
< >

:

가

: 1993 3 2000 1

1 가 가 68

Garden stage,

SAS system Fisher exact test, chi-square test,

(logistic regression analysis) p 0.05

:

가

(p = 0.046). Garden stage,

(p > 0.05).

Garden stage (p = 0.028) (p = 0.027)가

logistic regression analysis

:

가

가

:

:

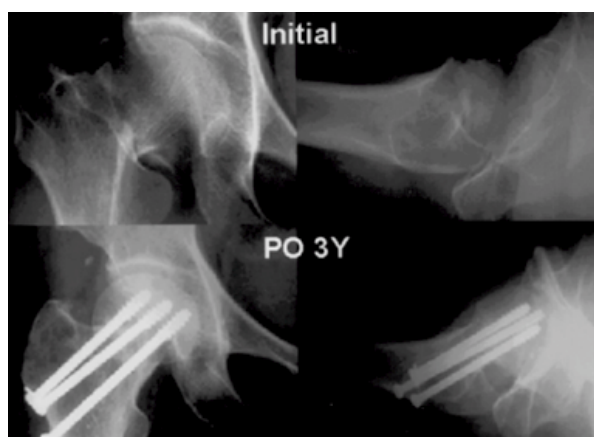
2가 50

TEL: 053-420-5638
FAX: 053-422-6605
E-mail: syukim@knu.ac.kr

				130 - 150		15
				, Garden	가	
				155 - 185		가 5mm
	가	가		13)		
				2		10mm
						5
가		1,2,5,7,8,11,13-15,17,18,21,23)				
가						
cannulated hip screw	Scand pin		가			
			가			
				Garden stage,		
1993	3	2000	1		SAS system	Fisher
	cannulated hip screw	Scand pin	90	exact test, chi-square test,		(logistic
1	9	가	12	regression analysis)		p
			1	0.05		
	1	가 가	68			
			22.5	(12 - 96		
)			50	(14 - 82		
)	가 38	가 30				
	34	13	가 21	68 21 (30.9%)		
				가 14 (20.6%),		
	68 9	Scand pin	, 59	가 7 (10.3%)		6
	cannulated hip screw			- 36	6	
	5			, 2		6
	, 4					
				6 2		
		33	35		3	
	, Garden stage		(I, II)			1
22		(III, IV)	46			
	24		가 41	24	Table 1	
가 27				Garden stage		

Table 1. Complications and affecting factors

Classification		Normal (%)	Failure(%)		Total (%)	p-value
			Osteonecrosis(%)	Nonunion(%)		
Garden stage	I, II (22)	18 (81.9)	3 (13.6)	1 (4.5)	4(18.1)	0.117
	III, IV (46)	29 (63.0)	11 (24.0)	6 (13.0)	17(37.0)	
Interval	Within 24hr (41)	29 (70.7)	8 (19.5)	4 (9.8)	12(29.3)	0.723
	After 24hr (27)	18 (66.7)	6 (22.2)	3 (11.1)	9(33.3)	
Fracture site	Subcapital (33)	21 (63.7)	8 (24.2)	4 (12.1)	12(36.3)	0.342
	Transcervical (35)	26 (74.3)	6 (17.1)	3 (8.6)	9(25.7)	
Reduction	Satisfactory (57)	42 (73.7)	10 (17.5)	5 (8.8)	15(26.3)	0.082
	Unsatisfactory (11)	5 (45.4)	4 (36.4)	2 (18.2)	6(54.6)	
Position of screw	Satisfactory (47)	36 (76.6)	7 (14.9)	4 (8.5)	11(23.4)	0.046
	Unsatisfactory (21)	11 (52.4)	7 (33.3)	3 (14.3)	10(47.6)	

**Fig. 1**

The anteroposterior and lateral radiograph of 54-year old female shows Garden Stage 3 intracapsular femoral neck fracture. The three-year follow-up radiograph shows well united state without avascular change of femoral head and/or redisplacement of fracture.

