

Undercorrection of the Thoracolumbar Kyphotic Deformity in the Osteoporotic Spine Fractures

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– Abstract –

Study Design: A retrospective study.

Objectives: To assess the efficiency of undercorrection and transpedicular screw fixation through a posterior approach in osteoporotic spine fractures with a thoracolumbar kyphotic deformity.

Summary of Literature Review: The surgical treatment of osteoporotic spine fractures with a thoracolumbar kyphotic deformity requires extensive surgical procedures to obtain complete restoration of the sagittal alignment, but it has a few technical limitations due to insufficient mechanical stability at the bone-screw interface. A special strategy is essential for transpedicular screw fixation for osteoporotic spine fractures with a thoracolumbar kyphotic deformity.

Materials and Methods: We reviewed 14 osteoporotic spine fracture cases, with a thoracolumbar kyphotic deformity, which had undergone undercorrection and transpedicular screw fixation through a posterior approach, between March 2000 and June 2003, with an average follow-up period of 15.2 months. According to the Jikei grade of the osteoporosis, 9 and 5 cases were grades 2 and 3, respectively. As a radiographic assessment, we measured the kyphotic angles of the fused segments on the preoperative, postoperative and last follow up thoracolumbar lateral views on standing using Cobb's method, and also assessed the kyphotic angle correction (KAC). The clinical results were evaluated at the last follow-up.

Results: The kyphotic angles at the preoperative, postoperative and last follow-up were $33.5^\circ \pm 9.3$, $22.4^\circ \pm 6.9$ and $24.7^\circ \pm 6.8$, respectively. We obtained a mean KAC gain of 11.1° postoperatively ($p < 0.05$), but a loss of 2.3° at the last follow-up ($p < 0.05$).

The clinical results were analyzed as good, fair and poor in 8, 5 and 1 case, respectively. Fusions were achieved in all cases.

Conclusions: Undercorrection and transpedicular screw fixation for a thoracolumbar kyphotic deformity in osteoporotic spine fractures can be one of the alternatives to avoid fixation failure and an extensive surgical procedure.

Key Words: Thoracolumbar spine, Fracture, Osteoporosis, Kyphosis, Undercorrection

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1.
가²⁾
2000 3 2003 7
1

Table 1. Analysis of Case

Case	Age/ Gender	Dx	Fusion level	VP	PMMA Augmentation
1	71/F	Kümmell 's disease T11/L1 Com. Fx. T9/L1/L2 Posttraumatic kyphosis	T11 to L2	T9/T11/T12/ L1/L2	None
2	65/F	Com. Fx. T11/T12/L1/L2 Posttraumatic kyphoscoliosis	T10 to L2	L1/L2	T10/L3/L4/L5 (Rt)
3	74/M	Kümmell 's disease T12 Posttraumatic kyphosis	T11 to L2	T11(Rt)/ L1(both)	None
4	63/M	Kümmell 's disease T12 Com. Fx. L2 Posttraumatic kyphosis	T11 to L2	L2(both)	T11(Rt)
5	68/F	Kümmell 's disease T11 Old Com. Fx. L1 Posttraumatic kyphoscoliosis	T10 to L2	None	None
6	70/F	Kümmell 's disease T11/L1 Com. Fx. T9/T12	T10 to L2	T9/T12	T11(Rt)
7	70/F	Kümmell 's disease T11 Posttraumatic kyphosis	T10 to L1	T12(Rt)	L1(Lt)
8	79/F	Com. Fx. T12/L1 to L3 Posttraumatic kyphoscoliosis	T11 to L2	T12/L1/L2	None
9	80/F	Kümmell 's disease T12 Posttraumatic kyphosis	T11 to L3	None	T12/L1(Rt)
10	69/M	Kümmell 's disease T11 Old Com. Fx. L1 Posttraumatic kyphosis	T10 to L2	None	None
11	69/F	Kümmell 's disease T12 Posttraumatic kyphosis	T11 to L3	None	T12/L1(Lt)
12	82/F	Kümmell 's disease T11 Old Com. Fx. L2	T10 to L2	T12	None
13	80/F	Kümmell 's disease T12 Posttraumatic kyphosis	T11 to L3	L2	L4(Lt)
14	69/F	Com. Fx. T12/L1/L2 Posttraumatic kyphoscoliosis	T11 to L3	T12/L1/L2	None

Dx: Diagnosis VP: Vertebroplasty PMMA: Polymethylmethacrylate Rt: Right
 Lt: Left Com. Fx: Compression Fracture F: Female M: Male

가 가 14 (11 , 3)
 . 12 21
 15.2
 61~70 8 , 71~80 5 , 81~90 1
 72.1 (63~82) 가
 Jikei
 , 2 9 , 3 5 .

V-
 under-bending
 Kummell
 ,

(Table 1).

