# Does Thyroid Dysfunction Impact Outcomes and Complications after Multilevel Lumbar Fusion?

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INTRODUCTION: Thyroid dysfunction (TD) is a known risk factor for cardiovascular morbidity, as well as surgical complications. Thyroid disease can adversely impact bone metabolism, such as being an important cause of secondary osteoporosis. There remains scarce data on how thyroid disease influences outcomes and complications after multilevel lumbar fusion (MLF). This study analyzes whether preoperative thyroid status in patients undergoing MLF may confer greater risk for intra and postoperative complications.

METHODS: This was a single center retrospective cohort study. Patients aged ≥18 who underwent MLF of ≤4 levels between 2017-2023 were included. Patients were divided into those with an ICD-10 diagnosis consistent with TD and those without. For patients with TD, abnormal TSH, T4 and T3 laboratory results were flagged, as well as preoperative medication status. Analyses were conducted to compare patients with a TD to those without, as well as to assess the significance of abnormal laboratory values, and the impact of preoperative thyroid medication status. ANOVA, χ2 analysis, and t-tests were used to assess significance for demographics, comorbidities, pre-operative diagnoses, surgical characteristics, complications, and reoperation rates, with significance set to $p<0.05$.

RESULTS:

4,199 patients were included in the study. 854 patients (%) had a TD.854 had a TD. Patients with a thyroid diagnosis were significantly older, female, and sicker ($p<0.001$). Patients with TD were significantly more likely to have congestive heart failure, chronic pulmonary disease, ulcer disease, malignant cancer, metastasis of a solid tumor, and a rheumatic connective tissue disease ($p<0.001$). While the surgical characteristics for all patients were similar, TD patients had significantly more levels fused ($p=0.002$) and blood loss (0.02). Patients with a TD were also more likely to have a cardiac complication in the immediate postoperative window ($p=0.053$). Of the patients that had a TD, 71 (8%) had an abnormal lab reading while 783 (92%) had a normal lab reading. There were no differences in demographics, surgical characteristics, intraoperative complications or postoperative complications between patients with and without normal thyroid lab values preoperatively. However, patients with abnormal preoperative thyroid lab values were more likely to have a reoperation due to flatback ($p<0.001$), infection ($p=0.03$), or instrumentation ($p=0.003$) within the 90-day postoperative window. Amongst the patients with a TD and normal lab readings, 90 were medicated (11.5%) and 693 (88.5%) were not medicated. Patients who were medicated were significantly older ($p=0.04$) and female (0.02). Despite having similar CCI, non-medicated patients were more likely to have Diabetes Mellitus ($p=0.005$). Surgical characteristics were similar amongst the two groups, with the exception of medicated patients having significantly longer operative times ($p=0.007$). Medicated patients were significantly more likely to have massive blood loss intraoperatively ($p=0.005$), but less likely to have urinary complications postoperatively ($p=0.03$). Medicated patients were more likely to return to the OR within 90 days of the operation.

DISCUSSION AND CONCLUSION:

TD is associated with increased perioperative risk after multilevel lumbar fusion. TD patients were older, had more comorbidities, and experienced greater blood loss and postoperative cardiac complications. While abnormal preoperative thyroid labs did not significantly impact most outcomes, they were linked to higher reoperation rates due to flatback, infection, and instrumentation failure. Preoperative thyroid medication use was associated with longer operative times, greater blood loss, and increased reoperation risk. These findings highlight the need for optimizing thyroid status preoperatively to improve MLF outcomes.