Spontaneous Ossification after VEPTR

(*vertical expandable prosthetic titanium rib)*

Implantation in Children

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Treatment Problems in EOS

Spontaneous fusion at the spine may cause

- increased deformity
- Thoracic insufficiency syndrome
- growth disturbance
- difficult surgical correction

Theory

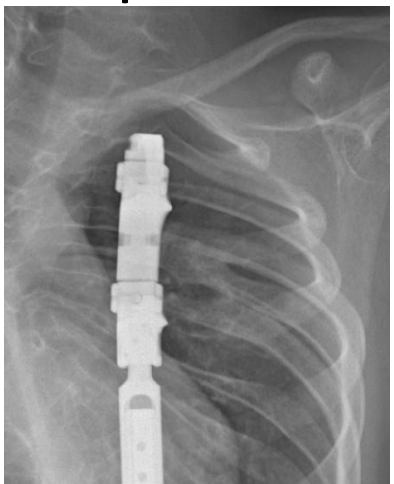
VEPTR has little or no contact to the spine

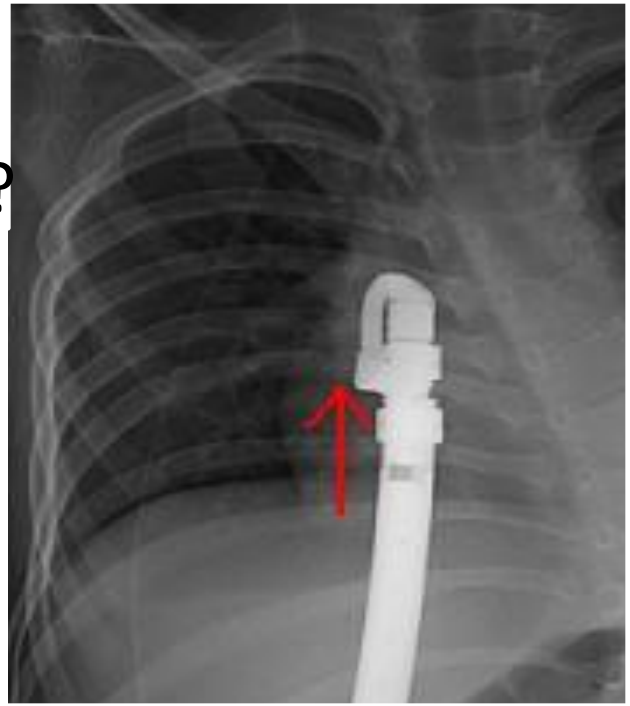
- therefore little or no ossifications

Clinical experience

Severe ossifications at follow-up surgeries

- ribs - along the implant
- laminar hook
- pelvic hook
- ??? spontaneous fusion at the spine without implant contact ???



