Femoral Neck Fractures: Should We Cement the Implants?

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SUMMARY
There is no consensus in the literature with regard to whether or not hemiarthroplasty with cement for femoral neck fractures is the “way to go.” The authors of this retrospective review compared perioperative mortality (within forty-eight hours after surgery) between patients who had undergone hemiarthroplasty with cement and those treated without cement for femoral neck fractures from 2005 to 2010. Eight deaths (1.66%) (two of which were intraoperative) occurred during the perioperative period in a group of 482 patients who had undergone hemiarthroplasty. All eight deaths (2.55%) followed a hemiarthroplasty with cement; 314 patients had undergone this procedure. No deaths followed a press-fit hemiarthroplasty (Austin Moore; DePuy Orthopaedics, Warsaw, Indiana); 168 patients had undergone this procedure. Not surprisingly, all eight patients who died had an American Society of Anesthesiologists (ASA) score of III or IV. The average duration between surgery and fracture presentation was less than two days. Surgical procedures were performed by both experienced consultants and trainees, with the training level having no noticeable effect on perioperative deaths. The authors concluded that the risk of perioperative death was significantly higher after hemiarthroplasty with cement and was more closely related to pre-existing cardiovascular/pulmonary morbidity.

DISCUSSION
The authors attempted to relate the eight perioperative deaths with the act of cementing and suggested that surgeons should carefully consider the risk-benefit ratio of cement use, especially for patients with an ASA score of III or IV. However, only two of the eight patients actually died during the hemiarthroplasty with cement. Two others had a sudden drop in blood pressure following cementation, never fully recovered, and died within forty-eight hours. The other four patients may or may not have had an insult directly related to cementing. In a retrospective study, causality is difficult to determine. The mortality rate is in line with previous literature demonstrating intraoperative rates typically <0.1% following hemiarthroplasty with cement.

In March 2009, the U.K. National Patient Safety Agency (NPSA) reported on mortality associated with cementing for hip fractures. Subsequently, data from the U.K. National Hip Fracture Database, which included 16,496 patients, suggested that there was no increase in mortality at the time of discharge from the hospital after cementing (J Bone Joint Surg Br. 2011 Oct;93[10]:1405-10), a conclusion that differed from the one presented by Hossain and Andrew. The total number of patients...
in each group in the study by Hossain and Andrew was very low given the scarcity of perioperative deaths, suggesting that the study was possibly not sufficiently powered to enable the authors to draw any definitive conclusions. The difference between the two studies, other than the number of patients, was the definition of perioperative (within forty-eight hours after surgery versus at the time of discharge from the hospital). However, both studies were retrospective, and thus the authors had a difficult time relating the deaths specifically to the cement technique.

Hossain and Andrew also looked at the training level of both the anesthesiologists and the operating surgeons and found no correlation with death. However, they did not look at the type of anesthesia administered (spinal versus general). They did acknowledge that there could have been selection bias in treatment. Additionally, almost twice as many patients underwent hemiarthroplasty with cement as opposed to without cement, which may have led to an underestimation of the death rate associated with cementless hemiarthroplasty.

Ultimately, it is difficult to conclude from this single small retrospective study that cementing is truly associated with a higher perioperative mortality rate. However, surgeons should be cautious because patients with cardiovascular/pulmonary comorbidities (an ASA score of III or IV) are at higher risk for perioperative death and cementing is known to be associated with sudden cardiac events, which certainly can lead to death.

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SUMMARY
There are mixed opinions with regard to the need to repair the pronator quadratus (PQ) following a volar approach for open reduction and internal fixation (ORIF) of distal radial fractures. The advantages of improving pronation strength and protecting the volar tendons
\cite{1,2} are offset by concerns that overtightening of the repair leads to ischemia and contractures\cite{3}. The authors of this recently published study attempted to determine if operative repair of the PQ bestows any functional advantage at one year postoperatively. This retrospective case-control study compared two groups of patients with a distal radial fracture treated with ORIF by two orthopaedic surgeons: one surgeon performed PQ repairs and the other did not. Postoperatively, the patients wore a splint for two weeks and then followed a physiotherapy regimen that included full activity after six weeks. On subsequent postoperative visits, wrist range of motion and grip strength were assessed. Pain and function were assessed with a Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire. An independent research assistant not blinded to the treatment conditions assessed radiographs for osteoarthritis (OA) at the one-year follow-up examination.

