**Pharmacy Practice: Lecture 5 Dr. Haider Raheem**

**Pharmaceutical Care Planning**

**Patient Case—** **Care Planning**

**Date:** Late August

**Location:** Outpatient clinic

**Chief complaint (CC):** “There has to be something you can do for my allergies”

**History of present illness (HPI):** Louisa Sorensen is a 31 y/o F with a 20+ yr history of seasonal allergic rhinitis (SAR) and type 2 diabetes mellitus (DM). She is allergic to ragweed and has symptoms every fall but claims that this fall is much worse than usual. She complains of multiple bouts of sneezing, runny nose, fatigue, irritability, and itchy eyes, nose, and throat. Her symptoms are worse when she is outside and better when she is inside air-conditioned buildings. She has taken every available prescription antihistamine but feels they are not as effective as the nonprescription antihistamines. She started taking nasal cromolyn sodium four times a day a couple of weeks ago. She has taken several short courses of oral steroids in the past but hasn’t taken any for several years. She tries to avoid steroids because they make her diabetes hard to control.

**Past medical history (PMH):** Type 2 DM × 10 yr controlled with oral medications and diet; S/P (status post) appendectomy age 16 yr

**Social history (SH):** Married, four children (sons 8 and 10 and daughters 4 and 5). Lives in a two-story house in the suburbs. No tobacco, no alcohol, no illicit drugs. Elementary school teacher (teaches first grade).

**Family history (FH):** M↑ (50, + SAR, + asthma), F↑ (51, + SAR); two siblings + SAR; all four of her children + SAR

**Review of systems (ROS):** As per history of present illness

**Medication History**

**Current prescription medications:**

metformin (Glucophage®) 1000 mg twice daily × 5 yr

**Past prescription medications:**

Has tried “every prescription antihistamine available.” Has had to use insulin a couple of times while taking prednisone.

**Current nonprescription medications:**

diphenhydramine (Benadryl® Allergy) 25 mg once or twice a day, mostly in the evenings or at night; started about 2 wk ago

cromolyn sodium (NasalCrom®) one spray each nostril four times daily during fall allergy season × 2 yr; started about 2 wk ago

**Current complementary and alternative medicines:**

No current alternative medicines

**Past complementary and alternative medicines:**

Has tried devil’s claw, pollen extracts, and echinacea for her allergies without noticeable benefit (unknown dates, dosages, durations)

**Immunizations:**

Had all the usual childhood vaccines; last tetanus/diphtheria booster was 5 yr ago; gets the influenza vaccine every fall

**Drug allergies:** NKDA (no known drug allergies)

**Adverse drug reactions:** None

**Adherence:** Takes her medications as prescribed or recommended

**Diet:** Low fat (< 200 mg cholesterol/day), high fiber (30 g/ day), low sodium (< 2.4 g/day) with moderate carbohydrates (about 50% of total daily caloric intake).

**Physical Examination Findings**

**General:** LS is a pleasant but uncomfortable-appearing woman. She is 5′1″ tall (5 feet, 1 inch; 1 foot = 12 inches; 1 inch = 2.54 cm) and weighs 180 lb (1 lb = 0.45359237 kg) (BMI34).

**Vital signs:** Afebrile; BP (blood pressure) 114/74 mm Hg; HR (heart rate) 72 beats/min, RR (respiratory rate) 10 breaths/min

**HEENT (Head, Eyes, Ears, Nose, and Throat):** PERRLA (pupil, equal, round, reactive to light and accommodation), EOMI (extra ocular muscles intact), TM (tympanic membrane) intact; + conjunctival injection; + chemosis; + rhinorrhea (clear watery secretions); pale, swollen nasal mucosa; oropharynx clear except for some postnasal drip; + periorbital edema; + allergic shiners; + allergic crease

**Chest and lungs:** CTAP (clear to auscultation and percussion)

**Cardiovascular (CV):** RRR (regular rate and rhythm); + S1 (first heart sound), + S2 (second heart sound); PMI 5ICS MCL [point of maximal impulse (PMI) normal = 5th intercostal space (ICS) along the left mid-clavicular line (MCL)]; no m/r/g (murmurs, rubs, and gallops)

**Abdomen:** NABS (normal active bowel sounds); NTND (non-tender, non-distended); appendectomy scar RUQ (Right upper quadrant)

**Extremities:** Strength 5/5 UE (upper extremity) and LE (lower extremity); reflexes 2+ UE and LE

**Neuro:** cranial nerves II-XII intact

**Laboratory Tests and Diagnostic Procedures**

**Today’s labs:** Random fingerstick blood glucose 110 mg/dL

**Labs from last visit 5 mo ago:** Hb A1c (glycated hemoglobin) 6.5%

**1. IDENTIFY THE PROBLEMS**

**Step 1—Obtain Patient Data**

**Subjective data:**

• “There has to be something you can do for my allergies.”

