Case Study:

The Simple and Accurate Cup Setting with Portable Navigation System in Total Hip Arthroplasty

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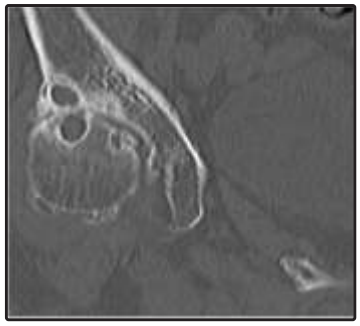
OrthAlign

precise · alignment · simplified

Pre-op AP X-ray



Pre-op CT

Introduction

The patient is a 78-year-old female who suffered from right hip pain. She also presented left hip pain but it's milder than right hip pain. Due to this pain, she presented antalgic gait, or right protective limping gait. She started to feel persistent pain 5 years ago and it gradually worsened. She had no past medical history of developmental hip dysplasia in her infancy.

Presentation

She presented positive Patrick's test bilaterally. She felt tenderness in the right side of Scarpa's triangle region. Her hip joint ROMs were slightly restricted bilaterally.
X-rays showed gross loss of joint space and osteophyte formation in bilateral side of hip joint. CT scans revealed bone cysts formation in both acetabulum and femoral head in her right hip joint.

Pre-op Plan

We had no choice other than to perform total hip arthroplasty (THA) to relieve the pain. Needless to say, accurate setting of acetabular cup was ciritical, especially since this patient hadh relatively weak muscle strength to avoid THA dislocation. Actually we'd been looking for better way than using ordinary "cup alignment guide" because we'd experienced some cases with incorrect cup anteversion with the guide. In addition, we couldn't afford to use ordinary intraoperative navigation system because of its larger cost. Therefore the decision was made to proceed with OrthAlign navigation for this case.

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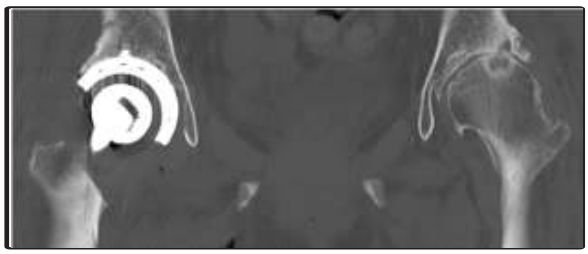
Operative Findings and Approach

Post-op AP X-ray

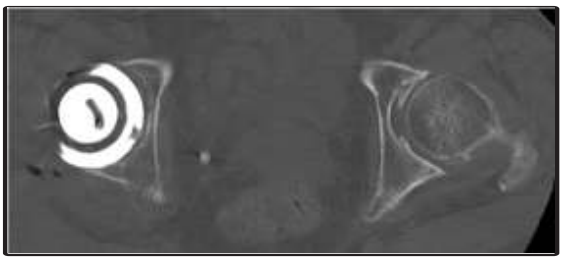
The patient was set in a decubitus position and posterior approach was used. We found bone cysts both in acetabulum and femoral head as CT scans had shown pre-operatively. Femoral neck was cut at 1.5cm above lesser trochanter and removed. Autograft bone grafting was performed to fill the bone cyst in the acetabulum with cancellous bone from her removed femoral head. After reaming with 49mm-reamer, 50mm cementless acetabular cup was attached into the reamed acetabulum by using HipAlign system targeting 40° inclination and 15° anteversion. Femoral stem was fixed with acrylic bone cement and dualmobile hip system was used. We finished the surgery after checking the stability of the hip joint. Duration of surgery was 106min. Intraoperative blood loss was 200mL.

Follow-up

At her 3 month post-operative visit, she was doing well and she felt no pain in her right hip. Acetabular cup setting was measured with post-operative X-rays. Radiographic inclination was 38°, which is 2° smaller than the aiming angle. Radiographic anteversion was 18°, which is 3° larger.



Post-op AP CT



Post-op Transverse CT

Discussion

As far as the result of this case showed, acetabular cup setting was so accurate that the errors in inclination and anteversion were within 3° compared with intraoperative aiming angle. Of course this is one of the most accurate results in our starting 30 cases of HipAlign experience, the mean differences between post-operative angle and aiming angle were 3.23° in inclination and 4.16° in anteversion with these 30 cases (data not shown). To obtain these accurate results, we spent only 3 minutes of extra operating time compared with 30 cases of THAs without using HipAlign. (data not shown). If a surgeon pursues more accuracy than one can achieve in the present day, it's better to use larger scale devices such as CT-based navigation system, however, that it is expensive and requires extra time in the surgery. That's a problem of "trade-off". After experiencing 30 cases of THAs with HipAlign, we realized that the system is a reliable method to resolve this trade-off problem.