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Arthroscopic resection of an osteochondral loose body in the distal radioulnar joint: A case report

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ABSTRACT

We report a 34-year-old man who presented with ulnar wrist pain, painful click, and locking during forearm rotation following a motorcycle accident. Plain radiographs showed a loose body in the distal radioulnar joint (DRUJ), deformity of the sigmoid notch and ulnar head, and ulnar minus variant. The DRUJ deformity was assumed to be associated with physeal injury of the distal ulna during childhood. Conservative treatment with a splint and oral analgesics for 3 months failed. During DRUJ arthroscopy, osteoarthritic changes were found, and the loose body was resected using DRUJ arthroscopy. Histological examination showed an osteochondral loose body. The patient remained asymptomatic without recurrence or DRUJ instability 2 years postoperatively.

Introduction

Osteochondral loose body is a common cause of clicking, locking, and pain affecting large joints. Loose body of the wrist joint is rare, and we only found 16 cases of loose bodies in the distal radioulnar joint (DRUJ) after reviewing the relevant literature.[1–12] All cases underwent open resection of the loose bodies.

Herein, we present a case with a loose body in the DRUJ diagnosed after a traffic accident, where the patient underwent arthroscopic resection with DRUJ arthroscopy. To our knowledge, this is the first report of a patient undergoing resection of a loose body in the DRUJ under DRUJ arthroscopy.

Case report

A 34-year-old right-handed man fell off his motorcycle and landed on his right wrist. He worked as a nurse, and had no relevant past medical history, including a previous trauma. He complained of ulnar wrist pain, painful clicking and locking during forearm rotation 2 days following the trauma. Initial examination showed tenderness on the volar side of the ulnar head and painful active movement. Plain radiographs of the right wrist showed a deformity of the sigmoid notch and ulnar head, and a rounded small bone between the sigmoid notch and ulnar head (Fig. 1a–c). Comparison with the uninjured side led us to assume that the physeal injury of the distal ulna occurred during his childhood because of the shortening of the ulna and the deformity of the sigmoid notch adapting to the distal ulna. After we explained to him that the traumatic event might have destabilized the loose body, and that this was an acute-on-chronic condition, he selected conservative treatment with the hope of spontaneous resolution. Conservative treatment with a splint and oral analgesics were pursued for 3 months, but without improvement. Serial radiographs showed a change in the position of the small bone (Fig. 2a). Computed tomography (CT) also revealed osteoarthritic change of the sigmoid notch and a loose body volar to the ulnar head (Fig. 2b–d).

He was diagnosed with a symptomatic unstable loose body in the DRUJ. Preoperative grip strength for the right and left hands, measured with a digital dynamometer (Takei Scientific Instrument Co., Ltd., Niigata, Japan), were 28.1 and 40.1 kg, respectively. The respective range of motion for right and left extremities, measured

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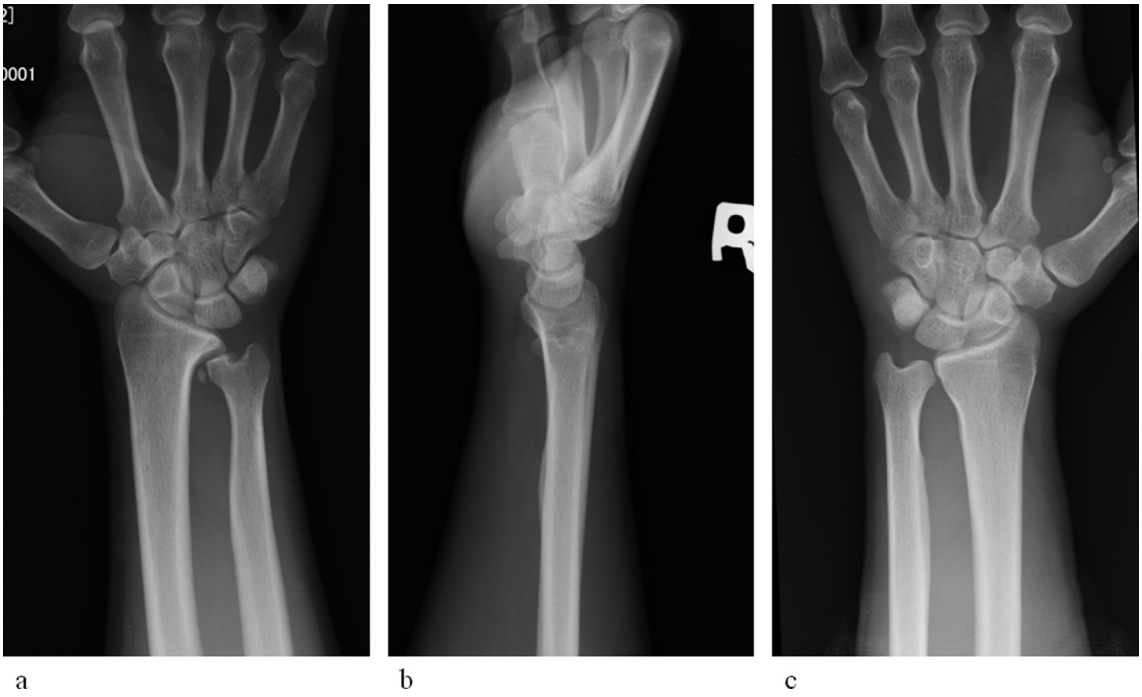