A total of 606 patients with a distal radial fracture were included for analysis; 175 underwent ORIF via a volar approach, and 112 of them were followed for one year and therefore merited inclusion in the study. Baseline demographics, DASH scores for the contralateral arm, and OTA fracture classifications were similar between the PQ-repaired and PQ-not-repaired groups. With regard to the one-year postoperative results, no significant differences were found between the two groups with regard to DASH scores, evidence of OA on wrist radiographs, wrist pain, grip strength, or five of six wrist movements. The only difference found was in the group whose PQ was not
DISCUSSION

This study adds to the recent interest in evaluating the clinical benefits of performing a PQ repair. The authors noted the potential limitations of comparing the results from two different surgeons utilizing different implants. They concluded that PQ repair is unnecessary and does not improve clinical or functional outcome. Unfortunately, several limitations in the study’s design draw questions with regard to its conclusion.

Several studies have consistently shown that operative treatment and nonoperative treatment for distal radial fractures produce similar functional outcomes. Therefore, if the effect size of an entire operative procedure is not large enough to produce a detectable functional difference in a study of more than 100 patients, it is safe to assume that the study by Hershman et al. was underpowered to detect the even smaller effect size of a variation in wound closure. Furthermore, the study contains several confounding factors that likely had a larger effect on the outcome: different surgeons, different implants, and different reduction techniques (with or without brachioradialis tenotomy). Another noticeable omission in this study design is the lack of a detailed postoperative radiographic analysis of both groups. No information was provided with regard to the quality of articular reduction (presence of articular step-off or gap deformity), radial length, inclination, or volar tilt. Such parameters have been well established to affect the functional parameters measured in this study. Without adjustment for these clinical and radiographic confounders, it is unlikely that the two groups were distinguished solely by the presence or absence of PQ repair. Pronation strength was not assessed in the study, despite the authors mentioning it as a theoretical advantage to PQ repair. Finally, the decision to utilize the radiographic presence of posttraumatic OA as a functional end point is questionable because OA has a poor association with the presence of pain and functional decline.

Although the PQ has been classically described as being a dynamic stabilizer of the distal radioulnar joint, its clinical relevance in the context of distal radial fractures remains unknown. The rate of PQ repair failure has been found to be low, with a recent series of twenty-four repairs showing a 96% success rate with no evidence of ischemia or contractures. Although its repair may not guarantee protection of the surrounding tendons, a high-quality prospective study should be attempted before writing off the muscle as a vestigial appendage.

REFERENCES


SUMMARY

This study objectively presents the financial opportunity present in appropriate documentation of and billing for nonoperative fracture treatment in an analysis of the practices of two surgeons at a trauma center. Appleton et al. found that nonoperative care...
The authors of this article reported the results of a somewhat randomized comparison between total hip replacement (THR) and open reduction and internal fixation (ORIF) for displaced femoral neck fractures (Orthopaedic Trauma Association [OTA] 21-B type) in 100 elderly patients (age range, sixty-five to ninety years) without pre-existing arthritis in Sweden. These patients were followed for seventeen years or to the time of death (>72% rate of follow-up). Chammout et al. found that the patients who underwent THR had better results than those in the ORIF group. The Harris hip score was about 88 for the THR group at one year and decreased to 84 at seventeen years. The Harris hip score for the ORIF group was about 75 at one year and increased to about 78 with long-term follow-up. The Harris hip score was on average 15 points higher in the THR group versus the ORIF group. Mortality did not differ between the two groups. The rate of reoperations (major and minor) was about three times higher for the ORIF group.

DISCUSSION
This succinct report coincides with my own experience and objectively illustrates the potential benefit of paying close attention to nonoperative fracture treatment as a part of a trauma service. This opportunity may be unrecognized and uncaptured at many centers, especially academic trauma centers. It is important to recognize that nonoperative treatment is an active process that requires documentation and is not merely the absence of operative treatment. It typically requires documentation of a clear diagnosis and treatment decision based on risks and benefits, as well as clear delineation and accomplishment of active closed treatment elements. Surgeons may be pursued for medicolegal deficiencies for these billed cases, so appropriate documentation is important. This process may also improve care by providing documentation that is clearer and by encouraging more active pursuit of closed treatment of fractures than sometimes occurs otherwise. I highly recommend this three-page article to everyone involved with fracture care. Even if you are currently capturing nonoperative charges, it is likely that you will learn something of value from this clearly presented article.