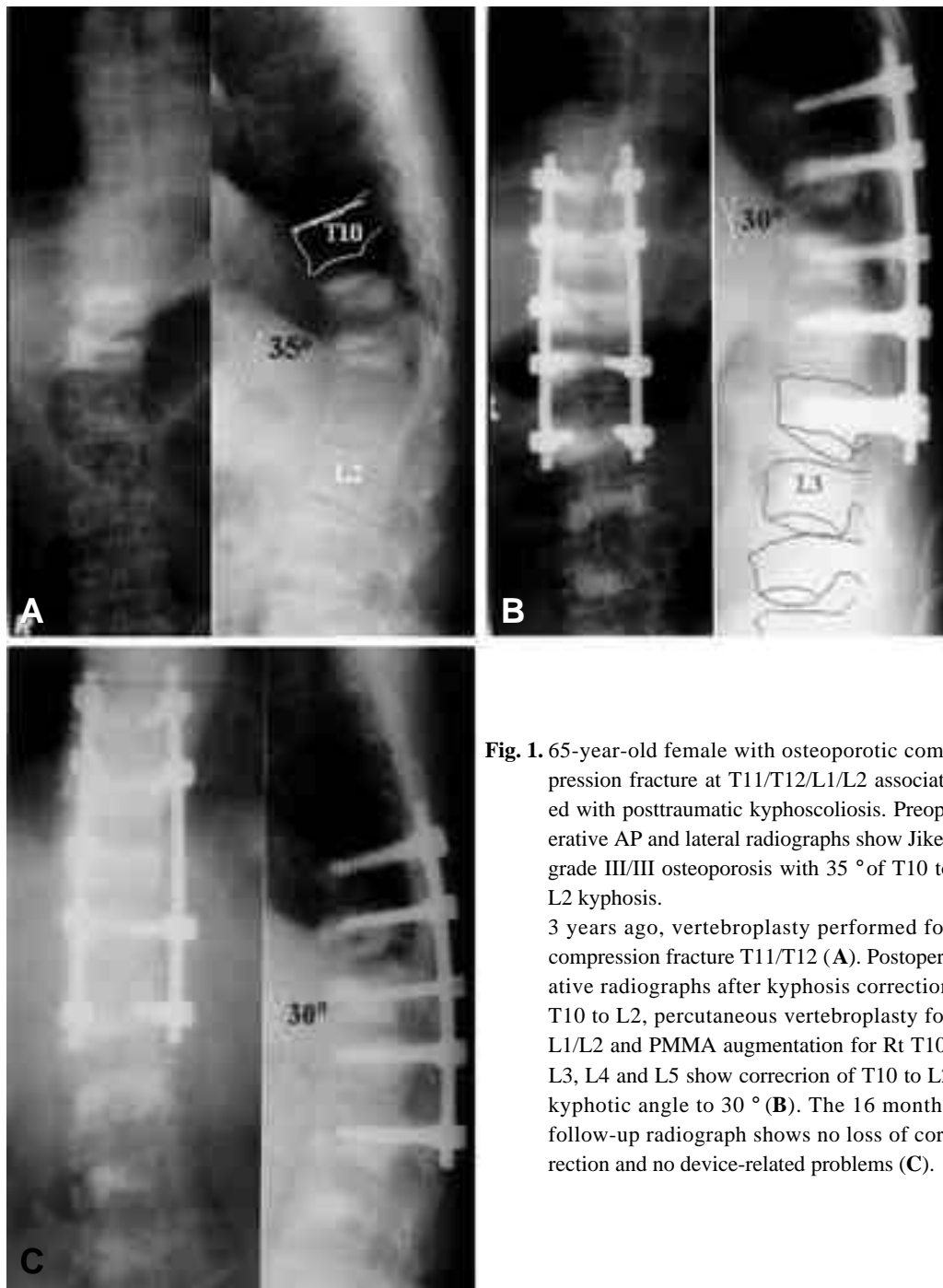


Fig. 1. 65-year-old female with osteoporotic compression fracture at T11/T12/L1/L2 associated with posttraumatic kyphoscoliosis. Preoperative AP and lateral radiographs show Jikei grade III/III osteoporosis with 35 ° of T10 to L2 kyphosis.

3 years ago, vertebroplasty performed for compression fracture T11/T12 (A). Postoperative radiographs after kyphosis correction T10 to L2, percutaneous vertebroplasty for L1/L2 and PMMA augmentation for Rt T10, L3, L4 and L5 show correction of T10 to L2 kyphotic angle to 30 ° (B). The 16 months follow-up radiograph shows no loss of correction and no device-related problems (C).

(Case 1, 6)

1.

33.5 °± 9.3, 22.4 °± 6.9, 24.7 °± 6.8

(Case 2,

11.1 °

(p<0.05)

2.3 °(p>0.05)

4 °

(Table 2).

13).

가

2.

, 가
(frozen

cancellous chip allograft)

가

3

5

, 4

9

3.6

8

12

Kumano⁴⁾

8 (57%),

5 (36%),

1 (7%)

1

4

(Case 1),

1 (Case 4)

4

2.

pullout

(Table 3).

Cobb

가 4

Kumano⁴⁾

가

가

(,)

(good),

(fair),

(poor)

가 가

가

가

가

(radiolucent

halo)

1).

Mann-Whitney

method

Table 2. Kyphotic Angle Correction

	Pre- Op	Post-Op	Last F/U
Mean KA	33.5 °	22.4 °	24.7 °
KAC* Gain	(11.1 °)	(-2.3 °)	

KA : kyphotic angle

KAC* : kyphotic angle correction

Table 3. Postoperative Complication(N=14)

	Perioperative	During F/U
Upper GI bleeding	1	
Compression fracture below fused segment		1
Screw pullout	none	none
Total	1 (7.1%)	1 (7.1%)

