Turkish Journal of Geriatrics
DOI: 10.29400/tjgeri.2023.356
2023; 26(3):294–301

- Özge PEKŞEN KIZILIŞIK [1]
- Havva KOCAYİĞİT[1]
- Ali Fuat ERDEM[1]

CORRESPONDANCE

[1]Özge PEKŞEN KIZILIŞIK

Phone : +905439406027
e-mail : ozgepeksen55@gmail.com

Received : Agu 14, 2023
Accepted : Agu 27, 2023

[1] Sakarya University, Anesthesiology and Reanimation, Sakarya, Turkey

ORIGINAL ARTICLE

ANALYSIS OF RISK FACTORS AFFECTING MORTALITY IN GERIATRIC PATIENTS OPERATED ON FOR HIP FRACTURES

Abstract

Introduction: High mortality rates after hip fracture surgery are an essential health problem. We evaluated the factors affecting mortality in the postoperative 30-day period.

Materials and Methods: A total of 906 patients aged 65 years and over who underwent hip fracture surgery were included. The patients were divided into two groups: those who died within 30 days of surgery and those who survived. Demographic data, ASA classifications, comorbidities, method of anesthesia, length of stay in hospitals and intensive care units, and the effects of these parameters on postoperative 30-day mortality were analysed.

Results: The postoperative 30-day mortality of the patients was 8.6%. The mean age of the patients who died during this period was 83.49 ± 6.9 years, while the mean age of the survivors was 78.7 ± 7.6 years. In our study, age (OD: 1.091; CI 95%, 1.051–1.132), The American Society of Anesthesiologists (ASA) physical status classification (OD: 12.69; CI 95%, 1.074–150.17), coronary artery disease (OD: 0.521; CI 95%, 0.287–0.944), general anesthesia administration (OD: 0.305; CI 95%, 0.140–0.667), and creatinine values (OD: 1.045; CI 95%, 1.114–1.892) were determined to be independent risk factors.

Conclusions: Detailed examination of elderly hip fracture patients considering these risk factors and close perioperative follow-up will reduce mortality.

Keywords: Aged; Anesthesia; Hip Fractures; Mortality.

INTRODUCTION

In most countries, the proportion of elderly individuals in the total population is increasing. In the US, the elderly accounted for 8.3% of the population in 2016, and this increased to 9.7% by 2021. This proportion is expected to increase to 11% in 2025, 22.6% in 2060, and 25.6% in 2080 (1).

The prevalence of hip fractures is also increasing. With the exception of distal radius fractures, hip fractures are the most common in older people. In younger people, hip fractures are usually the result of high-energy traumas, such as falling from a height or involvement in a traffic accident. Elderly individuals generally have lower bone density, and so hip fractures often occur due to low-energy traumas (2). In 1990, there were 1.66 million elderly hip fracture patients worldwide, and this number is expected to reach 6.25 million by 2050 (although the exact number will depend on changes in demographic characteristics of the population over the next quarter century). The one-month mortality rate of these patients varies from 4% to 14% (3).

Studies have shown that age, gender, ASA classification, comorbidities, anesthesia method, blood product transfusion, waiting time for surgery, hospitalisation time, and biochemical abnormalities affect mortality in elderly hip fracture patients. However, the extent to which these risk factors affect mortality is still debated. Accordingly, the purpose of this study was to determine the factors affecting the mortality of patients 65 years old and older in the first 30 days after surgery.

MATERIALS AND METHODS

Patient selection and data collection

Approval for this study was received from the Sakarya University Faculty of Medicine Non-Invasive Ethics Committee on 30 June 2022 (number 145950). Patients who had undergone surgery for hip fracture between 1 January 2015 and 1 June 2021 were retrospectively analysed. The study sample included 906 patients 65 years of age and older who had undergone surgery for a hip fracture. Patients with missing data, those who were younger than 65, or those who had received a massive blood transfusion were excluded.

The patients were divided into two groups. Group 1 (n=78) included patients who died within 30 days of hip fracture surgery, while group 2 (n=828) included patients who survived longer than 30 days. Demographic data available in patient files were recorded, including age and gender, ASA classifications, comorbidities, intraoperative anesthesia method, total hospitalisation time, waiting time for surgery, whether the patient was hospitalised in the intensive care unit, and length of stay (if any) in the intensive care unit. Routine preoperative and postoperative laboratory tests, including tests for haemoglobin (Hb), platelets (PLT), international normalised ratio (INR), aspartate aminotransferase (AST), alanine aminotransferase (ALT), urea, and creatinine were also examined. The data from the analysis of the two groups' files were compared, and a regression analysis was used to determine the factors affecting mortality.