• 20+ history of SAR

• Type 2 DM × 20 yr

• Allergic to ragweed

• Allergy symptoms every fall but are worse than usual

• Multiple bouts of sneezing

• Runny nose

• Fatigue

• Irritability

• Itchy eyes, nose, and throat

• Allergy symptoms are worse outside

• … etc.

**Objective data:**

• 5′1″

• 180 lb

• BMI 34

• + Conjunctival injection

• + Chemosis

• + Rhinorrhea (clear watery secretions)

• Pale, swollen nasal mucosa

• Oropharynx clear except for postnasal drip

• + Periorbital edema

• + Allergic shiners

• + Allergic crease

• Appendectomy scar RUQ

• Random fingerstick glucose 110 mg/dL

• Hb A1c 6.5% 5 mo ago

**Step 2—Group Related Data**

***Allergy Group***

**Subjective data:** “There has to be something you can do for my allergies”; 20+ yr history of SAR; allergic to ragweed … etc.

**Objective data:** + conjunctival injection; + chemosis, + nasal congestion; + rhinorrhea (clear, watery secretions) … etc.

***Diabetes Group***

**Subjective data:** Type 2 DM 10 yr; prednisone increases her blood glucose level; diet: low fat (<200 mg cholesterol/ day) … etc.

**Objective data:** 5′1″; 180 lb; BMI 34; random fingerstick glucose 110 mg/dL; Hb A1c 6.5% 5 mo ago

***Obesity Group***

**Subjective data:** None

**Objective data:** 5′1″; 180 lb; BMI 34

***Appendectomy Group***

**Subjective data:** S/P appendectomy age 16 yr

**Objective data:** Appendectomy scar RUQ

***Primary Disease Prevention Group***

**Subjective data:** Had all the usual childhood vaccines; last tetanus/diphtheria booster was 5 yr ago; gets the influenza vaccine every fall

**Objective data:** None

**Step 3—Determine Each Problem**

• SAR

• DM

• Obesity

• Appendectomy

• Primary disease prevention

**Step 4—Assess Each Problem**

• SAR: Acute, severe, symptomatic, treated, uncontrolled

• DM: Type 2, chronic, moderate, asymptomatic, treated, controlled

• Obesity: Class I, chronic, moderate, asymptomatic, untreated, uncontrolled

• Appendectomy: S/P appendectomy

• Primary disease prevention: Up-to-date with vaccines; missing other recommended gender- and age-based screenings

**2. PRIORITIZE THE PROBLEMS**

**Step 1—Identify the Active Problems**

• SAR

• Type 2 DM

• Obesity

• Primary disease prevention

**Step 2—Identify the Inactive Problems**

• S/P appendectomy

**Step 3—Rank the Problems**

***Active Problems That Need Immediate Therapeutic Intervention***

• SAR

***Active Problems Requiring Less Immediate Therapeutic Intervention***

• Type 2 DM

• Obesity

• Primary disease prevention

***Inactive Problems of Historical Interest***

• S/P appendectomy

Of the patient’s active problems, her SAR is causing her the most immediate discomfort; interventions are needed to improve the quality of her life. Her type 2 DM and obesity are active problems, but both are stable and do not need immediate intervention. She has not received some of the recommended vaccines and disease screenings for a woman her age with DM. Therefore, this patient’s prioritized patient problem list is as follows:

1. SAR

2. Type 2 DM

3. Obesity

4. Primary disease prevention

5. S/P appendectomy

**3. SELECT PATIENT-SPECIFIC DRUG AND NONDRUG INTERVENTIONS**

**Step 1—Determine Short-Term and Long-Term Goals of Therapy**

***Problem No. 1: Seasonal Allergic Rhinitis***

Short-term goal: Reduce patient symptoms

Long-term goal: Initiate preventive therapy before symptoms develop

***Problem No. 2: Type 2 Diabetes Mellitus***

Short-term goal: Control blood glucose level on a daily basis

Long-term goal: Prevent morbidity and mortality by keeping the Hb A1c value at <7%

***Problem No. 3: Obesity***

Short-term goals: Refer the patient to a nutritionist for dietary counseling; initiate an exercise program

Long-term goal: Lose 1-2 lb/wk until goal weight achieved; reduce morbidity and mortality by maintaining goal weight

