Percutaneous Axial Lumbosacral Interbody Fusion: Preliminary Clinical and Radiological Results

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Background: Minimally invasive spine surgery continues to be a growing trend for orthopedic and neurosurgical spinal surgeries. Generally, anterior and posterior approaches are chosen for direct exposure of the lumbosacral spine. Anterior access to the L5-S1 disc space for interbody fusion can be technically challenging, frequently requiring the use of an approach surgeon for adequate exposure. We reviewed our experience with a novel minimally invasive technique for L5-S1 interbody fusion (Trans1) that exploits the pre-sacral space and its relative dearth of critical structures.

Materials and methods: 8 patients were included in this analysis. Average follow-up was 6 months. Back pain was secondary to lumbar degenerative disc disease (DDD) in 2 cases, failed-back surgery syndrome in 1 case and lytic spondylolistesis grade I in another 1 case. All patients had radiographic evidence of L5-S1 degeneration and underwent percutaneous interbody fusion with Trans1 cage. Trans1 was followed by percutaneous pedicle screw-rod fixation in 2 patients; in the remaining patients facet joint screw fixation devices were implanted. Clinical evaluation was performed using a visual analogue scale (VAS) and Oswestry disability index (ODI).

Results: Mean operative time for the Trans1 procedure was 55 minutes. All patients had radiographic evidence of stable L5-S1 interbody cage placement and fusion at last follow-up. The VAS scores assessing back pain improved significantly from 7.20 to 2.65. The mean Oswestry score improved significantly from 58.3% to 31.5%. No device related complications were identified.

Conclusion: The percutaneous paracoccygeal approach to the L5-S1 intervertebral disc space provides a minimally invasive corridor through which discectomy and interbody fusion can safely be performed. It can be used alone or in combination with minimally invasive posterior screw fixation. It may provide an alternative route of access to the L5-S1 intervertebral disc in those patients who may have unfavourable anatomy for or contraindication to traditional open approach to this level.