



Case report

Late posterior hip instability after lumbar spinopelvic fusion

Colin A. Mudrick, MD, J. Stuart Melvin, MD, Bryan D. Springer, MD *

OrthoCarolina Hip & Knee Center, Charlotte, NC, USA

ARTICLE INFO

Article history:

Received 9 March 2015

Received in revised form

4 May 2015

Accepted 7 May 2015

Available online 19 June 2015

Keywords:

Total hip arthroplasty

Hip dislocation

Instability

Lumbar fusion

ABSTRACT

The kinematic relationship between the hip and the axial skeleton is dynamic and can be variable based on individual anatomy. It has been shown [1] that pelvic incidence (sacral slope + pelvic tilt) can be used as a proxy to determine the ability of the pelvis to accommodate changes in sagittal balance. Individuals have varied pelvic incidence and thus may adapt differently degenerative and/or iatrogenic to changes that occur in the axial spine. This is a case report in which surgical changes to the lumbopelvic spine resulted in chronic posterior periprosthetic hip instability. The focus of this discussion reflects the intimate relationship between the hip and spine and highlights the role between sagittal balance and acetabular version, specifically as it pertains to total hip arthroplasty.

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Introduction

Instability after primary total hip arthroplasty remains a common reason for revision [2]. Contributing causes include patient specific factors [3–5], surgical technique [5,6], and implant choice [7,8]. Patient factors such as age, gender, obesity, cognitive disability and neuromuscular disease as well as previous hip surgery have all been reported to be potential risk factors for post-operative instability [5,9–13]. Surgical technique is paramount to decreasing the risk of dislocation however there is controversy as to the ideal positioning of implants, approach, and soft tissue management [6,14]. With improvement in the production of bearing surfaces and the use of alternative materials such as ceramics, it has been suggested that osteolysis related failures have the potential to decrease [15–17]. Recently, biomechanical analysis and advanced imaging have given us a better understanding of the relationship between spinal sagittal balance and acetabular orientation. Acetabular placement is often based on a standing AP pelvis film taken pre-operatively in conjunction with intra-operative landmarks. The standing radiograph provide a snapshot of native acetabular version

which is in part determined by lumbar lordosis and can be used to help guide implant version. Sagittal balance however, changes over time through degenerative changes in the spine as well as iatrogenically from spinal fusion. In addition, the dynamic relationship between the spine and the pelvis during positions such as sitting and standing must be taken into account. The focus of this report is to describe a case of posterior hip instability following a change in sagittal balance resulting from a spinopelvic fusion.

Case history

A seventy-three year old female underwent left primary total hip arthroplasty through a posterior approach for end stage coxarthrosis secondary to femoral dysplasia and concomitant inflammatory arthropathy (Figure 1). Pertinent medical history included rheumatoid arthritis, type 2 diabetes, chronic obstructive pulmonary disease, and depression. Her prior surgical history included an L3–L5 posterior lumbar interbody fusion four years prior for degenerative spondylolisthesis with lumbar stenosis. She had an uneventful post-operative course following her left hip arthroplasty and progressed well with physical therapy. At her one and three-month follow up visits she stated that her left groin pain that she complained of prior to surgery had completely resolved.

The patient did, however continue to have discomfort in her lumbar spine as well as bilateral buttocks which continued to worsen over the following two years. Lateral lumbar spine radiographs revealed progressive proximal junctional kyphosis but she remained very satisfied with her hip surgery (Figure 2). After failure

One or more of the authors of this paper have disclosed potential or pertinent conflicts of interest, which may include receipt of payment, either direct or indirect, institutional support, or association with an entity in the biomedical field which may be perceived to have potential conflict of interest with this work. For full disclosure statements refer to <http://dx.doi.org/10.1016/j.artd.2015.05.002>.

* Corresponding author. 2001 Vail Avenue, Suite 200A, Charlotte, NC 28207, USA. Tel.: +1 704 323 3836.

E-mail address: bryan.springer@orthocarolina.com

<http://dx.doi.org/10.1016/j.artd.2015.05.002>

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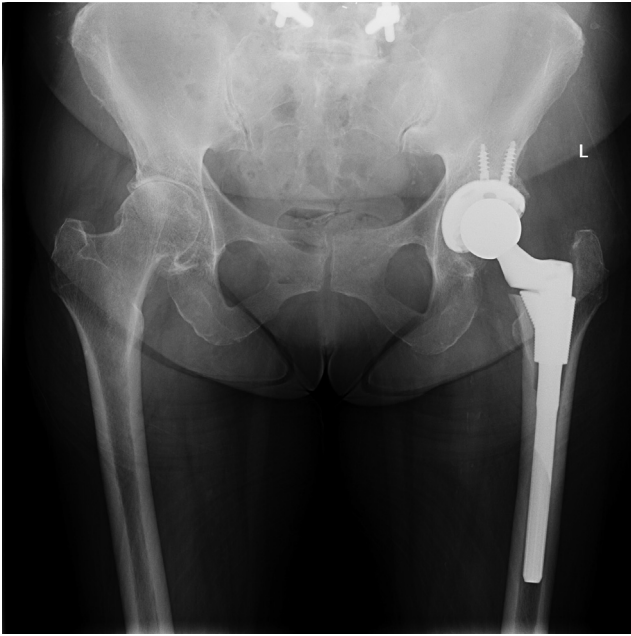


