Combined Use of Transpedicular Enucleating and a New Instrumentation Fixation in One Stage Operation as a Treatment for Progressive Hemivertebra Scoliosis

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• **BACKGROUND AND PURPOSE:** No study has reported the results of combined posterior hemiepiphysiodesis and instrumentation which is able to modulate the asymmetrical spinal growth of the spinal column in the later growing years after operation.

• Our study is a retrospective assess the effectiveness of combined use of transpedicular enucleating and a new instrumentation PRSS (Plate Rod System for Scoliosis) fixation in the treatment for growing hemivertebral (HV) scoliosis.
METHODS: From June 2003 to April 2009, total 16 patients with progressive HV scoliosis underwent our combined methods. The mean age at operation was $8.125 \pm 1.82$ years.

The technique involves: A small curette and an electrical drill was used to cannulate the pedicle and enter into the heimivertebral body to remove the cancellous bone for eliminating the blood supply of the cartilaginous endplate and destroy the superior and inferior vertebral end plate from the inner side of HV body, followed by PRSS fixation for desirable correction of the main curve and compensation curve and to maintain it.

Analysis included age at surgery, measured changes in scoliosis angle and complications.
• **RESULTS:** The mean follow-up period was 37.25 ± 22.24 months. The scoliosis curve was corrected from average 55.06° ± 25.68° preoperation to 21.25° ± 15.51° post-op with corrective rate 60.5%, and in the latest follow-up, the Cobb angle was 24.38° ± 16.44° compared with immediate postoperative angle, there was no significant differences (P > 0.05), indicating no significant loss of correction. No complication of neurological deficit was found in our series.
Zhen x h M 10 with T12 HV scoliosis 40°, The combined method was used to enucleate cancellous bone of the heimivertebral body & fixed with PRSS. Scoliotic curve was corrected 40° → 15°. P-op 15° (p-3+11) p-op, instrumented spinal column growth 30mm. after op.
Discussion

- Recent studies: Several papers (Ruf et al./Mikles et al. . . . ) reported transpedicular hemiepiphyseodesis (eggshell technique) and posterior instrumentation to treat hemivertebra scoliosis. Their major effect is to eliminate the growth potential of the offending HV. But a number of reinterventions revealed curve progression despite HV resection. That suggested we need further continued correction mechanism for those cases in the later growing years.

- We combined use of transpedicular enucleating which offers advantage of an one-stage, one approach operation to eliminate the growth potential of the offending HV. and PRSS was used to extend the corrective level including 2 to 3 segments above and below the HV to maximum spontaneous correction after operation. PRSS with its special design will provide modulating efficiency in normalizing the spinal growth and gradual realignment of the spine curvature in the later growing period, good results was obtained.
Chao P P M 9 yrs, with T9 HV congenital scoliosis, posteri-or resection of hami-vertebrae & PRSS, curve correction: 58°

40 ° (P-op) ➔ 22 ° P5 yrs+6 op),
Growth of instrumented segments was 5 cm. (from 66 mm 10 mm)
CONCLUSION:

• Combined use of transpedicular enucleating and PRSS fixation is a safe and effective method for the management of HV scoliosis in one stage operation in growing children.

• The desirable correction was abstained and maintained in growing year after one stage operation due to the efficiency of modulating the asymmetrical spinal growth provided by PRSS.
谢谢！Thank you!