

Matched-cohort survivorship comparison of cemented vs cementless TKA from a single manufacturer

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Introduction

In the last decade, cementless total knee arthroplasty (TKA) has gained in popularity due to encouraging studies showcasing comparable survival rates to cemented TKA. However, much of this is driven by the results of one specific implant, which now represents the majority of cementless TKA implanted in the US. Those results do not necessarily apply to other modern cementless implants.

Purpose

Evaluate aseptic and cause-specific revision rates of implants from a popular cementless TKA implant manufacturer (Zimmer Biomet, ZB), following cementless versus cemented primary TKA of similar designs.

Methods

Design: Matched cohort study.

Data Source: Kaiser Permanente Total Joint Replacement Registry.

Study Sample: 104,831 patients aged ≥ 18 years with a primary TKA for osteoarthritis between 2009-2021, with Zimmer/Biomet *Persona*[®], *Nexgen*[®], or *Natural Knee*[®] implants, and fixation either fully cemented or fully cementless (hybrid excluded).

Statistical Analysis:

- Cemented TKA were 3:1 propensity-score matched to cementless TKA.
 - Age, sex, body mass index, race/ethnicity, smoking, ASA, implant stability, and operative year.
- Cox proportional-hazards regression was used to evaluate aseptic revision rate.
- Cause-specific revision reasons, including loosening, instability, and “other” reasons, were also evaluated.
- Hazard ratios (HR) and 95% confidence intervals (CI) are presented. $p < 0.05$ was considered statistically significant.

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Results

- 1,292 cemented TKA were matched to 431 cementless TKA.
- At 10-years, the aseptic revision rate was 8.6% for cementless TKA and 3.3% for cemented TKA.

Multivariable Regression Analysis:

- Cementless TKA had a higher risk of aseptic revision
 - HR=2.42, 95% CI=1.52-3.86, $p < 0.001$.
- Cementless TKA had a higher risk of loosening
 - HR=2.17, 95% CI=1.03-4.59, $p=0.042$
- Cementless TKA had a higher risk of revision for “other”
 - HR=2.46, 95% CI=1.24-4.86, $p=0.010$.
- No difference was observed for instability
 - HR=2.39, 95% CI=0.61-9.36, $p=0.212$.

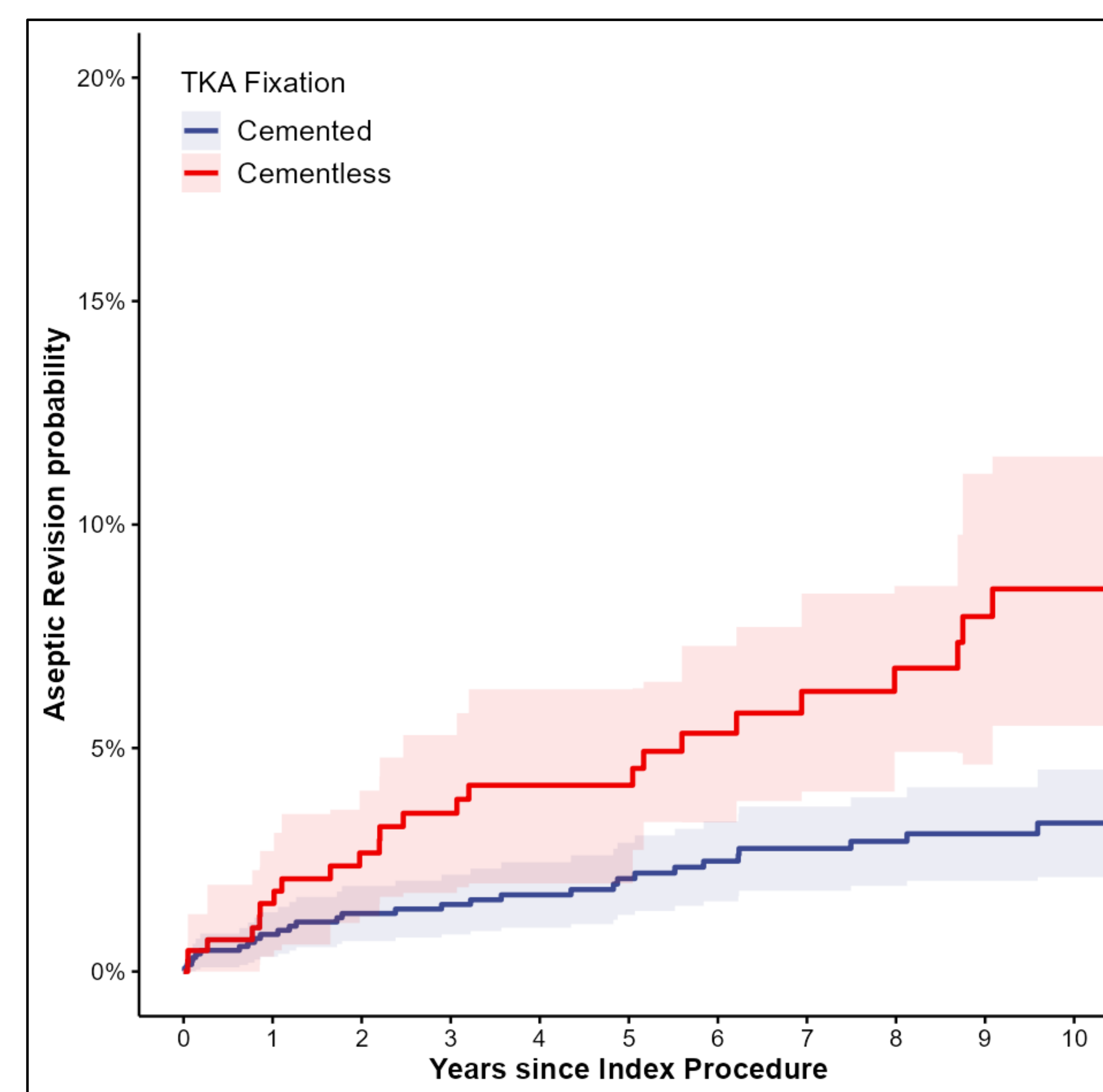


Figure: Cumulative aseptic revision incidence for TKA using cementless ZB implant systems and a propensity score matched group of TKA using cemented ZB implant systems.

Conclusions

- In this matched cohort study comparing the performance of analogous cemented and cementless TKA implants from a single large manufacturer (ZB) in the last decade, we found that cementless TKA from this manufacturer had a higher risk of aseptic revision.
- Significant design changes have recently occurred with the next iteration of ZB cementless TKA, and comparative studies will be needed to be repeated in the future.