Rheumatoid Elbow

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KEYWORDS

• Rheumatoid arthritis • Elbow • Elbow degeneration
• Total elbow arthroplasty

The elbow is often involved in the progression of rheumatoid arthritis (RA).[1] Because of the elbow's unique role in maneuvering and positioning the hand in space, loss of normal elbow motion, loss of stability, or increased pain with the use of the elbow are all significant sources of impairment in patients with rheumatoid arthritis. The improvements in disease-modifying medications have greatly diminished the prevalence of severe elbow degeneration among patients with rheumatoid arthritis. However, it has not eliminated it. Abe and colleagues[2] followed disease activity in the course of elbow degeneration in 118 elbows in 59 subjects who began treatment using modern antirheumatic drugs over a 10-year period. At 10 years, 30 of 120 progressed to Larsen grade 3 changes despite medication.

Surgery remains necessary for many patients whose disease involves the elbow. Surgical management varies according to the age of patients and the stage of the disease. The goal of early intervention is to minimize or delay the loss of articular and ligamentous anatomy. In later stages, excising or creating interposition for arthritic joint surfaces may delay the need for prosthetic replacement. Once the joint is significantly destroyed, arthroplasty is the remaining option. Although results of total elbow arthroplasty are comparable in patients with rheumatoid arthritis to those in other patients, there are particular concerns for this surgery.

ELBOW ANATOMY

The elbow is uniquely and marvelously adapted for its role positioning the hand in space. It comprises 2 articulations. The ulno-humeral joint permits function and extension over nearly a 180° arc, with a stable rigid endpoint at full extension. The radiocapitellar joint and proximal radioulnar joints permit an independent 180° arc of rotation of the forearm unit in all positions of elbow flexion. Neither of these bony articulations has much intrinsic stability. Stability to varus and valgus stress is conferred by the radial and ulnar lateral collateral ligaments. Rotational stability is conferred by the annular ligament and by the elbow joint capsule.

PATHOPHYSIOLOGY OF RA IN THE ELBOW

Rheumatoid arthritis is fundamentally an inflammatory disease of soft tissue. The bony abnormalities and cartilage loss are secondary effects, resulting from the erosive properties of the inflammatory pannus. It is helpful to bear this in mind when approaching patients with rheumatoid with elbow involvement.

At the early stages of disease, stopping or modifying the inflammatory process will arrest advancement of bony changes. If stopping or modifying the inflammatory process fails, physical removal of the inflammatory pannus (synovectomy) may significantly forestall further articular degeneration. Only after the failure of these interventions is joint replacement normally considered.

Inflammatory changes also affect the ligaments around the elbow joint. Instability may be a dominant feature of presentation in the elbow. Failure to address elbow stability may affect the outcome of other interventions.

CLINICAL PRESENTATION

The clinical approach to patients with rheumatoid arthritis affecting the elbow requires particular care. Several staging systems have been developed

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and these generally include both radiographic criteria and clinical symptoms. Rheumatoid disease of the elbow rarely occurs in isolation. Account must be taken of impairments at the hands and wrists distally, as well as at the shoulder proximally. In general, patients with advanced rheumatoid arthritis are both remarkably adaptable, adjusting functionally to their impairments, and also particularly able to share in the decision-making about management of their disease.

For purposes of research and to adopt a common frame of reference to describe radiographic changes, the Larsen grading system is often used. This grading system ranges from Grade 0 (no change); Grade II (showing periarticular erosions with some joint-space narrowing); Grade III (with moderate joint destruction); Grade IV (having severe destruction, collapse, and significant periarticular erosions); and Grade V (grossly mutilating changes).

However, severity of radiograph changes is never the only indication for surgical intervention. One useful classification system is the Mayo classification, which is a combination of clinical symptoms and radiograph assessment. Mayo grades I and II are marked predominantly by synovitis. Grade II is defined by clinical symptoms that cannot be controlled by medication alone. Mayo grades III and IV are marked by increasing degrees of joint destruction, and synovitis may be less apparent or quiescent.

MANAGEMENT

Clearly the first stage of management is to maximize medical therapy. Modern disease modifying agents have truly revolutionized the management of this disease. It is therefore assumed that the subsequent discussion concerns patients in whom these nonsurgical options have failed.

Intraarticular Injection

Intraarticular injection of corticosteroid may be helpful in early stages. Variable precision has been reported in injections performed blindly in an office setting; however, follow-up studies demonstrate equal effectiveness of ultrasound-guided injection.[3] Intraarticular injection of modern disease-modifying medication, such as etanercept, has been tried with disappointing results that are no better than corticosteroid.[4]

Synovectomy and Radial Head Excision

If the medical control of inflammatory synovitis fails, it may be physically removed through surgical synovectomy. This procedure is generally performed through a lateral approach, and if sufficiently deformed by disease involvement, the radial head may be excised at the same time. Particular care must be taken to perform as thorough a synovectomy as possible. It may be difficult to reach the medial and posterior aspects of the elbow through a lateral approach.

Fuerst and colleagues[5] presented a carefully performed follow-up of open synovectomy. They separated early synovectomy (performed with radiographic changes of Larsen grades I and II and preserving the radial head) from late synovectomy (performed with Larsen grades III and IV) and performed together with radial head excision. For early synovectomy they reported a survival rate (no further operations) of 91% at 5 years and 78% at 10 years. For late synovectomy they reported a survival rate of 82% at 5 years and 66% at 10 years.

Long-term follow-up of open synovectomy, with or without excision of the radial head, shows durable improvements in pain motion and daily functioning in many patients.[6]

ROLE OF ARTHROSCOPY

There has been considerable interest in performing synovectomy with the use of an arthroscope rather than through an open incision. In addition to the obvious advantages of less exposure and smaller incisions, it may be possible to reach the less accessible aspects of the elbow through an approach with multiple portals rather than with a single lateral incision.

Nemoto and colleagues[7] (2004) reported on arthroscopic synovectomy without resection of the radial head with a short follow-up of 37 months. There were significant and stable results over that period. Horiuchi and colleagues[8] reported on arthroscopic synovectomy in 29 elbows. They found good short-term relief of pain and improvement in Mayo score but a high rate of progression to total elbow replacement in subjects with higher-grade changes at the time of synovectomy.

In a nonrandomized trial, Tanaka and colleagues[9] compared results of open versus arthroscopic synovectomy. Overall, they found somewhat better relief of pain in the open group and a slightly greater rate of recurrence in the arthroscopic group. They identified subjects with early disease and with a preoperative arc of elbow flexion greater than 90° as a particularly favorable group for arthroscopic intervention.

TOTAL ELBOW ARTHROPLASTY

Total elbow replacement is an effective treatment for end-stage arthritis of the elbow. Total elbow