Annual Meeting Podium Session I:
Fragility Fractures & Periprosthetic Fracture II

Hip Fracture Surgery: Who Should Go First? A Personalized Medicine Tool

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Purpose: Most studies report benefits from early hip fracture surgery, although some show no benefit focusing on average treatment effect (ATE). We argue that ATE masks individual variation in outcomes, proposing a novel approach to identify patients likely to benefit most. Probability of necessity and sufficiency (PNS), developed by Mueller and Pearl, could reveal deeper insights than traditional risk assessment tools.

Methods: Using administrative data, we compared the effect of surgery within 2 days to waiting longer on 64 patient groups (strata) with different health, age, hospital, and care factors. We measured the individual benefit of early surgery using PNS. A previously published causal diagram informed covariates.

Results: We analyzed 140,000 patients, finding 8 fewer deaths per 1000 surgeries with early intervention. However, in 14/64 patient groups, early surgery showed significantly greater benefit (7%-15%). Specifically, patients over 85, those from long-term care, or home with comorbidities benefited most. Teaching hospitals provided slightly more benefit than community hospitals (Figure).

Conclusion: Our study challenges previous literature by unmasking the varied impact of early surgery on different patient groups. We establish probability bounds for the causal reduction in mortality resulting from early/late surgery. Our method could help prioritize patients for surgery, offering a personalized decision-making tool, aiding doctors in determining who should receive surgery first in cases of prioritization.