### Total Hip Replacement for Femoral Neck Fracture?

Thomas A. DeCoster, MD
University of New Mexico

**SUMMARY**
The authors of this article reported the results of a somewhat randomized comparison between total hip replacement (THR) and open reduction and internal fixation (ORIF) for displaced femoral neck fractures (Orthopaedic Trauma Association [OTA] 21-B type) in 100 elderly patients (age range, sixty-five to ninety years) without pre-existing arthritis in Sweden. These patients were followed for seventeen years or to the time of death (>72% rate of follow-up). Chammout et al. found that the patients who underwent THR had better results than those in the ORIF group. The Harris hip score was about 88 for the THR group at one year and decreased to 84 at seventeen years. The Harris hip score for the ORIF group was about 75 at one year and increased to about 78 with long-term follow-up. The Harris hip score was on average 15 points higher in the THR group versus the ORIF group. Mortality did not differ between the two groups. The rate of reoperations (major and minor) was about three times higher for the ORIF group.

**DISCUSSION**
The results of this article strongly support THR over ORIF for displaced femoral neck fractures in elderly patients who are healthy and cognitively intact. In this well-designed, well-executed study, the patients who underwent THR functioned better with lower reoperation rates and no increase in mortality. However, there are always concerns about overinterpreting the data. No comparison of hemiarthroplasty and THR was performed, and there was no cost analysis. Less than 10% of all patients with femoral neck fracture were considered for inclusion in this study. The Harris hip scores were high and actually higher than reported for the average seventy-eight-year-old in the U.S. The authors appropriately excluded patients with preexisting arthritis to eliminate a confounding variable. However, this exclusion likely introduced a new bias in favor of patients who were healthier and more active than “average.” Although the authors mention a “high” mortality rate, there were only five deaths (five of ninety-five patients) at one year, which is much lower than typically reported for all comers. This also suggests that this group was relatively quite healthy, something the authors also mention. Dislocation of the THR occurred in nine (23%) of the thirty-nine of
Gel-One® Hyaluronate is a sterile, transparent, viscoelastic hydrogel approved for the treatment of pain in osteoarthritis (OA) of the knee in patients who have failed to respond adequately to non-pharmacologic therapy, non-steroidal anti-inflammatory drugs (NSAIDs) or simple analgesics, e.g., acetaminophen. The unique cross-linking process enables increased viscoelasticity, which serves to provide pain relief and improved knee function.

**Safety and Efficacy**

In the Gel-One® Hyaluronate clinical study, pain relief was measured at 1, 3, 6, 9, and 13 weeks demonstrating statistically significant improvement over the Phosphate Buffered Saline control (PBS). Incidence of adverse effects did not differ significantly between Gel-One® Cross-linked Hyaluronate and PBS. There were no serious adverse effects or pseudoseptic reactions related to Gel-One® Cross-linked Hyaluronate injection. Patients receiving Gel-One® Hyaluronate experienced, on average, a nearly 40% reduction in pain from baseline (28 mm reduction in WOMAC pain on a 100 mm VAS, Visual Analog Scale).1

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Injection Technique

1. Using strict aseptic technique apply antiseptic and, if desired, local anesthetic. The knee joint space is accessed through the soft palpable anterolateral port that can be felt just lateral to the inferior pole of the patella and the proximal portion of the patella tendon.

2. If present, remove joint effusion through an 18-20 gauge needle before injecting Gel-One Hyaluronate. Maintain needle placement in the joint while disconnecting the syringe used to remove joint effusion. Discard the syringe containing the removed joint effusion.