Statistical analysis

The SPSS Statistics 20 package of programs was used to conduct a statistical analysis of the data. Qualitative data were expressed as numbers and percentages, and quantitative data were expressed as means ± standard deviations. Normality testing of continuous data was done using the Kolmogorov–Smirnov test. The two samples t-test was used to compare repeated measures of continuous variables. Student's t-test and the Mann–Whitney U test were used to compare continuous variables between the two groups. Factors affecting mortality were determined by logistic regression analysis. $P<0.05$ was considered to be statistically significant.

RESULTS

A total of 906 patients aged 65 years and over who had undergone hip fracture surgery were included in our study. The mean age of all patients was 79.1 ± 7.6 years. The mean age of the patients in group 1 (83.49 ± 6.9) was statistically higher than the mean age of the patients in group 2 (78.7±7.6) (p<0.001).

Of 906 patients, 63.9% (n = 579) were female, and 36.1% (n = 327) were male. While 64.1% (n = 50) of the patients were female and 35.9% (n = 28) were male in group 1, in group 2, 63.9% (n = 529) were female and 36% (n = 299) were male. There was no difference between the two groups in terms of gender distribution (p = 0.970).

Table 1. Demographic data

	All Patients n = 906	Group 1 n = 78	Group 2 n = 828	p Value
Age (Years)	79.1 ± 7.6	83.49 ± 6.9	78.7 ± 7.6	<0.001
Gender, n (%)				
Female	579 (63.9)	50 (64.1)	529 (63.9)	0.970
Male	327 (36.1)	28 (35.9)	299 (36.1)	
ASA classification				
I	6 (0.7)	0 (0)	6 (0.7)	
II	84 (9.3)	0 (0)	84 (10.1)	0.049
III	815 (90)	78 (100)	737 (89)	
IV	1 (0,1)	0 (0)	1 (0,1)	
Hemoglobin (gr/ dL)	11.5 ± 1.6	10.9 ± 1.9	11.5 ± 1.6	<0.001
Platelet (1000/ µL)	227.5 ± 80.8	215 ± 96	228 ± 79	0.217
INR	1.1 (0.9-1.2)	1.2 (1.2-1.3)	1.0 (0.9-1.1)	<0.001
Urea (mg/dl)	54 (42-76)	84 (45-170)	52 (40-71)	<0.001
Creatinine (mg/ dL)	0.9 (0.8-1.3)	1.5 (0.7-2.4)	0.9 (0.8-1.3)	0.083
ALT (U/L)	12 (9.2-16.7	11.5 (7-14)	12 (10-16)	0.206
AST (U/L)	23 (17.2-34)	23 (17-32)	26 (21-40)	0.545
General	67 (7.4)	12 (15.4)	55 (6.6)	0.005
Regional	839 (92.6)	66 (84.6)	773 (93.4)	
Comorbidities				
Hypertension	613 (67.7)	53 (67.9)	560 (67.6)	0.955
Chronicle renal failure	44 (4.9)	8 (10.3)	36 (4.3)	0.020
Asthma	46 (5.1)	7 (9.0)	39 (4.7)	0.101
COPD	102 (11.3)	7 (9.0)	95 (11.5)	0.504
Diabetes	257 (28.4)	19 (24.4)	238 (28.7)	0.411
Cerebrovascular accident	104 (11.5)	10 (12.8)	94 (11.4)	0.703
Epilepsy	8 (0.9)	0 (0)	8 (1.0)	0.383
Coronary artery disease	153 (16.9)	21 (26.9)	132 (15.9)	0.013
Alzheimer	118 (13.0)	16 (20.5)	102 (12.3)	0.040
Heart failure	158 (17.4)	26 (33.3)	132 (15.9)	<0.001

ASA classification: The American Society of Anesthesiologists physical status classification. INR: International Normalised Ratio. ALT: Alanine Aminotransferase. AST: Aspartate Aminotransferase. Regional anesthesia: Combined Spinal Epidural Anesthesia, Spinal Anesthesia, Peripheral Nerve Block, Epidural Anesthesia. COPD: Chronic Obstructive Pulmonary Disease. Data are given as n (%), mean ± standard deviation or median (25-75 percentile).

