Lateral Lumbar Interbody Fusion – Outcomes, Complications and Fusion Rates with Recombinant Human Bone Morphogenetic Protein-2

Matthew B Morton, Yi Yuen Wang, Aaron J Buckland, David A Oehme, Gregory M Malham

GREG MALHAM
BSc MBChB FRACS NEUROSURGEON

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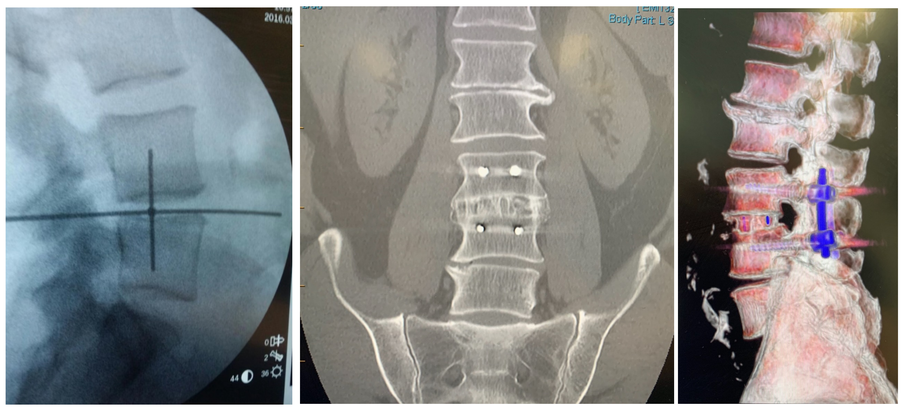
Background

- Direct lateral transpsoas retroperitoneal technique indicated for degenerative disc disease, disc herniation, spinal stenosis, deformity
- Benefits: minimally invasive, large interbody cage for graft material, indirect neural decompression
- Concerns: approach-related neuropraxia, visceral & vascular injury, safety at L4/5
- rhBMP-2 boasts high fusion rates but is controversial around cost and potential adverse outcomes



Aims

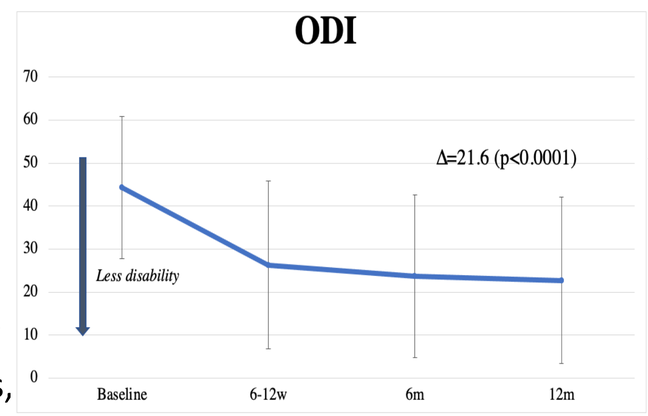
1. Report a consecutive series of patients undergoing LLIF with an emphasis on the clinical outcomes, fusion rates, and complication profile in particular neurological complications and complications occurring at L4/5
2. Report the use of rhBMP-2 in LLIF with an emphasis on the fusion rates and any adverse outcomes associated with its use

