This month’s stumper

A 54-year-old man comes to the physician for a follow-up examination because of progressive rheumatoid arthritis unresponsive to high dose nonsteroidal anti-inflammatory drugs (NSAIDs). Treatment with prednisone and hydroxychloroquine was started six weeks earlier. The patient is concerned about steroid-induced osteoporosis, because his father, a type 2 diabetic, recently fell and broke his hip. Laboratory studies and a dual energy x-ray absorptiometry (DEXA) test of the spine and hip are ordered to address the patient's concerns.

Which of the following additional tests would be recommended for this patient?

A. 1,25-dihydroxy vitamin D levels

B. High-density lipoprotein levels

C. Intact parathyroid hormone levels

D. Serum glucose levels

E. Serum protein electrophoresis
The correct answer is D.

Kaplan Medical explains why

The clue to the answer in this question is that this patient has a family history of diabetes. Long-term corticosteroid therapy in a patient with a family history of diabetes may increase the chance of a patient developing that disease. However, patients with or without any risk factors of diabetes who take corticosteroids chronically may experience increased levels of blood glucose. Glucocorticoids increase hepatic gluconeogenesis, inhibit glucose uptake, and induce insulin resistance. The risk of glucocorticoid-induced diabetes increases with dosage, duration of therapy, family history of diabetes mellitus, age, obesity, and high blood-glucose concentrations prior to glucocorticoid therapy.

Prednisone is a glucocorticoid indicated for a variety of inflammatory and autoimmune conditions. Common additional adverse side effects include Cushingoid appearance and weight gain, skin thinning and purpura, sleep disturbances mood changes, skeletal and muscle abnormalities (e.g., osteoporosis, increase fracture risk, myopathy), immunosuppression, neutrophilia, and increased risk of adverse cardiovascular events.

Why the other answers are wrong

Choice A: Measurement of 1,25-dihydroxy vitamin D, the active vitamin D metabolite, would not be recommended since corticosteroids do not generally impact vitamin D levels. Glucocorticoids produce osteoporosis by decreasing intestinal calcium absorption and increasing urinary calcium excretion.

Choice B: Serum high-density lipoprotein (HDL) levels have been reported to increase during steroid
therapy of patients with rheumatoid arthritis; this would generally be considered beneficial.
Rheumatoid arthritis is strongly associated with an increased risk of atherosclerosis. The reported
increase in the HDL/LDL ratio in rheumatoid patients treated with combination therapy that includes
glucocorticoids is potentially anti-atherogenic. Since adverse changes in the lipid profiles, such as
decreased HDL levels, are not associated with this therapy, their measurement is of less benefit for
this patient.

Choice C: Although parathyroid hormone (PTH) is a calcium regulator in the body, it is not
considered a major contributor to corticosteroid-induced bone loss, so measurement of intact PTH is
not the best choice. It would be significant in a patient with osteoporosis who has underlying
malabsorption such as that occurring with inflammatory bowel disease.

Choice E: Serum protein electrophoresis is used for the diagnosis of multiple myeloma in patients
with pathologic fractures or a high clinical suspicion of myeloma. This patient does not have the signs
and symptoms commonly associated with multiple myeloma such as bone pain, renal impairment,
fatigue and anemia.

Tips to remember

- Glucocorticoids, such as prednisone, prevent or suppress inflammation and immune
  responses when administered at pharmacologic doses.
- These drugs cause many side effects, including steroid-induced osteoporosis and increased
  levels of blood glucose in patients with diabetes or impaired glucose tolerance.

For more prep questions on USMLE Steps 1, 2 and 3, view other posts in this series.