FRACTURE OF THE CUBOID IN CHILDREN

A SOURCE OF LEG SYMPTOMS

PETER T. SIMONIAN, JAMES W. VAHEY, DAVID M. ROSENBAUM, VINCENT S. MOSCA, LYNN T. STAHELI

From the Children's Hospital and the University of Washington, Seattle, USA

We report eight cases of fracture of the cuboid in seven children under four years of age, collected during a two-year period. There was no history of trauma in five of the patients. This fracture is rarely diagnosed and has probably been under-reported. Small children are poor historians and difficult to examine, and early radiographs may be normal or have only subtle abnormalities.

Cuboid fracture should be considered in the differential diagnosis of limping toddlers, and a bone scan may be needed to confirm the diagnosis earlier than radiography. These fractures heal completely, without sequelae. Treatment in a short-leg walking cast is recommended, primarily for reasons of comfort.

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Cuboid fractures are uncommon in adults (Hermel and Gershon-Cohen 1953) and are thought to be very uncommon in children (Nicastro and Haupt 1984; Blumberg and Patterson 1991); they can be caused by direct or indirect injury. We could find only a single case report of a "probable stress fracture" in an 18-month-old child, which was diagnosed with some difficulty (Nicastro and Haupt 1984). In children, stress fractures are rare but most common in the tibia (Devas 1970). They have been reported in the foot (Starshak, Simmons and Sty 1984).

Blumberg and Patterson (1991) described two 'presumed' and two 'probable' cuboid fractures in children sustained in falls. At one to two weeks after injury, the radiographs showed a characteristic band of proximal scler-

osis in all four cases and in the two probable cases bone scans were also positive. In the two presumed fractures an early radiograph or bone scan was not obtained. Englaro, Gelfand and Paltiel (1992) reviewed bone scans in 56 children under five years of age with pain in the lower leg of uncertain origin. Of the 31 abnormal bone scans, nine showed abnormal uptake in or adjacent to the cuboid. Of these nine patients, only four had radiographs of the cuboid at the time of injury and these were all considered normal.

PATIENTS AND METHODS

We report the cases of eight probable cuboid fractures in seven patients seen in a two-year period. There were five boys and two girls. Their average age was 33 months (19 to 49). There were four right fractures and four left. Six patients presented with an antalgic limp and two had refused to bear weight. Three cases followed known trauma, but there was no history of trauma in the other five (Table I). There was no evidence of infection, and all five patients without trauma had a normal white blood cell count and ESR.

The initial physical examination localised symptoms to the foot in only three of the patients, and early radiographs of the foot were obtained only in these three. Bone scans and radiographs of the others were obtained later because of persisting symptoms.

Four patients were treated by cast immobilisation and four by observation, until symptoms had resolved. All patients were evaluated for the purpose of this review. Details are given in Table I.

The first evidence of the diagnosis in all eight fractures was increased uptake on a bone scan performed after a mean of 11 days (Fig. 1). In the three patients with local symptoms and signs in the foot, the initial radiographs were considered to be normal, but there was evidence of sclerosis of the cuboid on later radiographs taken at an average of 11 days (Figs 2 and 3).

In the four untreated cases, symptoms resolved at a mean of 27 days (11 to 47). The four patients treated in a short-leg walking cast were immobilised for a mean of 23 days (7 to 41). In the three fractures with a history of trauma, symptoms resolved at a mean of 30 days (21 to 41); in the five with no history of trauma symptoms resolved at a mean of 20 days (7 to 47). At latest review at a mean of 34

P. T. Simonian, MD

J. W. Vahey, MD

V. S. Mosca, MD, Associate Professor

L. T. Staheli, MD, Professor

Department of Orthopaedics

D. M. Rosenbaum, MD, Associate Professor, Department of Radiology
School of Medicine, RK-10, University of Washington, Seattle, Washington 98195, USA.

Correspondence should be sent to Dr P. T. Simonian.

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Table I. Details of seven patients with eight fractures of the cuboid. Cases 6 and 7 were the same patient.