(I, II) 22 4 (18.1%) , 9 (33.3%)
 (III, IV) 46 17 (37%) .
 33
 (Fig. 1). 12 (36.3%) , 35 9 (25.7%)
 1 6 가
 .
 57 15 (26.3%) , 11
 24 41 12 6 (54.5%)
 (29.3%) , 24 27

가

p 0.082 가 , ,
가
가 가
47 11 (23.4%) , .
21 10 (47.6%)
가
(p=0.046). , Robinson ¹⁹⁾
가
가 가
가 가
(logistic regression analysis) (Table 2).
Table 1 Garden stage, , 가 , ,
, Garden stage , ,
(p value : 0.028, 0.027),
(odds Ratio) 1,2,5,7,8,11,13-15,17,18,21,23).
Garden stage , , 가 가 Thomas ²²⁾
가 6.1 , 가
가 5.8 가 , Alberts ¹⁾
가 1.5 , Lindequist ¹⁴⁾
Garden stage, ,
가 (Table 3).
. Gautam ⁸⁾ 15 - 50
25
4
1878 Langenbeck 가
가 가

	Estimated regression coefficient	Standard error	Odd ratio	Confidence interval	p-value
Garden Stage	1.809	0.822	6.11	1.22 ~ 30.57	0.028
Reduction	0.426	0.799	1.53	0.32 ~ 7.33	0.594
Position of Screw	1.749	0.793	5.75	1.21 ~ 27.21	0.027

	Garden stage	Screw position	Reduction	Probability	Frequency
Group 1	Stable	I	I	0.074	0/10
Group 2	Stable	I	II	0.150	0
Group 3	Stable	II	I	0.230	3/9
Group 4	Stable	II	II	0.397	1/3
Group 5	Unstable	I	I	0.237	11/34
Group 6	Unstable	I	II	0.406	0/3
Group 7	Unstable	II	I	0.537	1/4
Group 8	Unstable	II	II	0.719	5/5

stable : Garden stage I, II unstable : Garden stage III, IV

I : satisfactory II : unsatisfactory

Diagram illustrating a network structure with nodes and edges:

- Nodes: Holmberg, Garden III, IV, Pauwel, Lausten, Park, Garden stage, (predictive probability).
- Edges: Holmberg to Garden III, IV; Garden III, IV to Pauwel; Pauwel to Lausten; Lausten to Park; Park to Garden stage; Garden stage to (predictive probability).

가
가
Gaeden stage III, IV

가

가

가

가 가

- 1) **Alberts KA and Jervaeus J:** Factors predisposing to healing complications after internal fixation of femoral neck fracture. A stepwise logistic regression analysis. Clin Orthop, 257: 129-133, 1990.
- 2) **Alho A, Benterud JG, Ronningen H and Hoiseth A:** Radiographic prediction of early failure in femoral neck fracture. Acta Orthop Scand, 62-5: 422-426, 1991.
- 3) **Min BW, Kang CH and Jung MH:** Femoral neck

fracture fixation. Comparison of dynamic hip screw and cannulated screw fixation. J Korean Orthop Assoc, 34: 365-371, 1999.

- 4) **Christie J, Howie CR and Armour PC:** Fixation of displaced subcapital femoral fracture. Compression screw fixation versus double divergent pins. J Bone Joint Surg, 70-B: 199-201, 1988.
- 5) **Chua D, Jaglal SB and Schatzker J:** Predictors of early failure of fixation in the treatment of displaced subcapital hip fractures. J Orthop Trauma, 12: 230-234, 1998.
- 6) **Clark DI, Crofts CE and Saleh M:** Femoral neck fracture fixation. Comparison of a sliding screw with lag screws. J Bone Joint Surg, 72-B: 797-800, 1990.
- 7) **Elmerson S, Andersson GB, Irtam L and Zetterberg C:** Internal fixation of femoral neck fracture. No difference between the Rydell four-flanged nail and Gouffon's pins. Acta Orthop Scand, 59-4: 372-376, 1988.
- 8) **Gautam VK, Anand S and Dhaon BK:** Management of displaced femoral neck fractures in young adults (a group at risk). Injury, 29-3: 215-218, 1998.
- 9) **Herngren B, Mork-Petersen F and Bauer M:** Uppsala screws or Hanson pins for internal fixation of femoral neck fractures. Acta Orthop Scand, 63-1: 41-46, 1992.
- 10) **Holmberg S, Kalen R and Thorngren KG:** Treatment and outcome of femoral neck fracture. Clin Orthop, 218: 42-52, 1987.
- 11) **Lagerby M, Asplund S and Ringqvist I:** Cannulated screws for fixation of femoral neck fractures. Acta Orthop Scand, 69-4: 387-391, 1998.
- 12) **Lausten GS, Hesse B, Thygesen V and Fog J:** Prediction of late complications of femoral neck fractures by scintigraphy. Int Orthop, 16: 260-264, 1992.
- 13) **Lindequist S, Malmqvist B, and Ullmark G:** Fixation of femoral neck fracture. Acta Orthop Scand, 60-3: 293-298, 1989.
- 14) **Lindequist S and Tornkvist HT:** Quality of reduction and cortical screw support in femoral neck