The ASA classification of all patients in Group 1 was ASA 3, and there was a significant difference between the two groups (p = 0.049). When the patients in group 1 and group 2 were compared concerning other diseases, group 1 was found to have significantly more patients with chronic renal failure, coronary artery disease, Alzheimer's disease, and heart failure (p = 0.20, p = 0.013, p = 0.40, p < 0.001, respectively). There was no difference between the two groups with regard to other comorbid diseases.

General anesthesia was applied to only 7.4% (n = 67) of the 906 patients in our study, while regional anesthesia was used in 92.6% (n = 839). When comparing the method of anesthesia applied, it was found that general anesthesia was applied to 15.4% (n = 12) of the patients in group 1 and 6.6% (n = 55) of the patients in group 2, and the difference was statistically significant (p=0.005) (Table 1).

Group 1 and group 2 were compared regarding length of hospital stay and waiting times for surgery, and no significant difference was found (p = 0.773 and p = 0.405). However, as might be expected, admission to the intensive care unit was significantly higher in group 1 (66.7%). vs. 24.3% p<0.001). No significant difference was found between the two groups in terms of patients followed in the intensive care unit (p=0.953) (Table 2).

Parameters with a statistically significant difference in mortality were analysed by multivariate

Table 2. Hospital and intensive care unit length of stay

	All Patients n = 906 (100)	Group 1 n = 78 (8.6)	Group 2 n=828 (91.4)	P Value
Length of Hospitalization (days)	9.3 ± 6.2	10.1 ± 7.2	9.2 ± 6.1	0.773
Surgery Waiting Time (days)	3.7 ± 2.4	4.4 ± 2.7	3.7 ± 2.4	0.405
Number of Patients Admitted to Intensive Care Unit (n,(%))	253 (27.9)	52 (66.7)	201 (24.3)	<0.001
Intensive Care Unit Hospitalization Time (days)	3 (2-4)	3 (2-4)	3 (1.2-4.7)	0.953

Data is given as n (%) or mean ± standard deviation and median (25-75) percentile .

Table 3. Logistic regression analysis of factors affecting mortality

	ODDS rate	95% confidence interval		P
Age	1,091	1,051	<0.001	<0.001
ASA Classification	12,690	1,074	0.044	0.044
Hypertension	1,303	0.736	0.364	0.364
Chronic renal failure	0.535	0.200	0.212	0.212
Chronic obstructive pulmonary disease	1,504	0.625	0.362	0.362
Coronary artery disease	0.521	0.287	0.032	0.032
General anesthesia	0.305	0.140	0.003	0.003
Insertion of blood product	0.920	0.525	0.771	0.771
Number of waiting days for surgery	1,062	0.959	0.247	0.247
Hemoglobin	0.871	0.744	0.087	0.087
Urea	1,006	0.999	0.102	0.102
Creatinine	1,045	1,114	0.006	0.006

logistic regression. Age (OD:1.09; CI: 95% 1.051–1.132), ASA classification (OD:12.690; CI: 95% 1.074–150.17), coronary artery disease (OD: 0.521; CI: 95%, 0.287–0.944), general anesthesia (OD: 0.305; CI: 95%, 0.140–0.667), and creatinine (OD: 1.045; CI 95% 1.114–1.892) were found to be independent risk factors for postoperative 30-day mortality ($p<0.001$, $p=0.44$, $p=0.032$, $p=0.003$, $p=0.006$, respectively) (Table 3).

DISCUSSION AND CONCLUSION

In this study, we aimed to determine the postoperative 30-day mortality rate and risk factors for mortality in elderly patients who underwent hip fracture surgery. The study included 906 patients, and the postoperative 30-day mortality rate was 8.6%. The independent risk factors affecting mortality were age, ASA value, coronary artery disease, administration of general anesthesia, and a high creatinine value.

