The Impact of Neuropathic Pain on Sex-stratified Outcomes Following Primary Total Knee Arthroplasty

Caroline Cristofaro[1], Raja Rampersaud, Anthony V Perruccio, Anuj Bhatia, Michael G Zywiel
[1]Division of Orthopaedic Surgery

INTRODUCTION:
One in five patients continue to experience pain and/or poor function following total knee arthroplasty (TKA) for osteoarthritis (OA). It has been suggested that preoperative neuropathic pain (NP) may negatively impact patient reported outcome measures (PROMs) and walking ability following TKA and may differ substantially by sex.
METHODS: This was a prospective cohort study analyzing data from patients who underwent primary unilateral TKA for OA at a single academic institution from November 1, 2013 to March 12, 2018. Patients were screened preoperatively for NP using the patient-completed PainDETECT questionnaire (PDQ). Patients with 'unlikely', 'unclear', and 'likely' NP were compared on 12 month Knee Injury and Osteoarthritis Outcome Score (KOOS) (overall and by specific domain) and Timed Up and Go (TUG) time scores. Linear regression modeling was undertaken adjusting for a number of covariates in male and female-only cohorts.
RESULTS: A total of 785 patients were included, with 341 (43.4%) males and 444 (56.6%) females. The mean age in males was 66.5±8.8 years and 65.9±9.4 years in females. When compared to males, a greater proportion of females were deemed to have 'likely' NP (16.7% vs 10.0%), were not in a current domestic partnership, lived alone, had lower annual income, and never smoked ($p<0.05$). Females had a higher number of possibly NP-related comorbidities, non-NP related comorbidities, and had higher (poorer) catastrophizing, anxiety and depression scores preoperatively ($p<0.01$). Females also had lower (i.e. poorer) KOOS sports and recreation function domain scores and higher (i.e. poorer) TUG times prior to TKA ($p<0.01$) than males. Likely' NP was associated with poorer KOOS total score and quality of life in males (-6.07, 95%CI -11.62, -0.52; -8.25, 95%CI -15.14, -1.35), not in females. 'Likely' NP was associated with poorer KOOS symptoms and activities of daily living domain scores only in females (-4.03, 95%CI -7.88, -0.19; -4.48, 95%CI -8.41, -0.56), not males in the sex-stratified analyses. Pain domain scores were 8.40 units and 5.96 units worse in males and females, respectively, for 'likely' vs 'unlikely' NP. was not associated with KOOS sport and recreation function domain score or with TUG time at 12 months in either males or females.
DISCUSSION AND CONCLUSION: Preoperative NP is associated with poorer PROMs, with the magnitude differing by sex, but not with TUG time at 12 months following TKA. Preoperative NP screening with PDQ could inform preoperative identification and treatment of NP, assist in setting sex-specific patient expectations prior to TKA, and possibly improve outcomes following TKA. These results should also prompt future research into sex-specific therapies and treatment protocols for NP that may be introduced preoperatively and assess their impact on postoperative outcomes in patients who undergo TKA for OA.