

Long-term outcomes of total hip arthroplasty after periacetabular osteotomy

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INTRODUCTION: Periacetabular osteotomy (PAO) is performed to delay or prevent osteoarthritis progression in patients with acetabular dysplasia. Although total hip arthroplasty (THA) following PAO (THA post-PAO) is technically demanding due to altered acetabular morphology, long-term outcomes remain unclear. This study aimed to evaluate the long-term implant survivorship and functional outcomes of THA post-PAO compared to primary THA in patients with developmental dysplasia of the hip (DDH) and to assess the impact of superior cup placement on survivorship.

METHODS: This retrospective cohort study included 50 hips (46 patients) undergoing THA post-PAO between June 2000 and June 2014 with ≥10 years follow-up. A control group of 50 matched hips (48 patients) undergoing primary THA during the same period was created using propensity score matching based on age, sex, and Crowe type. Clinical outcomes were assessed using the Harris Hip Score (HHS), and complications were reviewed. Radiographic evaluations included cup position, presence of radiolucent lines (RLLs), and loosening. Subgroup analysis examined the effect of elevated acetabular cup placement (vertical distance ≥28 mm) on outcomes.

RESULTS:

The mean follow-up periods were 13.0 years (PAO group) and 13.6 years (control group). Preoperative HHS was comparable (56.3 vs. 57.5, P=NS), but the latest follow-up HHS was significantly lower in the PAO group (86.7 vs. 90.3, P=0.021). Complication rates and revision surgeries did not significantly differ between groups. The mean cup inclination and anteversion were similar; however, the PAO group exhibited significantly more superior and lateral cup positioning (vertical: 26.1 mm vs. 22.8 mm, P=0.020; horizontal: 36.7 mm vs. 31.8 mm, P<0.001). Partial RLLs were observed in 4 (8.0%) and 3 (6.0%) hips in the PAO and control groups, respectively, without evidence of component loosening.

Kaplan–Meier survival analysis showed 10-year implant survivorship rates of 96.0% (PAO) vs. 98.0% (control) for revision surgery, and 92.0% vs. 94.0% for RLL appearance, with no significant differences. Subgroup analysis within the PAO group (elevated vs. anatomical cup placement) revealed no significant differences in HHS or RLL appearance. High cup placement was more frequently observed in patients with higher preoperative Crowe classification, but did not affect long-term survivorship (10-year survival: 94.5% vs. 90.6%).

DISCUSSION AND CONCLUSION: THA after PAO demonstrated comparable long-term implant survivorship to primary THA in patients with DDH, despite technically demanding conditions and more frequent superior-lateral cup placement. However, functional outcomes were slightly inferior in the THA post-PAO group, possibly due to compromised soft tissue and range of motion. Importantly, elevated cup placement did not negatively influence implant longevity. These findings suggest that with careful surgical planning, including appropriate cup positioning and grafting when needed, THA post-PAO can achieve excellent long-term outcomes.