Mortality rates after hip fracture surgery range from 4–14% in the literature (4). Moran et al. conducted a prospective observational study in 2011 including 2660 patients and found that the mortality rate was 9% in the first 30 days after hip fracture surgery (5). In another prospective observational study that included 728 patients, the 30-day mortality rate was found to be 5% (6). Similarly, the study of Palabiyik et al., which included 106 patients aged 80 and over, seven- and 30-day mortality rates were reported as 6.6% and 10.4% (7). In our study, which included 906 patients, the postoperative 30-day mortality rate was found to be approximately 8.6%, similar to the literature.

Advanced age is a risk factor in hip fracture operations. In addition to the main pathology, physiopathological changes occur in organ systems in elderly patients. This is important in the perioperative process. For this reason, we included patients aged 65 and over in our study in order to evaluate the elderly patient group within itself. There are many studies on this subject in the literature. In a study published in 2017, 168,087 patients over the age of 65 were divided into two groups for evaluation: 65–80 years of age and 81–99 years of age. Mortality was found to be 2.6% for the 65–89 age group and 4.4 % for the 81–99 age group (8). A cohort study by Frost et al. reported that advanced age affects in-hospital mortality in hip fracture patients (9). In our study, the mean age of the patients who survived was 78.7 ± 7.6 years, while the mean age of the patients who developed mortality was 83.49 ± 6.9 years. The age of the patients was among the independent risk factors affecting mortality. Similar to previous studies, our findings indicated that advanced age affects mortality.

Since our patients were of advanced age, most of them had comorbidities: hypertension, chronic renal failure, asthma, COPD, diabetes, cerebrovascular disease, epilepsy, coronary artery disease, Alzheimer's disease, heart failure, rheumatoid arthritis, thyroid gland disorders, Parkinson's, obesity, solid tumour, tuberculosis, and so on. ThΩe mortality and morbidity risks of elderly hip fracture patients are associated with comorbidities (10). When these other diseases were evaluated in our study, a significant difference was found for chronic renal failure, coronary artery disease, Alzheimer's disease, and heart failure, and coronary artery disease was found to be among the independent risk factors affecting postoperative 30-day mortality. Many studies have examined the impact of comorbidities on mortality. According to the cohort study of Ryan et al., which included 34,805 elderly hip fracture patients, obesity, COPD, and kidney failure were associated with mortality (11). In a study including 120 patients, comorbidities such as coronary artery disease, congestive heart failure, Alzheimer's, Parkinson's, and malignancy were reported to affect mortality (12). According to the cohort study of Frost et al., congestive heart failure, cerebrovascular disease, liver diseases, renal diseases, and malignancy also affects mortality rates (8). In another cohort study, COPD, diabetes, and solid metastatic tumour occurrence were found to affect mortality, with COPD showing a substantial predictive value for mortality (13). Finally, a meta-analysis including 25,349 patients reported that lung diseases, diabetes, and cardiovascular diseases increased the risk of mortality (14).

According to most studies on patients who underwent hip fracture surgery, the ASA value is among the factors affecting mortality: The higher the ASA value, the higher the mortality rate (15,16). The majority of the patients who died in our study had high ASA values, and high ASA values were found to be an independent risk factor affecting mortality.

Overall, the impact of the anesthesia method on mortality in hip fracture patients remains controversial. In this study, we found that the mortality rate was higher in the general anesthesia group than in the regional anesthesia group, and general anesthesia was an independent risk factor for postoperative 30-day mortality. Similar results were reported in a retrospective observational study conducted by Radcliff et al., which included 5,683 hip fracture patients over 65 years of age (17). An extensive analysis, including 47 clinical trials and 35 reviews/meta-analyses, showed that the specific mode of anesthesia influences mortality and morbidity. Regional anesthesia is associated with reduced early mortality and morbidity (18). In contrast, a study by White et al., which included 65,535 patients with hip fractures, found no significant differences in 30-day mortality between the general anesthesia and neuraxial anesthesia groups (19). Similarly, a study by Basques et al., which included 9,842 patients, found no significant differences in 30-day mortality between the two anesthesia groups (20). However, Fields et al. reported that the risk of developing complications for 30 days was higher in patients who underwent general anesthesia in their retrospective observational study, which included 6,133 hip fracture surgery patients (21). Although Basque et al. worked with patients aged 70 and over, White and Fields did not include age restrictions in their study. We think that the advanced age patient group should be separated from the younger age patient group in terms of tolerability of hemodynamic changes.