3. Peel off the lid from the Gel-One Hyaluronate blister package and remove the syringe.

4. Carefully remove the tip cap of the Gel-One Hyaluronate syringe, and aseptically attach the syringe to an 18-20 gauge needle (if aspiration of joint effusion occurred, the same needle may be used). To ensure a tight seal and to prevent leakage during administration, secure the needle tightly while firmly holding the Luer-Lok. Twist the tip cap before pulling it off to minimize leakage.

5. Inject the full 3mL of Gel-One Hyaluronate into the knee joint through the needle using aseptic injection technique. If treatment is being administered to both knees, use a separate syringe of Gel-One Hyaluronate for each knee.

NOTE: Injection techniques will vary by physician and may include different approaches in patient positioning.

Important Safety Information
Before using Gel-One Hyaluronate, tell your doctor if you are allergic to hyaluronic products, cinnamon, or products from birds such as feathers, eggs, and poultry. Gel-One Hyaluronate is only for injection into the knee, performed by a doctor or other qualified health care professional. You should not receive a Gel-One Hyaluronate injection if you have a skin disease or infection around the area where the injection will be given. Gel-One Hyaluronate has not been tested to show pain relief in joints other than the knee and for conditions other than OA. Gel-One Hyaluronate has not been tested in patients who are pregnant, mothers who are nursing, or anyone under the age of 21. You should tell your doctor if you think you are pregnant or if you are nursing a child. Talk to your doctor before resuming strenuous or prolonged weight-bearing activities after treatment. The safety and effectiveness of repeat treatment cycles of Gel-One Hyaluronate have not been established. The side effects most commonly seen after injection of Gel-One Hyaluronate in the clinical trial were knee pain, swelling, and/or fluid build-up around the knee. These reactions are generally mild and do not last long. Other conditions, including but not limited to skin redness and rash, knee stiffness, knee muscular weakness and dizziness, were also reported rarely. If any of these symptoms or signs appear after you are given Gel-One Hyaluronate or if you have any other problems, you should call your doctor.

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Clinical Summary

**Product**  
*Gel-One* Cross-linked Hyaluronate (*Gel-One* Hyaluronate)

**Authors**  
V. Strand, H.S.B. Baraf, P.T. Lavin, S. Lim, H. Hosokawa

**Title**  
A multicenter, randomized controlled trial comparing a single intra-articular injection of *Gel-200* (*Gel-One* Cross-linked Hyaluronate), a new cross-linked formulation of hyaluronic acid, to phosphate buffered saline for treatment of osteoarthritis of the knee

**Language**  
English

**Journal**  

**Methodology**  
A study was conducted to compare the safety and efficacy of *Gel-One* Hyaluronate with phosphate buffered saline (PBS) in the treatment of osteoarthritis (OA) of the knee. *Gel-One* Hyaluronate is a sterile, clear, viscoelastic hydrogel composed of crosslinked hyaluronate, which is a derivative of a highly purified sodium hyaluronate. *Gel-One* Hyaluronate is indicated for the treatment of pain in OA of the knee in patients who have failed to respond adequately to non-pharmacologic therapy, non-steroidal anti-inflammatory drugs (NSAIDs) or simple analgesics (e.g., acetaminophen). Currently, there are five intra-articular hyaluronic acid (IAHA) products offered in the United States, ranging from single injection treatment (Hylan G-F 20) to multi injection (3-5 injections) treatment. Past studies have shown that IAHA injections are effective in relieving pain due to OA. This report summarizes the efficacy of *Gel-One* Hyaluronate in human subjects as compared with PBS. In a double-blind, multi-center RCT, the safety and effectiveness of a single injection of *Gel-One* Hyaluronate were demonstrated by treating patients with either *Gel-One* Hyaluronate or PBS in a 2:1 randomization ratio, with the majority of patients receiving *Gel-One* Hyaluronate. In the publication (and clinical study), *Gel-One* Hyaluronate was referred to as *Gel-200*. The primary measure of effectiveness was Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) by 100 mm Visual Analog Scale (VAS).

**Results**  
The results indicate that a single intra-articular injection of *Gel-One* Hyaluronate is effective at week 13 and safely relieves pain associated with OA of the knee. Neither allergic reactions nor pseudosepsis were reported during this trial. Measurements were taken at weeks 3, 6, 9, and 13 and included WOMAC pain subscores, Total WOMAC score, and WOMAC physical function subscores. No significant differences between *Gel-One* Hyaluronate and the PBS control were observed in the incidence of AEs related to the study treatment or overall. The below figure summarizes the results of the WOMAC Pain Subscore.

