



The Impact of Neuraxial Anesthesia on Perioperative Complications in Hip Fracture Surgery. A Systematic Review and Meta-analysis.

Stavros G. Memtsoudis MD MBA PhD^{1,3}, Jashvant Poeran MD PhD¹, Jiabin Liu MD PhD FASA^{1,3}, Periklis Giannakis MD¹, Lisa Reisinger MD^{1,2}, Alex Illescas MPH¹, Ellen Soffin MD PhD^{1,3}, Mary Hargett¹, Bridget Jivanelli MLIS¹, Juliet Rowe MPH¹, Junying Wang PhD¹, Crispiana Cozowicz MD²

¹Department of Anesthesiology, Critical Care & Pain Management, Hospital for Special Surgery, New York, NY, USA
²Department of Anesthesiology, Perioperative Medicine and Intensive Care Medicine, Paracelsus Medical University, Salzburg, Austria
³Weill Cornell Medicine, New York, NY, USA



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INTRODUCTION

What we do know: Hip fractures global incidence at 1.6 million/year → >70% in patients >80 years old
Surgery: standard of care → comorbidity-ridden population → high-risk of perioperative morbidity and mortality → aspects of perioperative care are of great importance to optimize outcomes! → increasing interest in the impact of anesthesia technique

What we do not know: absence of high-quality prospective studies focusing on a wide range of perioperative complications and resource utilization

Therefore: we performed a systematic review and meta-analysis on the comparative impact of neuraxial versus general anesthesia among patients undergoing hip fracture surgery

METHODS

Population: Adults undergoing surgical treatment of hip fracture (all surgical options)

Intervention: Anesthetic regimen with neuraxial anesthesia

Comparator: General anesthesia without neuraxial anesthesia

Outcomes: Major postoperative complications: mortality, cardiac, pulmonary, renal, thromboembolic, neurological, infectious, and bleeding complications. **Resource utilization:** ICU admission, length of stay, readmission, and overall cost

Study types: randomized control trials and observational studies

Databases searched: Medline, PubMed, Embase, and Cochrane Library (including Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, NHS Economic Evaluation Database)

Timeframe: 1946 to February 29,2024

Neuraxial anesthesia was associated with lower odds or no difference in odds in virtually all reported complications.

	Cohort study				Randomized controlled trial			
	Effect	p-Value	N	Studies	Effect	p-Value	N	Studies
Mortality in hospital	0.78 (CI 0.72; 0.84)	<0.01	286,239	17	1.02 (CI 0.26; 3.97)	0.97	2,129	4
Mortality 30 day	0.93 (CI 0.88; 0.98)	<0.01	468,475	37	0.76 (CI 0.54; 1.08)	0.12	3,018	10
Any cardiac	0.91 (CI 0.82; 1.01)	0.08	164,356	18	1.09 (CI 0.58; 2.06)	0.79	2,477	9
Myocardial infarction (MI)	0.96 (CI 0.90; 1.03)	0.24	375,651	18	0.73 (CI 0.36; 1.47)	0.38	2,410	6
Hypotension	0.52 (CI 0.33; 0.81)	<0.01	15,314	9	0.65 (CI 0.25; 1.68)	0.38	2,404	11
Pulmonary	0.77 (CI 0.63; 0.93)	<0.01	35,455	5	1.12 (CI 0.51; 2.44)	0.78	560	3
Respiratory failure	0.64 (CI 0.52; 0.79)	<0.01	261,371	12	0.55 (CI 0.26; 1.18)	0.13	2,020	3
Mechanical ventilation	0.40 (CI 0.28; 0.59)	<0.01	279,248	8	-	-	-	-
Critical care admission	0.59 (CI 0.46; 0.75)	<0.01	283,297	15	0.62 (CI 0.34; 1.13)	0.12	1,576	1
Acute renal failure	0.81 (CI 0.69; 0.96)	0.02	314,313	16	0.54 (CI 0.36; 0.82)	<0.01	2,035	4
Delirium	0.90 (CI 0.83; 0.98)	0.01	645,347	22	1.18 (CI 0.92; 1.50)	0.19	3,717	9
Sepsis	0.80 (CI 0.69; 0.94)	<0.01	194,043	9	3.22 (CI 0.13; 82.38)	0.48	57	1
Pneumonia	1.04 (CI 0.97; 1.11)	0.24	223,919	22	0.67 (CI 0.41; 1.11)	0.12	2,732	10
Urinary tract infection	1.09 (CI 0.88; 1.37)	0.43	105,263	9	1.31 (CI 0.82; 2.08)	0.25	1,633	2
Wound deep infection	0.83 (CI 0.70; 0.99)	0.04	151,001	9	1.50 (CI 0.37; 6.08)	0.57	1,938	3
Readmission	0.88 (CI 0.84; 0.93)	<0.01	81,309	7	-	-	-	-
Blood transfusion	0.64 (CI 0.49; 0.83)	<0.01	83,206	18	0.92 (CI 0.76; 1.11)	0.39	3,247	7
Stroke	0.90 (CI 0.76; 1.05)	0.19	322,308	16	1.01 (CI 0.39; 2.58)	0.99	2,127	4
Deep venous thrombosis (DVT)	0.78 (CI 0.62; 0.99)	0.04	168,522	17	0.24 (CI 0.13; 0.45)	<0.01	534	4
Pulmonary embolism (PE)	0.85 (CI 0.63; 1.15)	0.29	203,858	13	0.89 (CI 0.32; 2.45)	0.82	2,063	5
Blood loss (mL)	-42.60 (CI -51.42; -33.79)	<0.01	3,805	13	-42.91 (CI -50.71; -35.10)	<0.01	1,133	11
Blood transfusion (mL)	-251.40 (CI -313.17; -189.64)	<0.01	465	2	0.00 (CI -76.21; 76.21)	1.00	322	1
Length of stay (days)	-1.14 (CI -1.17; -1.12)	<0.01	334,222	25	-0.26 (CI -0.63; 0.12)	0.18	1,676	5
Cost	-4271.38 (CI -4662.89; -3879.87)	<0.01	106,216	4	-	-	-	-

For none of the outcomes was general anesthesia found to be superior.

RESULTS

Search Results: N=119 studies including N=1,434,326 patients in the meta-analysis

Morbidity and mortality: neuraxial vs general anesthesia

- in-hospital mortality (OR 0.78, 95% CI: 0.72-0.84)
- 30-day mortality (OR 0.93, 95% CI: 0.88-0.98)
- cardiac (OR 0.91 95% CI: 0.82-1.01)
- hypotension (OR: 0.52, 95% CI: 0.33-0.81)
- respiratory failure (OR: 0.64, 95% CI: 0.52-0.79)
- acute renal failure (OR: 0.81, 95% CI: 0.69-0.96)
- blood transfusion (OR: 0.64, 95% CI: 0.49-0.83)
- sepsis (OR: 0.80, 95% CI: 0.69-0.94)
- readmission (OR: 0.88, 95% CI: 0.84-0.93)

DISCUSSION

Lower likelihood of morbidity with neuraxial anesthesia: Significant reduction in the odds of most major postoperative drivers of morbidity

Lower likelihood of mortality with neuraxial anesthesia: Significant reduction in the odds of non-only in-hospital mortality, but 30-day mortality as well

Lower resource utilization with neuraxial anesthesia: Significant reduction in LOS, cost and volume of blood transfusions

Overall: Results consistently indicate that that neuraxial anesthesia may be safer concerning multiple life threatening complications in patients undergoing hip fracture surgery

More Info →

