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5 Year Long-Term Multicenter Outcomes with Vitamin E Polyethylene Liners and Porous-Titanium Coated Shells

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Introduction: Monitoring clinical outcomes of new materials through multicenter-collaborations and registries is important to document effects in vivo. The purpose of this registry-based observational multicenter THA study is to prospectively monitor vitamin E diffused polyethylene (VEPE) liners and porous-titanium coated (PTC) acetabular shells compared to non-diffused medium cross-linked polyethylene (XLPE) liners and plasma sprayed (PS) shells.

Methods: In this prospective study, patients received either a PTC or PS shell with either VEPE or XLPE liners. All femoral heads were 32mm. Examination were preoperative and biannual for 10-years. At each interval, radiographs and surveys were obtained. All postop complications and revisions were collected. Radiographs were measured for implant position, radiolucencies, and polyethylene wear.

Results: Seventeen centers enrolled 977 patients with osteoarthritis. The average age at surgery was 62 ± 9 years, 50% male, and 90% white. Eleven percent of cases had an anterior approach, 32%-anterolateral, and 56%-posterolateral. There were 15 dislocations (11 patients) and 13 revisions. Average follow-up is 3.9 ± 1.1 years.

Forty-four percent of cups fell within 30° and 45° abduction and 5° and 25° anteversion. At postop, 1, 3, and 5 years, 22%, 27%, 24%, and 21% of the PTC shells had radiolucencies, respectively. At the same intervals, 28%, 13%, 5%, and 5% of the PS shells had radiolucencies, respectively. Head penetration was 0.02 mm/year for XLPE and -0.04 mm/year for VEPE ($p=0.23$). All surveys improved from pre- to post-op ($p<0.0001$).

Conclusion: Five-year follow-up of VEPE liners provides encouraging results regardless of the shell type. PTC shells had more radiolucencies than the PS shells, but none of the cups appeared loose and there were no signs of osteolysis in either group. Improvement was seen in physical function, activity, and health-related quality of life after treatment. Continued follow-up is required to determine if the use of these implants will result in less osteolysis and improved longevity.