**Key Take-Aways**

1. At week 13, a statistically significant advantage of 6.39mm in the WOMAC pain subscore was observed for *Gel-One* Hyaluronate. Furthermore, the study showed a favorable safety profile for *Gel-One* Hyaluronate.

2. On average, patients in the *Gel-One* Hyaluronate study group experienced average pain relief of 39.3% (27.8 mm) from baseline.
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cases in the THR group, and future work should include efforts to reduce that problem. The threshold for “healthy and cognitively intact” remains to be established, but the results of this article, in combination with other reports in the literature, strongly support a role for THR rather than ORIF for selected healthy, active elderly patients with displaced femoral neck fracture. The relative role of THR and hemiarthroplasty remains to be determined.

Distal Targeting of Screws Through Nails without X-Rays

Thomas A. DeCoster, MD
University of New Mexico

SUMMARY
A cadaveric model was used to determine the time and accuracy of distal locking screw placement with use of a magnetic targeting system that does not require x-rays, thus eliminating exposure of people in the operating room to ionizing radiation. Analysis of twenty-five cases demonstrated an average of eight minutes (range, four to eleven minutes) for the placement of each screw with good accuracy. Screws were placed at an average of 87° (range, 80° to 96°) to the longitudinal axis of the nail. One early prototype guide failed mechanically, resulting in a single missed screw.

DISCUSSION
This device is similar to others that are commercially available that allow for targeting for distal locking without the use of x-rays. The primary benefit is that people in the operating room are no longer exposed to ionizing radiation. Other benefits are a shorter time for distal locking, a more reliable technique for screw placement through the hole in the nail, and a more accurate alignment closer to the ideal 90° to the longitudinal axis of the nail. This technique may facilitate locked nailing techniques in operating rooms without fluoroscopy capability. The device is mounted to the proximal end of the nail and uses a magnetic field to adjust for the deformations that occur in the nail during placement. The device requires an additional magnetic field generator temporarily placed inside the nail to the level of the hole in the nail. Unlike the procedures with some other devices, the rest of this procedure proceeds like a normal nailing. The authors correctly identified the weaknesses of their study, which included the use of intact femora as well as the fact that a single experienced surgeon performed all the surgical procedures. Although devices of this type are very appealing and likely to gain widespread application for improving the technique of nailing in the future, additional information will be important and should include efficacy of clinical application, cost analysis, and learning curves.

Use What Is Given to You: An Alternative Approach to the Treatment of Open Calcaneal Fractures

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SUMMARY
High-energy open calcaneal fractures have been shown to have dire outcomes when managed with a staged reconstructive protocol through an extensile lateral approach. Heier et al. reported that more than a quarter of their patients who had undergone this treatment regimen developed osteomyelitis and half of those patients ultimately had an amputation (J Bone Joint Surg Am. 2003 Dec;85[12]:2276-82). The authors of the current study evaluated the outcomes of their protocol, which included
aggressive wound debridement and wound care with open reduction via the traumatic open medial fracture wound followed by percutaneous fixation.

The authors assessed seventeen patients in whom a type-II or III open calcaneal fracture had been treated with this protocol. Of importance is the fact that the protocol required open fracture excisional debridements in a serial fashion until an adequate, healthy wound bed was obtained. Temporizing soft-tissue management included antibiotic beads and/or negative pressure dressings until definitive treatment/closure was performed. A direct reduction of the tuberosity and medial calcaneal wall was obtained via the open medial wound followed by indirect reduction of the posterior facet and anterior process. Fixation was achieved with percutaneous screws from the tuberosity directed into the anterior process as well as posterior facet “kickstand” screws and sustentaculum screws. The central bone deficit was augmented with a calcium phosphate cement at the discretion of the senior surgeon.

