Cognitive Dysfunction in Hip Fracture Patients

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Hip fractures represent a widespread morbidity among the geriatric population. In North America alone, more than 320,000 hip fractures are sustained annually, a number that is expected to increase as the population continues to age.1,2 The impact of hip fractures on society in terms of associated morbidity, mortality (30-day mortality rate is 9% for men and 5% for women), and financial costs is staggering and will likewise continue to worsen.3–5

Disorders of cognition, primarily dementia and delirium, also have a higher-than-average incidence and prevalence among the geriatric population.6 The co-occurrence of cognitive dysfunction and hip fracture is common and is an important entity for orthopedic surgeons and other clinicians involved in hip fracture care to recognize. Until recently, cognitive dysfunction in patients with hip fractures has been an issue that has received scant recognition compared with conditions considered to represent a more immediate threat to life, such as cardiopulmonary and thromboembolic diseases.7

This article reviews the currently available evidence surrounding cognitive dysfunction, specifically dementia and delirium, in patients with hip fractures.

METHODOLOGY

The MEDLINE database was searched for articles pertaining to dementia, delirium, or other cognitive disorders in patients with hip fractures. The following MeSH terminology was used: hip fracture AND [delirium OR dementia OR amnesia or delirium, dementia, amnestic, cognitive disorders]. The search was supplemented with searches of the PubMED database, EMBASE database, and reference lists of related articles. All article titles and abstracts were screened for

KEY POINTS

- Co-occurrence of cognitive dysfunction and hip fracture is common in elderly patients.
- Dementia is a chronic form of cognitive dysfunction that increases the risk of falling and sustaining a fracture; preventive efforts have therefore focused on reducing these risks.
- Delirium is an acute fluctuating state of confusion that is associated with worse functional outcomes, increased lengths of stay, morbidity, and mortality in patients with hip fractures.
- Preventive efforts surrounding delirium have focused on provision of specialized care, pharmacologic prophylaxis, pain management practices, and approaches to anesthesia.
- Conclusions are limited by the quality of available evidence. More high-level, adequately powered, and rigorously conducted prospective cohort studies and randomized controlled trials are needed.

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relevance, and any uncertainty was resolved with screening of the full text of the article. The full text of all included articles was subsequently reviewed and the content organized thematically for this review.

DEMENTIA

Dementia is a syndrome characterized by persistent impairment in cognitive function as evidenced by deficits in short-term and long-term memory, attention, language, motor activity, and higher-level executive functions, such as problem solving. Many conditions may manifest as dementia, most of which are irreversible. As a chronic and often progressive condition, dementia may present on a spectrum of severity, ranging from mild cognitive impairment or “predementia” to advanced dementia.

Magnitude of the Problem

Dementia is a prevalent condition in the hip fracture population. A recent meta-analysis of 34 studies published up to June 2009 found that the estimated prevalence of dementia in the literature pertaining to hip fracture is 19.2% (95% confidence interval, 11.4%–30.6%).

Furthermore, individuals with dementia are more likely to fall, are more likely to fall repeatedly, and have a higher likelihood of sustaining a fracture secondary to fall, even when the number of falls are controlled for. The reasons for this are likely multifactorial. Formiga and colleagues showed that patients presenting with both hip fracture and dementia were more likely to have an intrinsic cause of fall, whereas those without dementia were more likely to have fallen secondary to extrinsic causes. This finding may be at least partially explained by cognitive impairment of patients with dementia, which results in gait disturbances. Studies have shown gait disturbances in patients with early executive function impairment. In a recent 5-year prospective cohort study of 256 patients, investigators showed that even in the absence of dementia, early impairment in executive function was able to predict fall risk. Furthermore, certain medications that patients with dementia are prescribed, such as anticholinergics, are also likely to precipitate syncope, falls, and hip fracture.

