

. . # . # . #
 , #

Comparative Analysis of Unstable Burst Fracture According to the Methodology of Surgical Treatment

Ye-Soo Park, M.D., Yee-Suk Kim M.D., Chang-Nam Kang M.D.#,
Choong-Hyeok Choi M.D.#, Jae-Lim Cho M.D.#

Department of Orthopedic Surgery, Guri Hospital, Hanyang University College of Medicine, Guri, Korea
Department of Orthopedic Surgery, Hanyang University College of Medicine, Seoul, Korea#

– Abstract –

Study Design: A retrospective analysis of the results of various methodologies for the surgical treatment of an unstable burst fracture with posterior column injuries.

Objectives: To compare the radiological and clinical results in unstable burst fractures, treated with various surgical methodologies (anterior, posterior and combined fusion), and to confirm their efficacy.

Literature Review Summary: Many authors recommended various surgical methods for the treatment of an unstable burst fracture, and of these, combined fusion is recommended for the preservation of stability.

Materials and Methods: A retrospective review of results was carried out on 22 patients, confirmed with an unstable burst fracture associated with a posterior column injury, between Nov. 1996 and Mar. 2003.

The preoperative plane x-ray, CT and MRI, and the last postoperative follow up plane X-ray and CT, in 22 unstable burst fracture patients, were reviewed. The authors looked for laminar fracture, facet injury and inter-spinous widening in the plane x-ray, canal compromise on the CT, and a posterior ligament injury and dural tear on the MRI. The neurological injury was evaluated using the Bardford and McBride criteria and the clinical result with the Denis' pain and work scale.

Results: In the anterior fusion group, the radiological findings showed 3 laminar fractures, 2 facet injuries, 7 inter-spinous widening and 8 posterior ligament injuries. In the posterior fusion group, they showed 5 laminar fractures, 4 facet injuries, 5 inter-spinous widening and 5 posterior ligament injuries. In the combined fusion group, they showed 5 laminar fractures, 4 facet injuries, 4 inter-spinous widening and 5 posterior ligament injuries. The average canal compromise was 54.3% in cases of anterior fusion, 20.9% of posterior fusion and 74% of the combined fusion groups. A dural tear was found in 1 each of the anterior and posterior and 4 of the combined group. From the clinical results, improvements of the neurology in the anterior, posterior and combined groups were 2.0, 1.7 and 1.3 degrees, respectively. From the Denis' pain & work scale better than good degrees were shown in 3 of the anterior, 4 of the posterior and 2 of the combined groups.

Conclusions: In conclusion, there were no differences in the improvements of the neurology and clinical results according to the

Address reprint requests to

Ye-Soo Park, M.D.

Department of Orthopedic Surgery, Hanyang University Guri Hospital,
249-1 Kyomun-dong, Guri city, Kyunggi-do, Korea

Tel: 82-31-560-2316, Fax: 82-31-557-8781, E-mail: hyparkys@hanyang.ac.kr

surgical methodology employed. However, the use of combined fusion is recommended for the preservation of stability in an unstable burst fracture with combined posterior ligament and bony injuries as well as with severe canal compromise.

Key Words: Unstable burst fracture, Surgical methodology

가

가

Denis¹⁾

. McAfee ²⁾

1996 11 2003 3

32

Table 1. Data analysis of all patients

case	Sex/age	Level of Fracture	A	B	C	D	E	F	G	H	I
1	F/33	T12	x	x	x	o	30	P	E	E	P3W3
2	F/36	L2	x	o	o	o	10	P	E	E	P2W2
3	F/22	L1	o	x	o	o	58	A+P	C	D2	P2W5
4	M/46	L2	o	x	o	x	10	P	D3	E	P3W3
5	F/18	L1	x	x	o	o	48	A	E	E	P2W2
6	M/60	L2	o	o	o	x	30	P	E	E	P2W2
7	M/40	L4	x	x	o	o	60	A	E	E	P4W4
8	F/61	L1,L2	x	x	o	o	54	A	E	E	P4W4
9	M/45	T12	x	x	x	o	50	A	E	E	P2W2
10	F/63	L1	o	x	o	o	8	P	E	E	P2W2
11	M/48	L3	o		o	o	70	A+P	D3	E	P2W2
12	M/37	L2	x	x	o	o	50	A	E	E	P2W2
13	F/34	L3	o	o	o	o	90	A+P	C	D1	P2W5
14	M/45	L3	o	o	x	o	90	A+P	D2	D3	P2W5
15	M/65	L4	x	x	x	x	30	P	D2	D3	P2W3
16	M/48	L3	o	x	o	o	50	A	E	E	P3W2
17	M/27	T12	x	x	x	o	10	P	E	E	P3W3
18	M/28	L3	o	o	o	o	60	A	D1	D3	P3W3
19	M/34	L2,3	o	o	o	o	30	P	C	D3	P2W3
20	M/35	L4	o	o	o	o	62	A+P	E	E	P2W2
21	F/38	L2	o	o	o	o	62	A	D2	E	P3W3
22	F/60	L1	o	o	x	x	30	P	E	E	P2W2

