

5. Morris JN, Hawes C, Fries BE, et al. Designing the national resident assessment instrument for nursing homes. *Gerontologist*. 1990;30(3):293-307.
6. Morris JN, Fries BE, Mehr DR, et al. MDS Cognitive Performance Scale. *J Gerontol*. 1994;49(4):M174-M182.
7. Ray WA, Griffin MR, Fought RL, Adams ML. Identification of fractures from computerized Medicare files. *J Clin Epidemiol*. 1992;45(7):703-714.
8. Berry SD, Zullo AR, McConeghy K, Lee Y, Daiello L, Kiel DP. Defining hip fracture with claims data: outpatient and provider claims matter. *Osteoporos Int*. 2017;28(7):2233-2237.
9. Fries BE, Simon SE, Morris JN, Flodstrom C, Bookstein FL. Pain in US nursing homes: validating a pain scale for the minimum data set. *Gerontologist*. 2001;41(2):173-179.
10. Neuman MD, Fleisher LA, Even-Shoshan O, Mi L, Silber JH. Nonoperative care for hip fracture in the elderly: the influence of race, income, and comorbidities. *Med Care*. 2010;48(4):314-320.
11. Mitchell SL, Miller SC, Teno JM, Kiely DK, Davis RB, Shaffer ML. Prediction of 6-month survival of nursing home residents with advanced dementia using ADEPT vs hospice eligibility guidelines. *JAMA*. 2010;304(17):1929-1935.
12. Berry SD, Samelson EJ, Bordes M, Broe K, Kiel DP. Survival of aged nursing home residents with hip fracture. *J Gerontol A Biol Sci Med Sci*. 2009;64(7):771-777.
13. Morrison RS, Siu AL. Survival in end-stage dementia following acute illness. *JAMA*. 2000;284(1):47-52.
14. Cram P, Yan L, Bohm E, et al. Trends in operative and nonoperative hip fracture management 1990-2014: a longitudinal analysis of Manitoba administrative data. *J Am Geriatr Soc*. 2017;65(1):27-34.
15. Haentjens P, Magaziner J, Colón-Emeric CS, et al. Meta-analysis: excess mortality after hip fracture among older women and men. *Ann Intern Med*. 2010;152(6):380-390.
16. Sieber FE, Mears S, Lee H, Gottschalk A. Postoperative opioid consumption and its relationship to cognitive function in older adults with hip fracture. *J Am Geriatr Soc*. 2011;59(12):2256-2262.
17. Jung HY, Meucci M, Unruh MA, Mor V, Dosa D. Antipsychotic use in nursing home residents admitted with hip fracture. *J Am Geriatr Soc*. 2013; 61(1):101-106.
18. Schneider LS, Dagerman KS, Insel P. Risk of death with atypical antipsychotic drug treatment for dementia: meta-analysis of randomized placebo-controlled trials. *JAMA*. 2005;294(15):1934-1943.
19. Neufeld RR, Libow LS, Foley WJ, Dunbar JM, Cohen C, Breuer B. Restraint reduction reduces serious injuries among nursing home residents. *J Am Geriatr Soc*. 1999;47(10):1202-1207.
20. Bellenger EN, Ibrahim JE, Lovell JJ, Bugeja L. The nature and extent of physical restraint-related deaths in nursing homes: a systematic review [published online May 1, 2017]. *J Aging Health*. doi:10.1177/0898264317704541
21. Baumgarten M, Margolis DJ, Orwig DL, et al. Pressure ulcers in elderly patients with hip fracture across the continuum of care. *J Am Geriatr Soc*. 2009;57(5):863-870.
22. Mitchell SL, Palmer JA, Volandes AE, Hanson LC, Habtemariam D, Shaffer ML. Level of care preferences among nursing home residents with advanced dementia. *J Pain Symptom Manage*. 2017; 54(3):340-345.

Invited Commentary

Hip Fractures in Patients With Advanced Dementia What Treatment Provides the Best Palliation?