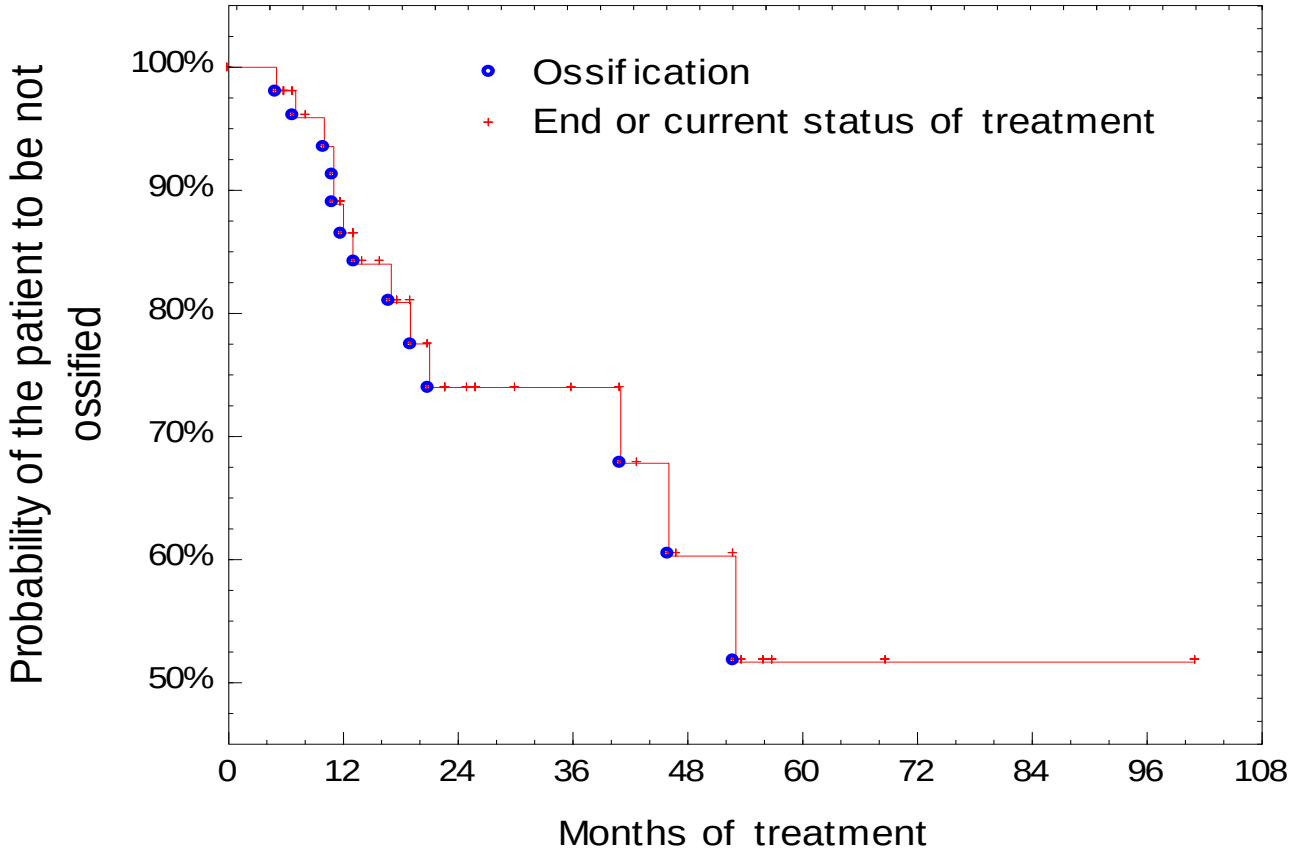


Material and Methods

- 57 radiological long term follow up after VEPTR implantation
- Diagnosis (congenital 16%, MMC 17%, SMA 9%, miss. 58%)
- 47 % walker
- Age at VEPTR implantation av. 7.66 yr.
- Follow-up av. 29.8 months (1-101)

Results

- 24% ossification (n=13); 12% within the first 12 months
- > 4 years 48% ossification



Results

Localization of the ossifications

- 54% laminar hook
- 23% ribs
- 23% pelvic hook

→ 92% of ossifications at the implant with the maximum of load sharing (medial hybrid, concave side)

Magnitude and Growth

- Great variability
- Magnitude at first appearance: 400mm² (48-1664)
- Magnitude at first expansion surgery after first appearance: 574mm² (51-2624)
- Magnitude after an av. of 3.9 expansion surgeries (after first appearance): 1071mm² (75-3399)

Results

Significant correlation (p=0.005) between

- ossifications and correction of Cobb angle in the first surgery

-> less correction = rigid situation (e.g. congenital scoliosis) = more ossifications

Results

No correlation of ossifications to

- gender
- age
- diagnosis

Summary

Overall ossification rate in 57 pts.: 24%

- 12% within the first year
- > 4 years follow-up 48%

Rigid deformity (e.g. congenital scoliosis)

- significant more ossifications than flexible deformity

Possible explanations

Ossifications after VEPTR implantation because of

- flexibility of the system
- implant movement
- repetitive surgical interventions (soft tissue trauma)
- and possible periost damage of ribs and spine during surgery