Ultrasound technique monitoring the lengthening of Magnetically Controlled Growing Rods

Ospedale dei Bambini
“V. Buzzi” Milano
Dott. Luca F. Colombo
Dott. Andrea Righini
Dott. Francesco Motta
Neuromuscular deformity

- Inverse relationship between pulmonary function test score and severity of scoliosis.
- For every 10° increase in Cobb angle, there is 4.7% decrease in predicted vital capacity and 3.3% decrease in peak flow.

Neuromuscular deformity

- Bracing is ineffective in halting curve progression and is poorly tolerated for the limitation of chest wall excursion.
- Surgical intervention before skeletal maturity is often indicated, but early fusion limits trunk height and may exacerbate pulmonary difficulties that are already a primary concern.
- Children undergo spinal fusion before 8 years of age have the worst Quality of life with different tests (M. Vitale, M. D. Children H. N.Y pres. ICEOS SRS 2007).
- This dilemma raises questions about the best method of controlling the large curves during an extended period of growth.
Method

- Since November 2012 we have treated with magnetically growing rod 8 children affected by neuromuscular scoliosis, 6 (SMA II), 2 Myopathy. Mean age 6 years
- Each implant was done with 2 rods submuscular tunnelled fixed with hybrid construct pedicular screw hook and sublaminar wire
Planning of the lengthening

- According with Akbarnia, patients lengthened at intervals of less than 6 months had higher annual growth.
- And following the indications of A. di Meglio that showed there is a reduced growth phase between 5 to 10 years (1.2 - 1.5 cm per year).
- We decided on lengthening intervals of 3 months with distraction approximately of 3.5 mm.
- These raises the problem that we expose the children to excessive x-ray control.
- So we start monitoring the lengthening with ultrasound since November 2013.
Ultrasound technique
We compare the data of the lengthening
Ultrasound technique

- We use high frequency linear transducer 14 MHz
- We have done 12 lengthening comparing the data and the mismatch between US and Remote cont. Was <0.3 mm
- The duration of the exam now it takes 10/15 min. with the magnetic lengthening.
RESULTS

X RAY Cobb angle measurement

Pre OP. 74° < 58°
Post Op 47° <23° mean correction 60%
Lengthening each 3 mounth
We have done 64 procedure
min lenghtening 2.5 mm max 8.0 mm mean 3.2
PFT we measured FVC + FEV1 pre op and every each lengthening
Complication

- One incomplete pull out of a pedicle screw in T2 now stable
- One rod disfunction
Pre post Surgery.
After 6 months we gave a subjective questionnaire.
Conclusion

• In this first two years we don’t have problem with the lengthening of the MCGR and thanks the ultrasound monitoring we expose the children to the x ray just ones in a year. With this instrumentation we reduced the morbidity and the complications avoiding the surgery time for the lengthening.