The literature provides conflicting results regarding the waiting time for surgery in hip fracture patients. Some studies suggest that surgery performed earlier than 12 hours reduces short-term mortality, while surgery performed before six hours has no effect on mortality (15). Delaying surgery for more than 48 hours may be associated with in-hospital mortality but not with 30-day and one-year mortality (22). Another study reported no significant difference in mortality when surgery was delayed for up to four days, but mortality increased 2.5 times after surgery was delayed for more than four days (5). In the present study, the mean waiting time for surgery was 3.7 ± 2.4 days, and the mean waiting time for patients who died was 4.4 ± 2.7 days. However, the statistical analysis showed that the waiting time for surgery did not affect postoperative 30-day mortality. Prospective randomised studies have also reported that waiting time for surgery does not affect mortality when other factors, such as age, gender, ASA classification, and type of surgery, are considered (16,23). Longer waiting times may lead to prolonged hospital stays and increased postoperative complications and morbidity risk (16).

In our study, it was observed that Hb values were lower in the group that developed mortality in the 30-day postoperative period. According to the cohort study conducted by Ryan et al., which included 34,805 elderly hip fracture patients, 30-day mortality and rehospitalisation rates were higher in geriatric patients who were anaemic at presentation (11). Similarly, in another study that included 7,319 hip fracture patients, anaemia was observed in 42.9% of the patients, and low Hb value were found to increase mortality (24).

The most important limitation of the study is that it was not a randomised controlled trial. In conclusion, the findings are consistent with the literature, which has reported mortality rates ranging from 4% to 14% in elderly patients who undergo hip fracture surgery. Advanced age is a known risk factor, and comorbidities such as chronic renal failure, coronary artery disease, Alzheimer's disease, and heart failure also increase mortality risk. The ASA value is another factor affecting mortality, with higher ASA values associated with higher mortality rates. The type of anesthesia used also plays a role, with general anesthesia associated with higher mortality rates compared to regional anesthesia.

Overall, this study highlights the importance of identifying risk factors for mortality in elderly patients who undergo hip fracture surgery. By identifying these factors, we can mitigate the risk of postoperative mortality and improve patient outcomes.

Ethics Committee Approval: This study was approved by the Sakarya University Faculty of Medicine Clinical Research Ethics Committee (Date: 30.06.2022, No: 145950).

REFERENCES

1. Turkish Statistical Institute. General Census and Address Based Population Registration System, 1935-2021. [Internet]. Avaible from: https://data.tuik.gov.tr, Accessed: 10.04.2023.
2. Marottoli RA, Berkman LF, Cooney LM Jr. Decline in physical function following hip fracture. J Am Geriatr Soc. 1992;40(9):861-6. (DOI:10.1111/j.1532-5415.1992.tb01980.x)
3. Dhanwal DK, Dennison EM, Harvey NC, Cooper C. Epidemiology of hip fracture: Worldwide geographic variation. Indian J Orthop. 2011;45(1):15-22. (DOI:10.4103/0019-5413.73656)
4. Johnell O, Kanis JA. An estimate of the worldwide prevalence and disability associated with osteoporotic fractures. Osteoporos Int. 2006;17(12):1726-33. (DOI:10.1007/s00198-006-0172-4)
5. Moran CG, Wenn RT, Sikand M, Taylor AM. Early mortality after hip fracture: is delay before surgery important? J Bone Joint Surg Am. 2005;87(3):483-9. (DOI:10.2106/JBJS.D.01796)
6. Forni C, Gazineo D, D'Alessandro F, et al. Predictive factors for thirty-day mortality in geriatric patients with hip fractures: a prospective study. Int Orthop. 2019;43(2):275-281. (DOI:10.1007/s00264-018-4057-x)
7. Palabıyık, O., Bayar, F., Caglar, T. Anesthetic Techniques in Octogenarians and Older Undergoing Orthopedic Surgery for Hip Fracture. Journal of Clinical and Experimental Investigations 2017;8 (3), 85-89. (DOI: 10.5799/jcei.343194)
8. Manoli A 3rd, Driesman A, Marwin RA, Konda S, Leucht P, Egol KA. Short-Term Outcomes Following Hip Fractures in Patients at Least 100 Years Old. J Bone Joint Surg Am. 2017;5;99(13):e68. (DOI:10.2106/JBJS.16.00697)
9. Frost SA, Nguyen ND, Black DA, Eisman JA, Nguyen TV. Risk factors for in-hospital post-hip fracture mortality. Bone 2011;49(3):553-8. (DOI:10.1016/j.bone.2011.06.002)
10. 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;16;152(6):380-90. (DOI:10.7326/0003-4819-152-6-201003160-00008)
11. Ryan G, Nowak L, Melo L, et al. Anemia at Presentation Predicts Acute Mortality and Need for Readmission Following Geriatric Hip Fracture. JB JS Open Access 2020;28;5(3):e20.00048. (DOI:10.2106/JBJS.OA.20.00048)
12. Kilci O, Un C, Sacan O, et al. Postoperative Mortality after Hip Fracture Surgery: A 3 Years Follow Up. PLoS One 2016;27;11(10):e0162097. (DOI:10.1371/journal.pone.0162097)
13. Wu LC, Chou MY, Liang CK, Lin YT, Ku YC, Wang RH. Factors affecting one year mortality of the elderly patients after surgery for hip fracture. International Journal of Gerontology 2016;10 (4), 207-211. (DOI:10.1016/j.ijge.2016.02.004)
14. Chang W, Lv H, Feng C, et al. Preventable risk factors of mortality after hip fracture surgery: Systematic review and meta-analysis. Int J Surg. 2018;52:320-328. (DOI:10.1016/j.ijsu.2018.02.061)

