



## APPROPRIATEZZA, QUALITÀ E SOSTENIBILITÀ DEL PERCORSO ORTOGERIATRICO

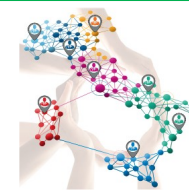
### Il Sessione: Aspetti cruciali del paziente ortogeriatrico in fase acuta

Colmare il divario  
tra Evidenze e  
Best Clinical  
Practice

# La Valutazione anestesiological: il tipo di paziente ed il tipo d'intervento

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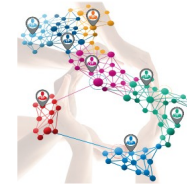


**Tabella IV.** Motivi accettabili e non accettabili per procrastinare l'intervento urgente nel paziente anziano con frattura del femore <sup>35</sup>.

Accettabili	Non accettabili
Valori di Hb <8 g /dL <sup>-1</sup>	Mancanza di risorse o disponibilità in SO
Sodiemia <120 or > 150 mmol/ L <sup>-1</sup>	Attesa di una ecocardiografia
Potassiemia <2.8 or > 6.0 mmol L <sup>-1</sup>	Indisponibilità di competenze chirurgiche
Diabete scompensato	Alterazioni elettrolitiche minori
Scopenso cardiaco acuto	
Aritmia cardiaca correggibile con FC > 120 min <sup>-1</sup>	
Infezione polmonare con sepsi	

Hb = emoglobina, SO = sala operatoria, FC = frequenza cardiaca.





Aging Clinical and Experimental Research  
<https://doi.org/10.1007/s40520-020-01624-x>

CONSENSUS DOCUMENT



## Perioperative Management of Elderly patients (PriME): recommendations from an Italian intersociety consensus

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### Abstract

**Background** Surgical outcomes in geriatric patients may be complicated by factors such as multiple comorbidities, low functional performance, frailty, reduced homeostatic capacity, and cognitive impairment. An integrated multidisciplinary approach to management is, therefore, essential in this population, but at present, the use of such an approach is uncommon. The Perioperative Management of Elderly patients (PriME) project has been established to address this issue.

**Aims** To develop evidence-based recommendations for the integrated care of geriatric surgical patients.

**Methods** A 14-member Expert Task Force of surgeons, anesthetists, and geriatricians was established to develop evidence-based recommendations for the pre-, intra-, and postoperative care of hospitalized older patients (≥ 65 years) undergoing elective surgery. A modified Delphi approach was used to achieve consensus, and the strength of recommendations and quality of evidence was rated using the U.S. Preventative Services Task Force criteria.

**Results** A total of 81 recommendations were proposed, covering preoperative evaluation and care (30 items), intraoperative management (19 items), and postoperative care and discharge (32 items).

**Conclusions** These recommendations should facilitate the multidisciplinary management of older surgical patients, integrating the expertise of the surgeon, the anesthetist, the geriatrician, and other specialists and health care professionals (where available) as needed. These roles may vary according to the phase and setting of care and the patient's conditions.

Aging Clinical and Experimental Research  
<https://doi.org/10.1007/s40520-021-01898-9>

CONSENSUS DOCUMENT



## Orthogeriatric co-management for the care of older subjects with hip fracture: recommendations from an Italian intersociety consensus

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### Abstract

**Background** Health outcomes of older subjects with hip fracture (HF) may be negatively influenced by multiple comorbidities and frailty. An integrated multidisciplinary approach (i.e. the orthogeriatric model) is, therefore, highly recommended, but its implementation in clinical practice suffers from the lack of shared management protocols and poor awareness of the problem. The present consensus document has been implemented to address these issues.

**Aim** To develop evidence-based recommendations for the orthogeriatric co-management of older subjects with HF.

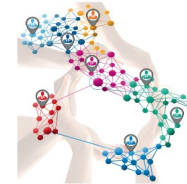
**Methods** A 20-member Expert Task Force of geriatricians, orthopaedics, anaesthesiologists, physiatrists, physiotherapists and general practitioners was established to develop evidence-based recommendations for the pre-, peri-, intra- and postoperative care of older in-patients (≥ 65 years) with HF. A modified Delphi approach was used to achieve consensus, and the U.S. Preventive Services Task Force system was used to rate the strength of recommendations and the quality of evidence.