A: Laminar fracture

B: Posterior facet injury

C: Inter-spinous widening

D: Posterior ligament injury

E: Canal compromise (%)

F: Methods of operation (A; anterior fusion/P; posterior fusion/A+P; circumferential fusion)

G: Preoperative neurologic status

H: Postoperative neurologic status

I: Pain and Work scale by Denis

22 (Table 1). 3 (37.5%), 4 (44.4%), 2 (40%).

8, 9, 5.

6.2 (5~8), 4.1 (3~6).

가

가

가

Bradford Denis McBride 가 5 (4~6).

1

13, 9, 21 가

가 1 가 41 (18~65), 47 (13~93).

(12 ~ 2) Denis¹⁾ Gertzbein³⁾

62.5% 15 가 3 6, 4

가 2

1 2 가 1, 2 3 가 1

가

가

가

(8) 3 (37.5%), 2 (25%), 가 7 (87.5%), 8 (100%), (9)

5 (55.6%), 4 (44.4%), 가 5 (55.6%), 5

(55.6%) (5)

(100%), 4 (80%), 5 (100%)

가 4 (80%), 5 (100%)

54.3%

(48~62), 20.9% (5~30), 74% (58~90)

1, 1, 3, 2, 3, 가

4, 3~4, 50%

1.7, 1.3 (P2W2)

, Denisa ¹⁰⁾

가 , 가가 가 가 가

Hu ⁴⁾ 가 가

, Bradford McBride⁵⁾ , ,

(69%) Grob ¹¹⁾

74

McAFee ⁶⁾ 49.8

가 ,

Hardarker ⁸⁾ , Gertzbein ¹²⁾ 50%

18 , 81% 1

4.6%

(Fig. 1, 2, 3, 4)

Okuyama ⁷⁾

가 ,

가

Carl ⁹⁾

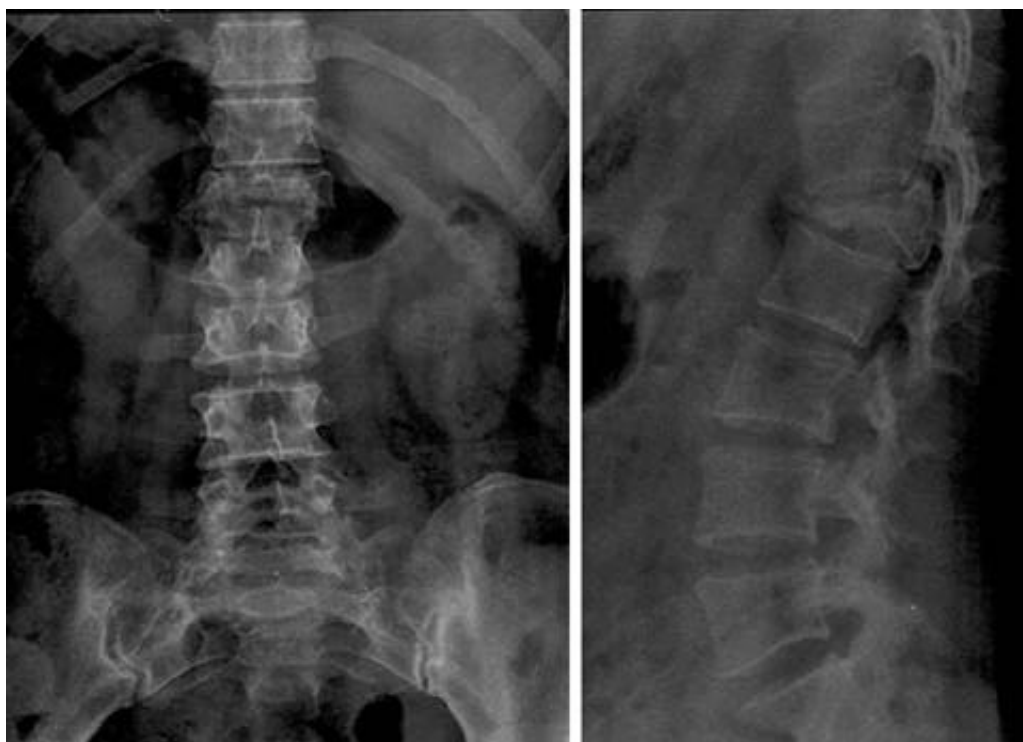


Fig. 1. In simple radiographs, it shows widening of interpedicular distance, collapse of anterior and middle column and interspinous widening.