Fig. 1. Plain radiograph at initial presentation. (a) Anteroposterior (AP) view of the right wrist. The deformity of the sigmoid notch and ulnar head is noted, and a loose body in the distal radioulnar joint (DRUJ) is found. (b) Lateral view of the right wrist. (c) AP view of the uninjured left wrist.

with a standard goniometer, was as follows: wrist dorsiflexion, 70° with click and 95°; wrist palmar flexion, 90° and 95°; forearm pronation, 75° with click and 90°; and forearm supination, 80° and 90°. DRUJ was stable based on the DRUJ ballottement test. Surgical treatment under regional anesthesia was performed. A 1.9 mm arthroscope (Stryker K. K., Tokyo, Japan) was used. The triangular fibrocartilage complex (TFCC) was intact, and the loose body was invisible via 3–4 and 6R portals in the radiocarpal joint (RCJ) (Fig. 3a). Stability of the foveal fibers was confirmed by a negative Hook test for TFCC. DRUJ arthroscopy using distal and proximal DRUJ portals showed articular fibrillation of the sigmoid notch and ulnar head, and cartilage subsidence was observed in the ulnar head (Fig. 3b). The loose body became visible from the dorsal portal during making of the volar DRUJ portal (Fig. 3c). The distal DRUJ portal was extended to about 1 cm to remove the loose body, followed by its resection. The size of the loose body was 3 × 7 × 3 mm (Fig. 3d). Histological examination showed an osteochondral loose body.

The patient was allowed to use his extremity freely 2 days postoperatively, and he returned to his job 2 weeks postoperatively. At the final follow-up after 2 years, he was asymptomatic without