In the context of hip fractures, dementia is relevant preoperatively as both a risk factor and a predictor of eventual outcome. Arguably, no conclusive evidence shows that dementia is acquired postoperatively, as recently summarized in a systematic review by Newman and colleagues.

Diagnosis and Clinical Presentation

The diagnosis of dementia is clinical, with supplementary laboratory and imaging investigations required for workup of secondary potentially treatable causes. The diagnostic workup generally entails a clinical diagnosis of dementia, a thorough investigation for underlying causes of dementia, and the identification and management of contributory comorbidities. The clinical diagnosis typically involves the use of brief cognitive tests, such as the Mini-Mental State Examination (MMSE), the Modified MMSE, or the Montreal Cognitive Assessment tool, to screen for cognitive impairment. These tools, among others, are fairly sensitive and specific in differentiating moderate dementia from normal cognitive function. However, they perform less than ideally in differentiating the milder forms of dementia and cognitive impairment. Therefore, full neuropsychological testing is indicated in patients in whom mild dementia or cognitive impairment is suspected. Validated criteria, such as those presented in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), are then applied to consolidate the diagnosis.

A more comprehensive description and approach to the clinical presentation and diagnosis of dementia are beyond the scope of this review and readers are referred to other publications.

Outcomes

Although it is well established that individuals with cognitive impairment and dementia are at increased risk of falls and fracture, whether these patients do worse when other comorbidities are controlled for in the short and long term after hip fracture is uncertain.

In a cohort of 348 patients studied retrospectively, Harboun and colleagues found that patients with dementia are more likely to be institutionalized in the 3 years after a hip fracture than those who have not sustained a hip fracture.

Muir and Yohannes performed a systematic review of the literature, which comprised 10 prospective cohort studies and 1 randomized controlled trial. Meta-analysis was not possible because of heterogeneity of outcomes. Studies included in this systematic review were evaluated to be of poor methodological quality. Sample sizes ranged from 48 to 320. The authors summarized findings pertaining to postfracture functional activity, length of stay, and discharge destination. No conclusive differences were evident in these studies between patients with and without prefracture dementia.
Prevention

As dementia is a chronic condition, prevention of dementia per se in the period immediately preceding hip fracture is not possible. In this context, preventive efforts pertaining to hip fracture involve preventing falls and subsequent fractures in this population.

Understanding factors leading to falls in patients with dementia is crucial to circumvention. Eriksson and colleagues described the circumstances surrounding falls in patients with dementia on a psychogeriatric ward. They found no difference between the frequency of falls between day and night, although night falls were more likely to be unobserved. In terms of characteristics of the fall events, falls at night occurred more frequently off a platform, such as a chair or bed. Therefore, they were more likely to occur in the patient's room. Day falls were more likely to occur in a location outside the patient's room, such as a dining room or an activity area. Anxiety, darkness, and not wearing shoes were other risk factors for falls. In terms of characteristics of the patients, men were more likely to fall than women, and these falls were more likely to be associated with a delirious episode. When women fell, they were more likely to have an associated urinary tract infection than men. Given the nature of the study, causal mechanisms were impossible to identify.

The use of hip protectors is one intervention that has been studied as a possible means to prevent hip fracture secondary to fall. A recent prospective cohort study showed a lower rate of hip fractures among patients with dementia who wore hip protectors (relative risk, 5.63; number needed to treat, 28; \( P = .007 \)). However, the effectiveness of hip protectors in the community and institutional setting has been controversial, because several studies have not shown a benefit. One study postulated that the lack of efficacy is predominantly secondary to a compliance issue. In this study by Garfinkel and colleagues, compliance criteria were strict in an institutional setting, which probably contributed to the observed positive outcome. Therefore, hip protectors may be protective given appropriate patient and setting selection to ensure adequate compliance, although making a firm suggestion in this regard is still controversial. Randomized trials are needed to definitively inform the effect of this intervention.

