Predictors for Infection Following Total Elbow Arthroplasties

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INTRODUCTION:

Total elbow arthroplasties (TEA) are uncommonly performed procedures, with a narrow scope of indications and the prostheses' limited functional tolerance following implantation reasons for its limited applicability. Infection following TEA can be extremely debilitating, further limiting one's functional capabilities. This study employed a database to gather a large number of TEA recipients to investigate various risk factors that may predispose one to infection following their procedure. We hypothesize that diseases that attenuate the immune system will have a role in infection risk following TEA.

METHODS:

A private, all-payer database was queried to collect all primary TEA recipients (n=8,430) from 2010 to 2022. Patients were collected utilizing Current Procedural Terminology and International Classification of Diseases, Ninth and Tenth editions codes. The number of patients experiencing infection within two years following their TEA were then collected (n=851). Age and various risk factors of TEA recipients sustaining an infection, including male gender, alcohol use, pulmonary disease, diabetes, hypertension, congestive heart failure, hypothyroidism, obesity, liver disease, and rheumatoid arthritis, were collected and compared to TEA recipients not experiencing an infection. Multivariate regression was then performed to quantify the degree of risk each specific comorbidity portended for infection.

RESULTS:

With ages 50-54 as the reference group, there was no additional risk for infection as patients aged, with ages 75 and older (age 75-79 odds ratio [OR]: 0.63; 95% confidence interval [CI]: 0.45-0.88; age 80+ OR: 0.42, 95% CI: 0.26-0.69) appearing protective against infection. Certain comorbidities, namely rheumatoid arthritis (OR: 1.97; 95% CI: 1.68-2.31), hypertension (OR: 1.66, 95% CI: 1.28-2.17), and alcohol use (OR: 1.52, 95% CI: 1.21-1.90) were found to portend the greatest significance in risk for infection. Diabetes (OR: 0.99, 95% CI: 0.75-1.31), hypothyroidism (OR: 1.07, 95% CI: 0.92-1.26), obesity (OR: 1.03, 95% CI: 0.88-1.20) and liver disease (OR: 0.98, 95% CI: 0.82-1.17) do not appear to be risk factors for infection.

DISCUSSION AND CONCLUSION:

Rheumatoid arthritis appears to be the largest risk factor for infection following total elbow arthroplasty. Several other factors, including, hypertension, alcohol use, tobacco use, male gender, and pulmonary disease increased the risk for infection following total elbow arthroplasty. Notably, age, obesity, diabetes, hypothyroidism, and liver disease did not appear to increase the risk for infection following total elbow arthroplasty.

Table 1. Multivariate Analysis of Risk Factors for Infection Following Total Elbow Arthroplasty

Variable	Odds Ratio	95% Confidence Interval
*Age**		
55-59	0.98	0.71 – 1.37
60-64	0.95	0.69 – 1.30
65-69	0.88	0.65 – 1.21
70-74	0.82	0.61 – 1.11
75-79	0.63	0.45 – 0.88
80+	0.42	0.26 – 0.69
Male Gender	1.45	1.22 – 1.72
Comorbidities		
Alcohol Use	1.52	1.21 – 1.90
Tobacco Use	1.46	1.26 – 1.70
Pulmonary Disease	1.37	1.17 – 1.60
Congestive Heart Failure	1.21	0.99 – 1.47
Diabetes	0.99	0.75 – 1.31
Hypertension	1.66	1.28 – 2.17
Hypothyroidism	1.07	0.92 – 1.26
Obesity	1.03	0.88 – 1.20
Liver Disease	0.98	0.82 – 1.17
Rheumatoid Arthritis	1.97	1.68 – 2.31

*Reference age: 50-54