Total elbow arthroplasty for post-traumatic arthritis in patients ≤ 45 years old is associated with high revision rates and high patient satisfaction

Introduction

The use of total elbow arthroplasty (TEA) for post-traumatic arthritis (PTA) has been increasing. This patient population is often younger and has higher demand than TEA performed for inflammatory arthritis or osteoarthritis. Additionally, many patients have undergone prior surgery which complicates the primary TEA. While younger age has been treated as a relative contraindication for TEA due to concerns of implant longevity, there is a subset of patients with poor function whose only reliable option for pain relief and restoration of function is TEA. Previous studies on the survival of TEA for young patients performed for PTA are limited. The purpose of this study is to report the results of TEA performed for PTA in patients ≤ 45 years old.

Materials and Methods

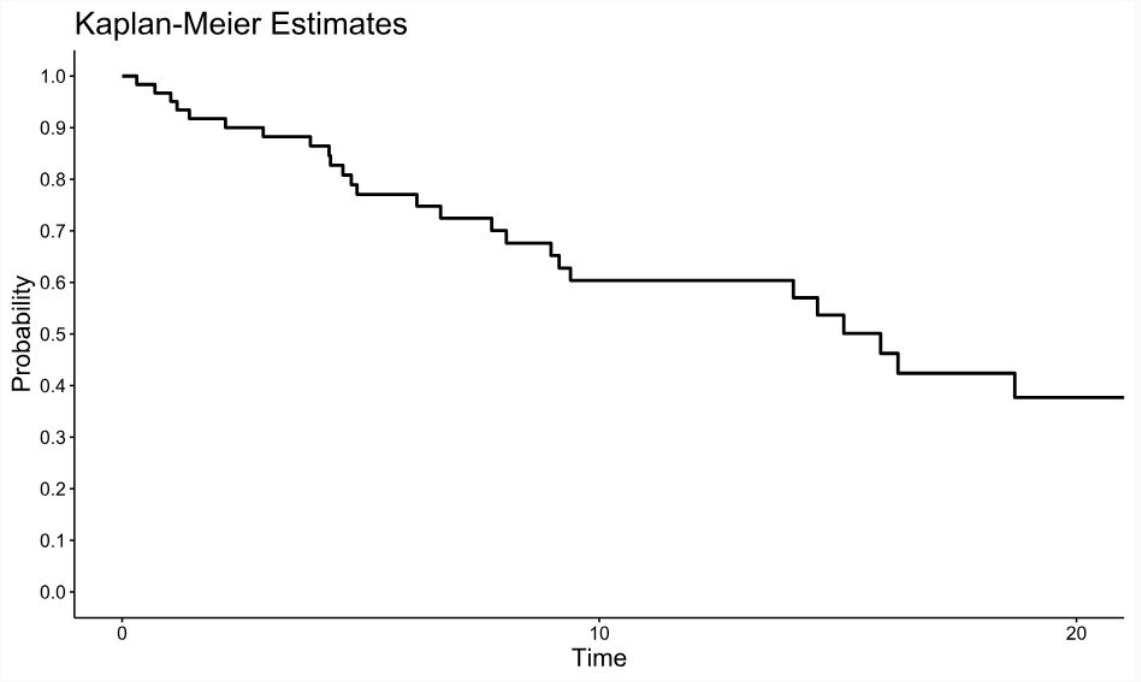
This retrospective review utilized our institution's Total Joint Registry to identify patients ≤ 45 years undergoing TEA for PTA between 1973 and 2020. 65 elbows met inclusion criteria. The mean follow-up was 14 years (range: 0-45). The cohort had a mean age of 38 years at index TEA (range: 21-45) and 33 (51%) were female. Twenty-one patients (23%) had a history of open fracture at initial injury, 15% of patients had a history of prior infection, and the mean number of previous surgeries was 3 (range 0-20). The Coonrad-Morrey TEA was utilized in 34 elbows (52%), Latitude TEA in 26 elbows (40%) and other TEA in 5 (8%) elbows. The observed surgical approaches included triceps off in 36 cases (55%), triceps on without tenotomy in 21 elbows (32%), and triceps on with tenotomy in 8 cases (12%). Kaplan-Meier survival analyses were performed to determine the overall implant survival following primary TEA.

Results

Revision TEA occurred in 28 elbows (43%). The most common indication for revision was aseptic loosening (14 elbows) and polyethylene wear (9 elbows). Survivorship free of revision was 77%, 60%, and 54% at 5, 10, and 15 years, respectively. Survivorship free of reoperation was 57%, 43%, and 31%, at the same time intervals. Patients requiring multiple revisions had a trend towards decreasing time between revision surgery with mean time to first revision of 9 years, 2nd revision 6 years, 3rd revision 5 years and 4th revision 1 year. Humeral component survivorship free of revision was 93%, 83%, and 77% at 5, 10, and 15 years. Ulnar component survivorship was 84%, 81% and 76% at 5, 10, and 15 years. Survivorship free of polyethylene/bushing exchange was 93%, 78%, and 64% at the same time intervals. The Latitude TEA had higher survivorship (76%, 64%, 55%) at 5, 10, and 15 years compared to the Coonrad-Morrey implant (60%, 40%, 40%). Survivorship free of revision at 10 years was 83% for triceps on with tenotomy, 75% for triceps on without tenotomy, and 47% for triceps off approaches. At 10 years, survivorship free of triceps failure was higher for triceps on with tenotomy compared to triceps on without tenotomy (83%) and triceps off approaches (78%). The mean Mayo Elbow Performance Score was 60 points with a mean VAS of 3. The mean Summary Outcome Determination score was 7/10 with 81% of patients rating their elbow between improved and normal.

Discussion

Total elbow arthroplasty for the young post-traumatic arthritic elbow is associated with high rates of revision and reoperation. However, patients have improvement in pain and function and have high satisfaction scores. Patients and surgeons need to be aware of the risk of revision surgery and have routine radiographic follow-up.



Years	Survivorship Free of Revision
5	77%
10	60%
15	54%
20	38%

Figure and table- KM survival analyses for overall implant survival following primary TEA surgery up to revision, or date of the latest follow-up. BlueSky (version 10.3.1-pro, BlueSky, Chicago, Illinois).