Costs and outcomes of recombinant human bone morphogenetic protein-2 usage in single level transforaminal lumbar interbody fusion in a national sample

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INTRODUCTION:
Recombinant human bone morphogenetic protein-2 (rhBMP-2) is widely used in transforaminal lumbar interbody fusion (TLIF) to enhance bone healing and improve fusion rates. While rhBMP-2 has demonstrated benefits, its high cost and potential complications, including radiculitis, heterotopic ossification, and reoperation, raise concerns about its long-term efficacy and value in spine surgery. This study uses a national cohort to evaluate the costs and outcomes associated with rhBMP-2 in single-level TLIF, offering insights into its financial and clinical implications.
METHODS:
We analyzed the PINC AI Healthcare database for patients who underwent single-level TLIF from January 2016 to December 2020. Patients treated with rhBMP-2 were identified, with a propensity score-matched 1 to 4 control group on Elixhauser comorbidities, age, race, ethnicity, and insurance type. We calculated average hospital costs by category (e.g, implants, labor, room and board, medication) and recorded adverse outcomes (reoperation, readmission, post-procedural seroma/infection, pseudoarthrosis) within two years post-discharge. Reoperation rates were plotted to assess time-dependent differences between groups.
RESULTS:
3,052 patients received rhBMP-2 (55.8% Female, 55.2% Medicare, 89.3% White); 12,208 were matched into the control (55.3% Female, 53.3% Medicare, 88.1% White). Average surgery costs were higher in the rhBMP-2 group ($33,626 vs. $30,520, p < 0.001), mainly due to orthopedic implants, which were 21% more expensive on average. The reoperation rate at 180 days post-discharge was lower in the rhBMP-2 group (1.1% vs. 1.8%, p = 0.018). However, pseudoarthrosis rates at 1-year (0.79% vs. 0.48%, p=0.049) and 2-years (1.38% vs. 0.84%, p=0.009) were significantly higher in the rhBMP-2 group. Reoperation rates for the rhBMP-2 group were greater than the control after 550 days, reaching 5.7% versus 5.2% at two years (p=0.362).
DISCUSSION AND CONCLUSION:
This national study shows significant cost and outcome differences for single-level TLIF patients with and without rhBMP-2. Pseudoarthrosis rates were higher in the rhBMP-2 cohort than in the control, though lower than prior studies. Reoperation rates change over time, with fewer in the rhBMP-2 group initially but increased rates around 1.5 years post-surgery. Further research will examine reoperation types and causes over the two-year period.