

대퇴 간부 골절에 대한 폐쇄적 골수강 내 금속정 고정술 후 단축 및 회전 변형의 정도 - Winquist-Hansen 분류에 따른 분석 -

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목 적: 대퇴 간부 골절에서 폐쇄적 골수강 내 금속정 고정술 후 단축 및 회전 정도를 Winquist-Hansen 분류에 따라 분석하고 이를 줄이기 위한 방법에 대해 분석하였다.

대상 및 방법: 2000년 1월부터 2005년 8월까지 본원에 내원한 대퇴 간부 골절을 폐쇄적 골수강 내 금속정 고정술로 치료한 환자 중 12개월 이상 추시가 가능한 98명 중, 술 전, 술 후 회전 정렬을 측정하였던 45예 및 orthoradiogram을 측정한 55예를 대상으로 하여, 이들의 회전 변형 및 단축 변형, 기타 합병증 등에 대해 분석하였다.

결 과: Winquist-Hansen 분류에 따른 회전 변형의 정도는 제1형에서 3.7°, 제2형에서 4.0°, 제3형에서 7.2°, 제4형에서 8.9°로 측정되었다. 양측 전염각의 차이가 15° 이상인 경우가 총 10예에서 나타났는데, 이 중 9예는 Winquist-Hansen 분류 3형, 4형이었다. 단축변형의 경우 제1형에서 3.2 mm, 제2형에서 5.1 mm, 제3형이 12 mm, 제4형이 14.2 mm로 하지 길이가 건측에 비해 2.0 cm 이상의 단축을 보이는 경우가 9예에서 있었으며, 모든 예에서 Winquist-Hansen 분류 3형, 4형이었다.

결 론: 분쇄 정도가 심한 Winquist-Hansen 분류 3, 4형 골절의 환자들은, 폐쇄적 골수강 내 금속정 고정술을 이용하여 치료할 경우 회전 및 단축 변형이 쉽게 발생할 수 있으므로 이를 예방하기 위해서 술 중 건측의 전염각 및 장축의 길이를 정확히 측정하여야 한다.

색인 단어: Winquist-Hansen, 폐쇄적 골수강 내 금속정, 회전 변형, 단축 변형

The Shortening and Rotational Deformity after Closed Intramedullary Nailing of Femur Shaft Fracture - According to Winquist-Hansen classification -

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Purpose: This study evaluated the shortening and rotational deformity after closed intramedullary nailing of femur shaft fracture according to Winquist-Hansen classification type.

Materials and Methods: This study was based on 98 cases who received closed intramedullary fixation about their femur shaft fractures between January 2000 and October 2005 with minimum 12 months follow up. The rotational deformity was analysed by Yang's method (45 cases) preoperatively and postoperatively, and the shortening by orthoradiogram (55 cases). Furthermore we analysed other complications, for example nonunion, infection, and metal failure.

Results: We found more than 15 degrees anteversion difference of both femurs in 10 cases. Among them, 9 cases were classified to type 3, 4. According to Winquist-Hansen classification, rotational deformity ranged from 3.7° (Type 1) to 8.9° (Type 4). More than 2 cm leg length discrepancy (LLD) was found in 9 cases, all of them were classified as Winquist-Hansen classification type 3, 4. In the type 1, LLD was checked as 3.2 mm and type 4, 14.2 mm.

Conclusion: To prevent the shortening and rotational deformity after intramedullary fixation of Winquist-Hansen classification type 3, 4 femur shaft fracture, intraoperatively the exact contralateral femoral anteversion and length should be checked.

Key Words: Winquist-Hansen, Intramedullary fixation, Rotational deformity, Shortening

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서 론

1940 Kuntscher가^{9,10,15,17)} 17, 14 가 가 (rotational alignment) 1998 Yang²⁰⁾ 67 ,
 가 ,
 .
 . Braten²⁾ 15° (rotational alignment) (Fig. 1, 2).
 19% Winkist 245 7 (3%)¹⁶⁾ 2 cm
 Win-
 quist-Hansen^{14,17)} ,
 . 10
 Steinmann

대상 및 방법

2000 1 2005 8
 12 가 가 98 (Winkist-Hansen
 1 34 , 2 25 , 3 24 , 4 15) ,
 45
 orthoradiogram 55
 35 , 12 (rotational align-
 54 . 98 ment) , orthoradiogram
 19 1/3 , 56 1/3,
 23 1/3 . 12 , Braten²⁾ (Table 1)



Fig. 1. Lt knee true lateral view is set to both femoral condyle parallel on the ground.



Fig. 2. Axial view of Lt hip is checked under Lt knee in true lateral state



Fig. 3. Orthoradiogram shows the leg length discrepancy.

Table 1. Difference in anteversion angle (Braten et al 1992)

<10°	No significant torsional deformity
10 to 14°	Possible torsional deformity
>15°	True torsional deformity

15°
가 2.0 cm 가
6
13,18)
결 과
98 53 가
가 45
0° 22° 6.3° , 10°
22 , 10~14° 13 , 15° 10
1/3
8.7° , 1/3 6.2° , 1/3
5.7° 1/3 가
(p=0.08).
10 가 5.4°
Winkvist-Hansen

1 3.7°, 2 4.0°, 3 7.2°, 4
8.9° , t- 1 2
(p=0.067), 2 3 4
가 (p=0.015).
55 ortho-
radiogram 0 41 mm 9.3 mm
. 33 1 cm , 1~2.0 cm 13
, 9
10 5 mm 가
가
Winkvist-Hansen
1 3.2 mm, 2 5.1 mm, 3 12 mm,
4 14.2 mm 4 가
t- 1 2
(p=0.077), 2 3 4
가 (p<0.001).
2 ,
가 15 ,
2
고 찰

(interlocking nailing)
,
(static and dynamic interlocking nailing)
,
1~2% 가
3,11)
가
가
가
15.3° 10°
Dunlap 4)
roentgenography), Braten 1)
12) 1,10)
Braten 1) , 15°

, 15°
 . 1995 Kim¹⁰⁾
 15 6
 15° 가 ,
 , 1998
 Yang²⁰⁾ 43 4 15° 가
 . Eckhoff⁵⁾
 가
 ,
 .
 45 10
 15° , 9 Winkist-
 Hansen 3 , 4 1, 2
 . Yang²⁰⁾
 가
 ,
 가 10
 가
 .
 5.4° 가
 Winkist-Hansen 3
 ,
 가
 3 , 4
 10.5° 가
 ,
 Giles Taylor⁷⁾ 7% 1 cm
 .
 1~1.5 cm
 , 2 cm
 가
 ,
 .
 (Spine-Malleolar Distance)
 scanogram,
 scanogram
 scanogram
 (reference point marking)
 가
⁸⁾ Braten
 3.4% (19) 2 cm

, 16
 Wolinsky 515
 5
 54 9 2 cm
 Winkist-Hansen 3 , 4
 5 mm
 19)
 .
 1
 가
 .
 가
 , Gibson 5 cm
 (<21) 10
 15 1 shoe raise
 ,
⁶⁾ Gile
 10 mm
 10% , 18.3%
 10 mm
 ,
⁷⁾
 10
 가 Winkist-Hansen 3
 , 가
 가 가
 ,
 가 가
 ,
 .

결 론

가 Winkist-Hansen 3, 4
 ,

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