Is Casting For Infantile Scoliosis Better Than The Natural History?

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Question: How do we know the resolution seen in EOS with casting isn't just the natural history?

- Spontaneous resolution is common in infantile scoliosis.
- Progressive curve may result in significant deformity and thoracic insufficiency.
- Serial casting with extension-derotation-flexion (EDF) technique is an option for the initial treatment of progressive infantile scoliosis.
- Randomized studies are not feasible.
- This study compares EDF casting to the published natural history.

Methods:

- Literature search (Pubmed and article bibliographies) for:
  - Early Onset Scoliosis
  - Infantile Scoliosis
  - Articles had to discuss the RVAD/Rib phase and curve pattern
- Data abstraction from the articles:
- Compared the abstracted historical data with our series

Articles

- 4 Articles Identified Meeting Criteria:
  - Mehta, M. H. (1972). The rib-vertebra angle in the early diagnosis between resolving and progressive infantile scoliosis. JBJS(B) 54(2): 230-243.
  - Ferreira, J. H., R. d. Janeiro, et al. (1972). Progressive and resolving infantile idiopathic scoliosis. The differential diagnosis. JBJS(B) 54(4): 648-655.
  - Ceballos, T., M. Ferrer-Torrelles, et al. (1980). Prognosis in infantile idiopathic scoliosis. JBJS(A) 62(6): 863-875.
  - Thompson, S. K. and G. Bentley (1980). Prognosis in infantile idiopathic scoliosis." JBJS(B) 62-B(2): 151-154.

Findings:

Parameter – Natural Hx	N	Number Progressing
Thoracic RVAD>20, Phase 1	89	71 (79.8%)
Double Curves	91	90 (98.9%)
Phase 2	No Denominator given	All phase 2 considered progressive

Parameter – Cast Cohort	N	Number Progressing
Thoracic RVAD>20, Phase 1	19	0 (0%)
Double Curves	4	0 (0%)
Phase 2	48	8 (16.7%)

Problems

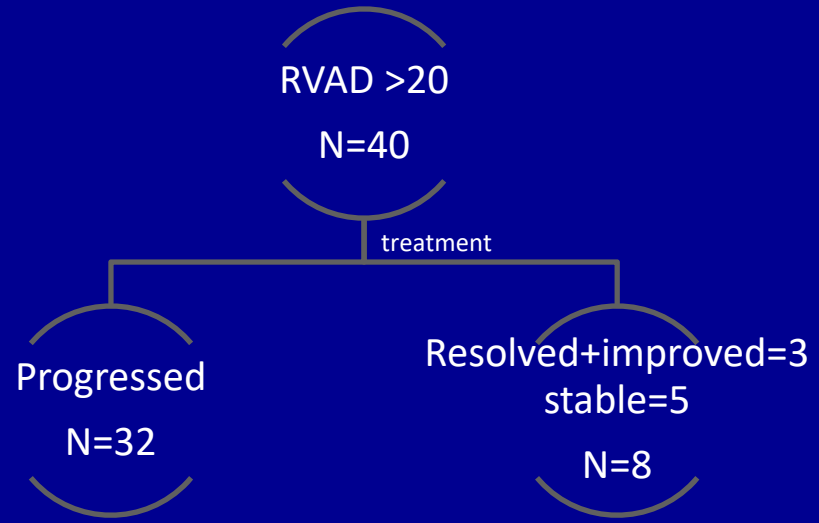
- With casting, the curves may be improved or stable rather than just resolving or progressive.
- Only one paper (Thompson and Bently) identified some curves as stable (19 of 86).
- The historic literature is still unclear.

A More Nuanced Story:

- Casting had:
  - 27% resolving
  - 56% improved but not resolved
  - 14% stable
  - 3% progressing
  - Hard to compare to the natural history.
- To date, 10% surgery in cast group
- Surgery rate unknown in natural history – assumed for all progressive curves – when?

Comparison with Thompson and Bentley

Thompson et al



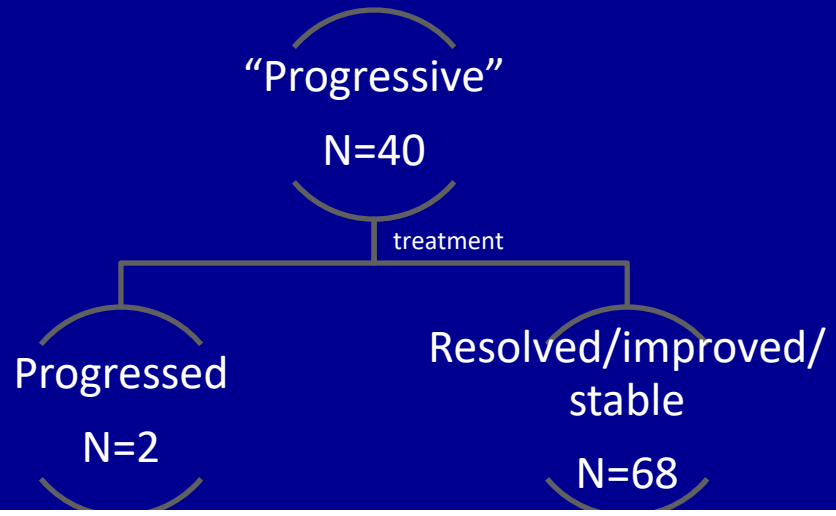
2x2 contingency table

	Outcome 1	Outcome 2	Total
Group 1	8	32	40
Group 2	68	2	70
Total	76	34	110

Fisher's exact test

The two-tailed P <0.001.

Sanders et al



Odds ratio 136.0 95% CI 27.3 to 677.3

z statistic 5.997

P < 0.001

Conclusions:

Progression Rate in EOS Historic compared to EDF Casting			
	Single Curves, RVAD ≥20°, Rib phase 1	**Single Curves, Rib Phase 2**	**Double Curves**
Historic	71/89 (80%)	"100%"	90/91 (98.9%)
Current EDF Casting	0/19 (0%)	8/48 (16.6%)	0/4 (0%)

- Casting improves on the natural history of infantile scoliosis.
- Phase 2 can be treated with casting.
- Casting has a large majority of cases where the curve is held stable or improved but not resolved.
- The natural history studies are problematic.
- Despite the problems with existing studies, it is unlikely that further natural history studies will be performed.

And the Winner Is!