# Appendix

## *PJI Definition*

Musculoskeletal Infection Society criteria were used to define PJI, which was diagnosed when either of the following main criteria was met: (1) presence of a sinus tract or (2) 2 positive cultures of the same organism, or when 3 of 5 minor criteria were met: (1) elevated serum erythrocyte sedimentation rate (ESR) and serum C-reactive protein (CRP) concentration, (2) elevated synovial leukocyte count, (3) elevated synovial neutrophil percentage, (4) a single positive culture, and/or (5) histologic evidence of >5 neutrophils per high-power field in 5 high-power fields.

## *Assessing Preoperative PJI Risk*

A previously developed and validated PJI calculator[20] was used to assign a numerical risk score to each individual based on the relative weight of 17 risk factors including surgical factors, demographics, and comorbidities. The risk factors included in the study were joint, sex, government insurance, BMI, prior surgical procedures, drug abuse, HIV/AIDS, coagulopathy, renal disease, psychosis, congestive heart failure, rheumatologic disease, deficiency anemia, diabetes mellitus, liver disease, and smoking status.

## *Propensity Score Matching*

Because patients were not randomized to dose groups, propensity score matching was conducted to minimize any significant treatment selection bias between the groups. Two separate propensity score analyses were performed. First, propensity scores were generated predicting dose group from the following covariates: antibiotic type, anesthesia type, whether or not antibiotic cement was used, whether or not VTE prophylaxis was given, age, preoperative risk score, and surgical duration. Second, an additional analysis was performed without the preoperative risk score to generate propensity scores for predicting dose group on the basis of antibiotic type, antibiotic cement, whether or not VTE prophylaxis was used, age, BMI, smoking, government insurance, CCI, surgical duration, anesthesia type, and joint involvement. Participants in the 2 groups were matched in a 1:1 ratio without replacement using an exact match for joint and a nearest-neighbor matching technique for all other covariates. A standard caliper of 0.20 was used to specify the maximum distance that 2 matched pairs could be from each other in terms of the standard deviation of the logit of the propensity score. The propensity score matching was conducted using an extension program for SPSS (version 3.0.4) based on R (http://arxiv.org/ftp/arxiv/papers/1201/1201.6385.pdf). The standard differences before and after propensity score matching without and with the PJI risk score are depicted below.

