

Not the Last Word: Bhandari's Paradox

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For the vast majority of geriatric femoral neck fractures treated with arthroplasty, the procedure most frequently chosen has been partial, not total, hip replacement. For example, Hochfelder and colleagues [11] reported on the treatment of femoral neck fractures and noted that

among 33,226 elderly patients treated with arthroplasty, 30,763 (93%) received hemiarthroplasty. In a similar study by Perry and colleagues [14] in which 114,119 patients were studied, only 11,683 (10.2%) underwent THA. By contrast, when Mohit Bhandari and his group [1] surveyed patients at risk for hip fracture, they found that 93% of patients preferred THA—almost the same proportion that received the alternative operation in the Hochfelder study. That is, there seems to be an overwhelming usage of hemiarthroplasty by surgeons despite its underwhelming appeal to patients.

With the name-donor's permission, I term this mismatch "Bhandari's Paradox".

There are at least three reasons why Bhandari's Paradox persists. The first is that rationally choosing between THA and hemiarthroplasty is a mentally daunting task. A proper decision analysis here requires not only estimating the probability of postoperative success, dislocation, and revision for the particular patient, but also defining the positive or negative utility he or she would ascribe to the outcome states. Further, the decision might hinge on the patient's life expectancy and the relative emphasis placed on short versus long-term gains.

Facing a decision-making challenge that may "exceed the inherent limitations of the unaided human mind" [8], the surgeon may elect to do what the author and journalist John Tierney terms "the ultimate energy saver: Do nothing"

[17]. Result: Hemiarthroplasty, the historical default option, is chosen in excess.

The second issue may be (in the United States, at least) that there are strong financial incentives against providing THA. For one thing, although THA may be a longer and more complicated operation, the Medicare payments do not reflect this. In a related point, surgeons who consider themselves competent at only hemiarthroplasty might be reluctant to refer patients to colleagues with more expertise in THA for economic reasons. Result: Hemiarthroplasty, the financially favored option, is chosen in excess.

A third factor is that surgeons may be "thinking too fast" [12]. According to a scheme proposed by Daniel Kahneman, (the 2002 Nobel Prize winner in Economics), "people employ two parallel decision-making processes, one which is fast and instinctive and one which is slower and more deliberate ... one reflecting an emotional response and yet another reflecting analytical calculus" [4, 12]. The fast, nonanalytic thought process may result in excessive use of hemiarthroplasty. That is because many geriatric hip fracture patients do not look well when they present in the Emergency Room. Elderly patients with hip fractures may be delirious because of pain or electrolyte imbalances. They may be dehydrated and unwashed. They groan and grimace with every movement. Many of these signs resolve quickly,

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Not the Last Word

with medical attention. Still, a transiently disheveled appearance may lead surgeons to deduce in error that the patient has a brief life expectancy or low function—factors that, if permanent, legitimately point to hemiarthroplasty. The tendency to think fast is abetted by care that demands expeditious surgery [13]. Result: Hemiarthroplasty, the option favored by the fast decision making process, is chosen in excess.

Of course, it is possible that Bhandari's Paradox is an illusion; that despite his study of preferences, and despite the apparent superiority of THA [18], we are in fact doing the correct numbers of each procedure. (The final word on this may be provided by the HEALTH trial, led by Bhandari himself, comparing THA and hemiarthroplasty [5]). When I look at the data, I see a shortage of THA.

If there is indeed a shortage of THA, two important lines of future research emerge. The first, clearly, is how to ameliorate the deficit. The ability to offer a THA to all appropriate patients might require geriatric hip fracture centers [3], but any incremental improvement—special financial arrangements with Medicare or real-time decision aids for determining patient preferences, to name two—will also help bridge the gap.

The second avenue of inquiry may be the more-important one: Namely, looking for other clinical cases beyond geriatric hip fracture where we might not be serving each patient's true needs. The THA versus hemiarthroplasty question is among the best-studied topics in orthopaedics [18]. Because of the robust data at hand, we have unmatched power to identify poor choices when they are being made here. On the other hand, in cases where their topic is not as well studied, our thinking is less amenable

to external examination, and our poor decision-making may never become known.

The discovery that we are not making the best choices in the case of geriatric hip fracture, a condition for which so much is known, should stimulate a concern that this error would be found all over, if only we could see it.

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Dr. Bernstein raised the issue of appropriate surgical management for displaced femoral neck fractures [1]. Currently, the main options for treating these fractures centers around either hemiarthroplasty or THA. In head-to-head randomized comparisons, the THA demonstrates superior function, but has a higher risk of dislocation and possibly a higher risk of complications [2, 6, 9]. Dr. Bhandari interviewed a select population of functionally independent individuals with a high potential for hip fracture [1]. Although these patients overwhelmingly preferred a THA over hemiarthroplasty (> 93%), only 8% to 13% of patients with fracture obtain a THA in most hip fracture registries and databases. Hence, Bhandari's Paradox.