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Nursing home residents sustaining a hip fracture have poor outcomes both in terms of survival and ambulation. Using US Medicare data on nursing home residents from 2005 through 2009, Neuman and colleagues¹ found that by 6 months after the fracture, 36.2% had died; moreover,

among residents who were not totally dependent in prefracture locomotion, 54% had either died or developed new total dependence. Nonetheless, unless patients are imminently dying, conventional wisdom suggests that the advantages of repairing hip fractures in terms of managing pain and facilitating mobility usually outweigh the disadvantages. These issues are particularly pertinent for nursing home residents with advanced dementia for whom a goal of maintaining comfort is often the predominant preference of their proxy decision maker.² However, the literature contains limited information to guide proxy decision makers regarding short- and long-term outcomes of operative or nonoperative management of hip fracture in these patients.

In this issue of *JAMA Internal Medicine*, Berry and colleagues³ use Medicare claims and nursing home Minimum Data Set (MDS) data to report on several outcomes of nursing home residents with advanced dementia whose hip fractures were treated operatively (85%) or nonoperatively (15%).³ By 6 months after fracture, deaths occurred in 31.5%

of those treated surgically and 53.8% of those treated without surgery. One might have expected an even higher figure for the nonoperative group. Although we are not presented exact figures for earlier mortality, including in-hospital mortality, the survival curve in the nonoperative cohort drops much more steeply in the first few months following the fracture. Consistent with this, the adjusted median survival is only 0.4 years in the nonoperative group. Among survivors, MDS assessments between 120 and 240 days following the fracture showed that 29% and 31% of residents reported pain among those treated operatively and nonoperatively, respectively. Antipsychotic use was more common in the operative group (29.5% vs 20.4%), and pressure sores were more common in the nonoperative group (19% vs 11%); however, neither of these results was statistically significant.

There are many methodological strengths in this study³; however, as with all observational studies of treatment, there are issues in interpreting the results. Residents treated nonoperatively were much more impaired at baseline than those in the operative group, which likely influenced both the choice not to operate and their poor outcomes. For example, 26% of residents in the nonoperative group were completely dependent in their activities of daily living, as opposed to 5% in the surgical group. Similarly, only 10.5% of those in the nonoperative group were fully ambulatory prior to the fracture compared with 31.8% in the operative group. The authors used a multivariable



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analysis to adjust for these and other differences, but there are potentially more powerful methods that they did not use. They argued, for example, that propensity matching would have eliminated too many cases, but there are other ways in which to use propensity scores, such as inverse probability weighting. The authors also note that they only measured secondary outcomes at a single time, and because of the high mortality, they may have lacked statistical power in reports of the secondary outcomes. For occurrence of pressure ulcers, for example, those treated operatively had an adjusted odds ratio of 0.68 (95% CI, 0.45-1.03) compared with those treated nonoperatively, the upper confidence limit barely exceeding 1.

While this study adds important new information about the course of nursing home residents with advanced dementia who sustain a hip fracture,³ it leaves many questions unanswered for physicians and families or other proxies making decisions on whether to choose operative or nonoperative treatment. For the many patients whose primary goal is comfort, factors that might influence this decision include the risk of very early mortality; the potential for postoperative complications, such as delirium, pneumonia, and heart failure; and whether surgical stabilization leads to better pain control in the short run. None of this information is available in this study. In elderly patients with advanced dementia and multiple other comorbidities, the risk of early complications, including in-hospital mortality, following surgery is likely high. In-hospital mortality is mostly related to complications of these comorbidities, such as respiratory infection, ischemic heart disease, and cardiac failure.⁴ Delirium is also highly likely in such patients, and delirium frequently worsens further dementia-related decline.^{5,6} Patients with fractures that undergo operative fixation may see improvement in early pain by having their fracture stabilized, but pain might occur 6 months later if the fracture does not heal or if there are complications, such as fixation failure. Patients with femoral neck fractures that are treated with hip hemiarthroplasty may have early and long-term pain improvement because there is no need for bone healing. However, if life expectancy is very short, palliative treatments such as scheduled administration of opioid drugs, nerve blocks, or continuous tunneled infusions for regional anesthesia are inpatient alternatives to surgery.

