satisfaction which reached AUC=0.743 [95% CI 0.691 - 0.795] when added to age, sex, BMI, WOMAC score and poor sleep quality (see Figure 1).

Conclusions: Our data confirm the strong difference in patient related outcomes for THR and TKR and highlight the importance of understanding the factors that contribute to neuropathic pain like symptoms and to pain in general post TKR.

16 LIFETIME RISK OF TOTAL HIP AND KNEE REPLACEMENT AND TEMPORAL TRENDS IN INCIDENCE BY HEALTH CARE SETTING, SOCIOECONOMIC STATUS AND GEOGRAPHIC LOCATION

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Purpose: Estimation of the lifetime risk of joint replacement surgery is an emerging field in musculoskeletal epidemiology. While global burden of disease data are valuable for understanding disease incidence and prevalence and the relative impact of a disease on patients’ lives(1), lifetime risk provides an alternative method of quantifying population disease burden and associated healthcare utilisation.(2) Gaining insight into population-wide fluctuations, which may be independent of disease burden, can be useful for budget priority setting and assessing the impact of policy changes on healthcare utilisation. These data may also support advocacy activities for policy and funding changes. Our primary aim was to investigate lifetime risk of total hip (THR) and total knee (TKR) replacement surgery. As changes in the lifetime risk of joint replacement over time could be mediated by environmental, health system or patient and clinician-level factors, we also sought to describe temporal trends in incidence by relevant factors which may impact utilisation of these procedures.

Methods: We analysed a population-based cohort of patients who received a primary THR or TKR in Victoria, Australia from 1999 to 2008. Hospital separations and life tables were used to estimate lifetime risk. Temporal changes in THR and TKR incidence were examined according to healthcare setting (public versus private), socio-economic status (SES) and geographic location (regional versus metropolitan).

Results: We identified 45,775 patients receiving a primary THR and 43,570 receiving a primary TKR over the time period. The lifetime risk by year for each procedure for a person aged 40-49 years is reported in Figure 1. There was a greater increase in the lifetime risk of TKR when compared to THR, particularly for females. We also identified an increasing number of both procedures in private hospitals (increase in THR of 0.14 per 1000 and TKR of 0.60 per 1000 over the time period), for people in middle socio-economic groups (increase in THR of 0.11 per 1000 and TKR of 0.07 per 1000), low socio-economic groups (increase in THR of 0.19 per 1000 and TKR of 0.10 per 1000) and in rural areas (increase in THR of 0.24 per 1000 and TKR of 0.70 per 1000)(Figure 2). The proportion of rural patients treated in private hospitals tended to be significantly less than patients in metropolitan settings (52.3% v 68.6% for THR and 51.3% v 65.7% for TKR, p<0.01 for both). With the exception of the increase in THRs in the middle socio-economic group, increases were more pronounced for TKRs over the time period.

Conclusions: The larger increase in lifetime risk of TKR over the study period could be partly attributed to the ageing population, with more people aged over 80 receiving TKRs, increased rates of sporting injuries(3) and rising rates of obesity (all risk factors for knee OA incidence (4,5,6,7)). As the number of TKRs increased most in private hospitals, it may also relate to insurance incentives introduced at the beginning of the study period. Increases in the number of joint replacement procedures performed for patients in regional areas suggest some reductions over time in known disparities. The larger increase in incidence for patients in regional areas could relate to greater previously unmet need, a higher burden of OA in rural areas related to higher rates of obesity and manual occupations and the increased provision of orthopaedic services in rural areas over the past decade. The lifetime risk of THR performed on women was found to be similar to males, despite a higher burden of hip OA. This difference may indicate under-utilisation of surgery by females. Similarly, low SES was associated with an overall lower incidence of THR and TKR during the study period. In Australia, people with low SES generally have reduced access to the private hospitals. This study utilized data from England and Canada which have reported reduced utilisation of TKR by lower SES groups.(8-10) These disparities warrant further investigation.

References

Figure 1. Lifetime risk of THR and TKR for a person aged 40–49 years stratified by gender.

Figure 2. Incidence of TKR and THR per 1000 according to healthcare setting (2a), socio-economic status (2b) and geographic location (2c) from 1999/2000 to 2007/08.

