Interbody spacer for anterior cervical discectomy and fusion

For interbody fusions, autograft was the gold standard for decades; however, limited availability and donor site morbidities have led to a constant search for new materials.

Clinically, it has been shown that calcium phosphate ceramics, including hydroxyapatite (HA) and tricalcium phosphate (TCP), are effective as osteoconductive materials and bone grafts.

Many options for interbody spacer and graft biologic exist for multilevel anterior cervical discectomy and fusion (ACDF).

Cornerstone HSR, Medtronic Sofamor Danek....

see Cervical cage.

see see Cervical PEEK Cage.

Common interbody graft options for anterior cervical discectomy and fusion (ACDF) include structural allograft and polyetheretherketone (PEEK). PEEK has gained popularity due to its radiolucency and its elastic modulus, which is similar to that of bone.

The authors sought to compare the rates of pseudarthrosis, a lack of solid bone growth across the disc space, and the need for revision surgery with the use of grafts made of allogenic bone versus PEEK.

The authors retrospectively reviewed 127 cases in which patients had undergone a 1-level ACDF followed by at least 1 year of radiographic follow-up. Data on age, sex, body mass index, tobacco use, pseudarthrosis, and the reoperation rate for pseudarthrosis were collected. These data were analyzed by performing a Pearson's chi-square test.

Of 127 patients, 56 had received PEEK implants and 71 had received allografts. Forty-six of the PEEK implants (82%) were stand-alone devices. There were no significant differences between the 2 treatment groups with respect to patient age, sex, or body mass index. Twenty-nine (52%) of 56 patients with PEEK implants demonstrated radiographic evidence of pseudarthrosis, compared to 7 (10%) of 71 patients with structural allografts ($p < 0.001$, OR 9.82; 95% CI 3.836-25.139). Seven patients with PEEK implants required reoperation for pseudarthrosis, compared to 1 patient with an allograft ($p = 0.01$, OR 10.00; 95% CI 1.192-83.884). There was no significant difference in tobacco use between the PEEK and allograft groups ($p = 0.586$).

The results of this study demonstrate that the use of PEEK devices in 1-level ACDF is associated with a significantly higher rate of radiographically demonstrated pseudarthrosis and need for revision surgery compared with the use of allografts. Surgeons should be aware of this when deciding on interbody graft options, and reimbursement policies should reflect these discrepancies [1].

1)
Fivefold higher rate of pseudarthrosis with polyetheretherketone interbody device than with structural allograft used for 1-level anterior cervical discectomy and fusion. J Neurosurg Spine. 2018 Oct 1:1-6. doi: 10.3171/2018.7.SPINE18531. [Epub ahead of print] PubMed PMID: 30485200.