**Results** A total of 120 recommendations were proposed, covering 32 clinical topics and concerning preoperative evaluation (11 topics), perioperative (8 topics) and intraoperative (3 topics) management, and postoperative care (10 topics).

**Conclusion** These recommendations should ease and promote the multidisciplinary management of older subjects with HF by integrating the expertise of different specialists. By providing a convenient list of topics of interest, they might assist in identifying unmet needs and research priorities.

**Keywords** Orthogeriatric management · Hip fracture · Femur fracture · Older · Consensus





## Perioperative Management of Elderly patients (PriME): recommendations from an Italian intersociety consensus

MEDICINE

Continuing Medical Education

### Determinants of Perioperative Outcome in Frail Older Patients

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#### Summary

**Background:** Older patients are undergoing surgery in increasing numbers. Frailty is a key risk factor associated with higher rates of complications and mortality, longer hospital stays, and functional impairment.

**Methods:** This review is based on pertinent publications retrieved by a selective search in PubMed, including guidelines from Germany and abroad.

**Results:** Many studies have been published on the assessment of frailty and its consequences, but the scientific investigation of this topic and the clinical utility of the findings are made more difficult by the lack of a uniform definition and of uniform instruments for assessment. Some definitions of frailty include only physical aspects, while others encompass cognitive, emotional, and social factors as well. Despite this variability, the assessment of frailty enables better estimation of the perioperative risk so that the patient can be optimally prepared for the operation. Especially for frail elderly patients, an interdisciplinary approach is called for over the entire perioperative treatment period.

**Conclusion:** In the future, the definition of frailty will need to be standardized so that this parameter can be properly assessed and investigated in comparative studies.

#### Cite this as:

Mende A, Riegel AK, Plümer L, Olotu C, Goetz AE, Kiefmann R: The determinants of perioperative outcome in frail older patients. *Dtsch Arztebl Int* 2019; 116: 73–82. DOI: 10.3238/arztebl.2019.0073

Church et al. *BMC Geriatrics* (2020) 20:393  
https://doi.org/10.1186/s12877-020-01801-7

BMC Geriatrics

RESEARCH ARTICLE

Open Access

### A scoping review of the Clinical Frailty Scale

Sophie Church<sup>1,2</sup>, Emily Rogers<sup>1</sup>, Kenneth Rockwood<sup>1,3</sup> and



#### Abstract

**Background:** Frailty is increasingly recognized among older adults. The Clinical Frailty Scale (CFS) is a just-in-time assessment of frailty (i.e., frailty that is currently clinically significant). The aim of this scoping review is to identify and synthesize the literature on the CFS.

**Methods:** We performed a comprehensive search of the literature using Medline OVID, Scopus, Web of Science, and Embase were searched from January 2005 to March 2017. The search was limited to English language publications, and the publication date, setting, and study design were included.

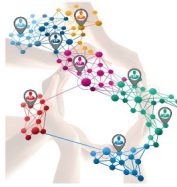
**Results:** Our search yielded 100 studies. Of these, 62% were conducted after 2015 and 63% of the studies were conducted in the United Kingdom. The association of the CFS with an adverse clinical outcome was examined in 62 studies, with CFS being associated with mortality 73% of the time, complications 100%, length of stay 94%, and quality of life 91%.

**Conclusions:** This scoping review has identified that the CFS has been widely used in multiple settings. The association of the CFS score with clinical outcomes is consistent across studies.

