin?
 - Creatinine 1.1 mg/dl
 - Sulfonylurea?
 - Byetta?
 - Januvia?

Case Study #6

- 68 y.o. female with exacerbation of longstanding Asthma
- Does she have pre existing diabetes?
 - Current A1c 7.5
- Anticipated duration of therapy?
 - Increased steroid inhaler + oral prednisone 6-8 weeks
- Current treatment?
 - 75/25 insulin 60 units ac breakfast and 20 units ac dinner
- Refuses to change to basal/bolus regimen

Pre Mix Insulin
Starting dose
Breakfast 2/3 of TDD
Dinner 1/3 of TDD

Once weekly if most values in range below	Adjust dose by:
<80 mg/dl	-2 units
80-109 mg/dl	No change
110-139 mg/dl	+2 units
140-179 mg/dl	+4 units
180 or >	+6 units
Pre dinner value is used to adjust pre breakfast dose	
Pre breakfast value is used to adjust pre dinner dose	
Do not increase dose if episode of hypoglycemia (<70) occurs during 3 day period	
Adapted from Lilly	

Type 1 Diabetes

- Should already be on basal/bolus insulin with correction dosing.
- If short term treatment – use correction
- If long term treatment – adjust basal and bolus doses + use correction

Please fill out the evaluation and post-test at
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THANK YOU

See you next month



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