



## **The association between Hounsfield units and mechanical failure in ASD patients**

Martin Heegaard, Kristin Ingadottir, Lærke Ragborg, Benny Dahl, Lars V. Hansen, Søren Ohrt-nissen, Martin Gehrchen

Spine Unit, Dept. of Orthopedic Surgery, Rigshospitalet, København, Denmark

### **Background**

Low bone mineral density (BMD) is a known risk factor for revision surgery in patients with adult spinal deformity (ASD). Hounsfield units (HUs) on CT scans have been suggested as a proxy for assessing BMD. This study aimed to assess HUs in the lumbar region, including the upper instrumented vertebra (UIV) as well as UIV+1, and the association with mechanical failure in patients undergoing ASD surgery.

### **Methods**

We retrospectively included ASD patients undergoing surgery from 2010-2020 with a minimum of two-years follow-up. Exclusion criteria were no preoperative CT scan at least one year before surgery. Mechanical failure was defined as proximal junctional failure, pseudarthrosis, or implant failure requiring revision surgery. On preoperative CT scans, HUs were measured on three axial slices on each vertebra from L1 to L5 and, if available, at UIV and UIV+1. Logistic regression model was used to assess the association between HUs and mechanical failure.

### **Results**

We included 170 patients with a mean age of 63  $\pm$ 12 years, 108 (64%) females, and median instrumentation was 13 [IQR 10-16] levels. Mechanical failure occurred in 27% (n=46) of patients at two-year follow-up. Mean lumbar HUs were 146  $\pm$ 51 in the mechanical failure group and 135 $\pm$ 52 in the no-revision group (p=0.232). The area under the curve was 0.58 (95% CI 0.48-0.68) corresponding to no to low discriminatory power in predicting mechanical failure using lumbar HUs. Univariate logistic regression analysis showed no statistically significant difference between mechanical failure and HUs in the lumbar region (OR= 1.00, 95%CI 1.00-1.01, p=0.239) or at UIV/UIV+1 (OR= 1.00, 95%CI 0.99-1.01, p=0.286).

### **Conclusion**

We found no association between mechanical failure and HUs on preoperative CT scans in ASD patients. Thus, we cannot recommend using HUs to predict mechanical failure in these patients.

### **Disclosures**

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