가 가

가

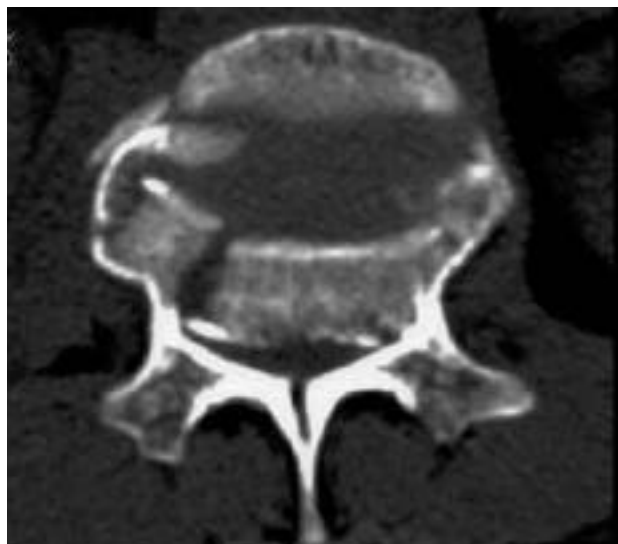


Fig. 2. The CT image shows over 60% encroachment of spinal canal and laminar fracture.



Fig. 3. In MRI, it shows injury of posterior ligament complex.

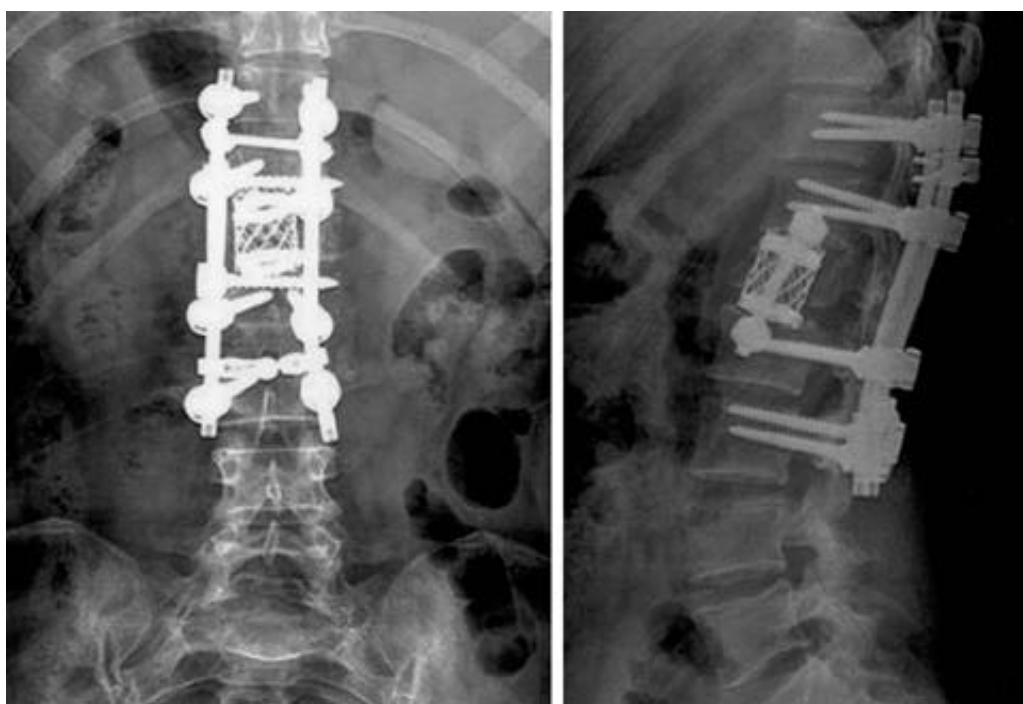


Fig. 4. In follow-up radiographs, it shows circumferential fusion of the unstable burst fracture.

가

- 283 -



:
 .
 : , , ,
 , ,
 : 1996 11 2003 3 22
 , ,
 , , 가 ,
 ,
 Bradford McBride , Denis 가 .
 : (8) 3 (37.5%),
 2 (25%), 가 7 (87.5%), 8 (100%) (9)
 5 (55.6%), 4 (44.4%), 가 5 (55.6%), 5 (55.6%)
 (5) 5 (100%), 4 (80%), 가 4 (80%),
 5 (100%) 54.3%(48~62), 20.9%(5~30),
 74%(58~90) 1 , 1 , 3
 , 2 , 3 , 4 .
 2 , 1.7 , , 1.3 , (P2W2
) 3 (37.5%), 4 (44.4%), 2 (40%)
 :
 가

: ,

249-1

Tel: 82-31-560-2316 Fax: 82-31-557-87814 E-mail: hyparkys@hanyang.ac.kr