Clinical Faceoff

Clinical Faceoff: Anterior Total Hip Versus Mini-Posterior: Which One is Better?

B. Sonny Bal MD, JD, MBA

Anterior hip replacement surgery was a novelty only a few years ago, promoted by some early-adopter surgeons. Currently, the operation has found a wider audience both among private practice surgeons and academic medical centers. Residents and fellows are learning anterior hip replacement as a standard method; peer-review articles have appeared in the literature supporting

improved early outcomes, and educational meetings are increasingly including anterior hip replacement techniques in their teachings. Accordingly, we have devoted this article to a debate about the pros and cons of anterior hip replacement. The participants are Drs. Thomas Sculco, and Kristaps Keggi. Both surgeons have an interest in less-invasive approaches to THA, although their perspectives on how to achieve this certainly differ.

Dr. Sculco has extensive experience with the mini-posterior technique of total hip replacement, and he has published his results in terms of accelerated recovery, shorter incisions, and patient satisfaction with this method [3]. He has advocated this method as a safe and reliable technique that is more readily learned by surgeons already experienced with posterior hip surgery [6]. Dr. Sculco is the Surgeon-in-Chief and Korein-Wilson Professor of Orthopaedic Surgery

at Hospital for Special Surgery, and the Chairman for the Department of Orthopaedic Surgery and Professor of Orthopaedic Surgery at Weill Cornell Medical College, New York City.

Dr. Keggi was an advocate of anterior hip surgery well before the operation gained its current popularity. He is the Elihu Professor of Orthopaedics and Rehabilitation in the Department of Orthopaedic Surgery at the Yale School of Medicine in New Haven, Connecticut. He has published extensively on the subject, and has extended the technique well beyond primary hip replacement, to revision, and complex reconstructions [4, 5].

It is my pleasure to introduce these premier surgeons to the Clinical Faceoff section of *CORR*®, and to enjoy their insights about less-invasive approaches to total hip surgery.

B. Sonny Bal MD: *Hip replacement is already a successful operation. What are the relative advantages of the anterior approach versus the mini-posterior approach for primary total hip replacement?*

Kristaps Keggi MD: Total hip replacement has been called the operation of the 20th century. When it was introduced in the United States 45 years ago, total hip replacement

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Clinical Faceoff

rapidly replaced most of the previous procedures performed for a variety of hip deformities and diseases. It was performed through a transtrochanteric approach, but within months, other less invasive methods not requiring the trochanteric osteotomy were being tried. The posterior, “Southern approach”, became the most popular.

The posterior approach had been used with the Austin Moore prosthesis and US surgeons were “comfortable” with its use in femoral neck fractures. The “Southern approach” offered a straight shot into the femur, and even though the acetabular exposure was somewhat more complex, when compared to the transtrochanteric approach, led most surgeons to adopt the technique for total hips. It has remained the most commonly used approach in the United States. Yet, from the earliest days of total hip replacements, surgeons have also used both the anterolateral and true anterior approaches.

The direct anterior approach is not new and I have been using it for all primary and revision THA since 1973. It is difficult to compare the advantages of the anterior approach versus others since the variables start with the surgeon, patient selection, implants used, pharmacological management, postoperative care, and others. However, from the earliest days of the anterior approach, it has been my impression that direct-anterior-approach

patients seemed to have less postoperative pain and recovered more rapidly compared with posterior approach patients.

The use of the anterior internervous interval and the spreading of muscles seems likely to be the reason for these observations. The success of the approach was, and is, related to a faster recovery. As posterior approach surgeons switch to the anterior approach, they seem to confirm this experience [1]. There are other advantages, such as the anatomical (simple supine) position on the operating table, the thinner fat layer, and the better visualization of the acetabulum for its implantation in a position less likely to lead to primary dislocation. Less postoperative pain, early recovery of function, and full and stable motion are the main advantages as I have seen them since 1973.

