Endocrine Surgery: Review Questions

Ravi J. Chokshi, MD

QUESTIONS

Choose the single best answer for each question.

Questions 1 and 2 refer to the following case.

A 45-year-old woman with no significant past medical history presents with a firm 3-cm mass in the right thyroid lobe with no clinical evidence of nodal involvement. A fine-needle aspiration (FNA) is performed and histologic examination confirms a diagnosis of papillary cancer.

1. **How should this patient be treated?**
   (A) Enucleation
   (B) Lobectomy and isthmusectomy
   (C) Radioiodine ablation
   (D) Total thyroidectomy
   (E) Total thyroidectomy with bilateral modified radical neck dissection (MRND)

2. **Following surgery, pathologic examination of the thyroid tissue reveals a well-circumscribed 3-cm papillary cancer with negative margins. A lymph node found in the specimen is positive for papillary cancer. What is the next step in this patient's management?**
   (A) External beam radiation therapy
   (B) Radioiodine ablation
   (C) Reexploration and ipsilateral MRND
   (D) Reexploration and ipsilateral radical neck dissection
   (E) No other intervention is needed at this time

Questions 3 and 4 refer to the following case.

A 60-year-old man with a past medical history of primary hyperparathyroidism presents to the emergency department with nausea, vomiting, constipation, confusion, polyuria, and generalized weakness. The patient is immediately placed on a monitor, intravenous (IV) access is obtained, and a Foley catheter is inserted. Initial laboratory testing reveals a serum calcium level of 16 mg/dL.

3. **What is the next step in this patient's management?**
   (A) Aggressive IV fluid resuscitation followed by a loop diuretic
   (B) Bisphosphonates and calcitonin
   (C) Neck exploration and removal of the enlarged gland
   (D) Neck exploration and removal of 3.5 parathyroid glands with autotransplantation

4. **Ultrasonography and a sestamibi scan are performed, and a large left inferior lobe gland is identified (Figure 1 and Figure 2). How should this patient be treated?**
   (A) Remove the enlarged gland
   (B) Remove 3.5 glands with autotransplantation
   (C) Identify all 4 glands and remove only the enlarged gland
   (D) Identify all 4 glands, remove the enlarged gland, analyze the specimen intraoperatively using frozen section analysis, and measure parathyroid hormone (PTH) levels intraoperatively

5. **A 45-year-old man is brought into the emergency department after being struck by a motor vehicle. A computed tomography (CT) scan of the abdomen and pelvis is negative for any traumatic injury but demonstrates a 7.0-cm left adrenal mass. There is no evidence of metastatic disease. What is the most appropriate treatment for this patient?**
   (A) Chemotherapy and radiation
   (B) Follow-up only if symptomatic
   (C) FNA of the mass
   (D) Observation with serial CT scans
   (E) Surgical resection

Dr. Chokshi is a fourth year surgical resident, St. Francis Medical Center–Seton Hall University, Trenton, NJ.

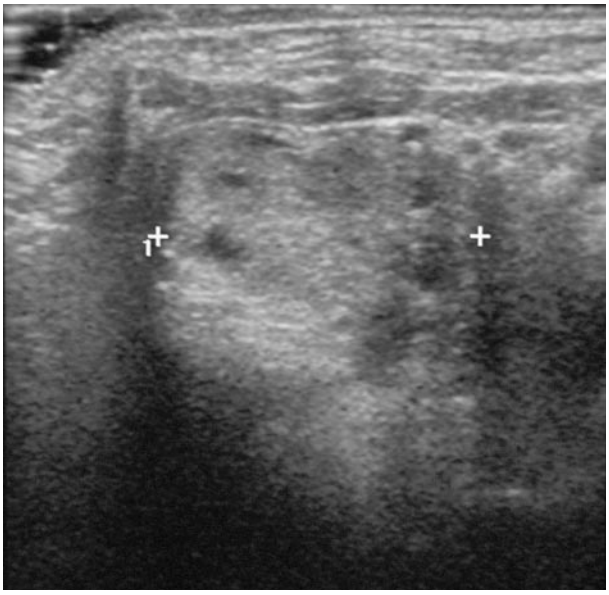

Figure 1. Ultrasound of thyroid of the patient in question 4 demonstrating solid nodule in left inferior pole.

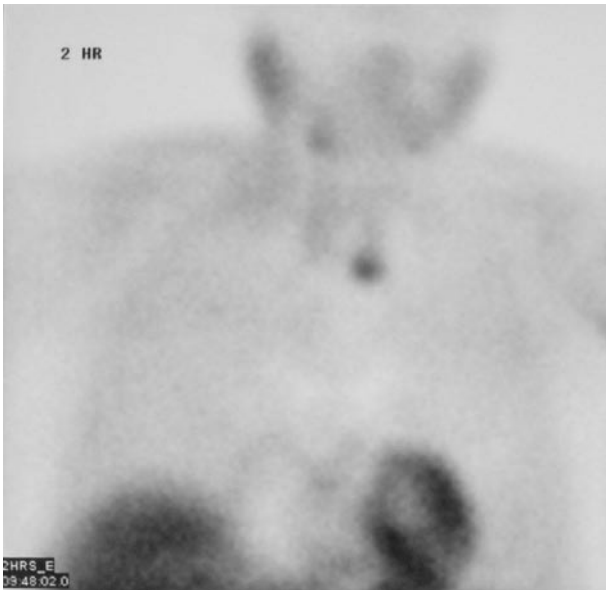

Figure 2. Sestamibi scan for the patient in question 4.

