

BACKGROUND

The complications from TLIF with cage and BMP have been described with varying doses of BMP. The largest series in the literature reports on 204 patients with 3 months follow-up.

PURPOSE

To analyze the complications and outcomes from a large series of patients undergoing TLIF with BMP in order to propose the optimal BMP dosage for arthrodesis with the least complications. This is the largest report of TLIF with BMP with the longest follow-up.

STUDY DESIGN

A retrospective review of prospectively collected clinical and radiographic data from a spine surgery database.

PATIENT SAMPLE

451 consecutive adults underwent open posterior instrumented fusion (PSF) with TLIF, PEEK cage, and rhBMP-2; Diagnosis: degenerative-195, spondylolisthesis-150, scoliosis-101, kyphosis-5. Patient age averaged 60years (range 19 - 91 years); 51 smokers, 182 had prior decompression/fusion.

OUTCOMES MEASURE

VAS pain scores, Oswestry Disability Index (ODI), pain medication records, and radiographic

imaging pre-op, 1 year, 2 years, and latest follow-up. Fusion was defined as bridging interspace bone, no loosening of instrumentation, no motion on flexion-extension radiographs.

METHOD

All patients underwent PSF with local autograft and corticocancellous allograft at average 4.4 levels (range 2-17 levels); TLIF in all patients averaged 1.7 levels (range 1-4 levels), with 1 level-202, 2 levels-180, 3 levels-66, 4 levels-4. Each TLIF was supported by a rectangular PEEK cage filled with autograft and the disc was backfilled with local autograft around the cage. Interbody BMP averaged 8.2mg/disc (range 4-12mg/disc) in a total of 775 discs, and was inserted deep to the cage prior to cage placement.

RESULTS

At average 4 years follow-up (range 24-86 months), Nonunions: 8 patients (8/775 discs; 3 scoliosis, 1 spondylolisthesis, 4 degenerative), 1 at L3/4, 1 at L4/5, 6 at L5-S1. Nonunion BMP dose: 12mg-1, 8mg-4, 6mg-2, 4mg-1. Five underwent revision surgery for nonunion repair. Possible BMP related complications: seroma-4, bony overgrowth-6, (all used 6-8mgBMP/disc, all resolved with decompression). Complications were too infrequent to be statistically related to BMP dose. Other complications: adjacent degeneration-142 (18 revised), adjacent fracture-28 (9 revised), infection-14, late instrumentation removal-9. Significant improvement was noted in VAS (pre-op-6.2, 2 yr-3.1, $P<.001$) and ODI (pre-50, 2yr-28, $P<.001$), and pain medication requirements.

CONCLUSIONS

Instrumented posterior spinal fusion with TLIF, PEEK cage, and BMP-2 produces reliable fusion (99%) and improved clinical outcomes in adults requiring arthrodesis. Most complications occurred in deformity patients; BMP related complications were uncommon, none at 4mg/disc dose. The optimal dose of BMP to avoid seromas and bone overgrowth without increasing the risk of pseudarthrosis appears to be 4 mg/disc.

TLIF with BMP (By Dose)

2 mg

4mg

6mg

8mg

10mg

12mg

Total discs

Non-union

L1-2

0

1

2

1

0

1

5

0

L2-3

0

7

29

24

0

10

70

0

L3-4

2

15

76

52

3

25

173

1

L4-5

3

22

116

92

5

58

296

1

L5-S1

1

21

87

73

3

46

231

6

Total discs

6

66

310

242

11

140

775

8

Nonunion

0

1

2

4

0

1

8

0

Seroma

0

0

1

3

0

0

4

0

Bone overgrowth

0

0

3

3

0

0

6

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