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PERIOPERATIVE ANTIBIOTIC PROPHYLAXIS IN TOTAL JOINT ARTHROPLASTY. A SINGLE DOSE IS AS EFFECTIVE AS MULTIPLE DOSES
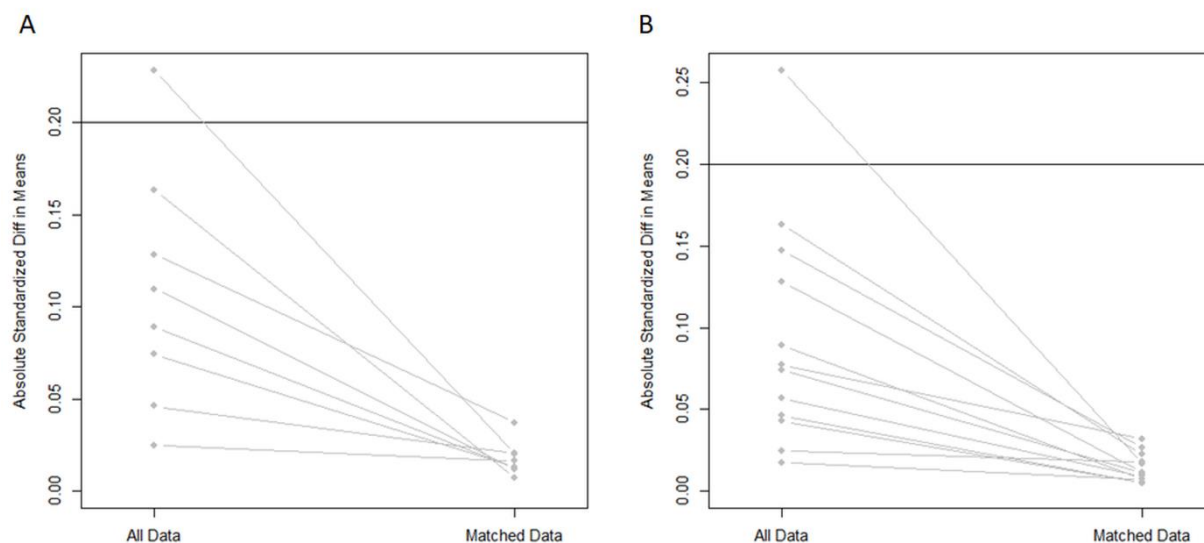http://dx.doi.org/10.2106/JBJS.18.00336
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Fig. E-1
Absolute standard difference in means before and after matching for propensity scores with (**Fig. E-1A**) and without (**Fig. E-1B**) the use of the preoperative PJI risk score.
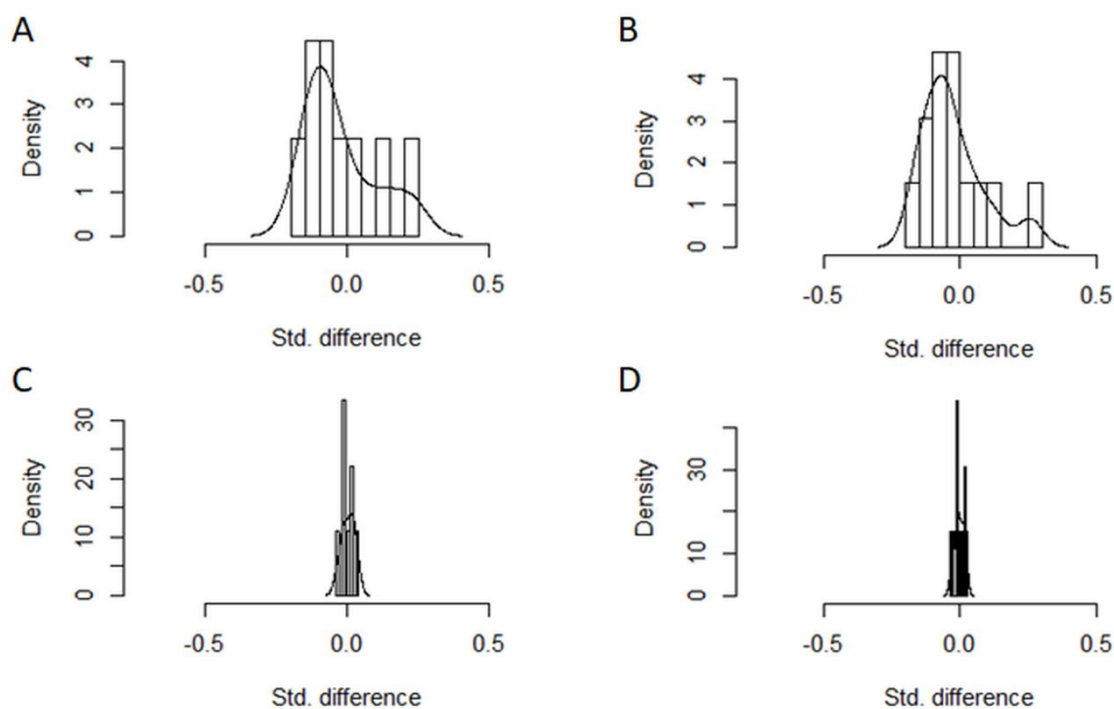
Fig. E-2

**Figs. E-2A and E-2B** Density plots of standardized differences before matching with (**Fig. E-2A**) and without (**Fig. E-2B**) the preoperative PJI risk score. **Figs. E-2C and E-2D** Density plots after matching with (**Fig. E-2C**) and without (**Fig. E-2D**) the PJI risk score.

TABLE E-1 Prevalence of Comorbidities by Dose Group and PJI Rate by Comorbidity and Dose

| | Prevalence | | | PJI Rate | | |
|---|---|---|---|---|---|---|
| | Single Dose (%) | Multiple Doses (%) | P Value | Single Dose (%) | Multiple Doses (%) | P Value |
| Diabetes | 10.2 | 13.5 | <0.0001 | 0.87 | 1.5 | 0.318 |
| Smoking | 7.5 | 7.9 | 0.377 | 0.88 | 1.3 | 0.510 |
| Obesity | 43.8 | 47.3 | <0.0001 | 0.91 | 0.99 | 0.728 |
| Rheumatoid arthritis | 2.7 | 3.1 | 0.128 | 3.3 | 1.4 | 0.164 |
| Psychosis | 0.38 | 0.75 | 0.008 | 0.00 | 2.5 | 0.982 |
| Liver disease | 0.95 | 0.97 | 0.928 | 0.00 | 6.4 | 0.209 |
| Renal disease | 1.1 | 1.9 | 0.0002 | 0.00 | 3.2 | 0.391 |
| HIV/AIDS | 0.07 | 0.11 | 0.461 | 0.00 | 0.00 | 0.440 |