6. A 32-year-old man presents to his primary care physician with generalized weakness. On physical examination, the patient is hypertensive and has significant truncal obesity. At 1-week follow-up, laboratory testing reveals increased plasma adrenocorticotropic hormone and serum cortisol levels. The patient undergoes a low- and high-dose dexamethasone test; the high-dose dexamethasone test reveals decreased urinary cortisol levels. CT scan of the brain demonstrates a pituitary mass. How should this patient be treated?

(A) Bilateral adrenalectomy
(B) Chemotherapy
(C) Long-term high-dose steroids for suppression
(D) Transphenoidal resection of pituitary adenoma
(E) Unilateral adrenalectomy

7. A 47-year-old woman presents to her primary care physician with palpitations and is sweating profusely. On physical examination, the patient has a heart rate of 110 bpm and appears diaphoretic. The remainder of the physical examination is unremarkable. A fingerstick glucose test shows a glucose level of 45 mg/dL. The patient is given a glass of orange juice and some crackers, and her glucose level returns to normal. A CT scan of the abdomen and pelvis reveals a 1-cm mass in the tail of the pancreas. What is the treatment of choice?

(A) Distal pancreatectomy
(B) Enucleation
(C) Observation
(D) Whipple procedure

ANSWERS AND EXPLANATIONS

1. (D) Total thyroidectomy. In this case, total thyroidectomy is correct because of the size of the lesion. Enucleation should not be performed due to the high risk of nerve injury, hemorrhage, and implantation of cancer in the wound. Lobectomy and isthmusectomy is typically used for small lesions (< 1 cm) and is not an acceptable operation for a 3-cm papillary tumor. In this case, there are no clinically evident lymph nodes necessitating a MRND. MRND can be used to stage large papillary tumors and in patients with palpable cervical lymph nodes, but no data are available regarding the use of bilateral MRND in this setting. Radioiodine ablation may be used in high-risk patients (eg, elderly patients, patients with multiple medical problems) but not in this young, healthy patient.

2. (B) Radioiodine ablation. Radioiodine ablation is the mainstay of treatment in patients with thyroid tumors that have metastasized. This can eradicate any residual tumor without requiring an additional operation. External beam radiation therapy is typically reserved for patients with an unresectable

tumor (this patient's tumor has been completely resected). Reexploration with ipsilateral MNRD is not appropriate because the presence of positive cervical lymph nodes has already been determined. There is no basis for reexploration and radical neck dissection in this patient.

3. **(A) Aggressive IV fluid resuscitation followed by a loop diuretic.** This patient has severe hypercalcemia due to a hyperparathyroid crisis and should be treated with IV fluids and a loop diuretic, which increase urinary calcium excretion. Neck exploration and removal of 3.5 parathyroid glands and autotransplantation is the treatment of choice for parathyroid hyperplasia, while neck exploration and removal of enlarged gland is the treatment of choice for parathyroid adenoma. However, neither of these choices would be appropriate because the patient is still in the acute phase of hyperparathyroid crisis and serum calcium levels must be reduced before definitive treatment is undertaken. Bisphosphonates and calcitonin can both decrease serum calcium levels; however, their use in the acute phase is limited.

4. **(D) Identify all 4 glands, remove the enlarged gland, analyze the specimen intraoperatively using frozen section analysis, and measure PTH levels intraoperatively.** In this patient, the presence of a single enlarged gland suggests an adenoma. All of the glands should be investigated to rule out hyperplasia or multiple adenomas; thus, only removing the enlarged gland without investigating the others is incorrect. Removing 3.5 glands and autotransplantation is the treatment for parathyroid hyperplasia, not for a parathyroid adenoma. In addition to identifying all of the glands and removing the enlarged gland, intraoperative frozen section analysis and measurement of PTH levels are necessary to confirm that levels are normalizing and the tissue is indeed an adenoma.

5. **(E) Surgical resection.** This patient has an incidentaloma that is suspicious for adrenalcortical cancer. Surgical resection with complete excision should be undertaken to establish a diagnosis and enhance survival. Observation is an acceptable choice for smaller masses but not for this large tumor. FNA is indicated for suspected metastatic tumors. The incidentaloma cannot be treated without establishing a diagnosis, and even if the diagnosis of adrenocortical cancer is confirmed, chemotherapy and radiation have limited success in treating these aggressive tumors.

6. **(D) Transphenoidal resection of pituitary adenoma.** This patient has Cushing's syndrome as evidenced by the decreased levels of cortisol on the high-dose dexamethasone test and the presence of a pituitary mass. Because the dysfunction can be attributed to the overproduction of adrenocorticotropin hormone and not to the adrenal glands themselves, adrenalectomy is not an appropriate management strategy. High-dose steroids are used for the diagnosis of a pituitary adenoma; however, steroids are not used to treat them. Pituitary adenomas are typically benign, and therefore chemotherapy is not an appropriate management option. Transphenoidal resection is the treatment of choice for pituitary adenomas.

7. **(B) Enucleation.** Insulinoma is the most common islet cell tumor of the pancreas. Unlike other functional endocrine tumors, insulinomas can be found throughout the pancreatic parenchyma. Characteristic findings of insulinoma are fasting hypoglycemia, symptoms of hypoglycemia, and relief of hypoglycemia with carbohydrate (ie, Whipple triad). The Whipple procedure is not indicated for small masses in the tail of the pancreas. Distal pancreatectomy would be a correct response if the patient had a larger tumor (> 2 cm). This patient has a small tumor (< 2 cm) and therefore enucleation can be performed to remove it. Observation is not appropriate in this setting.

SUGGESTED READINGS

Cameron JL, editor. Current surgical therapy. 8th ed. Philadelphia: Elsevier Mosby; 2004.

Townsend CM, Beauchamp RD, Evers BM, et al. Sabiston textbook of surgery: the biological basis of modern surgical practice. 17th ed. Philadelphia: Saunders; 2004.

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