Case Report
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FEMORAL NECK ROTATIONAL OSTEOTOMY FOR FEMORAL HEAD OSTEONECROSIS FICAT ARLET STAGE III: A CASE REPORT

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ABSTRACT

Femoral Neck Rotational Osteotomy (FNRO) is an advanced surgical technique designed to address femoral head osteonecrosis, particularly in young patients where hip preservation is critical. This case report discusses the successful application of FNRO in a 17-year-old female patient presenting with severe left hip pain and femoral head collapse, diagnosed as Ficat-Arlet stage III osteonecrosis. The surgery involved a precise osteotomy at the femoral neck base with careful preservation of the blood supply, achieved through circumferential release of the capsule and retinaculum. Postoperatively, the patient demonstrated significant improvement in hip motion and pain relief, as confirmed by radiographic and clinical assessments. FNRO presents distinct advantages over traditional methods, including enhanced exposure, stable fixation, and the potential for early rehabilitation. However, further research is necessary to evaluate long-term outcomes.

Keywords: Femoral neck rotational osteotomy, femoral head osteonecrosis, hip preservation, avascular necrosis, surgical technique.

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INTRODUCTION

Hip preservation surgery is preferred but remains a challenge for young patients with avascular necrosis of the femoral head (AVN) (1). Since the necrotic portion was moved away from the weight-bearing region, good results of trans trochanteric rotational osteotomy (TRO) and trans trochanteric curved varus osteotomy (TCVO) have been reported by Japanese surgeons after long-term follow-up. Two surgical techniques were emphasized for success of the osteotomy.

First, the transposed intact area should be more than 36% of the weight-bearing region (1,2). Second, the blood supply of proximal femur, especially the branches of the medial femoral circumflex artery (MFCA), must be carefully protected during osteotomy and transposition. Achieving these conflicting goals was a challenge for surgeons. Excessive rotation would tighten the retinaculum that contains the blood supply of proximal femur, and most complications and failure of this procedure are related to its technically demanding nature and the poor fixation stability provided by the screws, causing delayed union and increased varus (2).

Based on this point of view, The retinaculum was released during the surgery, and rotational osteotomy was performed at the base of the femoral neck. Femoral neck rotational osteotomy is a method of surgery through surgical hip dislocation .by circumferential release of capsule and retinaculum, femoral neck osteotomy was performed at the base of femoral neck just 1,5 cm above lesser trochanter. FNRO through surgical hip dislocation had the advantages of safe exposure, direct visualization of necrotic lesion and high reorientation of healthy bone and articular cartilage on femoral head Case report A 17-year-old female came to the hospital with a major complaint of left hip pain which had occurred 1 year ago.

The pain was severe when the patient walked. The patients walked with an assistive device. Physical examination revealed positive tenderness in the anterior and posterior hip joints. Plain Pelvic AP view radiograph showed collapse of the left head femoral (3). The patient had a femoral neck rotational osteotomy after being informed and was positioned right lateral decubitus under spinal anesthesia. Lateral, straight, longitudinal skin incision of 12 to 17 cm was made, depending on the size and weight of the patient (4,5).

The incision was centered over the greater trochanter and extended from 5 cm below the vastus lateralis ridge of the greater trochanter to 5 to 7 cm proximal to the greater trochanter. We used a posterior approach to the hip joint (Kocher Langenbeck). The short external rotator muscles, except the quadratus femoris, were completely transected. The joint capsule was T incised close to the acetabular rim. Drill k-wire 1.4 mm at the basis neck femur start from neck femur at the greater trochanter side to neck femur at the lesser trochanter side. Osteotomy the basis neck femur distal and pararel from

Kwire. use K-wire as a joystick to rotational neck femur from superior part (collapse area) to inferior part.

PRESENTATION OF CASE

A 17-year-old female presented to the hospital with a serious complaint of left hip discomfort that had occurred one year previously. When the sufferer walked, the pain was excruciating. The patients walked with the assistance of a walker. Physical examination revealed anterior and posterior hip joint pain. The collapse of the left head femoral was visible on a plain Pelvic AP view radiograph. After being told, the patient underwent a femoral neck rotational osteotomy and was positioned right lateral decubitus under spinal anesthetic (Table 1.). Depending on the patient's size and weight, a lateral, straight, longitudinal skin incision of 12 to 17 cm was created. The incision was made over the greater trochanter and prolonged from 5 cm below the vastus lateral ridge to 5 to 7 cm proximal to the greater trochanter. We approached the hip joint from the back (Kocher-langenbeck).

