Quick Recertification Series

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ROTATOR CUFF DISEASE

GENERAL FEATURES

- The rotator cuff is a group of four muscles (supraspinatus, infraspinatus, subscapularis, and teres minor) situated in the periscapular region whose tendons run intra-articularly through the glenohumeral joint and attach at the proximal humerus.
- The major function of this muscle group is to enhance the support of the humeral head in the glenoid. Several of the muscles also have rotational and abduction functions at this joint.
- Tendon disease in this group occurs on a spectrum from impingement/tendinosis to partial rupture of the tendon(s), to full rupture of the tendon(s).
- Most commonly, rotator cuff tears occur in the dominant arm as a degenerative process caused by blood supply issues and bone spur growth in older adults and less commonly as an acute injury in younger adults.
- There is some evidence that rotator cuff tears may occur more commonly in smokers and that smokers have a more prolonged recovery from rotator cuff surgery.

CLINICAL ASSESSMENT

- History
  - Patients generally complain of shoulder pain that radiates to the anterolateral portion of the arm and is worse with overhead reaching and rotational activities at the glenohumeral joint.
  - The pain is usually described as worsening over time and interferes with the patient's ability to sleep.
  - Muscle weakness and limited range of motion may accompany the pain.
- Physical examination
  - Decrease in active range of motion at the shoulder, especially in rotation and flexion, is common in both impingement/tendinosis and rotator cuff tear.
  - Weakness in external rotation may suggest an infraspinatus tear (and, although less common, a teres minor tear).
  - The lift-off test (patient places hand, palm up, on back and lifts off back) is helpful when examining subscapularis function.
  - The drop arm test is performed by the examiner passively positioning the patient's arm in abduction and then the patient attempts to slowly lower the arm. An abrupt drop of the arm is positive and may indicate damage to the rotator cuff.
  - Provocative tests for presence of impingement include the Hawkins test and Neer impingement test.
    - In the Hawkins test, the patient holds the arm in 90° of glenohumeral flexion and flexes elbow; tester internally rotates the glenohumeral joint. Finding is positive if this maneuver induces pain.
    - In the Neer impingement test the patient holds the forearm in pronation as the examiner forcibly flexes at the glenohumeral joint while stabilizing the scapula. Finding is positive if pain is induced.
  - In long-standing rotator cuff tears, you may see periscapular muscular atrophy.

DIAGNOSIS

- Presumptive diagnosis may be made by history and physical examination findings.
- Plain radiography of the shoulder may show signs of acromioclavicular bone spurring of humeral head elevation.
- Noncontrast T2-weighted MRI of the shoulder is the standard evaluation for suspected rotator cuff disease; however, results may be normal in impingement syndrome. Findings suggestive of impingement syndrome include narrowed subacromial space, rotator cuff tendinosis, and fluid in the bursa. Partial and full-thickness tendon tears are generally evident on MRI.
- MRI arthrography may be performed in patients with possible glenoid labrum tears or who have previously had intra-articular surgery.

TREATMENT

- Impingement syndrome
  - May be treated conservatively with cryotherapy and NSAIDs during symptomatic flares. Patients may

QUESTIONS & ANSWERS

1. The integrity of the subscapularis tendon can be tested by

a. The lift-off test
b. The Neer impingement test
c. The Hawkins test
d. Resisted external rotation

Answer: a

Explanation: The Neer impingement test and Hawkins tests both test for nonspecific impingement. Resisted external rotation would give you information about the integrity of the infraspinatous muscle.

2. The presence of unilateral periscapular muscle atrophy and weakness on physical examination

a. Suggests acute injury to the rotator cuff tendons
b. May indicate traumatic subacromial bursitis
c. Correlates with long-standing rotator cuff tendon tear
d. Should alert the examiner to look for pathology outside of the rotator cuff

Answer: c

Explanation: Not enough time has elapsed in order to see muscle atrophy in acute rotator cuff tendon damage, including traumatic subacromial bursitis, therefore, the presence of unilateral periscapular muscle atrophy is highly suggestive of a long-standing rotator cuff tear.

