



Prolonged hospital stay before hip fracture surgery in the elderly: a single parameter but multiple roles

Paolo Mazzola^{1,2} 

Received: 3 October 2017 / Accepted: 6 November 2017 / Published online: 21 November 2017
© SICOT aisbl 2017

To the Editor:

I read the paper by Tulic et al. [1] that describes the association between pre-operative hospital stay and clinical-functional outcomes after hip fracture surgery in a population of elderly patients. Pre-operative stay, also referred to as *time to surgery* or *delay of surgery* (DOS), is one of the most debated—and yet insufficiently explained—parameters of hip fracture management because of its potential association with poor functional recovery, morbidity, and mortality.

Tulic and colleagues showed that a DOS longer than 72 hours among elderly patients undergoing hip fracture surgery negatively and significantly affects early outcomes, leading to increased incidence of overall complications and lower functional gain, as measured by the motor FIM. However, this delay apparently does not affect in-hospital or one year mortality.

Though profound differences may exist between-country when considering distinct cohorts of elderly subjects experiencing hip fracture, we agree that DOS could be interpreted as a confounding factor rather than an independent predictor when considering the risk of short- and long-term mortality as the outcomes. As shown in a previous study, I believe that DOS takes on an important role when considering the frailest patients, especially in terms of pre-existing functional impairment [2]. Unlike Tulic and colleagues, who considered a cohort of subjects who were functionally independent prior to fracture, Bellelli et al. considered a population comprising both individuals with and without functional disability in basic activities of daily living. Results cannot be compared due to the different study design, but they indirectly

confirm that the effect of DOS on the risk of mortality is most likely mediated by a stronger predictor, i.e., functional impairment. Indeed, functionally independent subjects did not display an increased risk of one year mortality when experiencing a DOS >48 hours [2].

According to local policies, dedicated protocols and facility-specific organizational aspects, DOS represents a heterogeneous parameter to be considered and compared between countries when focusing on the risk of mortality in these patients. Moreover, different independent predictors of mortality emerged from the literature pertaining to hip fracture in the elderly, such as delirium [3], disability [4], and the comorbidity burden [5]. Focusing on comorbidity, a recent paper by Bliemel et al. investigated pre-existing conditions among hip fracture elderly patients and showed that respiratory, neurological, gastrointestinal, and kidney disorders present a high impact on both functional outcomes and medium-term mortality [6]. Together, these conditions collectively contribute to describe the complexity of geriatric patients rather than merely quantifying general organizational aspects. This complexity should be taken into account from the very beginning when caring for an older subject. Indeed, some mistakes are avoidable, such as the inappropriate use of antihypertensive medications, which often leads to an increased risk of hip fracture occurrence [7]. Other conditions are potentially preventable, e.g., a poor nutritional status, which was associated with the occurrence of post-operative delirium in a recent study [8]. Nutritional markers were also used to predict the risk of 30-day readmission among patients hospitalized for hip fracture: according to Stone et al. prealbumin, albumin, total protein, and vitamin D levels represent the core part of a statistical model to predict 30-day readmissions [9]. To date, both delirium and short-term hospital readmission may increase the risk of mortality.

Despite being incompletely clarified—as Tulic and colleagues correctly stated—the role of pre-operative stay remains crucial. It should not be excessively prolonged because of its negative impact on functional outcomes and complications [1], but it does not need to be shortened per se and at all

✉ Paolo Mazzola
paolo.mazzola@unimib.it

¹ University of Milano-Bicocca, School of Medicine and Surgery, Via Cadore, 48 – U8 Building, Floor 4, Lab 4045, 20900 Monza, MB, Italy

² NeuroMI – Milan Center for Neuroscience, Clinical Neurosciences research area, Milan, MI, Italy

costs disregarding the overall complexity of geriatric patients, which may need some degree of clinical stabilization.

Quality of life, unfortunately too often neglected, perhaps endures as the most important outcome in this population.

Funding The author declares that the present manuscript was unfunded.

Compliance with ethical standards

Conflict of interest Dr. Mazzola declares that he has no conflict of interest.

References

1. Tulic G, Dubljanin-Raspopovic E, Tomanovic-Vujadinovic S, Sopta J, Todorovic A, Manojlovic R (2017) Prolonged pre-operative hospital stay as a predictive factor for early outcomes and mortality after geriatric hip fracture surgery: a single institution open prospective cohort study. *Int Orthop*. <https://doi.org/10.1007/s00264-017-3643-7>
2. Bellelli G, Mazzola P, Corsi M, Zambon A, Corrao G, Castoldi G, Zatti G, Annoni G (2012) The combined effect of ADL impairment and delay in time from fracture to surgery on 12-month mortality: an observational study in orthogeriatric patients. *J Am Med Dir Assoc* 13(7):664 e669–664 e614
3. Bellelli G, Mazzola P, Morandi A, Bruni A, Carnevali L, Corsi M, Zatti G, Zambon A, Corrao G, Olofsson B, Gustafson Y, Annoni G (2014) Duration of postoperative delirium is an independent predictor of 6-month mortality in older adults after hip fracture. *J Am Geriatr Soc* 62(7):1335–1340
4. Mazzola P, Bellelli G, Broggin V, Anzuini A, Corsi M, Berruti D, De Filippi F, Zatti G, Annoni G (2015) Postoperative delirium and pre-fracture disability predict 6-month mortality among the oldest old hip fracture patients. *Aging Clin Exp Res* 27(1):53–60
5. Pedersen AB, Ehrenstein V, Szepliget SK, Lunde A, Lagerros YT, Westerlund A, Tell GS, Sorensen HT (2017) Thirty-five-year trends in first-time hospitalization for hip fracture, 1-year mortality, and the prognostic impact of comorbidity: a Danish Nationwide cohort study, 1980–2014. *Epidemiology* 28(6):898–905
6. Bliemel C, Buecking B, Oberkircher L, Knobe M, Ruchholtz S, Eschbach D (2017) The impact of pre-existing conditions on functional outcome and mortality in geriatric hip fracture patients. *Int Orthop*. <https://doi.org/10.1007/s00264-017-3591-2>
7. Corrao G, Mazzola P, Monzio Compagnoni M, Rea F, Merlino L, Annoni G, Mancina G (2015) Antihypertensive medications, loop diuretics, and risk of hip fracture in the elderly: a population-based cohort study of 81,617 Italian patients newly treated between 2005 and 2009. *Drugs Aging* 32(11):927–936
8. Mazzola P, Ward L, Zazzetta S, Broggin V, Anzuini A, Valcarcel B, Brathwaite JS, Pasinetti GM, Bellelli G, Annoni G (2017) Association between preoperative malnutrition and postoperative delirium after hip fracture surgery in older adults. *J Am Geriatr Soc* 65(6):1222–1228
9. Stone AV, Jinnah A, Wells BJ, Atkinson H, Miller AN, Futrell WM, Lenoir K, Emory CL (2017) Nutritional markers may identify patients with greater risk of re-admission after geriatric hip fractures. *Int Orthop*. <https://doi.org/10.1007/s00264-017-3663-3>