Overall, evidence is insufficient to make any evidence-based recommendations regarding fall prevention in the dementia population. Optimal fall prevention strategies for patients with dementia are not well elaborated and further research is needed.

Treatment and Rehabilitation

After a hip fracture, one of the earliest and most important interventions that can be used is the relief of pain through adequate analgesia. Adequate pain control should be considered fundamental to the care of all patients with hip fractures, both as a moral and compassionate responsibility and because it can prevent secondary complications, such as the development of delirium. Unfortunately, pain control in patients with dementia is too frequently suboptimal despite evidence that these patients do experience pain. A prospective study by Morrison and colleagues comparing 59 cognitively intact patients with 38 patients experiencing dementia found that the latter group received one-third of the morphine sulfate equivalent as the former group. Most patients in either group did not receive a standing order for pain medication (arguably more important in patients with advanced dementia). Part of the issue may be that health care personnel, such as nurses, are not adequately trained to assessing pain in patients with dementia. Strategies could be considered, such as regular administration as opposed to as-needed administration.

A nonblinded randomized controlled trial of 260 independent community-living patients in Finland was conducted to determine whether a specialized geriatric rehabilitation team consisting of physicians, nurses, and allied health professionals could impact length of stay, mortality, and place of residence at 3 months and 1 year. An unequal distribution was seen based on MMSE scores postrandomization, and subgroup analyses were undertaken of the patients with and without low MMSE scores. Patients with hip fractures with mild to moderate dementia who received the intervention showed decreased length of stay and returned to independent community living at 3 months compared with controls. However, the significant difference did not persist at 1-year follow-up. The trial was not able to detect a significant difference in outcomes among patients with normal cognition and in those with severe dementia per se in the period immediately preceding hip fracture is not possible. The evidence and implications of this are discussed later in the Delirium section.

Overall, the postfracture implications of dementia have not been well elucidated in the scientific literature. Studies have generally been few in number and small in size, and lack standardization to allow for meta-analysis.
Dementia. Although no significant difference in mortality was detected, a trend was seen toward increasing mortality with increasing severity of dementia. This trial was certainly underpowered to detect a difference in its primary outcomes, because the a priori determined sample size of 250 was not achieved.

Patients with hip fractures who are not able to adequately regain function in the hospital are often discharged to specialized institutions for further rehabilitation. However, home-based rehabilitation is another option for community-dwelling patients with dementia after a hip fracture. In a prospective cohort study of patients with hip fractures managed operatively, Giusti and Barone followed 55 patients discharged to a rehabilitation institution and 41 patients discharged directly home postoperatively. They found that function was at least equivalent to if not superior to institution-based rehabilitation as measured by the Barthe! index for Activities of Daily Living (ADLs) and the Lawson index for Instrumental ADLs.

**DELIRIUM**

Delirium is an acute state of confusion, which tends to have a short and fluctuating course but can last several weeks to months. It is characterized by the acuity of its onset (typically <24 hours), changes in level of consciousness, decreased ability to concentrate, cognitive decline, and perceptual disturbances.

**Magnitude of the Problem**

Delirium is a condition especially prevalent in hospitalized patients. In certain hospital settings, its incidence is particularly marked. Next to patients admitted to the intensive care unit, postoperative patients and those with hip fractures are considered to be among those at the highest at risk for delirium.

In regard to hip fracture, a meta-analysis of studies to 2005 showed a variable prevalence of delirium as reported in the orthopedic literature, ranging from 4.0% to 53.3%, with a pooled effect size of 21.7%. Consistently across studies, patients with hip fractures tended to have higher rates of postoperative delirium than those undergoing elective orthopedic surgery. Up to 35% of delirium cases were shown to have preoperative onset, a large proportion of which persisted postoperatively.

