

Introduction

The use of preoperative magnetic resonance imaging (MRI) in the care of adolescent idiopathic scoliosis (AIS) remains controversial. These patients may have neuro-axis anomalies that pose a risk during scoliosis surgery; manipulation of spinal alignment without knowledge of spinal cord anomalies could risk motor or sensory function. The definitive way to uncover these anomalies is by MRI.

Methods

We sought to determine predictive factors of spinal cord anomalies in children with AIS, especially those that would require evaluation and intervention prior to scoliosis surgery. We performed a retrospective chart review of 255 patients and collected demographic information, radiological findings on scoliosis x-rays, and objective signs on the patient's clinical exam. We performed univariate analysis to discover whether any of these variables might predict the presence of spinal cord abnormalities using logistic regression model. The concordance statistics (C-index) was computed for each potential predictor to assess its predictive accuracy. We also evaluated the profile of those patients with abnormal MRIs.

Results

40 patients with abnormal MRI findings preoperatively

- Chiari- 17
- Syringomyelia- 22
- Tethered Cord- 5
- Pineal cyst- 1, Cervical mass- 1

25% with abnormal MRI were male (however almost 25% of total studied population were male)

22.5% had left sided curves (22% of total population had left sided curves)

37.5% had Lenke type 2 curves (41% of total population had Lenke type 2 curves)

Several variables were noted to have a statistically significant (P-value<0.05) association with the finding of spinal cord abnormality on MRI and demonstrated moderate predictive accuracy. One such variable is Risser classification, an indirect measure of skeletal maturity, calculated when scoliosis surgery was deemed appropriate; the C-index for this variable is 0.715. When a minor structural curve is present, the Cobb angle of this secondary curve also has an association with spinal cord anomaly; C-index is 0.631. The measurement of the sagittal plane deformity is also significant with a C-index of 0.649.

Conclusions

We describe several variables from scoliosis x-rays which exhibit association with spinal cord anomaly. These findings suggest that scoliosis which is progressive earlier rather than later in age is more likely to be associated with MRI findings. Other studies have suggested left sided curves or male gender to be predictive of patients who will have abnormal MRIs however we saw little difference in the abnormal MRI population as compared to the studied population as a whole. Further study with more patients may define a predictive model such that spinal cord anomalies could be anticipated without preoperative MRI.

References

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