HEMIVERTEBRECTOMY

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HV resection, what does it mean?

Posterior + anterior approach or single posterior ?

Hooks or screws?

Results



Thoracolumbar Hemivertebrae Resection by Double Approach in a Single Procedure: Long-term Follow-up Spine Volume 31(15), 1 July 2006, pp 1745-1757 Bollini Gérard MD, Docquier Pierre-Louis, Viehweger Elke, Launay Franck, Jouve Jean-Luc

Lumbosacral Hemivertebrae Resection by Combined Approach: Medium- and Long-Term Follow-Up Spine Volume 31(11), 15 May 2006, pp 1232-1239 Bollini Gérard, Docquier Pierre-Louis, Viehweger Elke, Launay Franck, Jouve Jean-Luc

Lumbar Hemivertebra Resection J Bone Joint Surg Volume 88-A(5), May 2006, p 1043-1052 Bollini Gérard, Docquier Pierre-Louis, Viehweger Elke, Launay Franck, Jouve Jean-Luc

HV resection, what does it mean?

Posterior Aspect

Whatever the approach (single posterior or posterior and anterior) and the hardware used (hooks or screws)



You have from the back to remove :

- . The posterior hemilamina frequently hemi fused with
- one of the two adjacent laminae
- . Two facets joints, sometime agenetic
- . Transverse process
- . Pedicle

You can remove only the osseous part of the HV body







EGG SHELL PROCEDURE

Anterior Aspect

The osseous part of the HV body



The osseous part of the HV body







Convexe compression

The osseous part of the HV body









Convexe compression

Stability can be expected

The osseous part of the HV body

+ Surrounding growth structures





The osseous part of the HV body

+ Surrounding growth structures



The osseous part of the HV body

+ Surrounding growth structures







Convexe compression

The osseous part of the HV body

+ Surrounding growth structures

Fibrous scar/ pseudoarthrosis







Convexe compression



Stability is questionnable









Anterior Aspect







Convexe compression







Convexe compression



Concave growth can be expected













Whole level fused





Spine Volume 28(18), 15 September 2003, pp 2132-2138 Posterior Hemivertebra Resection With Transpedicular Instrumentation: Early Correction in Children Aged 1 to 6 Years Ruf, Michael MD; Harms, Jürgen MD

Correction of Kyphosis by anterior growth against posterior tension band.



Spine Volume 27(21), 1 November 2002, pp E460-E466 Pedicle Screws in 1- and 2-Year-Old Children: Technique, Complications, and Effect on Further Growth Ruf, Michael MD; Harms, Jürgen MD The most secure way to reach stability after HV removal is to perform a true convexe or total arthrodesis between at least the two vertebrae adjacent to the HV





Posterior + anterior or single posterior approach?











Big amount of « soft » tissue difficult to removed from the back Need of a strong bone bone graft in the front







15 Y

12 Y

Rod (s) +









Using screws in the very young means to cross the neuro-central cartilage





Pedicle screws were inserted at 16 M of age. CT scan 7 Y after surgery

Spine Volume 28(18), 15 September 2003, pp 2132-2138 Posterior Hemivertebra Resection With Transpedicular Instrumentation: Early Correction in Children Aged 1 to 6 Years [Deformity] Ruf, Michael MD; Harms, Jürgen MD

Hemivertebra Resection by a Posterior Approach: Innovative Operative Techniqueand First Results [Technique] Ruf, Michael MD; Harms, Jürgen MD Spine Volume 27(10), 15 May 2002, pp 1116-1123

Two months old pig





T4 Aspect 5 months after surgery



Beguiristain JL, De Salis J, Oriaifo A, Canadell J (1980) Experimental scoliosis by epiphyseodesis in pigs. Int Orthop 4: 317-321

The effect of pedicle screw placement with or without compression on the morphology of the spinal canal and pedicle in immature pigs. A Cil, M Yacizi, K Daglioglu, and al. Eur Spine J 2003; 12 (suppl 1): S30-31



T8 vertebra in a mini pig 4 months follow up

La scoliose expérimentale chez le mini-porc: étude des déformations vertébrales. C Coillard, S Rhalmi, C RivardAnnales de Chirurgie 1999, 53; 8, 773-780

From 1987 to 2003 we performed 77 HV resection

Surgery performed in Barcelona, Turino, Limoges, Bordeaux, Reims and patients coming from abroad (Italy, Spain, Germany, Russia)

34 thoracolumbars HV were excised in 33 consecutive patients (17 females, 16 males).

26 lumbars HV were excised (11 females, 15 males).

17 lumbo-sacrals HV were excised (9 females, 8 males).

34 thoracolumbar HV were excised in 33 consecutive patients (17 females, 16 males).