Except for the quadratus femoris and obturator internus muscle, the short external rotator muscles were totally transected. Close to the acetabular rim, the joint capsule was T incised. Drill 1.4 mm k-wire at the base of the neck femur, starting from the greater trochanter side and working your way down to the lesser trochanter side (Table 2.). Distal and parallel osteotomy of the neck femur from the K-wire Use K-wire as a joystick to rotate the neck of the femur from the superior (collapse area) to the inferior section.

Table 1. Pre operation measurement motion

Motion	Pre operation
Flexion	Cannot evaluation due to pain
Extension	Cannot evaluation due to pain
Abduction	Cannot evaluation due to pain
Adduction	Cannot evaluation due to pain
External Rotation	Cannot evaluation due to pain
Internal Rotation	Cannot evaluation due to pain

Table 2. Post operation measurement motion

Motion	Post operation
Flexion	100°
Extension	5°
Abduction	45°
Adduction	5°
External Rotation	10°
Internal Rotation	5°

Figure 1. Pre operative radiograph

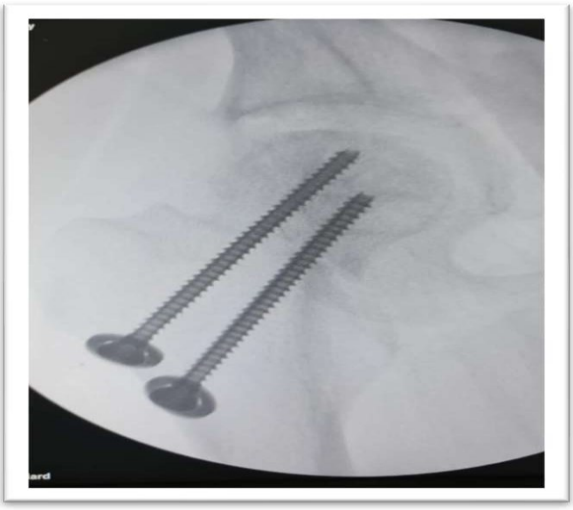

Figure 2. Post operative radiograph after the procedure

(A)

(B)

Figure 3. (A). Process procedure Incise, (B) Process procedure osteotomy.

(A) (B)

Figure 4. (A) Post op 5 months with partial weight bearing, dan (B) Post operation 12 months with full weight bearing.

DISCUSSION

Femoral neck rotational osteotomy is a method of surgery through surgical hip dislocation by circumferential release of capsule and retinaculum, femoral neck osteotomy was performed at the base of femoral neck just 1,5 cm above lesser trochanter.

FNRO through surgical hip dislocation had the advantages of safe exposure, direct visualization of necrotic lesion and high reorientation of healthy bone and articular cartilage on femoral head. When compared to the original TRO approach, a FNRO has various advantages (Figure 1.). The greater trochanter does not need to be detached and reattached. As a result, there is no need for concern for larger trochanter nonunion. The quadratus femoris is not separated either. FNRO can be combined with other operations such as a muscle-pedicle-bone transplant (Figure 2.). Sugioka's postoperative therapy includes continuous skin traction for one week, followed by overnight skin traction for another two weeks.

Within two weeks of surgery, active hip exercises started. Early rehabilitation is possible in our series since skin traction is not required postoperatively, and our patients begin hip mobilization exercises the day following surgery (Figure 3.). Subsequent THA may be easier since the anatomy of the greater trochanter is not altered and the quadratus femoris is not separated, which may be significant for circulation preservation. When the posterior branch of the medial circumflex artery is damaged during surgery, circulation may be preserved via the quadratus femoris.

According to one study, quadratus femoris muscle-pedicle-bone grafting could be used to treat displaced femoral neck fractures because the muscle's microcirculation would presumably offer more blood flow through the quadratus femoris muscle (Figure 4.). Our study is restricted by the short duration of follow-up. Longer follow-up would be required in this patient population to evaluate the true survivability of this surgery.

CONCLUSIONS

FNRO has the advantages of safe exposure, maintaining blood supply, no concern about nonunion of the greater trochanter, the ability to combine additional procedures such as muscle pedicle-bone graft with FNRO, probable early recovery, and subsequent THA may be easier. More research is needed to assess the long-term outcome of FNRO.

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