17 DO WOMEN HAVE POORER OUTCOMES FOLLOWING TOTAL KNEE REPLACEMENT FOR OSTEOARTHRITIS?


Purpose: Some prior research findings have suggested that females have poorer outcomes following total knee replacement (TKR) than males. Studies also have suggested that females with the same clinical profile as males are less likely to be offered hip or knee replacement. Moreover, some studies report that females have worse pain and functional status compared to males at the time of TKR. Given that pre-surgery status remains the strongest predictor of outcome following TKR, this study examined whether females were at risk of poorer pain and functional outcomes at 6 and 12 months following TKR independent of pre-surgery status.

Methods: This study utilized data from an existing cohort of 494 people who underwent primary TKR for osteoarthritis. The primary outcomes of interest were the Pain and Function/Daily Activity subscales of the Knee Injury and Osteoarthritis Outcome Score (KOOS) (lower scores indicate worse status) at 6 and 12 months post-surgery. In addition, the patient-completed survey captured age, sex, body mass index (BMI), education level, presence of low back pain (LBP), depression, number of comorbidities, and symptomatic joint count. Descriptive statistics were calculated by sex for the personal and health status characteristics and the KOOS. A sequential series of regression analyses were conducted for each of the pain and function
outcomes using the following independent variables: 1) sex; 2) sex and age; 3) sex, age and pre-surgery score of the outcome; and, 4) the latter model plus BMI, education level, low back pain (LBP), depression, number of comorbidities, and symptomatic joint count. P values of < 0.05 were considered significant. As change between 6 and 12 months surgery is known to be much less relative to baseline to 6 months, we conducted analyses at 12 months as a validation of the 6 month results.

Results: The sample included 323 females and 171 males. Females had worse pain and function scores at baseline compared to males: (pain: 39.3 ± 16.5 in females versus 44.9 ± 16.4 in males, p = 0.002; function: 47.7 ± 18.6 in females versus 55.0 ± 17.5 in males, p = 0.0001). As well, females had worse pain and function at follow-up (72.2 ± 18.4 vs. 76.1 ± 17.7, p = 0.03; 75.2 ± 17.5 vs. 80.5 ± 17.1, p = 0.003, respectively). Females also had worse pre-surgery depression scores (5.6 ± 3.6 vs. 4.7 ± 3.2, p = 0.006), higher rates of obesity (BMI ≥ 30: 54.2 vs. 36.3%, p = 0.0002), and higher symptomatic joint count (≥4: 61.3 vs. 44.4%, p = 0.0004).

Initially, regression findings suggested that females had worse outcomes for pain (p = 0.04) and function (p = 0.007) compared to males. However, this effect was lost once baseline pain/function status were also considered. In the final model, worse outcomes were predicted by pre-surgery pain/function status, as well as depression, LBP and comorbidity count. The results at 12 months were consistent with those at 6 months.

Conclusions: Women appear to have worse outcomes following TKR in part as a function of their greater pain and more limited function pre-surgery. However, depression and comorbidity, for which women have worse status pre-surgery, further contribute to worse outcomes. These finding suggest that women potentially could achieve comparable outcomes to men if surgery were performed before their symptoms and disability became so severe. This could, in addition, limit the effect of mood or, alternately, interventions to address mood could positively influence outcomes.

18 IDENTIFICATION OF SEROLOGICAL PROFILES ASSOCIATED WITH TOTAL JOINT REPLACEMENT IN OSTEOARTHRITIS PATIENTS

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Purpose: To identify patients who will progress to requiring total joint replacement (TJR) amongst a population with moderate-to severe-osteoarthritis (OA) by measuring tissue specific biomarkers in serum thus establishing a panel of prognostic biomarkers that may provide molecular insight into the mechanism and pathology of the progression of OA. 2. Investigate the effect of NSAIDs on the predictive and diagnostic serum profile.

Methods: OA patients were randomly selected from clinical trials involving one of the anti-NGF therapeutic antibody tanezumab. Serum samples from 240 patients who underwent a TJR (cases) and from 440 control OA patients who did not undergo TJR were used. Control group consisted of ~2 patients per case matched on: age (<65 or ≥ 65 years), Kellgren-Lawrence (K-L) grade, gender, BMI category (<30 or ≥ 30 kg/m²), OA severity (severe if both WOMAC Pain and Physical function subscale scores were >7 and the Patient Global Assessment score was >4 (i.e. Poor or Very Poor), otherwise baseline OA severity was classified as not severe). On the average, the OA population was 62 years old, 80% K-L grade ≥ 3, females (68%), BMI ~ 31 kg/m², WOMAC pain score of 7. Serum samples were analyzed for bone (Total Osteocalcin, CTX-I, DKK1, SOST), cartilage (C2M, COMP, PiANP), connective tissue (PINP, ICTP, C1M), synovial tissue (C3M), protease burden (MMP-9) as well as inflammation markers (IL6, hsCRP, VEGF). Classification and Regression Tree analysis was used to identify biomarker phenotypes.