15. Bretherton CP, Parker MJ. Early surgery for patients with a fracture of the hip decreases 30-day mortality. Bone Joint J. 2015;97-B(1):104-8. (DOI:10.1302/0301-620X.97B1.35041)

16. Mariconda M, Costa GG, Cerbasi S, et al. The determinants of mortality and morbidity during the year following fracture of the hip: a prospective study. Bone Joint J. 2015;97-B(3):383-90. (DOI:10.1302/0301-620X.97B3.34504)

17. Radcliff TA, Henderson WG, Stoner TJ, Khuri SF, Dohm M, Hutt E. Patient risk factors, operative care, and outcomes among older community-dwelling male veterans with hip fracture. J Bone Joint Surg Am. 2008;90(1):34-42. (DOI:10.2106/JBJS.G.00065)

18. Luger TJ, Kammerlander C, Luger MF, Kammerlander-Knauer U, Gosch M. Mode of anesthesia, mortality and outcome in geriatric patients. Z Gerontol Geriatr. 2014;47(2):110-24. (DOI:10.1007/s00391-014-0611-3)

19. White SM, Moppett IK, Griffiths R, et al. Secondary analysis of outcomes after 11,085 hip fracture operations from the prospective UK Anaesthesia Sprint Audit of Practice (ASAP-2). Anaesthesia 2016;71(5):506-14. (DOI:10.1111/anae.13415)

20. Basques BA, Bohl DD, Golinvaux NS, Leslie MP, Baumgaertner MR, Grauer JN. Postoperative length of stay and 30-day readmission after geriatric hip fracture: an analysis of 8434 patients. J Orthop Trauma. 2015;29(3):e115-20. (DOI:10.1097/BOT.0000000000000222)

21. Fields AC, Dieterich JD, Buterbaugh K, Moucha CS. Short-term complications in hip fracture surgery using spinal versus general anaesthesia. Injury 2015;46(4):719-23. (DOI:10.1016/j.injury.2015.02.002)

22. Dailiana Z, Papakostidou I, Varitimidis S, Michalitsis S, Veloni A, Malizos K. Surgical treatment of hip fractures: factors influencing mortality. Hippokratia 2013;17(3):252-7.

23. Rae HC, Harris IA, McEvoy L, Todorova T. Delay to surgery and mortality after hip fracture. ANZ J Surg. 2007;77(10):889-91. (DOI:10.1111/j.1445-2197.2007.04267.x)

24. Praetorius K, Madsen CM, Abrahamsen B, Jørgensen HL, Lauritzen JB, Laulund AS. Low Levels of Hemoglobin at Admission Are Associated With Increased 30-Day Mortality in Patients With Hip Fracture. Geriatr Orthop Surg Rehabil. 2016;7(3):115-20. (DOI:10.1177/2151458516647989)