

Abdominal Wall Ectopic Bone Formation With Previous Abdominal Surgery

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Ectopic ossification is a biological process in which bone is formed in tissues that normally do not ossify. The formation of ectopic bone is a well-recognized complication following any type of arthroplasty of the hip,¹⁻³ and has also been reported following trauma.⁴⁻⁶ This report documents bone formation following abdominal surgery.

CASE REPORT

A 33-year-old man presented to Martin Army Hospital Family Practice Clinic with a chief complaint of "soreness in his belly," which he had three weeks prior to his admission. This soreness was worse with exertion and better with acetaminophen with codeine therapy. Patient had no relief with ibuprofen. This pain progressively worsened and was associated with a "lump" in his upper abdomen. Gastrointestinal review of systems was otherwise normal.

Past surgical history was significant for a stab wound to his upper abdomen in 1976. This wound led to internal hemorrhage in the peritoneal cavity, and the patient was taken to surgery for an exploratory laparotomy. At that time a laceration of the stomach wall was repaired. The patient had an uneventful postoperative course. From 1976 to 1984 the patient had two episodes of "midepigastric indigestion," both occurring while training for boxing. Both episodes spontaneously resolved after the training period.

Examination revealed a well-developed man with mild abdominal discomfort. Vital signs showed a temperature of 98 °F, pulse of 80 beats per minute, blood pressure was 142/92 mmHg, and the respiratory rate was 20. A

hard, nonmovable mass, approximately 12 cm long and 2 cm wide was palpated in the midepigastric area extending from the xiphoid process to the umbilicus. This mass, located under the previous abdominal surgical scar, was tender to palpation. Remainder of the examination was unremarkable. Laboratory studies were normal. Chest x-ray, abdominal flatplate, and ultrasound examinations were normal without calcific densities in the epigastrium.

At this time the impression was that this mass represented probable ectopic bone formation. Surgery to remove the mass was undertaken. At surgery the ectopic bone mass was found to extend from the xiphoid process to the umbilicus within the subcutaneous tissue, linea alba fascia, and reaching the rectus abdominis muscle. Most of this bone formation was directly included in the area of the previous abdominal wall surgical scar. The ectopic bone was removed. No postoperative complications were noted. The pathology report stated: Bone fragment tissue, measuring 12.5 cm by 2.5 cm by 1.5 cm.

DISCUSSION

Dystrophic calcification of soft tissues is a condition in which an abnormal deposition of amorphous calcium is made. This condition can be found in bursa calcification, hematoma calcification, burn injuries, neoplasms, and collagen diseases. Ectopic ossification is a more advanced process than dystrophic calcification, for there is a definite osteoblastic activity with formation of an osseous matrix.

Although the exact mechanism of both dystrophic calcification and ectopic ossification is unknown, Kewalramani and Orth⁶ have described a theory of two separate cell populations: (1) an immediately reacting group of cells present in the periosteal, endosteal, and stromal connective tissue cells with osteogenic potential derived from contact with previously existing bone tissue; and (2) another slowly reacting cell population present in mesenchymal cells of endomysium that is influenced by some triggering mechanism, proliferate, and show competence to differentiate into osteoblasts and produce an osseous

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matrix. In certain situations, therefore, activation and proliferation of endomyseal mesenchymal cells may end after disposition of an amorphous calcium and form patches of dystrophic calcification; or in the presence of an appropriate stimulus, mesenchymal cells may differentiate to form osteoblasts and chondroblasts, which lay down an osseous matrix.

Treatment of ectopic ossification is as controversial as its etiology. MacLennan and colleagues⁷ have presented a summary of several methods used to prevent or stop ectopic ossification once it has started. These methods have had various success rates and include the following: (1) careful irrigation of the operative site with sterile saline and gentle handling of tissue; (2) diphosphate, which has been shown to decrease calcification of callus, but removal of this therapy causes recalcification; (3) indomethacin, which decreases incidence of ectopic ossification if given immediately after surgery; (4) postoperative irradiation of the hip after total hip arthroplasty; and (5) surgical removal, indicated if the deformity is severe enough to prevent patient's rehabilitation or mobility.

Although ectopic ossification is associated mainly with hip arthroplasty and trauma, this case illustrates an example associated with abdominal surgery as the precipitating event. Over an eight-year period the patient was asymptomatic, except during his training for boxing and

during a three-week period prior to his surgery for removal of the ectopic bone. Initial x-ray films were interpreted as normal, but further review revealed a calcific density in the epigastrium, which was later confirmed as ectopic bone formation. In this case, surgical excision was the treatment of choice. This surgery relieved the patient's discomfort, and the patient has remained asymptomatic without recurrence of ectopic ossification during the past year.

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