PSEUDARTHROSIS OF THE ULNA AND OSTEOARTHRITIS OF THE ELBOW

A CASE REPORT

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A 10-year-old boy who sustained a fracture through a cyst in the ulna later developed a pseudarthrosis. During 13 years' follow-up the characteristic short bowed forearm developed but, instead of the more usual spontaneous dislocation of the head of the radius, the patient also developed the previously unreported complication of osteoarthritis of the elbow.

Congenital pseudarthrosis of the ulna is a rare condition. Although the term "congenital" is used, as it is with the more common deformity of the tibia, only four of the 12 previously reported cases were detected at birth with deformity of the forearm. Most patients presenting with this deformity were infants with no history of injury but with thin tapering bone ends. However, two previously reported cases and the patient presented in this report were diagnosed after a childhood fracture through a lytic lesion in the ulna.

All the previously reported cases had developed a short varus forearm and most had progressive bowing of the radius; eight of the 12 later suffered dislocation of the head of the radius (Table I). Management of these patients has included simple observation, excision of the pseudarthrosis, various bone-grafting procedures, and radio-ulnar synostosis to give a one-bone forearm. Excision of the head of the radius also has been performed. A review of the literature, however, revealed that degenerative arthritis of the elbow as a result of the pseudarthrosis had not previously been recorded.

CASE REPORT

A boy aged 10 years presented three days after a fall on to his previously normal left arm. He sustained a short oblique fracture at the junction of the middle and distal third of the ulna; the radius was uninjured and intact. His bones were noted to be rather slender and there was the appearance of a cyst at the fracture site (Figs 1 and 2). In common with reported cases of congenital pseud-

arthrosis of the tibia (Sage 1980), he showed no other signs of neurofibromatosis. He was treated in a forearm plaster for seven weeks and, because of doubtful union, a dorsal plaster slab was retained for a further two months. At this stage the fracture was thought to have united and follow-up ceased.

When he was aged 12, he was referred because of varus deformity of the forearm. Radiographs taken two years later showed non-union with marked atrophy of the distal part of the ulna and bowing of the radius (Fig. 3). The radial head was not dislocated and, because function was practically normal, no treatment was advised. The mild deformity became only slightly worse (Fig. 4) and for 10 years he enjoyed normal function, including sports and weight-training.

From the age of 21 years, however, he experienced mild but increasing pain, crepitus and loss of movement at the left elbow. The left forearm was 2.5 cm shorter than the right and had moderate radial bowing (Fig. 5) but the deformity was partly disguised by good muscle bulk. He had lost 30° of extension, 40° of flexion and 45° of pronation as compared with the normal side. Radiographs taken when he was 22 showed subluxation of the wrist (Fig. 5) and also early degeneration at the elbow with sclerosis, loss of joint space (especially on the lateral side) and osteophyte formation (Figs 6 and 7).

DISCUSSION

All the cases previously reported had good forearm function, although few had been followed to adult life. This appears to be the first report of a patient with deterioration of function and the first with degenerative changes at the elbow; these changes may be related to the fact that no operation was performed and the radial head did not dislocate. His progress supports the view that the ununited ulna may act as a tether, leading to progressive

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Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

Figures 1 and 2 - Radiographs taken when the patient was 10 years old show the original fracture with a cyst at the fracture site. The radius already shows slight bowing and thickening. Figure 3 - Four years later there is atrophy of the ulna and increased bowing of the radius. Figure 4 - By 18 years of age the epiphyses have closed, there is more thickening of the radius and a suggestion of joint distraction at both ends of the ulna. Figure 5 - By the age of 22 there is subluxation at the wrist. Figures 6 and 7, taken at the same time, show degenerative changes at the elbow.

Table 1. Clinical and radiological features, treatment and results in 13 cases of pseudarthrosis of the ulna

Report	Management	Union of ulna	Bowing of radius	Dislocation of head of radius	Pronation	Function
Lee 1933 4	Conservative	No	Yes	Yes	Limited	Good
Moore 1949	Radial osteotomy, tibial bone graft to ulna	Yes	No	Yes	—	—
Madsen 1956	Conservative	No	Yes	Yes	Limited	Good
Cobb 1968	Radial osteotomy, iliac bone graft to ulna	No	Yes	Yes	Limited	Weak grip
Shertzer, Bickel and Stubbins 1969	1. Radial osteotomy and excision of pseudarthrosis	—	Yes	No	Limited	Good
	2. Tibial bone grafts (3) and excision of pseudarthrosis	Yes	Minimal	No	Limited	Good
Hadlow 1979	Radio-ulnar synostosis, radial head excision	—	—	Yes	Nil	Good
Sage 1980	1. Radio-ulnar synostosis	—	—	—	Nil	—
	2. Radial head excision	—	—	—	—	—
Allieu et al. 1981	Free vascularised fibular graft	Yes	Yes	Yes	Limited	—
Ali and Hooper 1982	1. Excision of pseudarthrosis and fibular graft	No	Yes	Yes	Limited	Good
	2. Radial osteotomy	No	Minimal	Yes	Limited	Good
Fernandez 1986	Conservative	No	Yes	No	Limited	Deteriorating

Dash (—), not reported

bowing of the radius during growth (Schertzer, Bickel and Stubbins 1969; Sage 1980; Ali and Hooper 1982). Usually this causes dislocation of the head of the radius but, in the patient reported, the unrelieved excess pressure across the joint appears to have produced progressive degenerative change. The disability suffered by this patient indicates that operation at an earlier stage may have been advisable, either excision of the ununited part of the ulna with the aim of reducing the tethering effect, or some form of bone grafting with the aim of restoring normal radio-ulnar proportion.

The future management of this patient presents some difficulties; as a first stage, however, excision of the lower ulnar remnant is being considered in an attempt to decompress the radiohumeral joint.

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REFERENCES

- Ali MS, Hooper G. Congenital pseudarthrosis of the ulna due to neurofibromatosis. *J Bone Joint Surg [Br]* 1982;64-B:600-2.
- Allieu Y, Gomis R, Yoshimura M, Dimeglio A, Bonnel F. Congenital pseudarthrosis of the forearm - two cases treated by free vascularized fibular graft. *J Hand Surg* 1981;6:475-81.
- Cobb N. Neurofibromatosis and pseudarthrosis of the ulna: a case report. *J Bone Joint Surg [Br]* 1968;50-B:146-9.
- Hadlow V. Congenital pseudarthrosis of the ulna: a case report. *Aust NZ J Surg* 1979;49:100-4.
- Lee M. Congenital absence of ulna with associated deformity of radius. *Proc R Soc Med* 1933-4;27:1268-9.
- Madsen ET. Congenital angulations and fractures of the extremities. *Acta Orthop Scand* 1956;25:242-80.
- Moore JR. Delayed autogenous bone graft in the treatment of congenital pseudarthrosis. *J Bone Joint Surg [Am]* 1949;31-A:23-39.
- Sage FP. Congenital anomalies. In: Edmonson AS, Crenshaw AH, eds. *Campbell's operative orthopaedics*, Vol. 2. 6th ed. St Louis etc: CV Mosby, 1980:1748-1938.
- Shertzer JH, Bickel WH, Stubbins SG. Congenital pseudarthrosis of the ulna: report of two cases. *Minn Med* 1969;52:1061-6.