All wounds healed, but two required a skin graft and one, a local rotational flap. One patient developed a deep wound infection and one patient had a wound dehiscence, but no patient required an amputation. Forty-one percent of the patients required additional surgical procedures, and 65% developed post-traumatic arthropathy, ultimately resulting in subtalar fusions for four patients. Of the four subtalar fusions, three had a loss of reduction of >20° compared with the postoperative Böhler angle. Orthopaedic-specific and general health outcome scores did not appear substantially different from those reported for patients who had sustained similar foot and ankle trauma.

DISCUSSION
The results of the study protocol for high-grade open calcaneal fractures compare favorably with those in the recent literature, in which much higher rates of deep infection (11% to 72% compared with 6% in the present study) and amputation (~13% compared with 0%) have been reported. The utilization of the traumatic medial wound for reduction and fixation combined with aggressive modern wound-care strategies including antibiotic beads and negative pressure dressings appears to reduce the risk of a limb-threatening or infectious complication after high-energy open calcaneal fractures. Of note, early in the series the authors did not address the bone deficit of the body of the calcaneus that occurred with injury and surgical debridement. They attributed some gradual loss of reduction to this factor, and modified their protocol by adding calcium phosphate cement to further support the reduction as well as sustentacular screws to further buttress the posterior facet. It is unclear whether this change in the protocol resulted in better clinical and radiographic outcomes.

Optimal Screw Position for Cephalomedullary Nail Treatment of Trochanteric Proximal Femoral Fractures

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SUMMARY
Although the desirable location for screw placement for extramedullary hip-screw side-plate implants is well established, there are very limited data on the optimal screw position for the increasingly popular medullary fixation devices. Most surgeons have applied the principles from plate fixation to medullary devices.

Kuzyk et al. explored this topic with a biomechanical analysis of lag-screw placement using fourth-generation synthetic femora and Long Gamma3 Nails for trochanteric proximal femoral fractures (Orthopaedic Trauma Association [OTA] types 31-A3.1, 31-A3.2, and 31-A3.3). The authors’ primary goal was to determine which of five possible lag-screw positions (central, anterior, posterior, inferior, and superior) in the femoral head provided the most mechanical stiffness and load to failure. They also evaluated the importance of the previously described tip-apex distance (TAD). Radiographic measurements and linear regression analysis were used to compare the relationships between lag-screw placement and mechanical stiffness as well as lag-screw placement and load to failure.
The authors found the optimal lag-screw placement, in order to maximize biomechanical stiffness and load to failure, to be inferior in the anteroposterior (AP) plane and central in the lateral plane. They also found that minimizing the TAD maximized these biomechanical properties. The authors reported a significant negative linear relationship between axial stiffness (N/mm) and TAD. These results demonstrate that the lag-screw position in the femoral head for cephalomedullary nails influences the biomechanical properties of stiffness and load to failure. The inferior position in the AP plane and the central position in the lateral plane with a TAD of <25 mm was the optimal placement.

**DISCUSSION**

According to this biomechanical analysis, the optimal screw placement as viewed on radiographs is inferior in the AP plane and central in the lateral plane with the smallest possible TAD. These results provide empirical data to support a biomechanically advantageous position for lag-screw placement that has been previously mentioned in the literature without support and is very similar to findings with hip-screw side-plates.

Prior studies have also demonstrated the utility of the TAD in determining proper lag-screw placement and the prediction of fixation failure, with lag-screw cutout being the most common form of failure. The authors of this study bolstered our understanding of the importance of the TAD measurement with respect to the apex of the femoral head on lateral radiographs and the calcane on AP radiographs, in order to optimize lag-screw placement. A threshold of 25 mm with summation of the AP and lateral TADs has been previously defined as the maximum safe distance in sliding hip screw-plate constructs. A very small TAD may increase the risk of screw penetration of the femoral head, something that was impossible to quantify in this biomechanical study; however, it can occur clinically, especially if an inferior (not central) position for the screw is chosen. The authors suggested a cumulative TAD of <25 mm for this implant.

It is important to recognize the limitations of this study. Synthetic femoral components have been shown to perform more consistently than cadaveric femora. However, they may not accurately display the properties of osteoporotic bone. Furthermore, accurate representation of clinical forces on the hip in patients is difficult to reproduce, given the number of force vectors working around the hip joint. Good clinical data, supported by comparative studies on lag-screw placement location, would substantiate these results and allow for the development of more definitive guidelines for lag-screw placement in cephalomedullary nail treatment of trochanteric proximal femoral fractures.