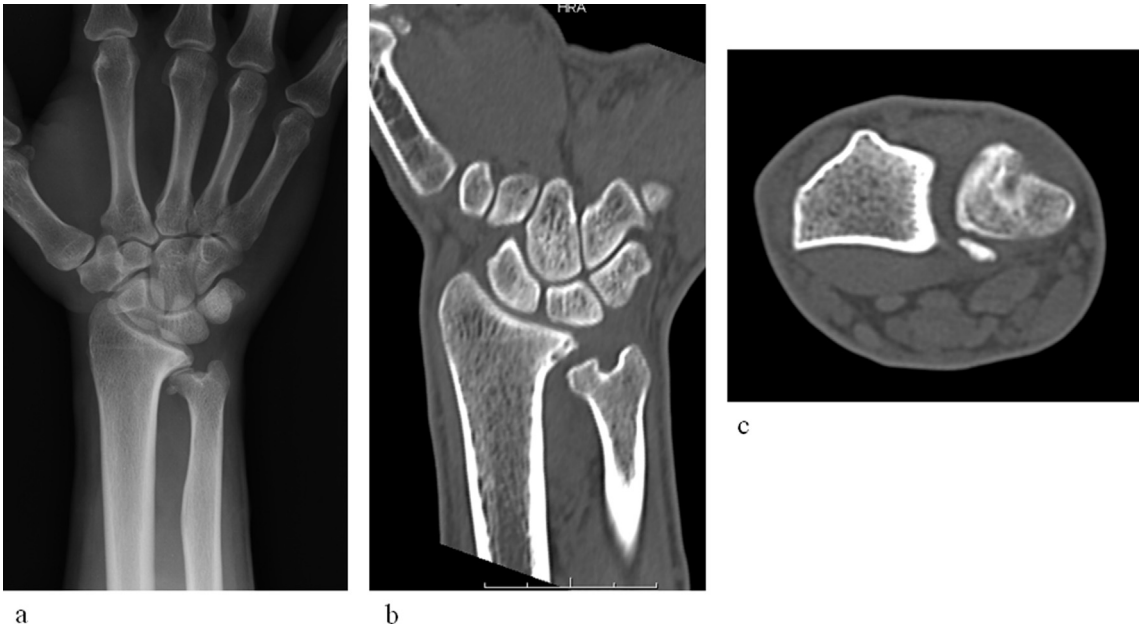

Fig. 2. Preoperative plain radiography and computed tomography (CT). (a) AP view of the right wrist. The position of the loose body is changed compared with Fig. 1a. (b) Coronal CT image. Osteoarthritic change, osteosclerosis and bone cyst, was found in the sigmoid notch. (c) Axial CT image. The loose body was located anterior to the ulnar head.