Thomas Sculco MD: There are many approaches to the hip that yield outstanding results, the anterior and mini-posterolateral being two of them. In my experience with the mini-posterior approach, recovery is rapid. Some patients leave the hospital 2 days after surgery on a cane, reciprocating stairs. Many patients discontinue the cane within 3 to 4 weeks postoperatively. Some younger patients discontinue the cane even faster. Pain is not much of an issue with the mini-posterior approach. Most patients take a small

dose of pain medication after the first 24 hours postoperative.

The concern I have with the anterior approach is that visualization of the femur can be more challenging, especially in muscular male patients. Many experienced anterior surgeons use fluoroscopy continually during the procedure, which adds cost, prolonged surgery, and possible wound contamination. Also, many are now advocating a short-stem prosthesis, which has only short-term results. The use of the implant facilitates the procedure through the anterior approach. The issue of lateral femoral cutaneous neuropraxia is reported in as high as 60% to 70% of patients [2] and although usually transitory, many are not. In the hands of Dr. Keggi, a true expert in the anterior approach, results will be excellent, but even some other experts have stated that there is a learning curve of 30 to 40 procedures [7].

The average orthopaedic surgeon performs much less than 25 hip replacements a year. It does not seem practical for them to embark on this pathway when the posterolateral approach is not as difficult to perform.

Dr. Bal: *Surgeons worry about extending a surgical approach should they run into anything unusual, such as a femur fracture, or unexpected anatomic variations. Which surgical*

Clinical Faceoff

approach, anterior versus mini-posterior, in your opinion, lends itself more readily to an extensive revision exposure if the surgeon should encounter difficulty during the operation?

Dr. Keggi: “What do I do if something goes wrong?” That is the question I hear from posterior hip surgeons thinking about switching to the front. It is a valid question and applies to all surgical operations. Anybody can do a simple hip arthroplasty, but excellence in surgery is based on the ability to get out of trouble — preoperative planning that includes managing the unthinkable.

The patient’s supine position is a major advantage. The abdomen can be draped free if there is any concern about potential intrapelvic or abdominal problems related to the primary or revision procedure at hand. Injury to the femoral artery or vein can also be controlled without repositioning of the patient. In cases of severe acetabular problems, the skin incision can be extended along the iliac crest, and a true Smith-Petersen approach is performed to expose the outer iliac wall. The inner iliac wall can be reached by going over the iliac crest into the pelvis. Exposure of the entire femur can be performed by extending the skin incision distally, along the lateral thigh, splitting the fascia lata, elevating or splitting the vastus lateralis for exposure of fractures, perforations or

corrective osteotomies of a deformed femoral shaft. Longitudinal osteotomies for cement removal are easily performed and fixed with cerclage wires. This standard anterior approach can be converted to an incision to the tibia for a total femur replacement.

Hemorrhage, from a screw placed for acetabular graft fixation from the posterior approach, can be fatal by the time it is identified, the patient repositioned, and the pelvis entered for the control of the lacerated iliac artery. This is a tragic course of events that might be avoidable with the patient in the supine position.

The sciatic nerve, like a roadside explosive device, is ever present with the posterior approach. While the sciatic nerve does not always have to be identified during surgery, the surgeon must be aware of its location and take steps to protect it. Its retraction cannot be too vigorous and its dissection in scar tissue is always a time consuming, risky process. With the anterior approach, it is out of the way and safer.

No operation is safe, no hip procedure is without difficulties, but there is no reason to fear the anterior approach — extend the incision, split the muscles, and do what has to be done.

Dr. Sculco: The posterolateral approach is easily extensible for exposure of acetabulum or femoral complications. Visualization of the femur is excellent and quite easy with the posterolateral

approach, and should problems arise, lengthening the incision distally will expose the entire femur. This applies to acetabular visualization as well. The posterolateral approach is also ideal for revisions of the femur or acetabulum as excellent exposure is possible. In expert hands with the anterior approach, the anterior dissection can be extended, but this is more difficult for the less-experienced hip surgeon. There often is considerable manipulation, traction, external rotation, adduction needed to see the femur in routine cases. Therefore, exposure of the more distal or greater trochanteric area can be challenging. For intrapelvic complications, the supine position for the anterior approach would facilitate exposure. In the posterolateral approach, the patient must be rolled to the supine position to obtain better visualization.

