Capitate-hamate fusion for Kienböck's disease

Good results in 8 cases followed for 3 years

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8 patients with Kienböck's disease and without negative ulnar variance were treated with a modification of Chuinard's capitate-hamate fusion. All patients returned to their normal activities free of pain. The postoperative wrist motion was unchanged, but the grip strength was increased.

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Joint leveling procedures, such as radial shortening (Hulten 1928) and ulnar lengthening (Persson 1945) decrease the load on the lunate in Kienböck's disease but may cause ulno-carpal abutment (Armistead et al. 1982, Nakamura et al. 1986, Weiss et al. 1991). The capitate-hamate fusion, as reported by Chuinard and Zeman (1980), is another means of relieving pressure on the lunate.

I report results of a modified Chuinard's procedure in 8 patients with Kienböck's disease without negative ulnar variance.

Patients and methods

Between 1980 and 1988, 8 patients with Kienböck's disease without negative ulnar variance were treated surgically and followed for at least 2 years. There were 5 men and 3 women with an average age of 40 (24–59) years; 6 involved the dominant hand and 2 the nondominant hand. 6 patients had engaged in heavy manual work, and none had had preceding trauma. On admission, 6 patients complained of moderate pain and 2 complained of more severe pain which interfered with work. The time between the onset of symptoms and operation averaged 16 (2–36) months.

Wrist motion and grip strength were measured preoperatively in all patients (Table 1).

Table 1. Observations in 8 patients treated with capitate-hamate fusion for Kienböck's disease

Case	Age	Sex	Occupation	Ulnar variance (mm)	Follow-up (months)	Stage		Wrist motion[a]		Grip strength[b]		Pain[c]		CHR[d]	
						Preop	Postop	Preop	Postop	Preop	Postop	Preop	Postop	Preop	Postop
1	59	M	Farmer	0	65	III	III	70	70	92	93	++	–	0.51	0.51
2	24	M	Laborer	0	60	II	I	83	89	50	88	+	–	0.57	0.57
3	42	F	Laborer	+1	50	III	III	70	80	35	100	+	±	0.45	0.45
4	29	F	Housewife	0	48	II	III	73	80	90	86	+	–	0.51	0.49
5	46	F	Farmer	+2	36	III	III	62	64	76	92	+	–	0.44	0.46
6	46	M	Driver	0	25	II	II	81	71	53	78	++	±	0.51	0.51
7	34	M	Laborer	+1	25	II	II	77	73	78	100	+	–	0.52	0.52
8	41	M	Laborer	+2	24	II	II	92	95	100	100	+	–	0.55	0.55
Average					42			76	78	72	92				

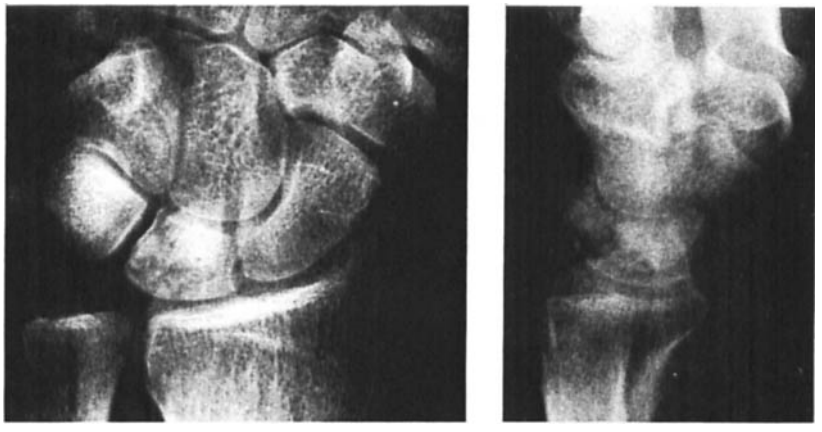
[a]Wrist motion: arc of flexion and extension of the wrist in percent of unaffected wrist
[b]Grip strength in percent of unaffected wrist
[c]Pain: – painless, ± mild pain with strenuous use, + mild pain with daily use, ++ pain interfering with work.
[d]CHR carpal height ratio

Standard anterior-posterior and lateral radiographs were made with the forearm in neutral rotation and the elbow flexed 90 degrees. 4 wrists had zero variance and 4 positive variance (+1 to +2 mm). All patients were staged using Decoulx's system (1965); 5 had Stage II and 3 Stage III disease. The degree of carpal collapse was quantitated by the method of Youm, which uses the ratio of the carpal height to the length of the third metacarpal. The ratio in normal wrists is 0.54 ± 0.03. By this criterion, 2 patients had carpal collapse with ratios of 0.45 and 0.44 (Table 1).

