Higher Rates of Fusion with Porous Titanium than with PEEK Lumbar Interbody Cages: a Retrospective Cohort Study

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ABSTRACT SECTION #1: Objectives

Lumbar fusion is commonly performed to treat various degenerative conditions. The choice of interbody cage material influences the rate of bone fusion. This study aims to compare the fusion rate of polyetheretherketone (PEEK) cages and porous titanium (PT) cages.

ABSTRACT SECTION #2: Method

This is a retrospective cohort study. We identified patients who underwent lumbar fusion surgery with PEEK or PT interbody cages at l'Hôpital de l'Enfant-Jésus between January 2014 and December 2024. Adult patients who underwent lumbar fusion surgery with a PEEK or porous titanium cage and had a CT scan available to evaluate fusion more than 9 months postoperatively were included. Collected data included demographic information and factors predisposing to non-union (smoking, diabetes, obesity, renal insufficiency). The fused levels were recorded, and fusion was independently evaluated by two authors. Multivariate analyses were performed to detect the significant influence of comorbidities on the fusion rate. Means, medians, and variances were compared using bilateral Student's t-tests and Fisher's tests to determine the presence of significant differences between the two groups for measured data. Statistical significance threshold was set at 5% ($\alpha = 0.05$).

ABSTRACT SECTION #3: Results

We included 86 patients in the PT group and 48 patients in the PEEK group. There were no demographic or medical history differences between the two cohorts (p=0.06). At the last available CT follow-up, 36/48 (70.8%) PEEK cages had fused, while 75/86 (87.2%) PT cages showed bone union (p=0.036; RR=2.8 [1.2-6.8]). This difference was even greater in isthmic spondylolisthesis and for L5-S1 levels. A multivariate analysis of various risk factors did not show a significant influence on fusion rates.

ABSTRACT SECTION #4: Conclusions

Our results suggest that PT appears more effective in bone fusion, especially in isthmic spondylolisthesis. PEEK remains a viable option, particularly in otherwise healthy patients at low-risk for pseudarthrosis. Literature also suggests PT fuses faster than PEEK but more data is needed to confirm.