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TABLE E-2 Standardized Difference in Each Variable Before and After Matching (Propensity Score without PJI Risk Score)*

| | Without Matching | | | With Matching | | |
|---|---|---|---|---|---|---|
| | Single Dose (N = 4,186) | Multiple Doses (N = 16,060) | Standardized Difference | Single Dose (N = 4,186) | Multiple Doses (N = 4,186) | Standardized Difference |
| Male sex† | 1,983 (47.4) | 7,165 (44.6) | 0.055 | 1,983 (47.4) | 1,985 (47.4) | 0.001 |
| Joint (knee)† | 1,607 (38.4) | 7,607 (47.4) | 0.182 | 1,607 (38.4) | 1,607 (38.4) | <0.001 |
| Antibiotic type† | | | 0.121 | | | 0.019 |
| Vancomycin | 594 (14.2) | 2,997 (18.7) | | 594 (14.2) | 622 (14.9) | |
| Cefazolin | 3,592 (85.8) | 13,063 (81.3) | | 3,592 (85.8) | 3,564 (85.1) | |
| Antibiotic-impregnated cement† | | | 0.156 | | | 0.020 |
| No | 3,039 (72.6) | 10,503 (65.4) | | 3,039 (72.6) | 3,077 (73.5) | |
| Yes | 1,147 (27.4) | 5,557 (34.6) | | 1,147 (27.4) | 1,109 (26.5) | |
| VTE prophylaxis† | | | 0.023 | | | 0.015 |
| No | 2,093 (50.0) | 8,212 (51.1) | | 2,093 (50.0) | 2,124 (50.7) | |
| Yes | 2,093 (50.0) | 7,848 (48.9) | | 2,093 (50.0) | 2,062 (49.3) | |
| Government insurance† | 1,461 (34.9) | 6,201 (38.6) | 0.077 | 1,461 (34.9) | 1,498 (35.8) | 0.018 |
| Smoking history† | 313 (7.5) | 1,278 (8.0) | 0.018 | 313 (7.5) | 305 (7.3) | 0.007 |
| CCI >2† | 64 (1.5) | 469 (2.9) | 0.094 | 64 (1.5) | 71 (1.7) | 0.013 |
| Neuraxial block administered† | 3,965 (94.7) | 14,312 (89.1) | 0.207 | 3,965 (94.7) | 3,954 (94.5) | 0.012 |
| Age‡ *(yr)* | 62.49 ± 11.15 | 63.32 ± 11.18 | 0.074 | 62.49 ± 11.15 | 62.48 ± 11.24 | 0.001 |
| BMI‡ *(kg/m²)* | 29.74 ± 5.53 | 29.98 ± 5.61 | 0.043 | 29.74 ± 5.53 | 29.64 ± 5.43 | 0.02 |
| PJI risk score‡ | 42.36 ± 17.13 | 44.24 ± 18.21 | 0.106 | 42.36 ± 17.13 | 42.42 ± 17.02 | 0.004 |
| CCI‡ | 0.29 ± 0.70 | 0.40 ± 0.86 | 0.132 | 0.29 ± 0.70 | 0.30 ± 0.75 | 0.011 |
| Surgical duration‡ *(min)* | 73.71 ± 32.19 | 76.57 ± 30.10 | 0.092 | 73.71 ± 32.19 | 73.80 ± 28.58 | 0.003 |
| Length of stay‡ *(days)* | 2.37 ± 1.94 | 2.46 ± 1.41 | 0.052 | 2.37 ± 1.94 | 2.33 ± 1.37 | 0.022 |
| Propensity score | 0.22 ± 0.04 | 0.20 ± 0.05 | 0.319 | 0.22 ± 0.04 | 0.22 ± 0.04 | 0.014 |
| Average of all covariates & length of stay | | | 0.095 | | | 0.011 |
| Average of all covariates, length of stay, & propensity score | | | 0.111 | | | 0.012 |

*The average standardized difference score was 0.11 before matching and 0.012 after matching. After matching, all standardized differences for covariates that were used for the construction of the propensity score were ≤0.02. †The values are given as the number with the percentage in parentheses. ‡The values are given as the mean and standard deviation.