Results: For NSAID and non-NSAID users separately, biomarker phenotypes were identified at baseline for patients predisposed for TJR. At baseline, the biomarker combination for patients who used NSAIDs before start of tanezumab clinical trials identified 96% of patients who underwent a TJR and 61% of the patients who did not undergo a TJR. Identification of these biomarker phenotypes lowers the odds of a TJR by 14-fold as compared to not having knowledge of the biomarkers. For patients who did not use NSAIDS, 83% of patients who had a TJR and 63% of the patients who did not undergo a TJR, were identified which lowers the odds of a TJR by 3.6-fold. For patients who used NSAIDS continuously, 84% of patients who had a TJR and 77% of the patients who did not have a TJR, were identified which lowers the odds of a TJR by 4.7-fold.

Conclusions: Serological biomarker profiles for predicting TJR were identified irrespective of NSAID use and may assist in identifying those patients whom will undergo a TJR. The profiles also suggest that NSAID use increases the importance of the role of bone metabolism in TJR pathology. The results need validation on other cohorts, and may finally provide value to patients and payers in selecting the most optimal treatment strategy for moderate-to-severe OA patients.

19 MALES ARE AT INCREASED RISK FOR SURGICAL COMPLICATIONS FOLLOWING TOTAL JOINT ARTHROPLASTY

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Purpose: The burden of osteoarthritis of the hip and knee is higher in females than in males. Despite this, there remains a gender disparity in the recommendation and uptake of total joint arthroplasty (TJA), with males being more likely to be offered surgery. This may result from a perception that females have a higher rate of complications, including: acute myocardial infarction (AMI), venous thrombo-embolism (VTE), infection, dislocation, early revision, and death. To date, few studies have examined if differences by sex persist in the rates of complications following TJA of the hip (THA) or knee (TKA).

Methods: We defined a cohort of patients who received their first primary elective THA or TKA between 2002-2009 utilizing administrative databases from Ontario, Canada. We excluded those who received a primary or revision arthroplasty of the hip or knee prior to April 1, 2002, those whose first procedure was non-elective (e.g. for cancer, fracture, or injury), or those with a history of hip dysplasia. We compared baseline characteristics and rates of complications following the index TJA for male and female recipients. Cox proportional hazards were used to determine the relationship between sex and the occurrence of specific complications (within 90d: VTE, AMI, mortality; within 2y: dislocation, infection, and revision), defined using validated algorithms, controlling for potential confounders (including income quintile, rurality, and provider volume) and for clustering by surgeons.

Results: Between April 1, 2002 and March 31, 2009, there were 97,445 patients who received their first TJA (males: 41,023 - 42%; females: 56,422 - 58%). Compared with female TJA recipients, males were more likely to have received a THA (43% versus 36%, p <0.001), more likely to come from a rural area (20% versus 15%, p <0.001), and had greater comorbidity (Charlson score of 2+, 5.5% vs. 3.8%, p <0.001). Controlling for these differences, and other potential confounders, male THA recipients were more likely to experience an infection (adjusted HR 1.41, 95%CI 1.24-1.61, p <0.0001), early revision (adjusted HR 1.24, 95%CI 1.10-1.40, p =0.0006), or death (adjusted HR 1.26, 95%CI 1.03-1.55, p <0.03). They were similarly likely to experience all other complications: dislocation (adjusted HR 0.94, 95%CI 0.79-1.12, p =0.48); AMI (adjusted HR 1.05, 95% CI 0.93-1.19, p =0.41); and VTE (adjusted HR 0.99, 95%CI 0.88-1.12, p =0.95).

Conclusions: In a population cohort undergoing their first primary TJA, male recipients were at increased risk for early revision, infection and death relative to female recipients.

20 BMP2 REQUIRES TGF-BETA TO INDUCE OSTEOPHYTES DURING EXPERIMENTAL OA


Purpose: Osteophyte formation is one of the hallmarks of osteoarthritis (OA). We have shown that either overexpression of TGF-beta or BMP2 can induce osteophytes in murine knee joints. However, comparing osteophytes induced by experimental OA, TGF-beta or BMP2 showed us that TGF-beta-induced osteophytes rather than BMP2-induced osteophytes more closely resemble those observed in experimental OA. TGF-beta-induced osteophytes develop mainly from