Dr. Bal: *Nerve injury and fracture have often been cited in the literature as complications of any minimally invasive total hip surgery. How do you view the relative risk of nerve injury and fracture when you consider the direct anterior approach to THA, versus the mini-posterior approach, and which approach do you think is safer in the hands of the community orthopaedic surgeon?*

Dr. Sculco: The risk of sciatic neuropathia is quite small with the mini-posterior approach if the approach is

Clinical Faceoff

performed properly. There should never be excess pressure on the posterior soft tissues as part of the approach. If the dissection becomes difficult, and tension develops in the tissues from retraction, extending and relaxing the incision generally will solve this problem. If this precept is followed, neuropraxia is rare. In the mini-posterior approach, full visualization of the entire proximal femoral neck is obtained circumferentially. Because of the way full visualization is obtained, there should not be any greater risk of fracture compared with a routine approach. With the anterior approach, vigorous rotation of the femur and elevation of the femur with retraction have resulted in fractures of the greater trochanter and even of the ankle. Additionally, neuropraxia of the lateral femoral cutaneous nerve has been reported in as high as 60% of cases with the anterior approach [2].

Dr. Keggi: The internervous technique is one of the major advantages of the anterior approach. The sciatic and femoral nerves are well outside of the operative field, and there is less of a possibility of injury to the nerve supply for any of the major muscle groups of the hip joint. With an “oblique” skin incision, in line with the long axis of the femoral neck, injury to any major branches of the lateral femoral cutaneous nerve have been extremely rare in our experiences..

In experienced hands, the anterior approach does not increase the risk of femoral fracture. The anterior approach allows an “anatomical” view of the femur even in the most severely deformed and contracted hips. In difficult exposures, this approach may be facilitated by an anterior capsulectomy, removal of acetabular and neck osteophytes, and in the most severe cases, a subcapital osteotomy. However, the view achieved allows for the safe preplanned osteotomy at the base of the neck. With further soft tissue releases, the dropping of the foot of the operating table to extend the femur, the use of the “double dog leg” rasps, and in large or obese patients, using a short secondary incision over the gluteus medius origin for the insertion of instruments through the internervous plane between the superior and inferior gluteal nerves, the procedure can be performed in all patients without increased risk of trochanteric fractures. I believe this approach can be adopted by all hip surgeons.

Bal: *Looking into the future, do you suppose surgical techniques will keep evolving such that outpatient total hip surgery becomes the norm, at least for the healthy, functional patient subset? If so, do you think the direct anterior approach or the mini-posterior approach is better suited toward making THA an outpatient procedure for selected patients?*

Dr. Sculco: I do believe length of stay will continue to decrease in the younger, fit patients. A 24-hour stay is reasonable in this population. Two to 3 days will be the norm for the majority of older and more deconditioned patients with comorbidities. Both mini-posterior and anterior approaches promote a shorter stay and I do not believe either is more favorable. The age and fitness of the patient is the key determinant.

Dr. Keggi: Even though the anterior approach would lend itself nicely to one day surgery of hip replacements, it is my belief that patient safety requires at least a 48-hour stay. Most of the major complications occur in these first postoperative hours, and one life saved because of a postoperative myocardial infarction or pulmonary embolus detected and treated in a hospital setting justifies the extra cost. The extra day or two of hospitalization could be in a simplified, lower-cost setting. If rapid discharge is the ultimate goal, then the anterior approach (with its lesser postoperative pain and chance of primary instability) is the quickest way to walk out of the hospital and into a new life.

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Clinical Faceoff

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