

# **Risk of Surgical Revision in Parkinson's Disease Patients Undergoing Total Hip Replacement: A Retrospective Registry Study**

Alberto Corrado Di Martino<sup>1</sup>, Francesco Schilardi, Claudio D'Agostino<sup>2</sup>, Piergiorgio Cataldi, Barbara Bordini<sup>3</sup>, Marco Viceconti, Francesco Traina<sup>2</sup>, Cesare Faldini<sup>2</sup>

<sup>1</sup>University of Bologna, <sup>2</sup>Istituto Ortopedico Rizzoli, <sup>3</sup>Istituti Ortopedici Rizzoli via

## **INTRODUCTION:**

Parkinson's disease (PD), is frequently identified as a risk factor that increases the probability of prosthetic implant failure and the need for revision surgery. The aims of this study are: 1) to assess the characteristics and relative differences between PD patients undergoing total hip arthroplasty (THA) surgery and a control group, 2) to evaluate the survival rates of THA implants in PD patients compared to controls, and determine the risk of implant failure, 3) to investigate how femoral head sizes  $\leq 28$  mm,  $=32$  mm,  $=36$  mm, and  $\geq 40$  mm, or Dual Mobility (DM) implants, impact on the survival rates of THA implants in the PD group.

## **METHODS:**

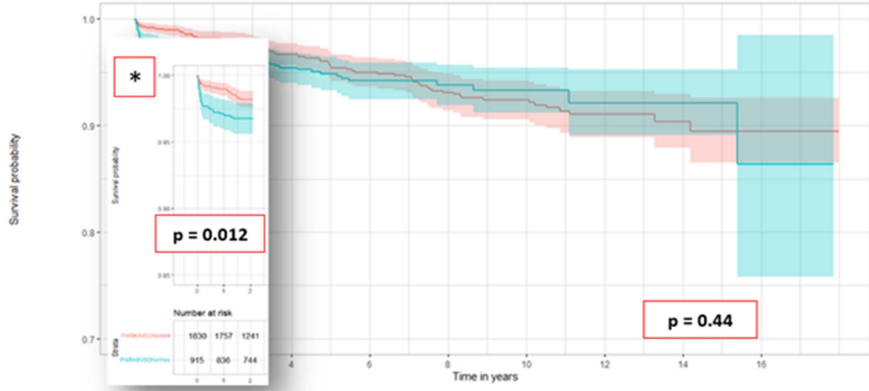
A retrospective analysis was conducted. The study combined the data from Emilia Romagna Registry of the Orthopaedic Prosthetic Implants (RIPO) with administrative databases to identify patients with PD who underwent THA. The RIPO registry was used to identify patients who underwent THA between 01/01/2003 and 31/12/2019 in the Emilia-Romagna Region. To determine the number of patients with PD, administrative databases were searched using a specific algorithm: to have the diagnosis of PD, it was required for the patient at least one hospitalization with a primary or secondary diagnosis of PD, identified by the ICD 9 codes 332.0, 332.1, 333.0, or 781, before THA surgery performance, as well as at least two drug prescriptions for PD, identified by the ATC N04\* code, in the year before hospitalization. Patients with PD who received a diagnosis or medication after THA surgery were excluded. To obtain a control group, we generated a match 1:2 with the PD cohort from the individuals subjected to THA enrolled in the RIPO registry, using the propensity score. The covariates used in the propensity score included age, gender, body mass index (BMI), diagnosis, implant type, fixation method, and follow-up duration.

## **RESULTS:**

A total of 2,745 THAs were examined, with 33.3% (915) performed in PD patients and 66.6% (1,830) in the control group. The use of DM versus standard implants showed a difference ( $p < 0.001$ ), with 84.7% (775) of standard implants and 15.3% (140) of DM in the PD group, and 98.3% (1799) of standard implants and 1.7% (31) of DM in the control group. Considering a follow up of 5.6 years for the PD group and 5.4 years for the control group (range 0-18 year), it was observed that 5.2% (48) of prosthetic implants failed in the PD group, while 4.4% (80) failed in the control group. The main causes leading to the failure of prosthetic implants were similar in the PD and control group. Specifically, periprosthetic fracture was responsible for 22.9% (11) of failures in the PD group and 48% (39) in the control group, aseptic stem mobilization accounted for 14.6% (7) and 12.5% (10) in the two groups, and prosthetic dislocation contributed to 18.8% (9) and 10.0% (8) of failures in the PD and control groups. During the first two years of follow up, there was a difference in prosthetic implant survival between the two groups ( $p = 0.012$ ), with PD group showing a 4.5 times higher risk of implant failure compared to the control group ( $HR = 4.5$ ,  $95\%CI$  2.7-7.5). The survivorship of prosthetic implants, with the endpoint being either dislocation or instability of prosthetic components, did not reveal any difference in the PD group among the different femoral head sizes and DMI ( $p = 0.42$ ). However, during a 15-year follow-up period, implants with  $\geq 40$ mm femoral head size and DM prosthetic implants demonstrated a 100% survival rate.

## **DISCUSSION AND CONCLUSION:**

PD influences the prognosis and perioperative outcomes of patients undergoing THA surgery. This paper highlights the increased risk of complications following THA in PD patients, including dislocation, instability, and other mechanical failures, in comparison to the overall population. Revision THA is more commonly required within the first two-years after surgery. The implementation of larger femoral head implants or the use of DM can potentially decrease the occurrence of dislocation episodes and the need for subsequent surgical revisions for instability.



Number at risk

Strata	0	2	4	6	8	10	12	14	16
PARKSONSCH=Not	1830	1241	771	675	545	422	218	101	40
PARKSONSCH=Yes	915	744	541	367	221	131	62	29	12

Time in years