

Case Report

The Prominent Conoid Process of the Clavicle: A New Radiographic Sign in Down's Syndrome

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The conoid tubercle is located along the inferoposterior surface of the clavicle at the junction of the lateral fourth and the remainder of the shaft. The conoid portion of the coracoclavicular ligament extends inferiorly from this bony process. Prominence of the conoid tubercle appears on radiographs as a triangular bony structure projecting downward and laterally. We describe two patients with Down's syndrome who had prominent clavicular conoid processes. We believe that this is the first report of this association.

Case Reports

Case 1

A full-term infant was born with features of Down's syndrome, including epicanthal folds, simian creases, hypotonia, and a protruding tongue. No heart murmur was detected. Genetic studies revealed translocation of chromosomes 14 and 21, consistent with Down's syndrome.

Chest radiographs at birth showed a normal-sized heart, 11 pairs of ribs, and no evidence of double sternal ossification centers. A triangular bony extension at the inferolateral surface of both clavicles was noted. These osseous structures are the prominent conoid processes of the clavicles (Fig. 1A). The infant's nursery admission was complicated by jaundice and polycythemia, which were treated with partial-exchange transfusion and phototherapy.

At 4 months of age, the infant was admitted with high fever, respiratory distress, and a history of one episode of cyanosis. Echocardiography showed a moderate atrial septal defect with right ventricular hypertrophy. A chest radiograph again revealed a promi-

nent conoid process of both clavicles. The conoid processes were larger than they had appeared on the radiographs obtained shortly after birth, but maintained their size relative to the rest of the clavicle (Fig. 1B). The infant was treated with IV fluids and ceftriaxone.



A



B

Fig. 1.—A, Frontal radiograph of both clavicles in a neonate with Down's syndrome shows prominent conoid process bilaterally.
B, Radiograph obtained when infant was 4 months old still shows prominent clavicular osseous variant.

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Case 2

A 25-year-old woman with Down's syndrome and severe mental retardation was admitted to the hospital with fever, a cough, and lethargy. She had been hospitalized 3 years earlier because of pneumonia in the left lower lobe.

Chest radiographs revealed opacities in the right middle and left lower lobes of the lung. Prominent conoid processes of both clavicles also were noted (Fig. 2). We observed 12 pairs of ribs and no other thoracic bony abnormalities. The patient was treated with IV cefuroxime.

Discussion

The conoid process of the clavicle, when prominent, appears on radiographs as a bony "spur" extending from the inferoposterior lateral surface of the clavicle. On rare occasions, a true diarthrodial joint with the coracoid process of the scapula is present. This bony process may be the result of calcification of the coracoclavicular ligament [1]. However, when seen on radiographs, it does not necessarily imply that a joint is present [2]. A few conflicting reports have been published that address the prevalence of this clavicular osseous variant with or without a joint. The frequency of the prominent clavicular conoid process ranges from 3% to 21% in the radiographic studies from Asia, vs only 1.2% in studies from the United States [3, 4]. Moreover, European studies have shown that the number of reported cases in anatomic



Fig. 2.—Frontal radiograph of right clavicle of a 25-year-old woman with Down's syndrome shows clavicular conoid process.

publications is 10 times greater than the number reported in radiologic publications [3].

Caffey [5] described "bony spurs" of the inferior clavicular surface in children with long-standing rheumatoid arthritis, and in one 4-year-old asymptomatic boy. Lewis [6] reported the presence of the coracoclavicular joint in two children and believed that this finding was a congenital anomaly. Pillay [7] described a series of similar cases in which the process was found to occur in an autosomal dominant inheritance pattern. High prevalence of coracoclavicular joints also has been reported in patients with Holt-Oram syndrome [8].

The prominent conoid process in two of our patients may also support a genetic basis for its occurrence. We also observed this clavicular osseous variant in a severely hypotonic 3-month-old infant with Joubert's syndrome (agenesis of the cerebellar vermis). The abnormal muscle tone in the shoulder and increased pressure in the clavicle might contribute to the development of the conoid process even at an early age. The combination of hypotonia and abnormal balance of the shoulder muscles, delayed skeletal maturation, and genetic factors might explain the presence of this clavicular variant in association with Down's syndrome.

The prominent clavicular conoid process is readily identified on routine chest radiographs and suggests the diagnosis of Down's syndrome.

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