**Risk Factors and Causes**

The pathophysiologic cause of delirium, although not completely understood, has been postulated to involve preexisting cerebral compromise secondary to aging or an underlying condition such as dementia. Subsequent insults by noxious external exposures result in further compromise and lead to the clinical manifestations of the delirious state. In accordance with this theory, clinical studies have generally attempted to elucidate patients at increased risk for delirium (preexisting compromise) or the external exposures that precipitate an episode of delirium.

In an exploratory study, Juliebo and colleagues studied many potential variables for possible predictive value of both preoperative and postoperative delirium. The investigators found that both precognitive impairment and sustaining an injury in an indoor environment were significantly more common in patients who developed delirium in hospital. Fever and lengthier waits for surgery were significantly correlated with preoperative delirium, whereas low body mass index (BMI) was significantly correlated with postoperative delirium. Because conclusions of causation or mechanism are impossible given the exploratory nature of this study, these results warrant further study.

In a prospective cohort study of 425 patients with hip fracture, Lee and colleagues found that the risk factors for delirium were most relevant in the absence of dementia. Patients with dementia were at increased risk of developing delirium regardless of other risk factors (54% vs 26%; \( P < .001 \)). Patients without dementia who were at increased risk of perioperative delirium were of advancing age (as a continuous variable), male sex, or low BMI, or had an operative time longer than 2 hours. Therefore, the authors noted that risk stratification must initially involve an assessment of preoperative cognitive status. This finding has been corroborated in other studies.

Brauer and colleagues had 571 cases reviewed by 2 physicians prospectively to determine precipitating causes of delirium. With well-defined prespecified diagnostic criteria, they were unable to determine a definitive cause of delirium in most cases. However, they did identify various factors that seemed to contribute to the development of postoperative delirium. Most commonly identified factors were sensory/environmental, infection, drugs, and fluid and electrolyte abnormalities.

Furlaneto and Garcez-Leme more recently identified these same causative agents in the development of delirium in patients with hip fractures. However, in contrast to the study by Brauer and colleagues, these investigators were able to identify a single underlying cause in most cases. However, a key limitation to this conclusion was that prespecified criteria for diagnosis were not
defined. Therefore, their conclusions require cautious interpretation.

**Diagnosis and Clinical Presentation**

A diagnosis of delirium is made clinically at the bedside, with laboratory and imaging investigations supplementing the diagnosis through identifying an underlying correctable cause or ruling out other suspected diagnoses. The diagnosis is made when a patient meets accepted diagnostic criteria, such as those outlined by the DSM-IV (Box 1). Various assessment tools have been devised to assist with rapid assessment and diagnosis. Among these, the Confusion Assessment Method instrument is most widely used and has a high sensitivity and specificity for diagnosing delirium.31 The MMSE has less than ideal sensitivity and specificity for diagnosing delirium.31 Other instruments are available that rate the severity of dementia. These instruments are used frequently in research studies but rarely in the clinical setting.

Patients with delirium may present clinically with 1 of 3 subtypes: hyperactive, hypoactive, or mixed.31 The patient with hyperactive delirium is often readily identifiable because of the heightened arousal manifested as aggression, agitation, and restlessness. Patients with hypoactive delirium typically are withdrawn, are lethargic, and have slowed psychomotor function. The diagnosis of delirium in these patients is frequently missed, because they are less likely to draw attention from nurses, physicians, and other health care practitioners. A mixed subtype presents with a variety of features of both hyperactive and hypoactive subtypes.

In a prospective cohort study of 103 patients presenting with hip fracture in a Swedish hospital, Duppils and Wikblad39 observed certain prodromal behavioral changes that predicted subsequent development of delirium. Specifically, disorientation and urgent calls for attention were significantly associated with the development of delirium in hospital. One-third of these behavioral changes were seen between 25 to 48 hours before a patient was diagnosed with delirium. This study was likely underpowered to detect other pertinent prodromal behaviors. Trends were observed in other behaviors, such as increased psychomotor activity and perceptual disturbances, but were not able to achieve statistical significance. Furthermore, observations were not structured in this study, and therefore other important prodromal behaviors may have been missed.

