Posterior cervical fusion

Anterior cervical discectomy and fusion for cervical spondylotic myelopathy led to lower hospital charges, shorter hospital stays, and an increased likelihood of being discharged to home relative to posterior cervical fusion (PCF) [1].

Posterior cervical fusion with cervical interfacet spacer (CIS) is a novel allograft technology offering the potential to provide indirect neuroforaminal decompression while simultaneously enhancing fusion by placing the allograft in compression.

Fusion rates are high for children undergoing posterior cervical fusion (PCF) and occipitocervical fusion (OCF).

Systematic reviews

Reintjes et al performed a comprehensive PubMed search of English-language articles pertaining to PCF and OCF in patients less than 18 years old. Of the 561 abstracts selected, 148 articles were reviewed, resulting in 60 articles that had sufficient detail to be included in the analysis. A meta-regression analysis was performed to determine if and how age, fusion technique, levels fused, fusion substrate, BMP use, postoperative bracing, and radiographic fusion criteria were related to the pooled prevalence estimates. A systematic review of the literature was performed according to the Preferred Reporting Items for Systematic Reviews and MetaAnalyses.

A total of 604 patients met the specific inclusion and exclusion criteria. The overall fusion rate was 93%, with a mean age of 9.3 years and mean follow-up of 38.7 months. A total of 539 patients had fusion with autograft (94% fusion rate) and 65 patients with allograft (80% fusion rate). Multivariate meta-regression analysis showed that higher fusion rates were associated with OCF compared with fusions that excluded the occiput ($p < 0.001$), with the use of autograft instead of allograft ($p < 0.001$), and with the use of CT to define fusion instead of plain radiography alone. The type of internal fixation, the use of BMP, patient age, and the duration of follow-up were not found to be associated with fusion rates in the multivariate analysis.

Fusion rates for PCF are high, with higher rates of fusion seen when autograft is used as the bone substrate and when the occiput is included in the fusion construct. Further study of the use of allograft as a viable alternative to autograft bone fusion is warranted because limited data are available regarding the use of allograft in combination with more rigid internal fixation techniques and osteoinductive substances, both of which may enhance fusion rates with allograft [2].

Case series

The NSQIP database was queried for CSM patients (International Classification of Disease, Ninth Revision, Clinical Modification [ICD-9-CM] code 721.1) aged 60-89 who underwent PCF (Current Procedural Terminology [CPT] code 22600) from 2012-2014. Cohorts were defined by age group (60-69, 70-79, 80-89). Data were collected on gender, race, elective or emergent status, inpatient or outpatient status, where patients were admitted from (home versus skilled nursing facility), ASA class, comorbidities, and single- or multi-level fusion. After controlling for these variables, logistic regression

analysis was used to compare outcome measures in the different age groups.

819 patients with CSM who underwent PCF (416 aged 60-69, 320 aged 70-79, 83 aged 80-89) were identified from 2012-2014. 79.7% of PCF procedures were multi-level. There were no significant differences in the odds of multi-morbidity, prolonged LOS, readmission, or reoperation when comparing octogenarian patients with CSM to patients aged 60-69 or 70-79. Patients aged 60-69 and 70-79 were significantly more likely to be discharged to home than patients over 80 (OR 4.3, 95% CI 1.8-10.4, p<0.0001 and OR 2.7, 95% CI 1.1-6.4, p=0.0005, respectively).

Compared to patients aged 60-69 and 70-79, octogenarian patients with CSM were significantly more likely to be discharged to a location other than home following PCF. After controlling for patient comorbidities and demographics, 80-89 year old CSM patients undergoing PCF did not differ in other outcomes when compared to the other age cohorts. These results can improve preoperative risk counseling and surgical decision-making [3].

Thirty-two patients underwent 36 procedures from 1986 to 1992, with a mean follow-up of 4.7 +/- 2.2 years (range, 2.0-8.0 yr). The most common disease processes were odontoid fracture (18 patients), transverse atlantal ligament injury (5 patients), os odontoideum (5 patients), and rheumatoid C1-C2 instability (3 patients). Thirty-one Gallie fusions, one Brooks-Jenkins fusion, two transarticular screw fusions, and two Halifax clamp applications were performed. Six (19%) of Gallie/Brooks-Jenkins fusions failed. These occurred with os odontoideum (three patients), Type II odontoid fracture (two patients), and transverse atlantal ligament injury (one patient). All transarticular screw and Halifax clamp procedures resulted in successful fusions. Two procedures (6%) resulted in new neurological deficit; both of these patients underwent posterior wiring for os odontoideum. This study suggests that Type II odontoid fractures may be successfully managed by a posterior wiring technique alone. Rheumatoid C1-C2 instability may be managed by posterior wiring supplemented with halo immobilization. Transarticular screw fixation has several potential advantages as a technique for C1-C2 arthrodesis and, in particular, may be appropriate for os odontoideum that had a high failure rate (75%) with conventional posterior wiring, even when this was supplemented with halo bracing [4].

1)
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