The most distressing finding reported by Berry and colleagues,³ and the greatest opportunity for improvement, is

the low rate of hospice care and orders limiting hospitalization, particularly among the residents who were treated nonoperatively. In the nonoperative group, only about one-third utilized hospice care within 6 months of their fracture, and only 1.1% acquired a new do-not-hospitalize order. In a study published in 2000, Morrison and Siu⁷ found very high 6-month mortality (55%) among patients with advanced dementia and hip fracture that was most often surgically treated.⁷ While mortality was somewhat lower in the operative group in the study by Berry et al,³ both studies point to hip fracture in patients with advanced dementia as a marker that they are nearing the end of life. This situation calls for a discussion of goals of care and should prompt serious consideration of initiation of hospice care. Moreover, families and proxies need to understand the likely ultimate causes of death in patients with advanced dementia. In our experience, too often this topic has not been discussed even in cases of advanced dementia, with the consequence that families have unrealistic expectations of the outcome of disease-oriented treatment of acute illnesses, such as pneumonia. Mitchell and colleagues² found that only 18% of proxy decision makers for patients with dementia had received prognostic information from a physician, but when a proxy understood prognosis and medical complications of treatment, patients with dementia were much less likely to undergo burdensome medical procedures.²

Berry and colleagues³ add an important contribution to the care of nursing home residents with advanced dementia who sustain a hip fracture. However, the study raises, but cannot answer, additional important questions about the immediate and longer-term care of these residents, who exhibited high mortality rates, particularly with nonoperative fracture management. Despite this, hospice care use was low, and pain was commonly found in survivors months after the fracture occurrence. We cannot answer why hospice care use was so low and can only speculate whether the pain was related to the fracture. Pain is common in nursing home residents with advanced dementia, even those without hip fracture.² Data also remain limited on how to decide whether patients will benefit from fracture surgery in terms of pain control and ability to move (eg, from bed to chair). Answering these questions will require data beyond what can be obtained from Medicare claims and MDS data.

ARTICLE INFORMATION

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REFERENCES

1. Neuman MD, Silber JH, Magaziner JS, Passarella MA, Mehta S, Werner RM. Survival and functional outcomes after hip fracture among nursing home residents. *JAMA Intern Med.* 2014;174(8):1273-1280. doi:10.1001/jamainternmed.2014.2362
2. Mitchell SL, Teno JM, Kiely DK, et al. The clinical course of advanced dementia. *N Engl J Med.* 2009;361(16):1529-1538. doi:10.1056/NEJMoA0902234
3. Berry SD, Rothbaum RR, Kiel DP, Lee Y, Mitchell SL. Association of clinical outcomes with surgical repair of hip fracture vs nonsurgical management in nursing home residents with advanced dementia [published online May 7, 2018]. *JAMA Intern Med.* doi:10.1001/jamainternmed.2018.0743
4. Roche JJ, Wenn RT, Sahota O, Moran CG. Effect of comorbidities and postoperative complications on mortality after hip fracture in elderly people: prospective observational cohort study. *BMJ.* 2005;331(7529):1374. doi:10.1136/bmj.38643.663843.55
5. Mosk CA, Mus M, Vroemen JP, et al. Dementia and delirium, the outcomes in elderly hip fracture patients. *Clin Interv Aging.* 2017;12:421-430. doi:10.2147/CIA.S115945
6. Gross AL, Jones RN, Habtemariam DA, et al. Delirium and long-term cognitive trajectory among persons with dementia. *Arch Intern Med.* 2012;172(17):1324-1331. doi:10.1001/archinternmed.2012.3203
7. Morrison RS, Siu AL. Survival in end-stage dementia following acute illness. *JAMA.* 2000;284(1):47-52.