**Appendix 1.** Sensitivity analysis of matched patients

In the final unmatched cohort of 4908 hips, there were three covariates with missing data: body mass index (BMI) (n = 1731); revision femoral head size (n = 111); and revision bearing surface (n = 320). For the final study analysis, we used multiple imputation methods to obtain a complete data set for all covariates before matching (detailed within the article). To ensure the results obtained from multiple imputation were similar to those obtained from the subgroup with complete data available, we performed a sensitivity analysis.

We first examined the effect of BMI on each of the study endpoints of interest for the 3177 hips in which BMI data were available. This was done using univariable regression analyses with the results summarized in Table 1.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Intraoperative complications | 5-year all-cause implant survival (95% CI) | 5-year all-cause patient survival  (95% CI) |
| Regression analysis (95% CI) assessing the effect of BMI on study endpoint | Crude odds ratio = 1.02 (0.97-1.06)  p = 0.490 | Crude hazard ratio = 1.02 (0.99-1.04)  p = 0.094 | Crude hazard ratio = 0.96 (0.91-1.01)  p = 0.084 |

In light of the large proportion of missing data for BMI (35%), and the findings that BMI had no significant effect on any of the three study endpoints of interest, we decided to subsequently perform a sensitivity analysis on a complete data set but which excluded BMI. The unmatched cohort with complete data available for all covariates (excluding BMI) consisted of 4588 hips. After propensity score matching, the cohort consisted of 2394 hips (1197 ARMD and 1197 non-ARMD). The study endpoints for this matched cohort with complete data available (excluding BMI) have been summarized in the subsequent table. The findings and effect sizes from this sensitivity analysis were similar to those obtained when using multiple imputation and propensity score matching in the main article (Table 2).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Cohort | Number of hips (%) | Intraoperative complications | 5-year all-cause implant survival (95% CI) | 5-year all-cause patient survival  (95% CI) |
| Matched complete data set  (excluding BMI) |  |  |  |  |
| Overall | 2394 | 2.5% (n = 59) | 92.1%  (90%-94%) | 95.6%  (93%-97%) |
| ARMD | 1197 | 2.5% (n = 30) | 94.6%  (92%-97%) | 96.4%  (91%-99%) |
| Non-ARMD | 1197 | 2.4% (n = 29) | 89.9%  (87%-92%) | 95.2%  (92%-97%) |
| Regression analysis (95% CI) |  | OR = 1.03  (0.62-1.72)  p = 0.896 | HR = 0.48  (0.32-0.71)  **p < 0.001** | HR = 0.61  (0.32-1.16)  p = 0.131 |

Statistically significant differences (p < 0.05) are highlighted in bold; odds and hazard ratios > 1 represent an increased risk of the specified endpoint in ARMD revisions; CI = confidence interval; ARMD = adverse reactions to metal debris; OR = odds ratio; HR = hazard ratio.