The Effect of Expandable Cages on Reconstruction of Sagittal Alignment in Posterior Lumbar Interbody Fusion

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Purpose

To evaluate the effect of expandable cages to reconstruct and maintain segmental lordosis in PLIF by means of minute radiographic measurements.

Theory-Description

Lumbar sagittal alignment is one of most important factors after spinal fusion, which influences clinical outcomes. Previous clinical reports about PLIF cages showed wedge-shaped cages had advantages over rectangular cages to reconstruct lumbar alignment.

L-Varlock® (KISCOMEDICA) is an expandable cage, rectangular at insertion, wedge-shaped after expansion, which has possibilities to enhance and preserve lumbar lordosis.

Materials

- 25 consecutive patients (14 males, 11 females)
- Mean age: 67.5 years old (39-78)
- 29 fused segments
- Short segment PLIF with expandable cages (21 single-level, 4 double-level fusion)
- (L3/4: 3 segments, L4/5: 23 segments, L5/S: 3 segments)
- August 2001 - November 2003
  - Deg. listhesis: 13 patients
  - Lysis. listhesis: 2 patients
  - Spinal instability: 10 patients
- The mean follow-up period: 15 months (at least 6 months)

Methods

Operative methods

- Prone position on the Hall frame
- Midline approach
- Laminectomy
- Pedicle screw insertion
- Cage insertion
- Cage expansion
- Posterior compression
- Fluoroscopic control
- Intra-operative:
  - Prone position
  - After decompression
  - Cage insertion (before expansion)
  - Cage expansion
  - Posterior compression
  - Post-operative standing
  - After weight bearing
  - After 3 months
  - After 6 months

Radiographic measurement

Segmental lordosis

Changes of disc heights

Angle of practical cage expansion

Materials

- Various PLIF cage designs
  - Mesh cage: titanium
  - Threaded cage: titanium
  - Rectangular cage: titanium, carbon
  - Wedge-shaped cage: titanium, carbon

L-Varlock®: expandable intra-operatively

Cage expansion: ° (by 7 revolutions of internal screw)
The Effect of Expandable Cages on Changes of Segmental Lordosis in Posterior Lumbar Interbody Fusion

• Results

Changes of segmental lordosis

All intra-operative changes showed significant differences (p<0.05). Loss of correction did not occur significantly during follow-up period.

Changes of disc heights

Anterior disc height increased 8.4mm, posterior disc height also increased 3.0mm on average.

• Discussion

The mean angle of practical cage expansion: 10.5° (9°-4°).

Breakage of cages did not occur.

• Conclusion

Expandable cages have significant effects to achieve successful segmental lordosis in instrumented posterior lumbar interbody fusion.