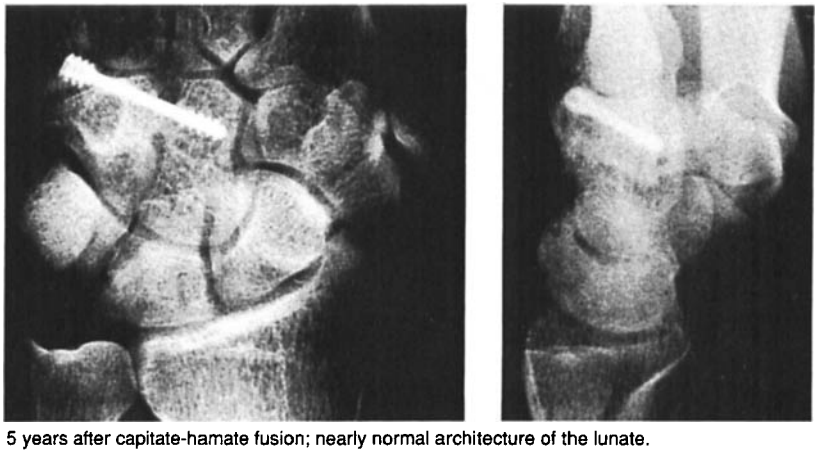
The operation

All patients were operated on using a dorsal transverse incision to expose the capitate-hamate joint. The surface of the cartilage of the distal two-thirds of the capitate-hamate joint was curetted. A 1 × 1 cm window was made across the joint in the dorsal cortex of each bone for a bone graft from the dorsal aspect of the distal radius. Cancellous grafts were packed into the fused joint, and the cortical key graft was inserted. The fusion was fixed with a Herbert screw using the "free-hand" technique. Postoperatively the wrist was immobilized in a short arm-cast for 4 weeks. A return to normal activity was allowed following the removal of the cast. Follow-up examination was performed 3 (2–5) years postoperatively.

Figure 1. Case 1.



Preoperatively Stage II Kienböck's disease with zero variance.



5 years after capitate-hamate fusion; nearly normal architecture of the lunate.

Figure 2. Case 7.

Preoperatively Stage II Kienböck's disease with an ulnar variance of 1 mm.

2 years after the capitate-hamate fusion; evidence of revascularization of ulnar half of the lunate with no further collapse of the lunate.

Results

All patients achieved consolidation of the fused joint within 2 months. At follow-up 6 patients were pain-free and 2 had mild pain with strenuous use of the wrist. All the patients had resumed their previous occupation and were satisfied with the outcome of the procedure. Wrist motion improved or was unchanged in 6 patients, while in 2, motion was slightly more restricted (Table 1). The average grip strength was 92 percent of that on the normal side, a postoperative improvement of 20 percent. Radiographically, the architecture of 1 patient's lunate improved to nearly normal (Figure 1), 6 patients showed no change in the appearance of the lunate (Figure 2), and 1 patient showed further collapse. The carpal height ratio increased in 1 patient and decreased in 1 patient.

Discussion

The rationale for treatment of Kienböck's disease by capitate-hamate fusion lies in relieving the pressure from the nutcracker effect on the lunate caused by impingement between the capitate and the distal radius (Chuinard and Zeman 1980). Although Trumble et al. (1986) and Horii et al. (1990) have failed to demonstrate any effect of decompressing the load on the lunate, my results seem to support Chuinard's theory.

Watson and Hempton (1980) have advocated the scaphotrapezio-trapezoid fusion for Kienböck's disease, on the basis that this fusion will reduce the load on the lunate. However, it has the disadvantage of reducing wrist motion (Trumble et al. 1986).

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