- fractures. J Orthop Trauma, 9: 215-221, 1995.
- 15) **Martens M, Van Audekercke R, Mulier JC and Stuyek J**: Clinical study on internal fixation of femoral neck fractures. Clin Orthop, 141: 199-202, 1979.
- 16) **Parker MJ and Dynan Y**: Is Pauwels classification still valid? Injury, 29-7: 521-523, 1998.
- 17) **Rehnberg L and Olerud C**: Subchondral screw fixation for femoral neck fractures. J Bone Joint Surg, 71-B: 178-180, 1989.
- 18) **Rehnberg L and Olerud C**: Fixation of femoral neck fractures. Acta Orthop Scand, 60-5: 579-584, 1989.
- 19) **Robinson CM, Saran D and Annan IH**: Intracapsular hip fractures. Results of management adopting a treatment protocol. Clin Orthop, 302: 83-91, 1994.
- 20) **Park SW, Han SB, Lee SH, Chung WK and Wong SY**: The effectiveness of Bone Scintigraphy of femur neck fracture. J Korean Orthop Assoc, 14: 323-330, 2001.
- 21) **Schek M**: The significance of posterior comminution in femoral neck fractures. Clin Orthop, 152: 138-142, 1980.
- 22) **Thomas JG, Sledge JB, Ekkernkamp A and Reinhold G**: Intraoperative assessment of femoral head vascularity after femoral neck fracture. J Orthop Trauma, 12-7: 474-478, 1998.
- 23) **Weinrobe M, Stankewich CJ, Mueller B and**

Abstract

Complications and Affecting Factors for Intracapsular Femoral Neck Fractures Treated by Multiple Pinning

Sung Jung Kim, M.D., Shin Yoon Kim, M.D., Gi Bong Cha, M.D.,
Chang Wug Oh, M.D., Il Hyung Park, M.D., and Joo Chul Ihn, M.D.

*Department of Orthopedic Surgery, School of Medicine, Kyungpook National University
Hospital, Daegu, Korea*

Purpose: To investigate the relationship between the complications of intracapsular femoral neck fractures treated by multiple pinning and several affecting factors.

Materials and Methods: Sixty-eight patients with intracapsular femoral neck fractures were treated by multiple pinning from March 1993 to January 2000 and followed at more than one year. Relationship between the complications such as failure of union, collapse of femoral head due to osteonecrosis of femoral head and several affecting factors including displacement of fracture according to Garden stage, state of reduction, position of screws, time interval from injury to operation, and fracture level were analyzed. The Fisher exact test, chi-square test, and multivariate logistic regression analysis were used to find the relevant factors influencing incidence of complications. Statistical significance was set at $p < 0.05$.

Results: Position of screw was the most important single factor affecting the results of treatment of intracapsular femoral neck fracture ($p=0.046$). Moreover, the Garden stage and position of screw were revealed affecting the incidence of complications together with other factors (each p value was 0.028 and 0.027).

Conclusion: We considered that satisfactory position of screw was important to reduce complications after multiple pinning for intracapsular femoral neck fracture. And the results of operation also seemed to closely relate with multiple factors including Garden stage and status of reduction.

Key words: Intracapsular femoral neck fractures, Multiple pinning, Complications, Affecting factors

Address reprint requests to _____

Shin-Yoon Kim, M.D.

Department of Orthopedic Surgery, School of Medicine,
Kyungpook National University Hospital, 50 Sam-Duck 2 Ga
Daegu, 700-721, Korea

Tel: +82-53-420-5635 Fax: +82-53-422-6605

E-mail: syukim@knu.ac.kr