Certain scales are available that identify a prodromal state that puts patients at risk of perioperative delirium. Using the Delirium Rating Scale-Revised-98 (DRS-R-98) in a prospective study of 101 patients at risk for postoperative delirium, investigators found that early elevations in scores as assessed by the scale were able to predict development of postoperative delirium. The authors suggested a possible role for structured postoperative observations in these patients.40 Other scales have also been validated for detecting patients with hip fractures who are at high risk for developing delirium during hospital admission. Some examples include the Risk Model for Delirium Scale41,42 and the NEECHAM confusion scale.43 These tools have the potential to risk stratify patients for an appropriate increase in monitoring and intervention.

**Outcomes**

The literature has consistently shown that patients with delirium have poorer outcomes than those without delirium, showing higher rates of morbidity and mortality. This finding has been corroborated in patients with hip fractures, alongside increased lengths of hospital stay and functional decline. Resultant cognitive impairments after the resolution of delirium may never completely improve and also may have long-term implications.

Gruber-Baldini and colleagues44 measured incident cognitive impairment in 673 community-dwelling patients with hip fractures and found that it resulted in sustained cognitive impairments (as measured by the MMSE) and declines in both ADLs and instrumental ADLs at 2 and 12 months after discharge from hospital.

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**Box 1**

**Diagnostic criteria for delirium**

1. Disturbance of consciousness, with reduced ability to focus, sustain, or shift attention.
2. Change in cognition or development of perceptual disturbance, which is not better accounted for by a preexisting or evolving dementia.
3. Disturbance develops over a short period (typically hours to days) and has a fluctuating course throughout the day.
4. Clinical evidence shows that the disturbance is attributable to the direct consequences of a general medical condition.

*All criteria must be met for diagnosis.*

Krogseth and colleagues also found long-term deterioration of cognitive function in patients with hip fracture. In a prospective cohort study of 106 patients with hip fracture without prefracture dementia, the investigators found that patients who had dementia at 6 months after hip fracture were significantly more likely to have experienced a delirious episode in hospital. Whether the delirium was simply a deterioration of preexisting cognitive dysfunction or was causally related to the subsequent dementia remains unclear.

A prospective cohort study of 682 elderly patients with no cognitive impairment at admission found lower rates of ADLs and ability to walk 10 feet, and higher rates of depressive symptoms and cognitive impairment up to 2 years postoperatively in patients who developed delirium preoperatively. Edelstein and colleagues also found higher rates of 1-year mortality, functional decline, and decline in independence in 47 community-dwelling patients who developed delirium after admission for hip fracture. Based on these studies, the literature suggests that patients with hip fractures who develop delirium tend to have poorer outcomes than those who do not develop delirium.

Some suggestion has been made that delirium can vary in severity and is not a dichotomous state. Marcantonio and colleagues used the Memorial Delirium Assessment Scale to classify patients into mild or severe delirium and also to subclassify delirium into hyperactive or hypoactive subtypes. They found that patients with mild delirium fared better than those with severe delirium, as measured by nursing home placement and mortality at 6 months. They also found that any hyperactive component to delirium led to worse outcomes using the same measures. Finally, and interestingly, they discovered that patients who had subsyndromal delirium (ie, some symptoms of delirium but not an adequate number to fulfill criteria for diagnosis) also had outcomes as poor, and sometimes poorer, than those with mild delirium.

Delirium itself can persist for prolonged periods and its persistence may also negatively influence outcomes. Lee and colleagues performed a prospective cohort study of 232 elderly patients with hip fracture managed operatively and found that delirium lasting longer than 4 weeks was associated with increased mortality at 2 years compared with patients with delirium lasting less than 4 weeks. Significant functional decline with prolonged delirium was also observed, as measured based on ability to ambulate independently outside one’s home.

