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The Impact of Metabolic Disorders of Bone Mineralization on Long-Term Outcomes Following Surgery for Adult Spinal Deformity Surgery: Analysis of 2-Year Surveillance

Introduction: Metabolic bone diseases (MBDs) are established risk factors for patients undergoing spinal fusion (SF). However, long-term outcomes in these patients are not well reported. We sought to evaluate 2-year postoperative complications in MBDs patients undergoing SF for adult spinal deformity (ASD).

Methods: ASD patients undergoing ≥ 4 -level SF with ≥ 2 -year surveillance were selected from the SPARCS database. Patients with vitamin D deficiency, hyperparathyroidism, osteomalacia, and rickets were included and compared to patients without MBDs for 2-year individual and overall medical and surgical complications, as well as reoperations. Logistic regression was used to identify independent predictors of these outcomes.

Results: 6,132 patients (MBD, n=117 [1.95%]; no-MBD, n=6,015 [98.05%]) were identified. MBD and no-MBD patients had comparable ages (59.6 vs. 57.6 years), sex (53.8% vs. 49.1% females), race (79.3% vs. 79.6% white), hospital charges (\$111,644 vs. \$109,744), and length of stay (7.5 vs. 5.8 days) (all, $p > 0.05$). Deyo index was greater in MBD compared to no-MBD patients (0.98 vs 0.62, respectively) ($p < 0.001$). MBD patients had higher rates of renal failure (17.9% vs. 8.1%), deep vein thrombosis (7.7% vs. 2.6%), transfusion (50.4 vs. 35.9%) and myocardial infarction (7.7% vs. 2.6%) (all, $p \leq 0.01$). Both cohorts had similar rates of wound complications, pulmonary embolism, pneumonia, urinary tract infections, and implant-related complications (all, $p > 0.05$). MBDs predicted 2-year medical complications (OR=1.76) and reoperations (OR=1.88) (both, $p < 0.05$).

Discussion: ASD patients with MBD experienced higher rates of 2-year complications than patients without MBDs. Presence of a baseline MBD was independently associated with increased postoperative medical complications and reoperations. Patients with MBDs necessitate further preoperative planning prior to ASD surgery.

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