Intraspinal Anomalies in Infantile Idiopathic Scoliosis: Prevalence and Role of MRI

Joshua M. Pahys, MD

Amer F. Samdani, MD

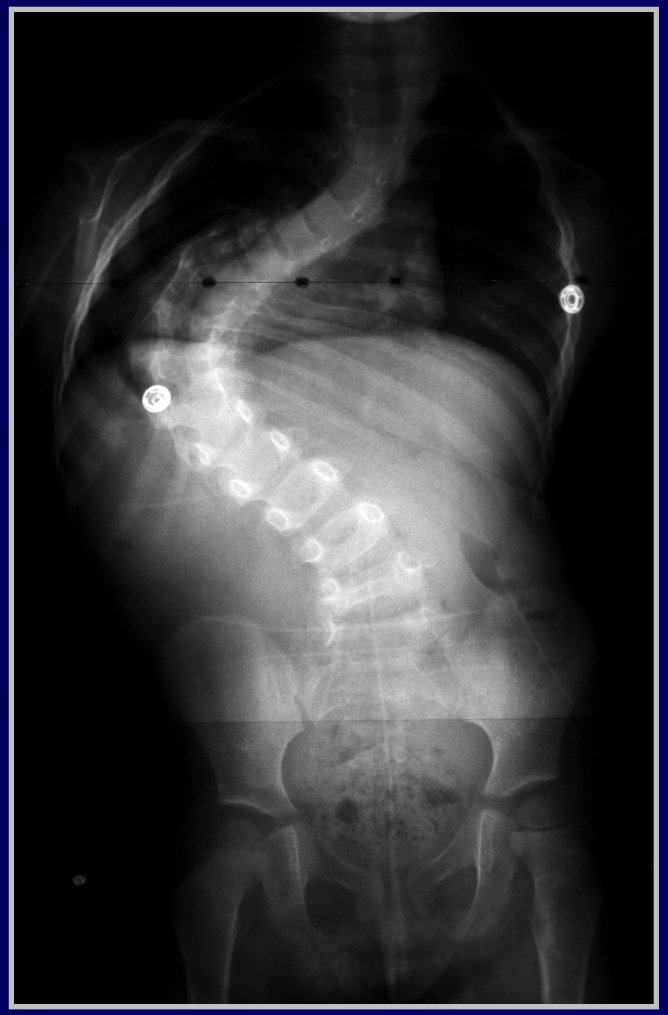
Randal R. Betz, MD

Shriners Hospital for Children Philadelphia, PA, USA

Shriners Hospitals for Children philadelphia

Background

- Reported prevalence of intraspinal anomalies in Infantile Idiopathic Scoliosis (IIS) is >20%



Background

- Lewonowski *et al.* Spine 1992
  - 2/4 (50%) IIS patients had Chiari malformations
- Gupta *et al.* Spine 1998
  - 3/6 (50%) IIS patients had intraspinal anomalies
  - 2/3 (66%) required surgical intervention

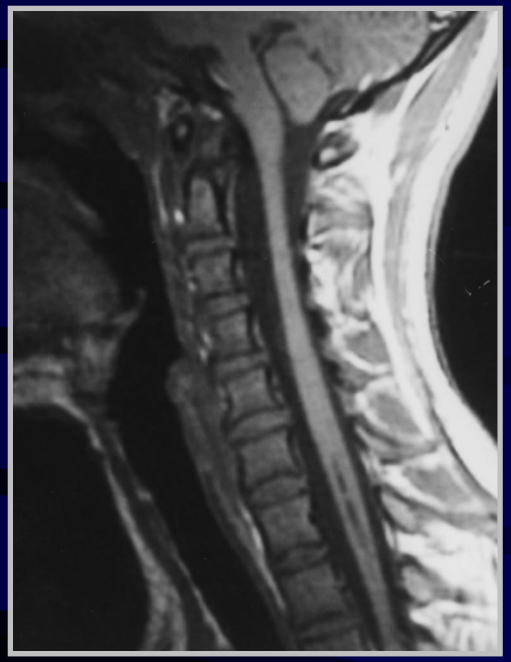
Background

- Dobbs *et al.* JBJS 2002
  - 10/46 IIS patients (21.7%) had intraspinal anomalies
  - 8/10 (80%) required surgical intervention
  - Recommended screening MRI for all IIS patients with curves >20º