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also benefit from physical therapy for cuff strengthening and the use of modalities to decrease edema in the subacromial space.
  - A subacromial injection of corticosteroid may offer temporary relief but should be used judiciously.
  - If conservative treatment fails, surgical subacromial decompression should be considered.
- Rotator cuff tear
  - Partial tears may be treated in the same way as impingement syndrome.
  - Full-thickness tears in a younger adult should be operatively repaired in either an open or arthroscopic approach followed by physical therapy.
  - In the elderly and persons with long-standing tears, even full-thickness tears may be treated conservatively with the hopes of maintaining as much function as possible.

HYPERPARATHYROIDISM

GENERAL FEATURES

- Hyperparathyroidism is an endocrine disorder caused by chronic, excessive secretion of parathyroid hormone from one or more of the parathyroid glands as a result of a parathyroid adenoma or carcinoma.
- Single parathyroid adenomas are the most common cause, accounting for approximately 80% of cases. Multiple parathyroid adenomas and carcinoma are much less common, accounting for 20% and less than 1% of cases, respectively. A small number of patients may have hyperparathyroidism as a result of multiple endocrine neoplasia.
- Hypercalcemia is often detected on routine screening laboratory tests in asymptomatic patients.
- Signs and symptoms can generally be correlated to the development and extent of hypercalcemia and increased parathyroid hormone (PTH) secretion. Symptomatic patients are noted to have problems with "bones, stones, abdominal groans, psychic moans, with fatigue overtones."
- Parathyroid adenomas are rarely palpable because of their size and location.
- Normocalcemic hyperparathyroidism may be found in patients during a workup for decreased bone mineral density. Serum calcium levels may be normal but PTH levels will be increased.

CLINICAL ASSESSMENT

- Musculoskeletal: osteitis fibrosa cystica is the hallmark sign of hyperparathyroidism; however, osteopenia is a more common finding. Osteitis fibrosa cystica involves bone pain, decalcification of bone, "salt and pepper" appearance of the skull, bone cysts, and brown tumors of the long bones. Patients may also report myopathy and weakness.
- GU: nephrolithiasis, nephrocalcinosis, and chronic renal insufficiency; patients may also have decreased urine concentrating ability manifesting as increased urination and thirst.
- GI: nausea, vomiting, abdominal pain, anorexia, constipation
- CNS: lethargy, depression, psychosis, and cognitive dysfunction

DIAGNOSIS

- Elevated serum ionized calcium (with adjusted calcium used for hypoalbuminemic patients), low serum phosphorus, and normal or elevated alkaline phosphatase
- Normochromic, normocytic anemia
- Elevated serum PTH. Intact PTH concentration can distinguish hyperparathyroidism from hypercalcemia when serum calcium is >12 mg/dL.
- Hypercalcemia may cause shortening of the QT interval.
- Bone scan may reveal evidence of subperiosteal bone resorption.
- Elevated BUN and creatinine may show renal insufficiency.

TREATMENT

- Patients should be instructed to consume 3 to 5 liters of fluid per day and 1,000 mg calcium.
- Surgery is the primary treatment, particularly for patients younger than 50 years and those with complications from hyperparathyroidism.
- Observation is acceptable approach in asymptomatic patients with mildly elevated calcium level (<12 mg/dL), no osteoporosis, normal kidney function, no history of life-threatening hypercalcemia.
- Bisphosphonates are recommended for patients with osteopenia or osteoporosis in addition to treatment.
- Secondary hyperparathyroidism may be treated with cinacalcet (Sensipar), an oral calcimimetic. JAAPA

QUESTIONS & ANSWERS

1. You detect a calcium level of 12.5 mg/dL during a routine laboratory evaluation of a 58-year-old asymptomatic man. You order the following follow-up test:

a. Parathyroid hormone
b. CBC
c. Intravenous pyelogram
d. Chest radiography

Answer: a

Explanation: Parathyroid hormone testing is used as a confirmatory test for hyperparathyroidism when elevated calcium is noted.

2. Your 50-year-old female patient complains of a history of kidney stones, osteopenia, fatigue, nausea, and constipation. You order laboratory tests and expect the following results:

a. Decreased serum calcium
b. Increased serum phosphorus
c. Normal BUN/creatinine
d. Elevated serum calcium

Answer: d

Explanation: Elevated serum calcium, decreased serum phosphorus, and elevated BUN/creatinine are all laboratory test results expected in hyperparathyroidism.

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