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= Abstract =

## Analysis of Cause of Collapse and Non-union After Internal Fixation of Intertrochanteric Fracture

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Sixty-five Intertrochanteric hip fractures were analyzed radiologically to study the factors affecting postoperative stability. Fractures were evaluated by measuring shortening and angulation, collapse of telescoping device when utilized, and migration of the fixation device within the femoral head. Fractures were classified according to their stability preoperatively and the reduction of lesser trochanteric fracture fragment postoperatively. The failure rate and postoperative stability were then compared on terms of severity of osteoporosis, type of fracture, existence of reduction of lesser trochanter fragment

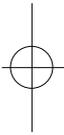
Results indicated that the severity of osteoporosis was not related to the group of fracture, which determines stability of fracture. Regarding the rate of bone union, anatomically reduced

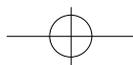
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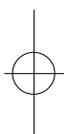




groups showed similar rates of bone union (73.8% in average) and degree of sliding of lag screw (4.13mm in average) regardless of fixation of lesser trochanter fragment. On the other hand, malreduced group which failed to obtain anatomical reduction had 26.1% of bone union rates and 10.95mm of sliding of lag screw representing importance of anatomical reduction rather than fixation of lesser trochanteric fracture.

In conclusion, there was no correlation between severity of osteoporosis and type of fracture. And it is suggested that unstable intertrochanteric fractures accompanied by large lesser trochanteric fracture fragment can be provided stability avoiding major complications such as loosening of implant or collapse of fracture fragment if it is fixed with anatomical reduction of fracture even without the fixation of lesser trochanteric fragment.

**Key Words** :Trochanteric Fracture, Lesser Trochanter Fixation, Compression Hip Screw



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(      )      가      1      가가      65

가      ,      1.4      .

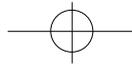
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**Table 1.** Criteria of grouping related to type of fracture and accuracy of reduction

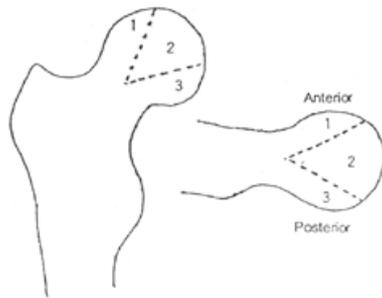
Group	Criteria	No. cases
I	Stable fracture without lesser trochanter fracture Accurate reduction obtained	23
II	Stable fracture with small posteromedial (lesser trochanter) fracture, displacement < 4mm, Accurate reduction obtained	12
III	Unstable fracture with large posteromedial (lesser trochanter) fracture, displacement > 4mm, Accurate reduction obtained	13
IV	Unstable fracture with large posteromedial(lesser trochanter) fracture, displacement > 4mm, Accurate reduction not obtained	17
Total		65





**Table 2.** Singh 's index of each group

Singh 's index	Group I	Group II	Group III	Group IV	Total
I	0	0	0	0	0
II	1	0	1	2	4
III	17	6	5	9	37
IV	3	2	2	2	9
V	2	4	5	4	15
VI	0	0	0	0	0
Total	23	12	13	17	65



**Fig 1.** The position of the tip of the lag screw on the Ap view(left) and the lateral view(right).



**Fig 2.** Measurement of screw shortening by Doppelt's  
 a : screw length on first postoperative radiograph  
 a : screw length on final follow up radiograph  
 b : barrel length on first postoperative radiograph  
 b : barrel length on given radiograph

$$\text{Correction factor (screw lengt)} = \frac{\text{Barrel length on first Postoperative radiograph(b)}}{\text{Barrel length on the given radiograph(b )}}$$

$$\text{screw shortening} = a - (a \times \text{correction factor})$$

(Table 1).

lag screw

Singh 's index<sup>15)</sup>

(Table 2). Lag screw tip

가  
Kyle<sup>11)</sup>

3 lag screw tip

2

(Fig. 1).

lag screw가 plate

barrel

Doppelt<sup>7)</sup>

(Fig.2).

가 22 (33.8%), 가 43 (66.2%) , 42 91

75.2

가 43

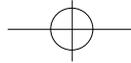
가

13

7 , 5 , 1 ,

3

1



1. 3.86 mm (4mm ) 4.15mm, 4.38mm, 4 10.95mm 1,2,3 가 4 (10.95mm) (p<0.05)(Table 4).

Singh index  
Singh 3 가 37 (56.9%) 가  
, 4 9 (13.8%), 5  
가 15 (23%) Singh index  
(Table 2).

**Table 4.** Degree of impaction(sliding of length of screw) according to each group

Group	Sliding length(mm)
I	3.86
II	4.15
III	4.38
IV	10.95*

\* p<0.05

2. 가 5mm 8( (76.9%) , 65 50 15 (Table 3).

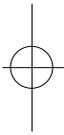
4. 가 가 가  
가  
- 1 -21 (91.3%), -2  
(8.7%), 2 -10 (83.3%), -2  
(16.7%), 3 -12 (92.3%), -  
1 (7.7%), 4 -7 (41.2%), -10  
(58.8%)

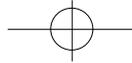
**Table 3.** Bone union rate according to group

Group	Bone Union(+) Non-Union(+)	No. cases (%) No. cases (%)
I	21 (91.3)	2 (8.7)
II	10(83.3)	2 (16.7)
III	12 (92.3)	1 (7.7)
IV	7 (41.2)	10 (58.8)
Total	50(76.9)	15(23.1)

4  
(Table 4).

3. (Lagscrew ) 가  
(Lag screw ) ( 5).  
1.4 ) .





가 ( ) Apel <sup>2)</sup> -

가 가 1) - 57% 가

Fujii<sup>9)</sup> 24 lag screw가 (buttreassing)

Wardle<sup>16)</sup> 가 가 , 가

가 Lag screw 가

Evans<sup>8)</sup> Laros Moor <sup>12)</sup> Boyd-Griffin<sup>4)</sup> Lag screw

(bone stock)

(Lag screw 3.73mm, 88.3% 가

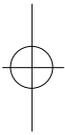
Griffin<sup>4)</sup> 4 Boyd- 10.95mm, 41.2%

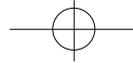
(metal failure), 가

14), 6), 75.2 가

(Wayne County Hospital), 11,13), 가

<sup>3)</sup> Dimon-Hughston<sup>6)</sup> Wayne County<sup>10)</sup> 15 screw 가





screw

screw

screw

screw

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