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Total elbow arthroplasty in bleeding disorders: an additional series of 8 cases

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Background: Total elbow arthroplasty (TEA) is a surgical option for an arthropathy secondary to a bleeding disorder. The literature consists of small case series. Our series provides further understanding into the outcomes of TEA in this population of patients.
Methods: Five patients underwent 8 primary TEAs for a bleeding disorder. Average age at time of surgery was 47 years. Four patients had hemophilia type A and 1 had von Willebrand disease. Clinical outcomes were evaluated with the Mayo Elbow Performance Score (MEPS) and the visual analog scale (VAS) for pain. Follow-up radiographs were evaluated for signs of loosening and infection.
Results: Revision surgery was performed in 3 TEAs. Two revisions were performed for aseptic loosening (104 and 118 months postoperatively). The third elbow underwent an excision arthroplasty for a deep infection 44 months postoperatively. Mean follow-up for the primary TEAs still in situ (5 elbows) was 114 months. The mean VAS score improved from 8 to 0 and MEPS from 35 to 95. The mean flexion arc improved from 70° to 100°, and rotation improved from 60° to 160°. Mean follow-up for the revised TEAs (3 elbows) was 94 months. The mean VAS score improved from 7 to 0 and the MEPS from 40 to 85. The mean flexion arc improved from 60° to 95°, and rotation improved from 70° to 160°.
Conclusions: Excellent clinical outcomes and an acceptable survival rate for TEAs, comparable with the nonhemorrhagic population, can be achieved in patients with bleeding disorders. Revision arthroplasty in this group of patients yields good clinical outcomes at medium-term follow-up.
Level of evidence: Level IV, Case Series, Treatment Study.

Keywords: Total elbow arthroplasty; hemophilia; bleeding disorders; arthropathy; elbow; revision; case series

Institutional Review Board approval was obtained from the Department of Surgery, Departmental Research Committee, University of Cape Town: Project No. 2014/096.

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Arthropathy is a serious and disabling complication of hemophilia.[1,8,31] The elbow is the second most frequently involved joint in hemophiliac arthropathy.[1] A chronic synovitis occurs as a consequence of recurrent bleeds in the joint, which in turn leads to destruction of the cartilage.

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A progressive contracture of the elbow develops because of the synovitis and cartilage damage.[1,8,31]

Treatment options in the early stages of hemophiliac arthropathy include medical (synoviorthesis) or surgical synovectomy with or without excision of the radial head.[3,6,10,15,25,29,30,33] Surgical options for an advanced arthropathy are arthrodesis and arthroplasty. The arthroplasty may be a soft tissue interposition, excision arthroplasty, or total elbow arthroplasty (TEA).[3-5,12,16,33]

As experience in arthroplasty has grown, TEA has become a more favored procedure in patients with hemophilia. Most papers on TEA for patients with hemophilia describe only 1 to 3 cases, with the largest series consisting of 8 TEAs in 5 patients. All are retrospective reports.[2,4,5,12,16-18,23,27,34]

The aim of this study was to evaluate the outcomes in our series of patients and to add these data to the small numbers reported in the literature.

Materials and methods

Patients

We obtained approval from the institutional ethical committee for a retrospective review of all patients who had undergone a TEA for arthropathy as a result of a bleeding disorder by a single surgeon (B.C.V.). Eight TEAs were performed in 5 patients (3 bilateral). All patients gave permission for their clinical data to be reported and were included in the review.

In all patients, the indication for TEA was significant pain and loss of function, with severe joint destruction on plain radiographs. The only female patient in our series had von Willebrand disease type III; the other 4 patients had severe hemophilia type A (factor VIII deficiency). The female patient with von Willebrand disease requires daily factor VIII and has a more severe form of bleeding disorder than those with hemophilia type A, who require only intermittent factor VIII. Two patients were human immunodeficiency virus (HIV) positive, 2 had hepatitis C, and 1 had both diseases. Before TEA, 1 patient had a synovectomy and removal of the radial head, and 1 patient had a release of the ulnar nerve. All patients had previous orthopedic operations of other joints, including bilateral total knee arthroplasties, bilateral ankle arthrodeses, shoulder hemiarthroplasty, and radial head excision (Table I).

Surgical procedure

All patients received a bolus of 1500 mg cefazolin 30 minutes before skin incision; this was continued for 24 hours. We used a posterior approach under tourniquet control. For the revision cases, the old scar was used. A triceps split was used in 6 cases, a Campbell approach in 1, and a triceps-sparing approach in 1. The ulnar nerve was identified in all patients and released in situ without transposition.

A synovectomy and contracture release were performed. When the radial head was still present, it was excised. After preparation of humerus and ulna, the components were cemented with gentamicin-impregnated cement. Superficial and deep drains were routinely used and removed within 24 hours. The wound was closed in layers with a continuous subcutaneous suture for skin closure to reduce the risk of bleeding and the need for factor VIII supplementation for removal of sutures. A plaster backslab was applied for 2 weeks in the patients who had an unlinked prosthesis, followed by a plaster splint, which was worn at night for a further 4 weeks. A Robert Jones bandage was applied for 10 to 14 days in the linked prosthesis, after which the elbow was left free. The female patient had an ipsilateral hemiarthroplasty of the shoulder performed at the same sitting as the TEA.

Hemophilia management

In all cases, a hematologist and a nurse with hemophilia training were involved in the perioperative care. Depending on the patient's profile and the clotting status, either a repeated bolus or a continuous infusion of factor VIII was administered. The female patient with von Willebrand disease also received factor VIII. Clotting factor titers were measured preoperatively, intraoperatively, and postoperatively. The patients were all well versed in the management of their condition and capable of managing their factor VIII requirements themselves with telephonic consultation from the hematology team.

Evaluation of clinical and radiologic outcomes

No patients were lost to follow-up. All patients were assessed at follow-up by the senior author (B.C.V.). The mean follow-up of the primary replacements (5 elbows) was 114 months (31-142). The mean follow-up of the revised elbows (3 elbows) was 94 months (24-160). The visual analog scale (VAS) score, Mayo Elbow Performance Score (MEPS), and range of movement were recorded and plain radiographs taken.[21] The MEPS of patient number 4 (operated on in 1991) was derived from the data recorded in his clinical notes as this score was described only in 1993.[21] Radiographic evaluation of the cement mantle was graded according to Morrey's criteria.[22]

Statistical analysis

Values were described as median (interquartile range) as of a nonnormal distribution. The preoperative and postoperative flexion, extension, arc of flexion, and rotation and the VAS score for pain and MEPS were compared by the Wilcoxon signed rank test, calculating exact P values. P values $< .05$ were considered statistically significant. All data were analyzed in SPSS 17.0 (SPSS Inc., Chicago, IL, USA).

Because of the low number of revision cases (3), the Wilcoxon signed rank test was not performed in this group.

Results

Mean age at primary surgery was 47 (32-63) years; the other characteristics of the 5 patients (8 TEAs) are shown in Table I. All TEAs, except the primary surgery in patient number 4, were performed by the senior author (B.C.V.).