**Keywords:** Frailty, Aging, Frail elderly, Clinical Frailty Scale

Stratification  
Risk





## Perioperative Management of Elderly patients (PriME): recommendations from an Italian intersociety consensus

Table 3 Summary of recommendations

Statement	Quality of evidence	Strength of recommendation
<b>Preoperative assessment and optimization</b>		
We recommend that the Timed Up-and-Go (TUG) test be performed for all patients. In case of pathological values (> 20 s), Comprehensive Geriatric Assessment (CGA) is necessary	Moderate	A
We suggest CGA for all older patients	Moderate	B
We recommend that this preoperative assessment be the responsibility of the anesthetist, in collaboration with a geriatrician if available, who together share assessments and appropriate pathways with the surgical staff	Moderate	A
We recommend that functional reserves and independence be evaluated before the intervention	Moderate	A
We suggest using multiparametric frailty scales (e.g., Fried Score or Edmonton Frailty Score) to identify areas where preoperative optimization is necessary	Low	B
We recommend a systematic prehabilitation strategy to improve functional status and increase the organic functional reserve	Low	A
We recommend a cardiopulmonary exercise test before major surgery (e.g., cardiovascular or thoracic)	Low	A
We recommend that the risk of falls be assessed, especially in older patients with reduced mobility, postural hypotension, or risk of syncope, and that preventive measures be adopted	Low	A
Visual and auditory aids must always be readily available and accessible to the patient, and should be removed only when their use conflicts with other needs	Low	A
We recommend cognitive assessment (e.g., Clock test, AMT, and MMSE) of all patients aged > 65 years, even in the absence of a history of cognitive decline	Moderate	A
We recommend a second-level specialist neurocognitive assessment for patients with pathological test scores	Moderate	A
We recommend that the relative implications of comorbidities, and chronic or degenerative pathologies, for the response to surgery be recognized	Low	A
It is recommended that the cardiovascular risk assessment includes:	Moderate	A
• Functional capacity and, in case of major surgery, cardiac stress test (when indicated)		
• A cardiac risk index (e.g., Lee Index) or a surgical risk calculator that includes age and comorbidities (ACS-NSQIP Surgical Risk Calculator)		
• Risk of cardiac complications associated with the type of surgical intervention		
Before surgery, we recommend that patients at risk of venous thromboembolism be identified and appropriate perioperative prophylaxis be established	Moderate	A
We recommend that risk factors for respiratory complications be assessed and reduced where possible (e.g., abstinence from smoking and optimization of therapies)	Moderate	A
We suggest the use of risk scores for postoperative pulmonary complications (ARISCAT)	Moderate	B
We recommend that a Patient Blood Management (PBM) strategy be implemented, including hemoglobin and iron optimization, predeposit autologous blood collection, and surgical and anesthetic strategies that reduce blood loss	Moderate	A
We recommend that hemoglobinemia be assessed in all geriatric patients, with particular attention to those aged > 80 years	Moderate	A
We recommend assessment of hemoglobinemia and iron metabolism in all geriatric patients who are candidates for surgery with expected blood loss > 500 ml, or who have fatigue, neoplastic disease, associated cardiovascular, respiratory or renal disease, resting tachycardia or pallor	Moderate	A
We recommend accurate estimation of renal function by calculating eGFR using the CKD-EPI equation	Moderate	A
We recommend evaluation of nutritional status and correction of any deficiency, especially before major surgery	Moderate	A
We recommend that albuminemia be assessed in all older surgical patients, especially those with hepatic comorbidity, multiple comorbidities, recent major pathology or suspected malnutrition, or candidates for major surgery	Moderate	A
In candidates for major surgery with organ failure, we recommend an estimation of hydration and volume status with an instrumental method (e.g., ultrasound estimation or bioimpedometry)	Moderate	A
We recommend pre- and postoperative nutritional support (enteral or parenteral), according to the level of undernutrition and/or feeding possibilities for patients at severe nutritional risk	Moderate	A
It is recommended that the pharmacological history must be extended to include all drugs used by the patient, including over-the-counter and herbal medicines	Low	A

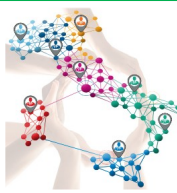
59]. Maintenance of a preoperative hemoglobin level above 12.0 g/dl is recommended in older patients, to reduce the need for perioperative transfusion [60].

