

Low/medium frailty subgroups may be more likely to benefit from regional over general anesthesia in surgical hip fracture patients

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BACKGROUND

- With millions of patients undergoing hip fracture repair surgery each year, it is critical that anesthesiologists consider factors such as patient frailty, age, and comorbidities when comparing the benefits and risks of anesthetic type.
- The Hospital Frailty Risk Score (HFRS) is a validated score used across various specialties to categorize geriatric patients as low, intermediate, or high risk of frailty.
- There is a dearth of literature on the perioperative outcomes experienced by hip fracture surgery patients of different frailty levels who received general (GA) or neuraxial anesthesia (NA).
- While clinical trial data has shown no differences in outcomes between GA or NA in surgical hip fracture patients, there may be subgroups (e.g. those based on frailty) that could potentially benefit from either approach.
- We aimed to assess whether certain frailty subgroups are more likely to benefit from NA over GA using a large national claims dataset.

METHODS

- This study was approved by the Institutional Review Board at the Hospital for Special Surgery (IRB#2012-050). The requirement for written informed consent was waived given the de-identified nature of the data.
- This retrospective cohort study included data from 268,185 surgical hip fracture patients between 2016 and 2021, as recorded in the Premier Healthcare (Premier Inc, Charlotte, North Carolina) all-payer claims dataset.
- Patients were grouped based on **age** (quantiles, ≤71, 72-86, ≥87 years) and **HFRS frailty groups** (low/medium combined and high).
- Outcomes of interest:** mortality, delirium, cardiac complications, respiratory complications, acute renal failure, intensive care unit (ICU) admission, high opioid use (>75th percentile), and prolonged length of stay (>75th percentile).
- Multivariable mixed-effects models measured the association between anesthesia type and outcomes separately in each of the 6 patient subgroups based on age and frailty.
- We report odds ratios (OR) and 95% confidence intervals.

RESULTS

- Among 268,185 surgical hip fracture patients, n=70,103, n=124,647 and n=73,435 patients were ≤71, 72-86, ≥87 years old, respectively
 - Low/medium frailty subgroup: n=254,729 patients
 - High frailty subgroup: n=13,456 patients
- For patients aged ≤71 years, those in the low/medium (compared to high) frailty cohort were significantly less likely to (Table 1, all p<0.05):
 - Have high postoperative opioid use, be admitted to the ICU, experience delirium, and die during hospitalization
- Patients aged 72-86 years old and ≥87 years old in the low/medium (compared to high) frailty cohort saw roughly similar patterns

Across all age groups, low/medium (compared to high) frailty patients tended to benefit the most from NA.

Table 1. Perioperative outcomes of the study population by age and six frailty subgroups.

Frailty Subgroup	≤71 years old		72-86 years old		≥87 years old	
	Low/Med N (%)	High N (%)	Low/Med N (%)	High N (%)	Low/Med N (%)	High N (%)
High opioid	26,992 (39.5)*	756 (41.9)	19,737 (16.7)*	1,037 (16)	6,185 (9.1)*	572 (11)
Odds ratio	0.64 (0.58, 0.71)	0.7 (0.35, 1.39)	0.65 (0.59, 0.71)	0.74 (0.5, 1.1)	0.67 (0.58, 0.78)	1.17 (0.75, 1.81)
ICU admission	7,240 (10.6)*	625 (34.6)	11,809 (10)*	1,142 (17.7)	7,596 (11.1)*	880 (17)
Odds ratio	0.84 (0.71, 0.99)	0.77 (0.37, 1.6)	0.85 (0.76, 0.95)	0.77 (0.52, 1.12)	0.76 (0.66, 0.87)	0.73 (0.49, 1.08)
Delirium	831 (1.2)*	83 (4.6)	3,633 (3.1)*	422 (6.5)	2,987 (4.4)*	346 (6.7)*
Odds ratio	0.6 (0.38, 0.94)	0.79 (0.18, 3.41)	0.83 (0.7, 1)	1.11 (0.68, 1.82)	0.82 (0.68, 0.99)	0.49 (0.24, 0.98)
Mortality	526 (0.8)*	77 (4.3)	1,572 (1.3)*	202 (3.1)	1,511 (2.2)*	205 (4)
Odds ratio	0.46 (0.23, 0.9)	0.41 (0.05, 3.1)	0.75 (0.57, 0.99)	0.55 (0.22, 1.35)	0.7 (0.54, 0.91)	0.62 (0.29, 1.36)
Composite outcome	10,384 (15.2)	533 (29.5)*	24,189 (20.5)*	1,740 (26.9)	16,479 (24.1)*	1,501 (28.9)
Odds ratio	0.9 (0.8, 1.01)	0.45 (0.23, 0.91)	0.81 (0.75, 0.88)	1.13 (0.86, 1.49)	0.83 (0.76, 0.9)	0.75 (0.56, 1.02)

Intensive Care Unit (ICU); *Statistical significance p<0.05

CONCLUSIONS

- Our findings suggest potential benefits of NA for low/medium (compared to high) frailty patients of diverse ages undergoing hip fracture surgery.
- Patients across all frailties see decreases in adverse outcomes when undergoing NA, with lower frailty patients seeing the most benefits.
- Seeing as the younger, less frail cohorts observed were less likely to experience adverse postoperative outcomes, our results may indicate that healthier patients have the most to gain from the use of NA.
- Future studies should further explore which patient populations are set to benefit most from either anesthetic approach.

CLINICAL RELEVANCE

Specific patient subgroups of varying ages and frailty levels may see the most benefits from undergoing neuraxial anesthesia during hip fracture surgery.

ACKNOWLEDGEMENTS

Thank you to my mentors, the Department of Anesthesiology, and the Department of Orthopaedic Surgery at Mount Sinai for your support on this project!



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