Figure 1. Standing AP pelvic radiograph after left total hip replacement.

of all conservative management, she underwent revision lumbar surgery with an L3 pedicle subtraction osteotomy and instrumented fusion from T10 to ilium three years after her primary total hip arthroplasty (Figure 3). She was discharged home and had an uneventful postoperative recovery. However, five weeks after spine



Figure 2. Standing lateral radiograph of the lumbar spine demonstrating previous L3 to L5 posterior fusion and development of adjacent segment disease and junctional kyphosis at L2.

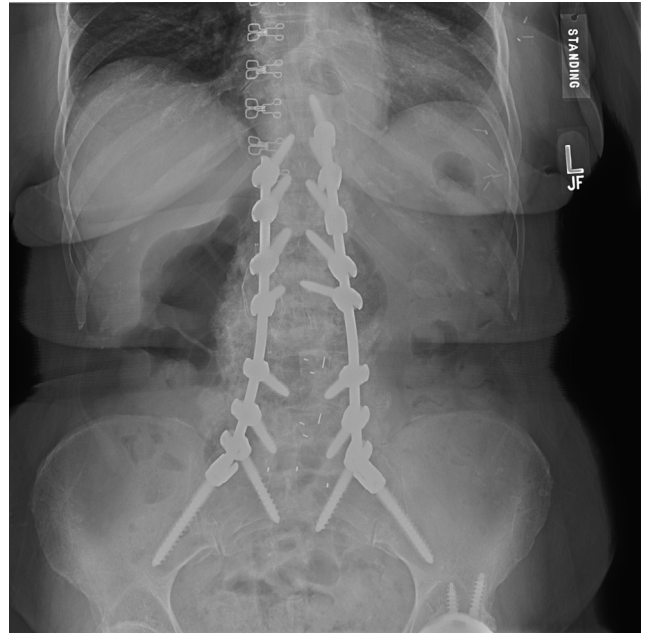


Figure 3. Standing AP Spine radiographs following instrumented T10 to Ilium fusion.

surgery she sustained a posterior left hip dislocation while squatting in her bathroom (Figure 4). She underwent closed reduction under anesthesia and was placed into a knee immobilizer. Her knee immobilizer was removed after 4 weeks and she presented two weeks thereafter with a subsequent posterior dislocation which was also closed reduced. The only pertinent change in this patient's history over this timeline was her revision lumbar pelvic fusion resulting in a fixed, increased lumbar lordosis. A long discussion was held with her and together we elected to attempt continued conservative management. Despite a soft abduction brace and reinforcement of posterior hip precautions she sustained three additional dislocations over the following two months. At this point revision surgery was again discussed and the patient elected to proceed.

Surgical options that were discussed with the patient included increasing the version of her modular stem and the use of a face changing liner versus acetabular revision with the potential for a dual mobility cup and/or a constrained liner. At the time of surgery,

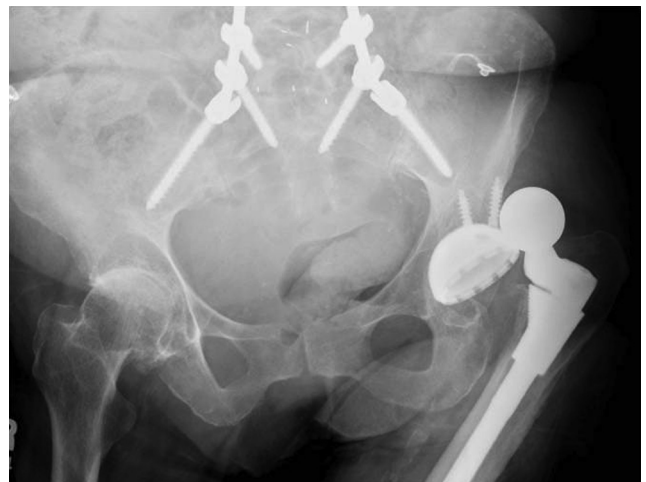


Figure 4. AP pelvic radiograph rays following posterior hip dislocation five weeks after lumbopelvic fusion.

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