outcomes [65–67]. A serum albumin concentration of 3 g/dl is considered to indicate severe nutritional risk, weight loss of > 10–15% within 6 months, or a BMI < 18.5 kg/m<sup>2</sup>. Patients at high nutritional

We recommend accurate estimation of renal function by calculating eGFR using the CKD-EPI equation	Moderate	A
We recommend evaluation of nutritional status and correction of any deficiency, especially before major surgery	Moderate	A

To reduce the incidence of postoperative delirium, we recommend:	Moderate	A
<ul style="list-style-type: none"> <li>• Identifying predisposing and precipitating risk factors early</li> <li>• Adapting surgical and anesthetic techniques</li> <li>• Avoiding medications that promote postoperative delirium</li> <li>• Using opioid-free anesthesia or low-dose opioid anesthesia</li> <li>• Monitoring for delirium (CAM, 4AT)</li> </ul>		





RESEARCH

Open Access



## Preoperative hemoglobin levels and mortality outcomes after hip fracture patients

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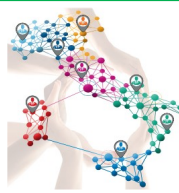


### Conclusion

Based on our retrospective study of patients who underwent surgery for hip fractures, we found that low hemoglobin levels, history of renal disease, male gender, age, length of hospital stay, and ICU admission were independent factors associated with increased 6-month mortality. Our study provides valuable insight into the impact of anemia on mortality after hip fracture surgery, which can help inform clinical decision-making and patient management. In addition, patients with history of renal disease, male gender, advanced age, extended hospital stays, and ICU admission were a predictors for mortality after hip fracture surgery; however, further studies should be conducted on a larger sample size so that the findings may be extrapolated on the Arab region and Middle East region as a whole. We recommend identifying anemia cases in presurgical periods and starting treatment to avoid surgery complications and improve patient outcomes. Furthermore, it is advisable to institute specific guidelines for blood management in hip fracture surgeries across all healthcare institutions. Moreover, further studies are needed to investigate the use of red blood cell transfusions before, during, and after hip fracture surgery and establish a clear cutoff for transfusion. Overall, our study highlights the importance of preoperative anemia screening and management in hip fracture patients to improve their outcomes and reduce mortality.

Management





RESEARCH ARTICLE

Open Access

# Preoperative risk factors for postoperative blood transfusion after hip fracture surgery: establishment of a nomogram



Fu Cheng Bian<sup>1,2†</sup>, Xiao Kang Cheng<sup>1,2†</sup> and Yong Sheng An<sup>2\*</sup>