### Prevention

Unlike dementia, delirium is an acute condition, and therefore acute prevention is feasible. Research on preventing delirium in patients with hip fractures has focused on interventions that decrease both the incidence and severity of delirium. The most effective interventions have involved provision of specialized care, although some research has evaluated pharmacologic prophylaxis, pain management practices, and approaches to anesthesia.

A prospective cohort study with a historical control group investigated whether the introduction of specialized geriatric nurses for patients with hip fractures would benefit those identified as being at high risk of delirium according to the NEECHAM confusion scale. Sixty patients underwent the intervention, whereas 60 received usual care. This study found that involvement of geriatric nurses was not able to reduce the incidence of delirium, but was able to reduce the severity and length of delirium when it did occur. No effects on functional status or mortality were evident.

A randomized trial of 126 patients, allocating groups to either usual care or a proactive geriatrics consultation, found that early involvement of a geriatric physician who managed patients using a structured recommendation protocol could reduce the incidence and severity of delirium in patients hospitalized for hip fracture.

In a nonrandomized experimental design, De schoedt and colleagues assigned 287 patients to receive either usual care or care by a comprehensive inpatient geriatric consultation team consisting of a nurse, geriatrician, social worker, physiotherapist, and occupational therapist, all of whom specialized in geriatric care. The consultation commenced preoperatively and followed the patients until discharge. The investigators found that the incidence of postoperative delirium and cognitive decline at discharge was reduced in patients treated by the inpatient geriatric team. In patients who developed delirium, the severity did not differ between groups.

Bjorkelund and colleagues implemented a comprehensive multifactorial intervention targeting key risk factors for delirium in the prehospital and perioperative settings. In this prospective cohort study of cognitively intact patients presenting with hip fracture, 131 patients experiencing the intervention were compared with a historical control cohort of 132 patients. The intervention group received a protocol-led intervention consisting of supplemental oxygen; intravenous fluids and extra nutrition; increased monitoring of vitals...
and other physiologic parameters; adequate pain relief; avoidance of transfer delays; daily screening for delirium; and avoidance of polypharmacy. The investigators detected a decrease in the incidence of postoperative delirium, from 34% to 22% (P = .03).

Studies have also examined pharmacologic prophylaxis for delirium. Kalsivaart and colleagues performed a randomized controlled trial of 430 patients. The intervention consisted of 1.5 mg/d of haloperidol started preoperatively until postoperative day 3. The control group received a placebo with identical parameters. The study found that although the incidence of delirium did not decrease, the intervention significantly decreased its severity (as measured by the validated DRS-R-98), the length of delirium (5.4 vs 11.8 days), and also the length of hospital stay overall (17.1 vs 22.6 days). Currently, another group of investigators are evaluating melatonin as a possible prophylactic option, because it has been shown to decrease the incidence of delirium in medical and elective surgical patients.  

Adequate control of pain is important to the prevention of delirium. A prospective study of 541 patients showed that severe pain in cognitively intact patients with hip fractures was significantly associated with the development of delirium. In patients with cognitive impairment, pain could not be adequately assessed. However, low or absent use of opioid medication was significantly associated with the development of delirium after a hip fracture. Meperidine was shown to increase rates of delirium among all patients, and it was recommended that it be avoided in the hip fracture population. Nie and colleagues recently published their findings that poor pain control in Chinese patients with hip fracture has also been associated with increased risk of delirium.

Owing to the association between pain and postoperative delirium in patients with hip fractures, a randomized placebo-controlled trial attempted to elucidate whether a nerve block (fascia iliaca block) could help reduce the incidence of delirium in patients at intermediate or high risk of this complication. The trial randomized 219 patients at intermediate or high risk for the development of delirium and found that these patients had a reduced incidence of delirium with the use of the fascia iliaca nerve block. Severity and duration of delirium were also decreased in the intervention group. Subsequent subgroup analysis found that this benefit was specific to intermediate-risk patients only; however, the number of participants considered at high risk was low (33 total), and therefore the study may have been underpowered to detect a true difference in this subpopulation.

