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Co-morbidities in elderly patients with hip fracture: recommendations of the ISFR-IOF hip fracture outcomes working group

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Introduction

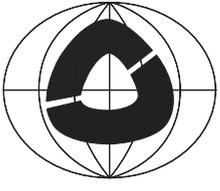
Hip fractures are the second leading cause of hospitalization in the aged with an estimated annual cost of over \$650 million in Canada; by 2041, projections foresee an increase in economic cost to \$2.4 billion and this population often presents with co-morbidity. Comorbid diseases (comorbidities) are defined as coexisting or secondary diseases distinct from the principal or primary illness for which the person seeks medical attention. When compared to patients without comorbid illness, patients with comorbidities receive less aggressive medical treatment, have increased length of hospital stays, increased health care costs and decreased quality of life. Perhaps due to their worse prognosis, investigators often exclude patients with co-morbidities from studies exploring interventions for hip fractures. This practice may improve the chances of finding a significant treatment effect, but also presents considerable challenges to generalizing conclusions to elderly hip fracture patients.

While inclusion of patients with comorbidities in hip fracture trials would improve the generalizability of results, investigators may rightly raise concerns that treatment effects may be confounded by prognostic differences between groups. It is therefore necessary to adjust for the impact of comorbid disease. A number of indices exist for this purpose when the outcome of interest is mortality, such as the Charlson and Kaplan-Feinstein indices; however, these measures are less helpful when the outcome of interest is physical function. To address this gap, Groll et al. have developed and validated the Functional Co-morbidity Index for use in the general population (FCI). The FCI contains diseases such as visual impairment, osteoporosis, and arthritis, which do not appear in indices such as the Charlson or the Kaplan-Feinstein. Visual impairment, cardiovascular disease and medications are major risk factors for falls in the elderly with hip fracture. Epidemiological studies continue to point to osteoporosis as an immense burden to patients and society. Arthritis is often cited as a common condition for musculoskeletal disease that affect negatively on patient health and quality of life. The FCI contains 18 diagnoses scored by adding the number of "yes" answers, with a score of 0, indicating no co-morbid illness and a score of 18, indicating the highest number of co-morbid illnesses. The underlying premise of the FCI is that diagnoses associated with physical function are, at least in part, different from those associated with mortality, and it is designed to adjust for the effect of co-morbidity on physical function. In 2009, "Osteoporosis: From Evidence to Action" was held in Monte Carlo, Monaco as a collaborative effort between the International Osteoporosis Foundation (IOF) and the International Society for Fracture Repair (ISFR). The summary of this event has been previously reported and held under the auspices of the Osteoporotic Fracture Campaign (OFC) of the ISFR.

In brief, the primary goals of the event were as follows: **To draw** together OFC members in order to elucidate how they have advanced in their various spheres since 2002, and to demonstrate how their association with the OFC has helped in this process **To paint** a vision of the next 5 years, identifying key areas in which we would like to influence global health concerns, such as surgical issues and patient-oriented assessment, and 3) to advance the current understanding of functional outcomes from the patient perspective using both quantitative and qualitative research. Advancing these initiatives required endorsement not only from other organizations such as the IOF and ISFR but also from healthcare professionals that attend to patient populations who seek osteoporotic care, which includes physical therapists, geriatricians, endocrinologists and scientists as well as industry partners. We formed working groups to tackle specific issues. The objective of the group was to gain a rich understanding of patient, proxy responder, and expert opinions on patient care following hip fracture using a mixed methods approach. In one session, the Hip Fracture Outcomes working group filled out questionnaires for a quantitative analysis on topics such as the impact of severity versus frequency of comorbidities affecting the target population, and on useful items tailored to hip fracture management and rehabilitation. Our aim was to evaluate the perceptions of our interdisciplinary group about hip fracture care and the impact of each of the diagnoses included in the FCI.

Results:

The majority of respondents strongly endorsed that the presence (70%) and severity (80%) of arthritis would impact physical function in hip fracture patients. Half of the respondents felt that osteoporosis would not impact physical function, but 88% agreed that severity of this disorder would be important in establishing an effect. The majority of respondents 'strongly agreed' that the severity of neurological disease and stroke or transient ischemic attack and visual impairment would impact physical function (86%, 71% and 66%, respectively). Respondents 'agreed' (Range 53% to 73%) that 10 out of 18 diagnoses would influence physical function following hip fracture. On the other hand, 63% 'strongly disagreed' that gastrointestinal disease and 64% 'disagreed' that diabetes type I and II would impact physical function. Eight respondents provided no additional diagnoses. Three out of 9 (33%) respondents listed dementia as an important comorbidity that would affect physical function following hip fracture. Two out of 9 (22%) respondents mentioned postural hypotension as an additional diagnosis to include in the list with the rationale that the elderly have a history of falls and previous fractures and the aged have a reduced sensation in their feet and lower extremities resulting in unsteady gait and decreased speed.



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Discussion and Conclusions:

Practitioners agreed that the majority of the diagnoses listed in the FCI were important in influencing physical function among hip fracture patients. Results from our survey indicated that respondents felt that the severity of 4 of the 18 diagnoses would affect physical function following hip fracture. Those surveyed also felt that osteoporosis as well as diabetes type I and II were not believed to otherwise affect physical function unless diagnosed as a severe condition. Results indicate that gastrointestinal disease was not perceived, by respondents, to have an impact, even if severe among hip fracture patients, and dementia was considered to be an influential comorbid condition.

Following an analysis of survey results from practitioners and an overview of the literature, we believe that the FCI can be a useful instrument to capture comorbid conditions that impact functional status after hip fracture; however, the index may need to be modified for this specific population. Specifically, the FCI should incorporate dementia. Limitations of our survey include a small sample size of individuals who self-selected from a pool of participants who participated in previous ISFR workshops to attend a Hip Fracture Outcomes Working Group, which limits the generalizability of our results. The strength of this sample is the inclusion of geographically diverse clinicians and researchers who are all experts and actively engaged in conducting hip fracture trials. Future investigation is needed into the validation of the test for the hip fracture population, which include patient involvement in the development stage of a modified FCI. Once established, we will need to conduct prospective studies measuring the usefulness of the FCI with respect to changes in physical function when compared to other indices.

For more information, please refer to the online publication of Hoang-Kim A, Busse J, Groll, D, Karanicolas PJ, Schemitsch E. Comorbidities in Elderly Patients with Hip Fracture: Recommendations of the ISFR-IOF Hip Fracture Outcomes Working Group. Arch Orthop Trauma. DOI. 10.1007/s00402-013-1756-z.

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From left to right, Amy Hoang-Kim (Canada), Francesco Pegreff (Italy) Gary di Giovanni (Depuy-Synthes), Declan Service (Fastform Research), Henry Ahn, (Canada), Denys Wahl (International Osteoporosis Foundation), Martha Hoque (Italy)