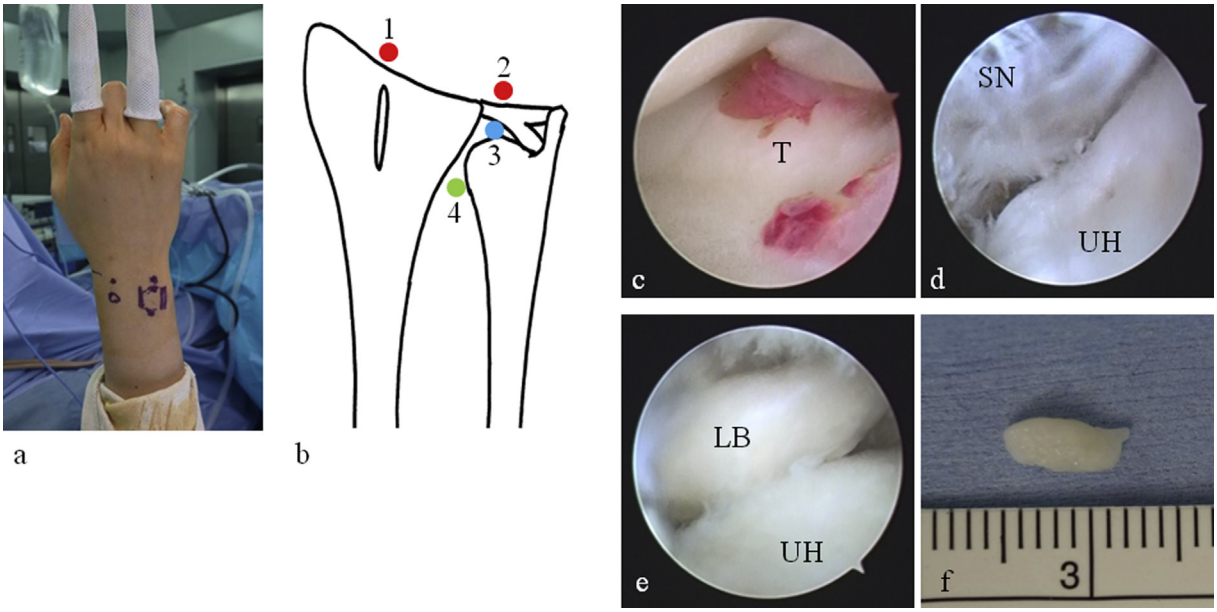

Fig. 3. Photograph during arthroscopic treatment and of the removed loose body. (a) Wrist arthroscopy. The Lister tubercle, ulnar head, extensor carpi ulnaris, and sigmoid notch were marked. (b) Schema of the portals. 1; 3–4 portal, 2; 6R portal, 3; distal DRUJ portal, 4; proximal DRUJ portal. (c) Arthroscopic view from 3 to 4 portal. The TFCC was intact and synovitis was found. (d) Arthroscopic view from the proximal DRUJ portal. Articular fibrillation on sigmoid notch and cartilage subsidence on ulnar head were observed. (e) Arthroscopic view from the proximal DRUJ portal. A loose body was found on the ulnar head. (f) Removed loose body. T, triangular fibrocartilage complex; SN, sigmoid notch; UH, ulnar head; LB, loose body.

recurrence or DRUJ instability (Fig. 4). The grip strength was 46.7 and 47.9 kg for the right and left hands, respectively. The range of motion of the right extremity was as follows: wrist dorsal flexion, 80°; wrist palmar flexion, 90°; forearm pronation, 80°; and forearm supination, 90°.

Discussion

Loose bodies in the wrist joint are rare, and involve the RCJ, pisotriquetral joint, and DRUJ. We searched for literature published in the English language on PubMed and found that loose bodies in DRUJ were reported in 15 cases and in the RCJ and DRUJ through the torn TFCC in 1 case (Table 1).[1–12]

Symptoms in patients with loose body in DRUJ were pain (n = 16), locking (n = 5), and click (n = 4). DRUJ is a small joint, and therefore, the larger size of the loose body may cause locking as a symptom, as in our case. Symptoms resolved in all cases after open surgical treatment except in 2 cases where recurrence with synovial chondromatosis occurred. Especially in our case, early return to work was possible because

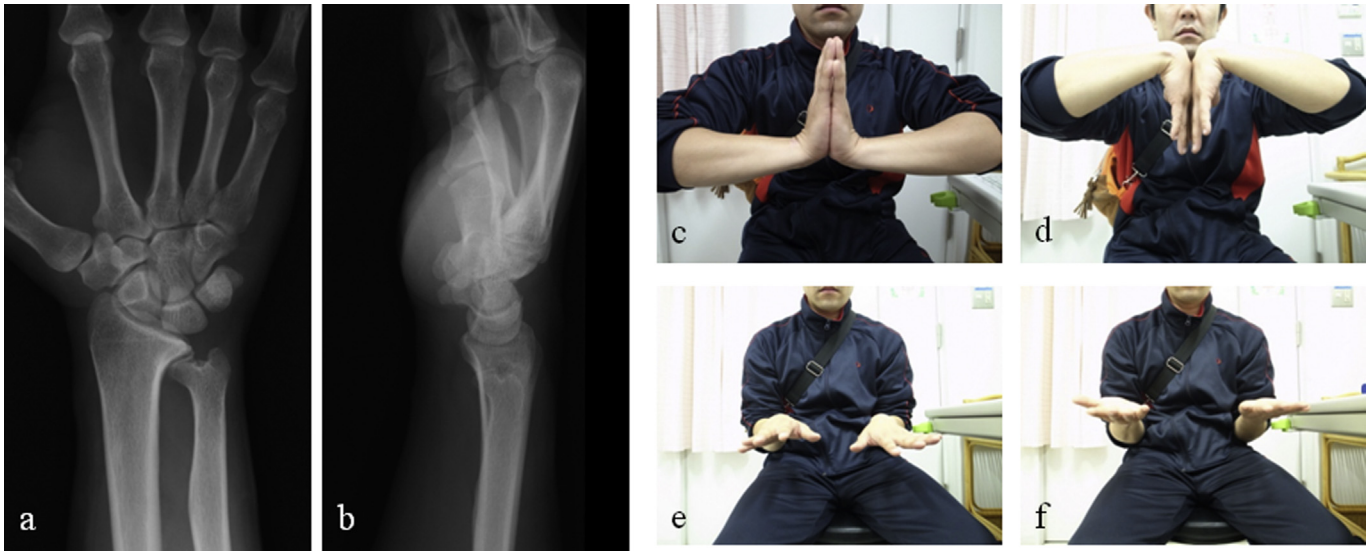

Fig. 4. Plain radiography and clinical photographs at final follow-up. (a) AP and (b) lateral views of the right wrist. No recurrence was noted. (c) Wrist dorsal flexion, (d) wrist palmar flexion, (e) forearm pronation, and (f) forearm supination, 2 years postoperatively.

