

SUMMARY

In patients undergoing extension of a prior idiopathic scoliosis fusion to the sacrum, rhBMP-2 had a lower, although not statistically significant, rate of pseudoarthrosis without any increase in adverse events when compared to distant autograft. Patient reported outcomes (ODI and SRS) showed similar improvements in both groups.

INTRODUCTION

Extension of a prior idiopathic scoliosis fusion to the sacrum is a challenging operation that has been associated with a 37% rate of pseudoarthrosis. (Islam et al, Spine 2002). We hypothesized that rhBMP-2 could be successfully used as a substitute for distant autograft. To our knowledge, this is the first study to evaluate use of BMP in this population.

METHODS

Consecutive patients who had undergone a long idiopathic scoliosis fusion as a teen or young adult and later presented with distal degeneration requiring extension of the fusion to the sacrum were identified from a single institution prospective database. Group 1 (rhBMP-2 without distant autograft, 2002-2006) included 36/39 patients with minimum 2 year follow-up while Group 2 (distant iliac or rib autograft without rhBMP-2, 1998-2002) included 24/25 patients with minimum 2 years follow-up. Radiographs were measured using SRS criteria. Fusions were evaluated by independent observers using a published 4-point scale. Clinical outcomes were evaluated using SRS and ODI questionnaires.

RESULTS

(Table 1) Groups were well matched with respect to demographic, radiographic, and surgical data with the following exceptions : In Group 1, the average dose of rhBMP-2 was 11.6mg/level anterior and 17.2mg/level posterior. Group 2 (no BMP) was younger (43.5 vs 49.8 years, $p=0.04$), had more anterior levels fused (3.3 vs 1.7, $p=0.01$), more thoracoabdominal approaches (25% vs 2.7%, $p=0.01$), and greater EBL (1938mg vs 1221ml, $p=0.1$). There was one wound complication (deep infection) in each group. Rates of radiographic pseudoarthrosis (11.1% vs 20.8%) and revision for pseudoarthrosis (5.6% vs. 12.5%) were lower in the rhBMP-2 group, although this did not reach statistical significance. Pre-op, post-op, and improvements in SRS and ODI scores were similar between groups. We did not observe any increase in adverse events with the use of rhBMP-2.

CONCLUSION

The rhBMP-2 group had a lower, although not statistically significant, rate of pseudoarthrosis without any increase in complications. Patient reported outcome measures (ODI and SRS) showed similar improvements in both groups.

SIGNIFICANCE

BMP-2 is a safe and effective alternative to iliac or rib harvesting when extending a prior long scoliosis fusion to the sacrum.

BMP Group (n=36)

Autogenous Group (n=24)

p-value

Age at Surgery (years)

49.8

43.5

0.038

Female:Male

33:3

23:1

0.643

Previous Levels Fused

9.9

10.2

0.873

New Levels Fused

2.6

2.6

0.884

Final Number of Instrumented Levels

13.4

14.1

0.264

Estimated Blood Loss (mL)

1221.4

1938.1

0.007

Length of Surgery (hours)

10.8

11.3

0.565

Spinal Osteotomy

14

12

0.395

Posterior Fusion Only

4

0

0.121

Radiographic Pseudoarthrosis

4 (10%)

5 (20.8%)

0.462

Reoperation for Pseudoarthrosis

2 (5.4%)

3 (12.5%)

0.380

Patient Reported Outcomes

Pre-op ODI

38.5

44.8

0.194

Post-op ODI

20.1

21.5

0.864

SRS Post-op Satisfaction

4.2

4.0

0.217

SRS Self Image Improvement

1.1

0.8

0.327

SRS Pain Improvement

1.0

1.2

0.518

SRS Function Improvement

0.6

0.9

0.221