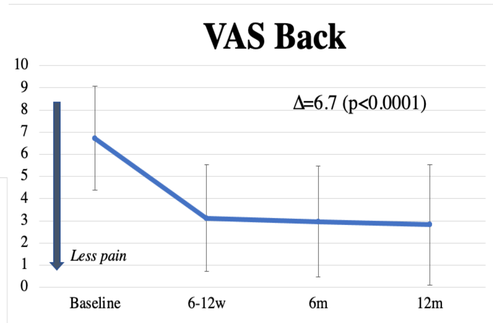
Methods

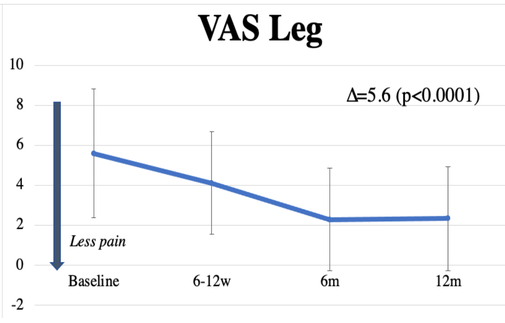
- Retrospective cohort study of patients undergoing LLIF 2011-2021 performed by four experienced surgeons
- Pathologies treated; degenerative disc disease, spondylolisthesis, spinal stenosis, facet arthropathy, deformity
- Cages filled with either rhBMP-2 or a non-rhBMP-2 graft material (allograft, demineralized bone matrix (DBM), synthetic tricalcium phosphate)
- Oswestry disability index (ODI), visual analogue score (VAS) for back and leg pain, short form health survey (SF-12) physical and mental component scores (PCS/MCS) were assessed preoperatively for baseline and at 6-12 weeks, 6 months and 12 months postoperatively
- CT performed at 6 and 12 months postoperatively for fusion status (Bridwell grading system)
- Complications identified post-operatively until end of follow up

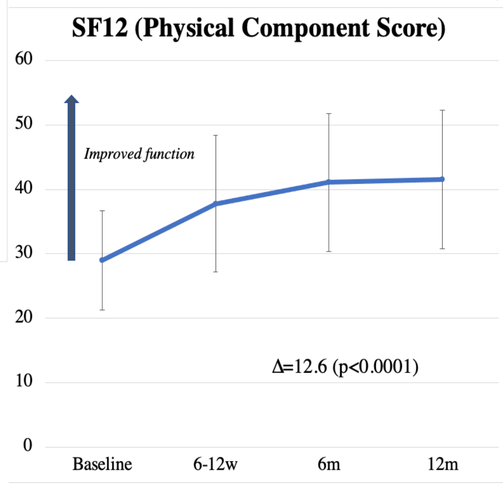
Results

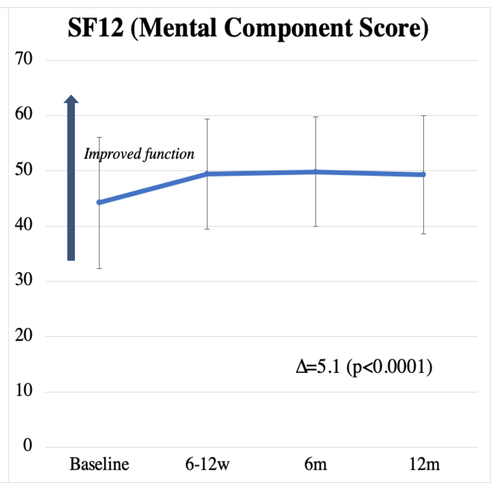
- 343 patients underwent 437 levels of LLIF. Mean age 67 ±11 years (range 29-89) and 65% were female. Mean BMI 29kg/m^2 (18-56). Most common operated levels L3/4 (36%) followed by L4/5 (35%). Most LLIFs (64%; 221/343) were single stage
- Most patients received rhBMP-2 (264/343, 77%). Most non-rhBMP-2 graft materials were DBM. No significant differences between the rhBMP-2 and non-rhBMP-2 group in age, gender, and levels treated
- ODI, VAS and SF-12 improved significantly from baseline to the end of follow-up. Clinical improvements evident at 3 months and maintained or further improved at last follow up.
- No increase in minor or major complications in the rhBMP-2 group compared to the non-rhBMP-2 group respectively; (10.6% vs 13.9% [p = 0.42], 2.7% vs 8.9% [p < 0.01])