Table 1
Demographic data of patients with loose body in DRUJ.

Case No.	Age	Sex	Trauma	Preoperative symptoms			Loose body detectable on preoperative plain radiograph	N	Diagnosis	Follow-up period (months)	Surgical outcome
				Pain	Locking	Click					
1[4]	23	M	Motorcycle	+		+	−	1	NA	NA	No pain
2[4]	30	M	Repetitive	+	+		+	1	NA	NA	No pain
3[4]	19	M	Repetitive	+			+	1	NA	NA	No pain
4[4]	67	F	−	+		+	−	1	OA	NA	No pain
5[4]	35	M	Contusion	+			+	3	NA	NA	No pain
6[7]	60	M	Repetitive	+	+		+	3	SO	NA	Asymptomatic
7[2]	41	F	−	+	+		+	Multiple	SO	6	Asymptomatic
8[1]	40	M	Repetitive	+			+	32	SO	24	Asymptomatic
9[5]	29	M	+	+			+	8	SO	NA	Asymptomatic
10[10]	34	M	−	+			−	NA	SO	6	Recurrence, moderate pain
11[12]	16	M	−	−			+	13	SO	NA	Asymptomatic
12[3]	49	F	NA	+			+	NA	SO	12	No limitation of activity
13[8]	43	M	+	+			+	NA	SO	NA	NA
14[11]	38	M	−	+	+	+	+	NA	SO	15	Asymptomatic
15[6]	22	M	NA	+			+	NA	SO	6	Asymptomatic
16[9]	27	M	−	+			+	NA	SO	NA	Recurrence, asymptomatic
This case	34	M	Motorcycle	+	+	+	+	1	OA	24	Asymptomatic

M: male, F: female, OA: osteoarthritis, SO: synovial osteochondromatosis, NA: not applicable, N: number of loose bodies.

arthroscopic treatment did not damage the capsular or ligamentous tissue grossly.

Preoperative plain radiographs showed loose body in 14 of the 17 cases (previous reported 16 cases and our case). When the bony proportion of the loose body is small, plain radiography is undiagnostic. In these cases, arthroscopy is essential for diagnosis and treatment. Recent technology advances enables the observation of small joints using small diameter arthroscopy. DRUJ arthroscopy is now used for arthroscopic repair of TFCC and arthroscopic resection of ulnar head for ulnar abutment syndrome.[13,14] Arthroscopic resection for loose body in DRUJ is, therefore, a potential treatment.

Generally, loose bodies in joints originate from osteochondral fractures, osteochondritis dissecans, osteoarthritis, or synovial osteochondromatosis. In this case, the predisposing factor for loose body was considered to be osteoarthritis based on the CT and arthroscopic findings. The predisposing factors for loose body in DRUJ were osteoarthritis in 2 cases, synovial osteochondromatosis in 11 cases, and were undescribed in 4 cases. In 9 of 15 cases, loose bodies were caused by a traumatic episode or repetitive minor trauma. Traumatic episodes may affect the symptoms by changing stable loose bodies to unstable. Deformities of the sigmoid notch and ulnar head were found in this case. Similar wrist deformity was reported by Ray et al, where they described symmetric shortening of the ulna caused by traumatic ulnar physeal arrest; therefore we assumed that the physeal injury occurred during his childhood.[15] Hollevoet et al described three morphological types of the DRUJ, and found that the oblique proximally facing type, as in this case, is more frequently affected by osteoarthritis.[16] The articular morphology of the DRUJ may affect the development of osteoarthritis. We did not perform any procedure for the deformed DRUJ, because the patient had no symptoms relating to his wrist before the trauma and at 2 postoperatively. When synovial osteochondromatosis is suspected as a diagnosis, open or arthroscopic radical synovectomy is needed to prevent recurrence.

Declaration of interest

Nothing to declare.

Acknowledgement

Nothing to declare.

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