TABLE E-3 Standardized Difference in Each Variable Before and After Matching (Propensity Score with PJI Risk Calculator)*

| | Without Matching | | | With Matching | | |
|---|---|---|---|---|---|---|
| | Single Dose (N = 4,186) | Multiple Doses (N = 16,060) | Standardized Difference | Single Dose (N = 4,186) | Multiple Doses (N = 4,186) | Standardized Difference |
| Male sex† | 1,983 (47.4) | 7,165 (44.6) | 0.055 | 1,983 (47.4) | 1,919 (45.8) | 0.031 |
| Joint (knee)† | 1,607 (38.4) | 7,607 (47.4) | 0.182 | 1,607 (38.4) | 1,607 (38.4) | <0.001 |
| Antibiotic type† | | | 0.121 | | | 0.012 |
|   Vancomycin | 594 (14.2) | 2,997 (18.7) | | 594 (14.2) | 611 (14.6) | |
|   Cefazolin | 3,592 (85.8) | 13,063 (81.3) | | 3,592 (85.8) | 3,575 (85.4) | |
| Antibiotic-impregnated cement† | | | 0.156 | | | 0.007 |
|   No | 3,039 (72.6) | 10,503 (65.4) | | 3,039 (72.6) | 3,052 (72.9) | |
|   Yes | 1,147 (27.4) | 5,557 (34.6) | | 1,147 (27.4) | 1,134 (27.1) | |
| VTE prophylaxis† | | | 0.023 | | | 0.015 |
|   No | 2,093 (50.0) | 8,212 (51.1) | | 2,093 (50.0) | 2,125 (50.8) | |
|   Yes | 2,093 (50.0) | 7,848 (48.9) | | 2,093 (50.0) | 2,061 (49.2) | |
| Government insurance† | 1,461 (34.9) | 6,201 (38.6) | 0.077 | 1,461 (34.9) | 1,511 (36.1) | 0.025 |
| Smoking history† | 313 (7.5) | 1,278 (8.0) | 0.018 | 313 (7.5) | 345 (8.2) | 0.028 |
| CCI >2† | 64 (1.5) | 469 (2.9) | 0.094 | 64 (1.5) | 106 (2.5) | 0.071 |
| Neuraxial block administered† | 3,965 (94.7) | 14,312 (89.1) | 0.207 | 3,965 (94.7) | 3,953 (94.4) | 0.013 |
| Age‡ *(yr)* | 62.49 ± 11.15 | 63.32 ± 11.18 | 0.074 | 62.49 ± 11.15 | 62.44 ± 11.32 | 0.004 |
| BMI‡ *(kg/m²)* | 29.74 ± 5.53 | 29.98 ± 5.61 | 0.043 | 29.74 ± 5.53 | 29.81 ± 5.56 | 0.012 |
| PJI risk score‡ | 42.36 ± 17.13 | 44.24 ± 18.21 | 0.106 | 42.36 ± 17.13 | 42.28 ± 17.20 | 0.005 |
| CCI‡ | 0.29 ± 0.70 | 0.40 ± 0.86 | 0.132 | 0.29 ± 0.70 | 0.36 ± 0.83 | 0.094 |
| Surgical duration‡ *(min)* | 73.71 ± 32.19 | 76.57 ± 30.10 | 0.092 | 73.71 ± 32.19 | 74.38 ± 29.67 | 0.022 |
| Length of stay‡ *(days)* | 2.37 ± 1.94 | 2.46 ± 1.41 | 0.052 | 2.37 ± 1.94 | 2.35 ± 1.30 | 0.013 |
| Propensity score | 0.22 ± 0.04 | 0.20 ± 0.05 | 0.299 | 0.22 ± 0.04 | 0.22 ± 0.04 | 0.016 |
| Average of all covariates & length of stay | | | 0.113 | | | 0.010 |
| Average of all covariates, length of stay, & propensity score | | | 0.131 | | | 0.011 |

*The average standardized difference score was 0.13 before matching and 0.01 after matching. After matching, all standardized differences for covariates that were used for the construction of the propensity score were ≤0.022. †The values are given as the number with the percentage in parentheses. ‡The values are given as the mean and standard deviation.