However, in viewing this discrepancy between desire and actual operation, one must address the true hip fracture population. In the randomized trials in which THA was found to be more successful than hemiarthroplasty [2, 6, 9], the patients enrolled all lived independently in the community with no cognitive impairment. The key question is whether the enhanced function of the THA will be used versus the added risk of complications. In a typical hip-fracture series, dementia and cognitive impairment is usually reported to be present in 20% of the patients [10]. But when formal

cognitive testing is utilized, such as the mini-mental status exam (or other similar tests), 40% to 65% of the patients appear cognitively impaired [10, 15, 16]. This is in sharp contrast to randomized trials where the IRB would not allow patients with cognitive impairment to enter such a trial except in very tightly controlled circumstances. Patients with cognitive impairment are not allowed to enter such trials at my institution; they can at our sister center, New York-Presbyterian Weill Cornell Medical Center, but only under several tightly defined pathways. Consequently, the barriers are high and orthopaedic departments rarely provide the rigor needed for their inclusion.

Additionally, many of the randomized trials comparing THA with hemiarthroplasty for femoral neck fracture limited enrollment to truly independent patients, defined as those who passing the mini-mental status exam [10, 15, 16]. But there are important differences in resiliency and function between truly independent patients and patients who live in the community, in that many in the latter group may or may not be completely independent. And both of those groups are quite different from patients with hip fractures who resided in nursing homes at the time they were injured. Limiting evaluation to those who are truly independent may not reflect the broader population of patients with hip fractures very well at all.

Combining these two elements, 50% of the population of patients with hip fractures is cognitively challenged and about two-thirds of the remaining population would be compromised functionally. Hence, less than 20% of patients with hip fracture would be candidates for THA. Consequently, the Bhandari Paradox is not so large anymore. More than half of the eligible

Not the Last Word

patients with fracture are getting the correct THA operation.

Yes, Bhandari's Paradox exists, but only for the truly independent patients with hip fracture but no cognitive impairment. Start with the 65- to the 69-year-old population, but include those individuals older than 70 years of age who are very active and healthy. We should consider THA in these patients, but only if the individuals covering trauma are equipped to perform a modern THA. Hemiarthroplasty should meet the needs of the remaining patients, most of whom are functionally, medically, or cognitively compromised.

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As we move forward in orthopaedics, evidence-based medicine should be used more to guide our treatment choices. Recently, the American Academy of Orthopaedic Surgeons offered moderate support for THA in properly selected patients in their clinical practice guideline on the management of hip fractures in the elderly [7]. Yet it is rather surprising to see the low numbers of THAs being performed for femoral neck fractures in older patients despite the support in the evidence favoring this intervention. If our goal is to practice evidence-based medicine, why is it so poorly adopted here?

Dr. Bernstein nicely touches on three reasons that may play a role: (1) Financial incentives/cost, (2) difficulty with decision making, and (3) "thinking too fast," and I would agree that all three play a role at varying levels. But the real question is how do we make effective change and ensure the best choices are being done for our patients? In my opinion, I believe this

will require a culture change in the way we treat geriatric hip fractures.

In an era of more and more subspecialization, how do we get the on-call orthopaedist interested in (and comfortable with) performing a THA, arguably in a higher risk group, and within 24 hours to 48 hours? It is not as simple as it might have been for intertrochanteric hip fractures, where it is easy to change the treatment from a plate to an intramedullary device. This change in practice will require surgeons who do not routinely place THA (a procedure much more demanding than a "simple" hemiarthroplasty) to restrain themselves to perform a procedure they do infrequently and are not comfortable performing. I doubt this will happen.

Alternatively, surgeons may consider transferring the care of their patient to another surgeon who is more comfortable with performing a THA. However, this may not be an option in many smaller communities. Additionally, some surgeons may not want to transfer the care of their patient to another orthopaedist, either for vanity, competition, or the compensation. When faced with these decisions, often the easiest solution, as Dr. Bernstein notes, is to perform a hemiarthroplasty.

Ultimately, this change will require creative solutions that will likely be different in each medical community. But the key is to deliver the best care for our patients and to practice evidence-based medicine in our profession. Ask yourself if you or one of your family members had a femoral neck fracture and you have the choice of a THA or hemiarthroplasty, what would you want? And who would you want to perform the surgery? Most orthopaedic surgeons still take call and treat geriatric femoral neck fractures. The easy choice is to place a hemiarthroplasty, but it may not be the

correct choice. We need a culture change in the treatment of geriatric femoral neck fractures and we need to do the right thing for our patients.

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Not the Last Word

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