***Problem No. 4: Primary Disease Prevention***

Short-term goal: Bring patient up to date with all recommended vaccinations and screenings

Long-term goal: Reduce morbidity and mortality by prevention of preventable diseases and early identification of other diseases

***Problem No. 5: S/P Appendectomy***

Short-term goal: Not applicable

Long-term goal: Not applicable

**Step 2—Create a List of Options**

***Problem No. 1: Seasonal Allergic Rhinitis***

• Antihistamines

* Systemic, nonsedating (cetirizine, fexofenadine, loratadine, desloratadine)
* Systemic, sedating (clemastine, diphenhydramine, chlorpheniramine, hydroxyzine, cyproheptadine)
* Ocular (azelastine, olopatadine, levocabastine)
* Nasal (azelastine)

• Decongestants

* Systemic (pseudoephedrine, phenylephrine)
* Nasal (phenylephrine, epinephrine, ephedrine, naphazoline, xylometazoline, tetrahydrozoline, oxymetazoline)

• Corticosteroids

* Systemic (prednisone, cortisone, dexamethasone)
* Nasal (beclomethasone, budesonide, flunisolide, fluticasone, triamcinolone, mometasone, ciclesonide)

• Anticholinergics

* Nasal (ipratropium bromide)

***Problem No. 2: Diabetes Mellitus***

• Drugs that increase insulin release (sulfonylureas [glipizide, glyburide], meglitinides [repaglinide])

• Drugs that increase insulin responsiveness (biguanides [metformin], thiazolidinediones [pioglitazone])

• Drugs that modify intestinal carbohydrate absorption (alpha glucosidase inhibitors [acarbose, miglitol])

• Exogenous insulin

***Problem No. 3: Obesity***

• Sympathomimetics (phentermine, diethylpropion, ephedra)

• Drugs that inhibit fat absorption (orlistat)

***Problem No. 4: Primary Disease Prevention***

• Recommended vaccines for the patient’s age group: tetanus/diphtheria every 10 yr, annual influenza

• Recommended vaccines for patients with DM: pneumococcal pneumonia polysaccharide, herpes zoster

• Recommended screenings for the patient’s gender and age group: visual every 2 yr, dental every 6-12 mo, weight each visit, cholesterol (fasting lipid profile) every 5 yr starting at age 20 yr, annual urinalysis for albuminuria, annual serum creatinine and estimated glomerular filtration rate (eGFR), clinical breast examination every 1-3 yr, optional monthly self-breast examination, annual cervical cancer screening (every 2-3 yr after three consecutive negative test results), human papillomavirus DNA testing every 3 yr.

**Step 3—Eliminate Options Based on Patient-Specific and External Factors**

***Problem No. 1: Seasonal Allergic Rhinitis***

According to the current practice guidelines, the recommended treatment for moderate to severe SAR consists of a nasal corticosteroid plus an oral nonsedating antihistamine with or without an oral decongestant; short courses of oral corticosteroids may be required. Nasal decongestants are not intended for long-term use. Therefore, eliminate nasal decongestants.

***Problem No. 2: Type 2 Diabetes Mellitus***

The recommended treatment for type 2 diabetes consists of dietary intervention, exercise, and oral hypoglycemics; some patients require short-term or long-term insulin. The drugs that increase insulin release are most effective for patients who are of normal weight or just a little overweight; the patient is obese. Therefore, eliminate the drugs that increase insulin release.

***Problem No. 3: Obesity***

Dietary intervention and exercise are considered first-line treatments for obesity; pharmacologic intervention is not indicated at this time. Therefore, do not consider drug therapy at this time.

***Problem No. 4: Primary Disease Prevention***

The patient should receive the annual influenza and scheduled tetanus/diphtheria boosters. As a patient with diabetes, she could receive one or two doses of the pneumococcal pneumonia polysaccharide vaccine and the herpes zoster vaccine; discuss with the patient’s physician.

**Step 4—Select Appropriate Drug and Nondrug Interventions**

***Problem No. 1: Seasonal Allergic Rhinitis***

Once-daily therapy may improve patient adherence. Initiate therapy with a nasal corticosteroid and a nonsedating antihistamine. Aqueous dosage formulations may cause less nasal mucosa irritation than other dosage formulations. Initiate therapy with triamcinolone acetonide (Nasacort® AQ) two sprays (220 mcg) each nostril once daily. Initiate therapy with loratadine (Claritin®) 10 mg once daily on an empty stomach. Advise the patient to avoid outdoor activities and to keep her car and house windows

closed. Patient should return to the clinic in 2 wk to evaluate the effectiveness of the regimen.