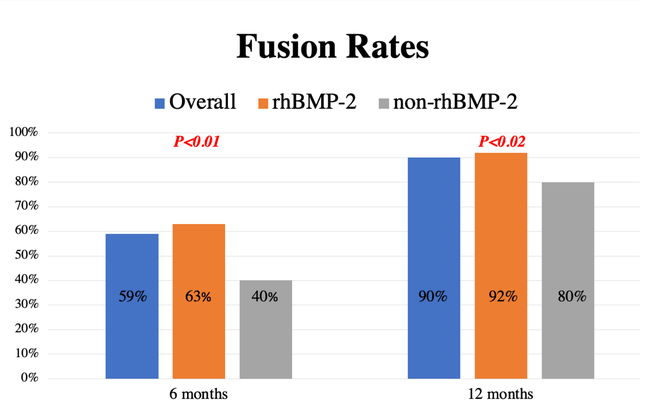


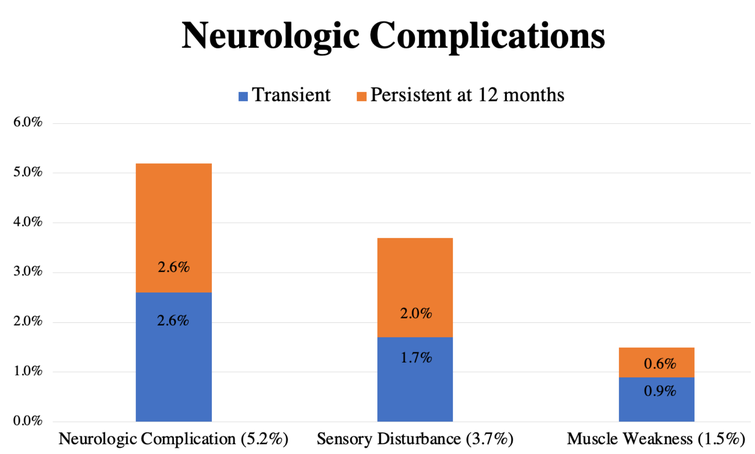


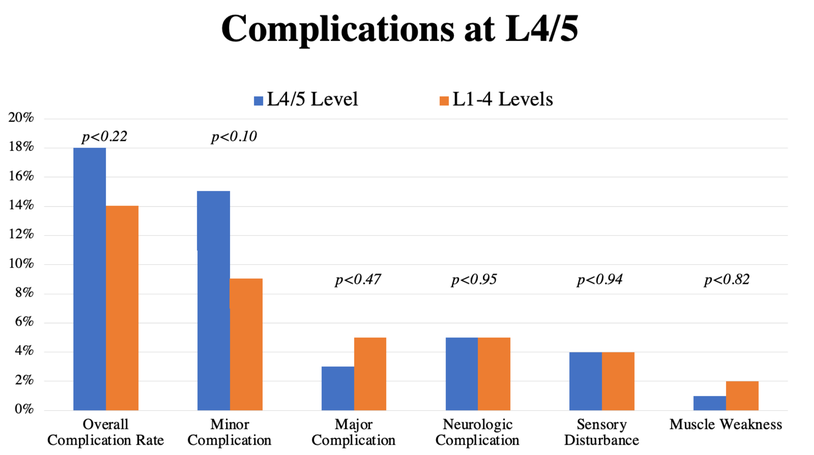




Minor		Major	
Sensory Disturbance	13 (3.8%)	Muscle Weakness	5 (1.5%)
Superficial wound infection	8 (2.3%)	**Bowel injury**	**2 (0.5%)**
Haematoma	6 (1.7%)	Transient incontinence	1 (0.3%)
Ileus	4 (1.2%)	Deep wound infection	2 (0.6%)
Pleural effusion	3 (0.9%)	**Dural tear***	1 (0.3%)
Post-operative delirium	2 (0.6%)	**Subdural haematoma***	1 (0.3%)
Urinary tract infection	1 (0.3%)	Pneumothorax	1 (0.3%)
Pneumonia	1 (0.3%)	Post-operative MI	1 (0.3%)
Fracture/subsidence (not requiring reoperation)	1 (0.3%)	**Vascular injury**	**0**
Total	39 (11.4%)	Total	14 (4.1%)







Conclusion

- This Australian LLIF experience demonstrated excellent clinical outcomes, high fusion rates and low complication rates, similar to previously published high volume studies
- LLIF can safely be performed at L4/5 by experienced surgeons in appropriately selected patients
- LLIF using rhBMP-2 provided earlier and higher fusion rates and similar clinical outcomes to other graft materials without an increased risk of complications