Reducing the Syndesmosis with a Squeezing Clamp

**SUMMARY**

The authors used a cadaver model of syndesmosis instability created by progressive sectioning of stabilizing ligaments and bone (small and large posterior tibial fragments with the fibula intact). They reduced the syndesmosis by placing a compression clamp in various configurations and used computed tomography (CT) scans to evaluate the quality of the syndesmosis reduction achieved. Clamp placement in the neutral anatomical axis reduced the syndesmosis accurately (0.1 ± 0.77 mm). Every oblique clamp placement location tested caused fibular malreduction in the sagittal plane. A tendency to overcompress the syndesmosis by about 1 mm was also noted.

**DISCUSSION**

This article demonstrates the efficacy of the placement of a two-point compression clamp between the fibula and tibia to reduce the disrupted and widened syndesmosis, independent of the degree of instability over the range tested. It also demonstrates that it is very important to align the points of the clamp parallel to the tibiofibular axis (approximately 20° posterior to the midcoronal plane) and to attach the points of the forceps to the middle of each bone along this plane. Deviation of 5 mm (either anterior or posterior) on the fibula or of 10 mm (either anterior or posterior) on the tibia resulted in malreduction with compression. The authors tested clamp position only 10 mm proximal to the plafond (tibial joint line) and, thus, did not test more proximal or distal positions. The amount of compression applied to the ratcheted clamp was one click more than required to attach the clamp.
Even this small amount of compression tended to “over-squeeze” the syndesmosis slightly. This is probably the appropriate amount for clinical stability. Although CT scans are being increasingly used to evaluate postoperative syndesmosis reduction, there is no established objective parameter for making that assessment. The authors of this study used their own “novel” measures of anteroposterior and mediolateral translation of the fibula to assess the accuracy of the syndesmosis reduction. Their conclusion is to utilize a compression clamp to reduce the syndesmosis once fibular anatomy is restored and to place this clamp in the midportion of the tibia and fibula along the tibiofibular axis with slight compression (one click of the ratchet).

Total Hip Replacement After Medullary Hip Screw Placement Is Frequently Complicated by Trochanteric Femoral Fracture

SUMMARY

This article is a retrospective review of twenty cases of trochanteric femoral fracture that were first treated with a medullary hip screw (IMHS), which failed, and then went on to have a total hip replacement (THR). The original fractures were mostly Orthopaedic Trauma Association (OTA) type 31-A1.1. The patients had a 45% incidence of symptomatic nonunion of the greater trochanter after the THR. The authors’ main conclusion is that there is a high rate of complications when an IMHS is revised to a THR. The authors’ first recommendation is to use a trochanteric fixation plate in addition to the femoral component at the time of the THR. Their second recommendation is that patients with a trochanteric femoral fracture who already have hip arthritis be treated with hip-screw side-plates rather than medullary devices.

DISCUSSION

Trochanteric femoral fracture is a common fracture in the elderly population. A hip screw with a side plate was commonly used to treat these injuries, but recently medullary fixation devices have become popular due to shorter operative times and less blood loss with equivalent function. Some patients with a trochanteric fracture require subsequent revision to a THR due to a variety of problems including progression of arthritis, loss of reduction, malunion, and nonunion. The authors (and others) expected that the revision of a nail to a THR would be easier and better than revision of a hip-screw side-plate to a THR due to the use of a common exposure. However, the authors found a high rate of complication when revising nails to THR. They postulated that the reason for the high rate of trochanteric fracture and nonunion included the stress risers present at the nail entry site and the proximal screw entry site on the lateral cortex, with osteopenia placing the greater trochanter at high risk for perioperative fracture and nonunion. We agree with the authors’ conclusions. Trauma surgeons should strongly consider using a hip-screw side-plate rather than a medullary device when treating elderly patients with a trochanteric femoral fracture and pre-existing hip arthritis who likely will need THR in the future. Arthroplasty surgeons who perform revisions in patients with a failed medullary nail should consider utilizing a trochanteric plate in addition to the femoral component. They should also anticipate the potential for indolent infection, heterotopic ossification, blood loss, and other complications.