M.K. is a 35-year-old Caucasian woman who presents to her PCP complaining of a dull but persistent headache, a significant weight gain over the past six weeks, significant facial hair growth, menstrual abnormalities, and both an excessive thirst and appetite. She also feels very depressed, does not have much energy, and has stopped performing all the activities that she had previously enjoyed (tennis, bridge, and shopping for new clothes). M.K. is married, has an adolescent son (age 16) and daughter (age 13) and has been in relatively good health throughout her life. She is the third oldest of four children. One of her brothers was diagnosed with type 1 diabetes mellitus at age 11 and was recently evaluated for hypertension. Her two sisters are in good health. Her father is a cancer survivor of childhood leukemia and her mother has a history of rheumatoid arthritis and breast cancer.

The patient does not smoke and only consumes alcohol in moderation at social functions. She has several allergies (ragweed and cat dander) and is not taking any medications other than a daily multivitamin tablet and ibuprofen (as needed) for headache.

**Physical Examination and Laboratory Tests**

The patient is an alert but anxious, moderately overweight white female with a noticeably round, full face. T = 98.3°F orally; P = 85 beats/min and regular; RR = 14 breaths/min and unlabored; BP = 185/105 mm Hg left arm, sitting; Ht = 5’0”; Wt = 141 lbs.

**Patient Case Question 1.** Of the vital signs listed above, which of them has to be of most concern to the patient’s PCP?

**Patient Case Question 2.** Assuming that the patient has hypercortisolism, briefly explain the pathophysiology of the abnormal vital sign noted in Question 1.

**Patient Case Question 3.** Is this patient technically underweight, overweight, obese, or is her weight considered healthy and normal?

**Patient Case Question 4.** Assuming that M.K. has hypercortisolism, what are two possible causes of this patient’s persistent, dull head pain?
Patient Case Question 5. What is the significance in the patient’s report that she is not taking any medications other than a daily multivitamin pill and ibuprofen?

HEENT, Skin, Neck

- Head exam normal except for significant facial hair growth
- Fundi without lesions, PERRLA
- Nares, tympanic membranes, and pharynx clear
- Skin appears hyperpigmented and thin with some bruising on the arms and hands
- Gingiva show localized areas of hyperpigmentation
- Neck supple
- No bruits
- Fat deposits in dorsocervical region
- Thyroid non-palpable
- No palpable cervical, supraclavicular, infraclavicular, or axillary adenopathy

Lungs, Cardiac

Exams unremarkable

Abdomen

- Protuberant with striae and minimal bruising
- Bowel sounds heard in all four quadrants
- No abdominal bruits, masses, tenderness, or organomegaly

Breast Exam

- Symmetric breasts
- No signs of dimpling, discoloration, or nipple discharge
- Two small, mobile, cystic nodules palpable in the UOQ of right breast suggest benign condition, probably fibrocystic change
- Mammogram pending

Extremities

- No edema
- Both upper and lower extremities show areas of hyperpigmentation
- Pulses full in both feet
- Muscular atrophy significant in all four limbs

Neurologic

- Alert and oriented
- Cranial nerves II–XII intact (including excellent visual acuity)
- Strength 3/5 throughout
- Sensory to light touch, proprioception, and vibration normal
- DTRs +2 and symmetric
- Gait within normal limits

Laboratory Test Results

See Patient Case Table 52.1
Patient Case Table 52.1 Laboratory Test Results

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum Na⁺</td>
<td>145 meq/L</td>
</tr>
<tr>
<td>Urinary free cortisol</td>
<td>190 µg/24 hrs</td>
</tr>
<tr>
<td>Serum K⁺</td>
<td>3.1 meq/L</td>
</tr>
<tr>
<td>pH arterial, whole blood</td>
<td>7.46</td>
</tr>
<tr>
<td>Serum Cl⁻</td>
<td>105 meq/L</td>
</tr>
<tr>
<td>Serum testosterone</td>
<td>160 ng/dL</td>
</tr>
<tr>
<td>Serum glucose, fasting</td>
<td>170 mg/dL</td>
</tr>
<tr>
<td>Hct</td>
<td>41%</td>
</tr>
<tr>
<td>Plasma ACTH</td>
<td>290 pg/mL</td>
</tr>
<tr>
<td>RBC</td>
<td>5.9 × 10⁶/mm³</td>
</tr>
<tr>
<td>Serum cortisol, 8 AM</td>
<td>73 µg/dL</td>
</tr>
<tr>
<td>WBC differential:</td>
<td></td>
</tr>
<tr>
<td>75% neutrophils, 15%</td>
<td></td>
</tr>
<tr>
<td>lymphocytes, 7% monocytes/macrophages, 2% eosinophils, 1% basophils</td>
<td></td>
</tr>
</tbody>
</table>

Patient Case Question 6. Identify the nine abnormal laboratory test results in Table 52.1.

Patient Case Question 7. Why is serum glucose elevated?
Patient Case Question 8. Explain the pathophysiology that underlies polydipsia in this patient.

Patient Case Question 9. Do laboratory test results suggest that hypercortisolism in M.K. is ACTH-dependent or ACTH-independent?

Patient Case Question 10. What is the significance of the serum K⁺ concentration and the pH of the arterial blood?

Patient Case Question 11. Note that hyperpigmentation of the skin and gingiva was a physical finding in this patient. Is this clinical manifestation more characteristic of ACTH-dependent or ACTH-independent Cushing syndrome?

Patient Case Question 12. Which imaging techniques might be critical to establishing a specific cause of hypercortisolism in this patient?

Patient Case Question 13. What type of menstrual abnormality would be suspected in this patient and which abnormal laboratory test result is consistent with this type of abnormality?

Patient Case Question 14. What is the treatment of choice for curing hypercortisolism in this patient?

Patient Case Question 15. Patient Case Figure 52.1 shows that an enlarged sella turcica is a potential clinical manifestation of Cushing syndrome/disease. Explain the association.

Patient Case Question 16. Why is cardiac hypertrophy shown as a clinical manifestation of Cushing syndrome in Patient Case Figure 52.1?