Case	Sex	Age (mth)	Side	Trauma	Initial imaging	Immobilisation	No limp (days)	Follow-up (mth)	Comment
1	F	28	R	No	Bone scan	No	11	26	Ganglioneuroblastoma
2	F	29	L	No	Bone scan	Yes	7	27	—
3	M	19	R	No	Hip, knee, ankle	Yes	21	27	Prior wrist cellulitis
4	M	41	R	Yes	Foot	Yes	41	34	—
5	M	49	L	No	Hip	Yes	13	34	Hunter's syndrome
6	M	30	L	Yes	Foot	No	21	49	Bilateral
7	M	34	R	No	Bone scan	No	47	47	Bilateral
8	M	33	L	Yes	Foot	No	27	26	—

Fig. 1a

Fig. 1b

Case 2. Two views of a bone scan of a 29-month-old girl, nine days after she developed a persistent limp with no history of trauma. There is focal uptake in one cuboid.

Fig. 2a

Fig. 2b

Case 2. Anteroposterior and oblique radiographs immediately after the abnormal bone scan. There is slight sclerosis at the proximal end of the cuboid, which could easily be overlooked.

Fig. 3a

Fig. 3b

Case 2. Anteroposterior and oblique radiographs one week later, showing increased sclerosis, characteristic of a healing fracture.

months (26 to 49) no patient had any residual complaints of pain or limp.

ILLUSTRATIVE CASE REPORTS

Case 1. A 28-month-girl with ganglioneuroblastoma of the neck began to limp eight days before a bone scan, previously scheduled to screen for possible metastases. There was focal uptake in the right proximal cuboid, and radiographs showed minimal sclerosis. Repeat radiographs 11 days after the scan showed increased sclerosis of the posterior articular surface of the cuboid, but the limp had resolved and two repeat bone scans at four-month intervals, to evaluate her tumour, showed that the uptake had returned to normal.

Case 2. A 29-month-girl had a nine-day history of left-sided limping, with no history of trauma. A bone scan showed focal increased uptake in the cuboid, and radiographs obtained immediately after the scan indicated sclerosis in the proximal cuboid. The patient was treated in a short-leg walking cast for seven days with resolution of symptoms. There was increased sclerosis on repeat radiographs after cast removal (Figs 1 to 3).

Cases 6 and 7. A 30-month-old boy was unable to walk after an unwitnessed fall. Radiographs of the left foot were normal, but limping persisted and after one week repeat radiographs showed sclerosis of the proximal aspect of the cuboid. After three weeks the symptoms resolved.

Four months later the patient again developed a persistent limp in his right leg with no known trauma. A bone scan four weeks after onset showed focal uptake at the right cuboid, and radiographs showed increased sclerosis in the right cuboid. The symptoms resolved after a total of seven weeks. Neither of these fractures was treated by immobilisation.

DISCUSSION

Cuboid fractures are uncommon: Hermel and Gershon-Cohen (1953) reported five patients, the youngest being 12 years of age. They proposed a 'nutcracker' mechanism causing injury by compression between the calcaneus and the bases of the fourth and fifth metatarsals when the front of the foot is fixed and the weight of the body is transmitted through the foot in plantar flexion. Nicastro and Haupt (1984) described a single case of a 'stress' fracture of the

cuboid considered to be due to the chronic stress of an abnormal gait as the child learns to walk. The cuboid injuries reported by Blumberg and Patterson (1991) were due to acute trauma, and symptoms resolved within three to four weeks without treatment.

In our patients, symptoms resolved at a mean of 23 days in those treated in a cast and 27 days in those not immobilised, although they may have resolved before cast removal or follow-up review.

All our patients were first diagnosed by bone scan. All early radiographs were read as normal, but later films showed sclerosis of the cuboid. None of our patients had any residual symptoms at late review.

There are many causes for an antalgic limp in a toddler, and any history of trauma is rarely clear in this age group. The initial radiological findings are often subtle: the fractures are often incomplete and undisplaced, while sclerosis develops only after one to two weeks as a result of healing.

We present our experience because we believe that these fractures have probably been under-diagnosed and under-reported. The diagnosis should be considered during the difficult assessment of limping toddlers. A bone scan will help to confirm the diagnosis earlier than radiography, but since these fractures heal without sequelae, it seems reasonable to avoid the additional cost and radiation of a bone scan. Suspicion of the diagnosis of fracture may warrant initial radiographs to rule out other diagnoses, and repeated radiographs after 10 to 14 days will then confirm it. When a cuboid fracture is suspected, we recommend the use of a short-leg walking cast, primarily for reasons of comfort.

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