Comparison of treatment outcomes following total knee arthroplasty among patients with rheumatoid arthritis and osteoarthritis: a nationwide population-based study

Sir, Total knee arthroplasty (TKA) is one of the most commonly performed surgeries for treating end-stage OA and RA to alleviate pain and recondition knee function [1]. There have long been concerns about post-operative treatment outcomes for OA and RA patients. However, most studies have focused on the long-term survival rate [2, 3] or standardized mortality ratios [4, 5] following TKA on patients with OA and/or RA. Very few studies have attempted to compare the short-term treatment outcomes following TKA for OA and RA patients. The aim of this study is to compare the risk of treatment outcomes (90-day re-admission and 90-day mortality) between OA and RA patients, using a 3-year nationwide population-based database in Taiwan.

This study used the National Health Insurance Research Database. In Taiwan, 29266 patients who underwent primary TKA from 2002 to 2004 were identified based on procedure code 81.54 (total knee replacement). We excluded patients under 18 years of age in order to limit the study sample to the adult population. We also excluded patients who had diagnoses of metastatic or bone cancer, fracture or infection at admission. A total of 29198 patients, including 768 suffering from RA and 28430 from OA, were left. Since patients with RA were more likely to be female and younger than patients with OA, we then randomly extracted 3840 patients with OA (five for every patient with RA) matched with the RA patients in terms of age (<60, 60–69 and >69 years) and gender. Ultimately, our study cohort included 4608 patients who underwent TKA.

The primary study outcomes were binary variables, including ‘90-day mortality’ and ‘90-day re-admission’. The ‘90-day re-admission’ was defined as patients re-hospitalized for local infection (including post-operative infection, infected post-operative seroma, infection and inflammation due to internal prosthetic device, implant and graft, acute osteomyelitis, chronic osteomyelitis and other cellulitis and abscess), cerebrovascular accident, thrombo-embolic events (including pulmonary embolism, fat embolism and deep venous thrombosis), cardiovascular/coronary heart disease (including myocardial infarction, angina, cardiac arrhythmias and congestive heart failure) and pneumonia within 90 days of the index TKA. Conditional logistic regression analyses which were conditioned on patient’s age and gender were performed.

Table 1 shows that patients with RA have a higher rate of 90-day re-admission than patients with OA (14.2 vs 11.3%). After adjusting for the patient’s age, gender, Charlson Comorbidity Index, surgical procedure (unilateral vs bilateral), hospital accreditation level, teaching status and geographical location and surgeon’s age, conditional logistic regression revealed that the odds ratio (OR) of 90-day re-admission was 1.37 (95% CI 1.09, 1.74; P = 0.002) for patients with RA, compared with those with OA. No significant difference in 90-day mortality between patients with RA and OA was observed.

We further analysed the causes and ORs for 90-day re-admission between the two groups of patients. Most re-hospitalizations within 90 days of the index TKA were due to local infection and pneumonia. After adjusting for other factors, patients with RA were more likely to be re-hospitalized within 90 days of the index TKA due to local infection (OR = 1.59; 95% CI 1.05, 2.39) and pneumonia (OR = 2.39; 95% CI 1.63, 3.48) compared with patients with OA.

To our knowledge, this is the first population-based study to explore the risks for short-term re-admission and mortality among RA and OA patients receiving primary TKA in a Chinese population. Our results indicate that there was no significant difference in 90-day mortality between RA and OA patients. Nevertheless, the 90-day re-admission rate after TKA was significantly higher among the patients with RA compared with those with OA.

We found infection was the predominant cause of 90-day re-admission following TKA. In addition, we also found that increased risks for re-admission, due to both pneumonia and local wound infection, were significantly higher among RA patients compared with those with OA. The mechanisms contributing to infection following TKA are multi-factorial, including biological (immunological, nutritional, etc.) and procedural factors [6]. Relatively compromised immune status that puts them at risk of infection has been recognized in RA patients [7]. In addition, some medications used for RA patients could alter immunological responses and wound healing processes, which further increase the risk for systemic and local infection [8, 9].

Our study has several limitations. First, some confounding variables such as obesity, social support and patients’ motivation and emotional status, which can potentially affect surgical outcomes, could not be assessed in our study. Secondly, we did not analyse medication use that could be associated with potential side effects. For example, NSAID use can lead to gastrointestinal bleeding and immunosuppressants can be associated with developing infection.

In summary, the risk of 90-day re-admission after TKA is significantly higher among patients with RA compared with those with OA. In particular, increased risks of re-admission for pneumonia and local infection were
noted among RA patients. We suggest that careful patient selection and post-operative care for TKA is necessary, particularly with RA patients.

**Rheumatology key message**

- The patients with RA receiving TKA were at increased risk of re-admission within 90 days, compared with OA patients.

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**References**