Several studies have examined the role of anesthesia in the development of delirium in patients with hip fractures. A small cohort study of 34 patients with hip fractures from Brazil found that the use of midazolam was associated with an increased risk of delirium. This finding is consistent with other research showing that benzodiazepines are associated with delirium. In a prospective cohort of 236 patients with hip fractures, Sieber and colleagues found no association between the type or dose of anesthetic or associated opioid use and delirium. A randomized controlled trial conducted by the same group randomized 114 patients undergoing hip fracture repair with spinal anesthesia to receive either light or deep sedation with propofol. The investigators found that depth of sedation was able to predict postoperative delirium. Specifically, lighter sedation was able to decrease the incidence of postoperative delirium from 40% to 19% (P = .02). Depth of sedation in this study was monitored with electroencephalogram, which is not standard practice in most operating rooms. Dosage of propofol use was not found to be associated with the development of delirium.

Overall, available evidence suggests a proactive approach to the prevention and treatment of delirium. Patients should be risk stratified at admission and followed by trained nurses and specialized multidisciplinary geriatric teams. Adequate pain control is of importance, with early evidence suggesting regional anesthesia and optimal use of opioids as 2 potential components to the prevention of delirium. Corroboration of these findings with well-designed, adequately powered randomized controlled trials is required.

**SUMMARY**

Cognitive dysfunction in patients with hip fractures most commonly manifests as either dementia or delirium. Dementia is a chronic form of cognitive dysfunction that is common in the hip fracture population. It heavily predisposes to falls and subsequent fracture among elderly patients. Preventive efforts in this population of patients have focused on identifying risk factors and causes of falls. Although hip protectors have shown some promise in preventing hip fractures after a fall, appropriate patient selection, setting selection, and high rates of compliance are integral to success. Management of patients with hip fractures and dementia requires adequate pain control and specialized rehabilitation, whether in an institutional setting or at home.
Deltirium is an acute confusional state that frequently develops in patients with hip fractures who are exposed to certain external precipitants. Diagnosis is clinical and may be preceded by a prodromal phase. Length of stay, functional recovery, morbidity, and mortality outcomes are worse in patients who develop delirium, and possibly exist on a continuum based on severity and length of delirium. Efforts at preventing incidence and reducing the severity of delirium have focused on early and active involvement of specialized geriatric personnel and protocols, adequate pain control, and optimal use of regional anesthesia.

This article attempts to provide a panoramic narrative overview of the available evidence pertaining to cognitive dysfunction in patients with hip fracture. Ultimately, the conclusions are limited by the quality of the available evidence. Most studies were observational, using either concurrent or historical control groups, and therefore could not control for all sources of potential bias. Future observational studies must be large enough to detect true differences in outcomes, and must strive to control for possible confounding variables. Arguably, without high-quality and consistent observational data, the true impact of cognitive dysfunction on patients with hip fractures cannot be comprehended. Therefore, a large prospective cohort study with close and meticulous follow-up is warranted to help practitioners truly understand all of the factors associated with outcome after hip fracture. Through delineating the relative and absolute impact of cognitive dysfunction on patients with hip fractures, its prognosis, prevention, and management can be better prioritized for targeted intervention.

The few clinical trials in the literature that have evaluated potential interventions are generally not randomized, not blinded, and underpowered. The randomized controlled trial is the gold standard in the hierarchy of evidence-based medicine when evaluating therapeutic questions. Therefore, the authors recommend that investigators aim to evaluate future interventions through the use of adequately powered and rigorously conducted randomized controlled trials. This strategy will enable the formation of a rigorous evidence base that can better inform future practice and policy, ultimately improving the care of patients with hip fractures and cognitive dysfunction.

REFERENCES


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