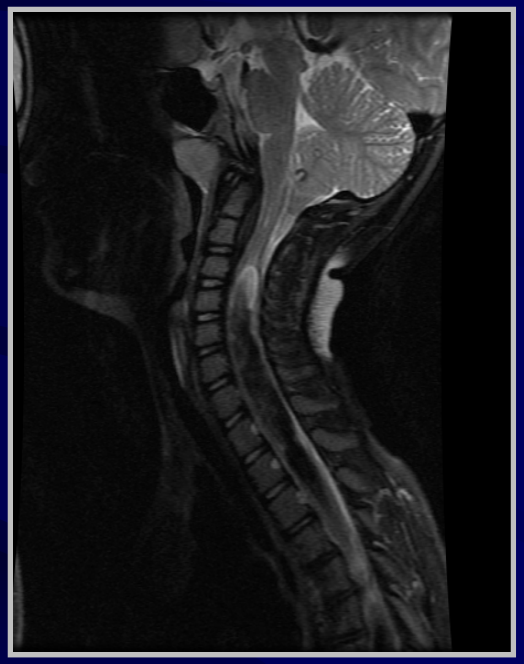
Purpose

- To report the prevalence of intraspinal anomalies in patients with presumed Infantile Idiopathic Scoliosis routinely screened at a single, large volume institution.
- Further define the role for a screening MRI in this patient population.

Intraspinal Anomalies



Syrinx



Chiari

Tethered Cord

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Intraspinal Anomalies

- 7 of 54 patients (13%): Positive MRI
  - Tethered Cord: 3 patients
  - Chiari Malformation: 2 patients
  - Nonoperative Syrinx: 2 patients
- 5 of the 7 patients (71.4%): required neurosurgical intervention

Results

	Sex	Age at Presentation (months)
Normal MRI	27 Female (57.4%)	14.3
	20 Male (42.6%)	(range: 4-34)
Abnormal MRI	4 Female (57%)	10.7
	3 Male (43%)	(range: 1-30)
p-value (Normal vs. Abnormal)	**0.98**	**0.21**

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Results

	Main Curve Apex Location	Main Curve Direction	Main Curve Cobb Angle
Normal MRI	41 Thoracic (87.2%)	37 Left (78.7%)	49.1°
	6 Lumbar (12.8%)	10 Right (11.3%)	range: 20°-106°
Abnormal MRI	6 Thoracic (85.7%)	4 Left (57.1%)	48.4º
	1 Lumbar (14.3%)	3 Right (42.9%)	range: 22°-90°
p-value (Normal vs. Abnormal)	**0.92**	**0.22**	**0.94**

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Results

	Curve Magnitude (patients)			
	20°-29°	**30°-39°**	**40°-49°**	**≥ 50°**
Normal MRI	9 **(19.1%)**	14 **(29.8%)**	4 **(8.5%)**	20 **(42.6%)**
Abnormal MRI	1 **(14.3%)**	2 **(28.6%)**	1 **(14.3%)**	3 **(42.9%)**

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MRI in Infants

- Sedation/General Anesthesia often required

- Malviya *et al.* Anesth Analg 1997
  - Sedation for 1,140 infant MRI's
  - 20% incidence of adverse events
  - 5.5% incidence of hypoxemia

- Malviya *et al.* Br J Anaesth 2000
  - Sedation for 922 infant MRI's
  - 7% failed scans secondary to inadequate sedation

When to get an MRI?

- "Curve progression should be the major indication for a magnetic resonance imaging scan in patients with early onset scoliosis."
  - Fernandes/Weinstein JBJS 2007

- Our recommendations:
  - Curve progression >10º per year
  - Change in neurologic exam
  - Surgical intervention planned

Conclusion

- A smaller percentage (13%) of neural axis abnormalities was identified in this population than previously reported
- A screening MRI may not be necessary in all patients at presentation with infantile idiopathic scoliosis measuring >20°