***Problem No. 2: Type 2 Diabetes Mellitus***

The patient’s DM is well controlled on her current regimen. Continue metformin (Glucophage®) 1000 mg twice daily. The patient should continue her current diet but reduce the number of calories (see obesity plan). Encourage moderate exercise.

***Problem No. 3: Obesity***

The patient is obese (BMI 34) and at risk for cardiovascular complications. The goal of therapy is to lose 0.5-1.0 kg/wk for the first 3 mo. Although drug therapy could be initiated (her BMI is >30), the conservative approach is to try a few months of dietary restrictions and moderate exercise. Refer the patient to a nutritionist and encourage the patient to adhere to the recommended dietary plan. Encourage the patient to start a walking program with a target of 30 min of walking 5 days/wk. Encourage the patient to find a “diet buddy” or join a weight loss support group.

***Problem No. 4: Primary Disease Prevention***

Schedule the influenza vaccine for November. Encourage the patient to schedule appointments with her ophthalmologist, dentist, and gynecologist. Request a fasting lipid profile, urinalysis, and serum creatinine level.

**Step 5—Identify Alternative Therapeutic Interventions**

***Problem No. 1: Seasonal Allergic Rhinitis***

The patient may need a short course of oral corticosteroids if her symptoms have not improved after a 2-wk trial of nasal corticosteroids and nonsedating antihistamine. Consider a 10-day course of prednisone (40 mg/day on days 1 and 2; 30 mg/day on days 3 and 4; 20 mg/day on days 5 and 6; 10 mg/day on days 7 and 8; 5 mg/day on days 9 and 10). Insulin may need to be added if prednisone is prescribed.

***Problem No. 2: Type 2 Diabetes Mellitus***

If prednisone is added to her regimen, instruct the patient to check her blood glucose level before regularly scheduled meals and to treat elevated blood glucose levels with short-acting regular human insulin (1 unit of regular insulin for each 50 mg/dL glucose above 150 mg/dL); instruct the patient to call the clinic if her blood glucose level is >400 mg/dL.

***Problem No. 3: Obesity***

Consider adding orlistat (Xenical®) 120 mg three times daily with meals containing fat (during or up to 1 hour after the meal) if the patient has not lost weight after several months of diet and exercise.

***Problem No. 4: Primary Disease Prevention***

If the patient gets influenza, recommend oseltamivir (Tamiflu®) 75 mg twice daily × 5 days if therapy can be initiated within 48 hours of the onset of symptoms to reduce the severity and duration of symptoms.

**Initial Treatment Regimen**

The following nondrug and drug interventions are recommended for the patient:

1. Initiate therapy with triamcinolone acetonide (Nasacort® AQ) two sprays (220 mcg) in each nostril once daily and loratadine (Claritin®) 10 mg once daily.
2. Advise the patient to avoid outdoor activities and keep car and house windows closed.
3. Instruct the patient to return to the clinic in 2 wk for reassessment.
4. Continue metformin (Glucophage®) 1000 mg twice daily.
5. Refer the patient to a nutritionist.
6. Advise the patient to start a walking program with a target of 30 minutes of walking 5 days/wk.
7. Encourage the patient to make appointments with her ophthalmologist, gynecologist, and dentist.
8. Discuss the recommendations for the pneumococcal pneumonia polysaccharide and herpes zoster vaccines with the patient’s physician.
9. Schedule the influenza vaccine for November.

**Patient Case—Pharmacy Practice**

A patient has metastatic cancer, was on morphine sulphate q4h, his physician called hospital pharmacist asking him about appropriate daily dose of oxycodone.

30 mg of morphine sulphate = 20 mg of oxycodone

**Answer/**

Morphine 60 mg × 6 = 360 mg/day

30 mg morphine/360 mg morphine = 20 mg oxycodone/X

X = 240 mg of oxycodone/day

Because of tolerance (25 % - 50 %)

240 mg of oxycodone/day × 0.5 = 120 mg/day (if we choose 50 % tolerance)

***Homework***

Patient is on morphine I.V. 15 mg q4h, Doctor wants to switch him to SR tablet form, if you know that the equivalent dose is: morphine 30 mg, oxycodone 6 mg, codeine 200 mg, hydromorphone 100 mg. what will be the suitable choice? (hint: consider percent of tolerance = 34 %)

a- 300 mg of codeine q12h

b- 60 mg morphine q12h

c- 15 mg oxycodone q12h

d- 100 mg hydromorphone q12h