

# A Growing Problem Acetabular Fractures in the Elderly and the Combined Hip Procedure



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## KEYWORDS

• Acetabular fracture • Elderly • Combined hip procedure • Total hip arthroplasty

## KEY POINTS

- The rate of acetabular fractures in the elderly is on the rise.
- Acetabular fractures in the elderly are more frequently caused by a low-energy mechanism, leading to characteristic fracture patterns.
- Geriatric patients often have multiple medical comorbidities and a multidisciplinary approach should be taken to their management.
- Acute total hip arthroplasty should be considered in a select group of elderly patients.

## EPIDEMIOLOGY

As the elderly patient population continues to pursue more active lifestyles, the incidence of pelvic and acetabular fractures in the elderly is on the rise. Epidemiologic studies, starting in the 1970s, have demonstrated a steady increase in the global incidence of pelvic fractures sustained by individuals older than age 60.<sup>1–3</sup> This trend is expected to continue as the elderly population increases with 20% of the United States estimated to be older than the age of 65 years by 2030.<sup>4</sup> Kannus and colleagues<sup>1</sup> reviewed first time, low-energy, osteoporotic pelvic fractures in patients older than age 60 from the Finnish national trauma registry from 1970 through 1997. They found the number of elderly pelvic fractures increased by an average of 23% per year and the incidence of osteoporotic pelvic fractures as a percentage of all pelvic fractures increased from 18% to 64%.<sup>1</sup>

Similarly, Gansslen and colleagues<sup>5</sup> in a large, multicenter study from Germany reviewed 3260 patients of all ages with pelvic trauma and reported an increase in the incidence of pelvic trauma among patients aged 50 to 70 years from 1972 to 1993. The influence of age on the annual incidence of pelvic fractures cannot be overstated, because a four-fold increase is seen in patients greater than 80 years compared with 60 years of age.<sup>6</sup>

Fractures of the acetabulum in elderly individuals are the fastest growing segment of pelvic trauma.<sup>7</sup> Estimated to account for between 10% and 20% of all osteoporotic pelvic fractures,<sup>8</sup> the incidence of acetabular fractures has risen concurrent with all types of pelvic fractures in the geriatric age group.<sup>9</sup> Laird and Keating<sup>2</sup> demonstrated an increase in the average age of individuals with acetabular fractures from 1988 to 2003 at a single institution in Edinburgh, Scotland. In the United

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States, Ferguson and colleagues<sup>3</sup> retrospectively reviewed records from 1980 to 2007 and found the percentage of displaced acetabular fractures in patients older than age 60 increased from 10% to 24% of the total number of displaced acetabular fractures in patients of all ages.

### MECHANISM OF INJURY

Low-energy falls from standing height are the predominant mechanism of injury responsible for acetabular fractures in the elderly.<sup>3,6</sup> This is different from the typical high-energy trauma from motor vehicle accidents or from high falls that are responsible for most acetabular fractures seen in the younger population.<sup>2,3</sup> The positive correlation of age with fall from standing height resulting in injury is well known and thought to be the result of cognitive decline and motor impairment.<sup>10</sup> An estimated 30% of people older than age 65 and 40% of people older than age 80 fall and sustain an injury significant enough to warrant a visit to the emergency department annually.<sup>11</sup>

Importantly, when compared with younger individuals, seemingly low-energy falls cause significant injury and are the leading cause of injury-related death in the elderly population.<sup>12</sup> Sterling and colleagues<sup>13</sup> retrospectively reviewed data from a level two trauma center registry between 1994 and 1998 and found an injury severity score of greater than 15 in 30% of patients older than 65 compared with only 4% of patients younger than 65 who sustained a same level fall. The older cohort was more likely to sustain head, neck, chest, and pelvic injuries than the younger population and nearly twice as likely to die from a fall from any level.

### ACETABULAR FRACTURE PATTERNS

Overall, associated both-column fractures are the most common acetabular fracture pattern observed in young and old individuals, accounting for 20% to 30% of acetabular fractures.<sup>3,14</sup> However, several unique features and fracture patterns are observed more commonly in elderly individuals, reflecting the difference in dominant mechanisms of injury.

Although high-energy trauma is responsible for most acetabular fractures in young patients, low-energy falls are the predominant mechanism of injury in the elderly, typically resulting in lateral compression type injuries.<sup>8</sup> The force from a direct impact on the greater trochanter is transmitted anteromedially to the anterior column, anterior wall, and quadrilateral plate. As a result, fractures of these structures are more common in the elderly

compared with younger individuals, who are more likely to sustain injury to the posterior column and wall and transverse patterns.<sup>3,14,15</sup> In the elderly, posterior wall involvement is more frequently associated with marginal impaction, comminution, and posterior hip dislocation than in young patients.<sup>3,14</sup> These features, and medial roof impaction, quadrilateral plate fracture, and injury to the femoral head, which are also seen at an increased rate in the elderly, are associated with poor outcomes after open reduction and internal fixation (ORIF) of acetabular fractures in the elderly.<sup>3,14,16</sup>

### INITIAL EVALUATION

Even before arrival to the hospital, elderly patients are often undertriaged because of failure of emergency responders to recognize potential major injuries.<sup>17</sup> Several studies have demonstrated an increase in morbidity and mortality when elderly trauma patients are delayed in their arrival to a high-level trauma center.<sup>9,18,19</sup> Vital to every new clinical encounter, a thorough history should include assessment of the magnitude of the injury and the risk for concomitant injuries.<sup>7</sup> Specific to the elderly, assessment of comorbidities, preinjury ambulatory status, and life expectancy are essential during the initial assessment,<sup>7,20</sup> because they play a role in treatment decisions. The two most widely accepted and validated methods for assessment of comorbidities in the elderly population are the Charlson index<sup>21</sup> and the American Society of Anesthesiologists Classification (ASA) index.<sup>20</sup>

A high level of suspicion for severe injuries should be maintained during the evaluation of elderly patients, because they report less pain than younger patients for the same injury.<sup>22</sup> Additionally, when elderly patients do sustain high-energy trauma, they are significant more likely to be polytraumatized than younger patients.<sup>12</sup> Pre-existing cognitive deficits, hearing difficulty, and other issues confound the use of the Glasgow Coma Scale in elderly patients.<sup>23</sup> Additionally, the initial trauma evaluation and physical examination of geriatric patients is different than for that of younger patients because of changes in their physiology, making evaluation and treatment difficult.<sup>24</sup> Specifically, vital signs considered within normal limits for younger patients, including heart rates greater than 90 beats per minute or systolic blood pressures less than 110 mm Hg, in the trauma setting, are associated with increased mortality in elderly patients.<sup>25</sup> Magnusson and colleagues<sup>26</sup> demonstrated that bleeding in acetabular fractures and age are directly correlated. Frequently lacking the cardiac reserve to adequately compensate, special attention should

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