These HV were located within the two levels proximal or distal to the thoracolumbar junction (from T10 to L2).

The mean age at surgery was 3.5 years (range, 12 M to 9.8 Y) There were 20 right sided HV and 14 left sided.

Twelve were fully segmented and 22 semi-segmented.

Other spinal abnormalities were associated in 24 cases (71%)

The mean time of surgery was 280 minutes

6 transfused patients among the 33 operated on.

Finally 28 scoliosis were followed-up more than two years.

For these 28 cases, the mean F.U. was 7.1 Y (range 2 to 14.6 Y).

At the time of the latest F.U., the mean age was 10.7 years (range 4.3 to 18.4 years).

Five patients were skeletally mature

28 cases of TL HV followed more than 2 years, the mean F.U. was 7.1 Y (range 2 to 14.6 Y).	Pre OP	Post OP	Last F.U.
Scoliose Alean segmental Mean total main	34.8° 40.4°	17.4° 24.6°	10.7° 26.9°
Cyphose Aean segmental Mean total main	<mark>20°</mark> 33.7°	<mark>8.6°</mark> 29.6°	13.6° 36.2°
Gravity trunk shift	10.6 %	11%	7%
True trunk shift	13%	12.5%	8.1%



1 case of paraparesia associated with implant displacement needed reoperation the second postoperative day for implant replacement. Neurological recovery was complete in a few days.








4 Y 6 M













9 Y 4 M

1 Y 8 M



2 Y



Pre Op Post Op 1 Y 10 M

3 Y

7 Y





1 Y 10 M













4 Y 2 M

<mark>8</mark> Y

12 Y 4 M

26 lumbar HV were excised (11 females, 15 males).

These HV were located at level L2-L3 in 9 cases L3-L4 in 9 cases L4-L5 in 8 cases.

Mean age at surgery was 3.4 years (range, 12 months to 10.2 Y)
There were 6 right and 20 left sided HV.
14 were fully segmented and 12 semi-segmented.
Other spinal abnormalities were associated in 19 cases (73%)

The mean time of surgery was 302 minutes

2 transfused patients among the 26 operated on.

Mean F.U. was 6.9 Y (range 6M to 17.4 Y).

At the time of the latest F.U., the mean age was 10.2 years (range 3.6 to 18.2 years).

Four patients were skeletally mature

RESULTS

26 Lumbar scoliosis			
	Pre OP	Post OP	Last F.U.
Scoliose Alean segmental Mean total main	<mark>32.6°</mark> 33.5°	10.8° 12.6°	8.8° 10.9°
Cyphose Mean segmental	- 2.6°	- 4.9°	-5.7°
Gravity trunk shift	11 %		7%
True trunk shift	18%		9%

On short term F.U.

Postoperative immediate period was uncomplicated for 22 / 26

1 case of regressive paresthesia of the femoral and tibial nerve

2 superficial wound infections healed with intravenous antibiotherapy

1 patient with a single kydney developed an acute renal insufficiency due to a ureteral lithiasis





1 Y

1 Y

6 Y

12 Y





12 Y



2 Y 1 M







 $\frac{1}{2}$ Fused







17 lumbo-sacral HV were excised (9 females, 8 males).

These HV were located at level L4-S1 in 3 cases L5-S1 in 13 cases L6-S1 in 1 case.

Mean age at surgery was 4.9 years (range, 3 months to 10.3 Y) There were 10 right and 7 left sided HV. 10 were fully segmented and 7 semi-segmented. Other spinal abnormalities were associated in 10 cases (59%)

The mean time of surgery was 290 minutes

2 transfused patients among the 17 operated on.

Mean F.U. was 7.6 Y (range 2.3 to 17.8 Y).

At the time of the latest F.U., the mean age was 12.7 years (range 7.7 to 19.8 years).

Five patients were skeletally mature

R	ESI	JL	TS

17 Lumbar scoliosis			
	Pre OP	Post OP	Last F.U.
Scoliose Aean segmental Mean total main	27.5° 28.4°	10.7° 12.7°	<mark>8.9°</mark> 11.4°
Cyphose Mean segmental	- 13.6°	- 14.8°	-14.1°
Gravity trunk shift	16 %	11%	9%
True trunk shift	18%	16%	15%

On short term F.U.

Postoperative immediate period was uncomplicated for 16 / 17

1 case of partially regressive deficit in tibialis anterior muscle







DOUBLE HEMIVERTEBRAE





11 Y 9 M



5 Y

DOUBLE HEMIVERTEBRAE



CERVICAL HEMIVERTEBRA







2 Y 6 M







2 Y 6 M

11 Y





11 Y



2 Y old boy







2 Y old boy