Stratification Risk

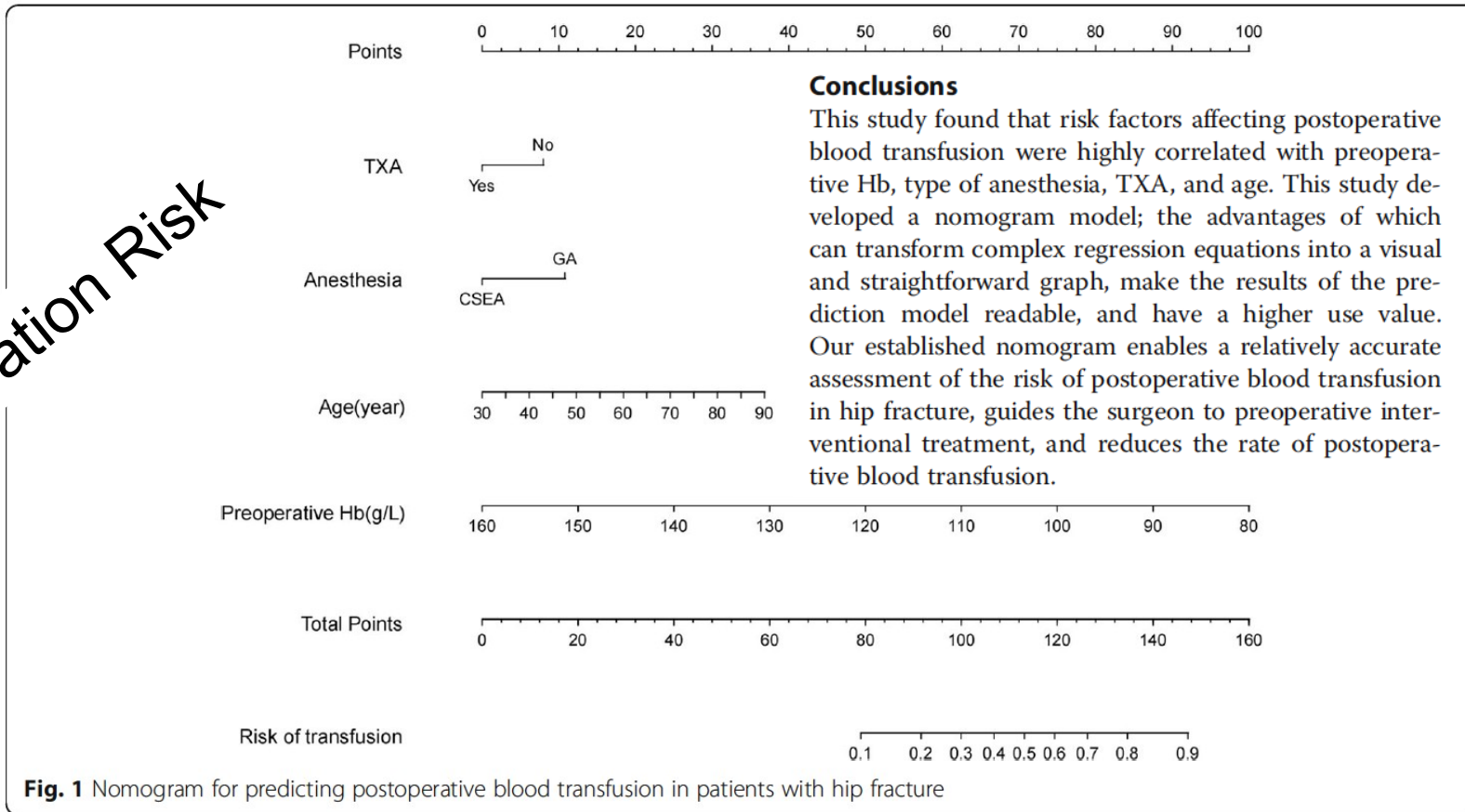
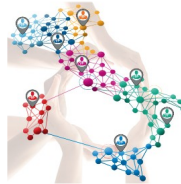


Fig. 1 Nomogram for predicting postoperative blood transfusion in patients with hip fracture

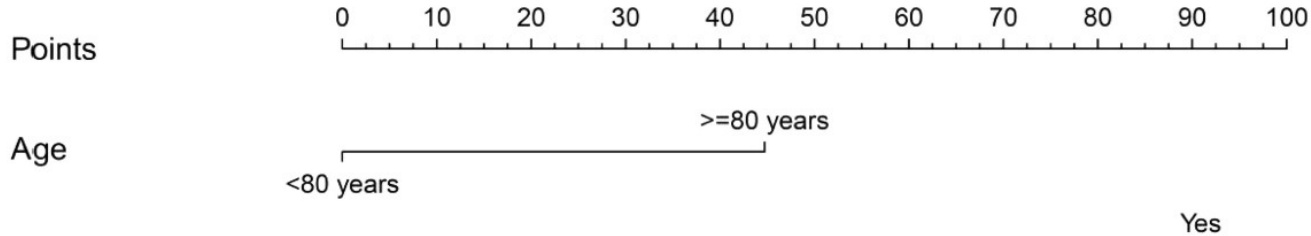


# Characteristics of Preoperative Acute Myocardial Infarction in Elderly Hip Fracture Patients and Construction of a Clinical Prediction Model: A Retrospective Cohort Study

Yaqian Zhang<sup>1,\*</sup>, Yan Liu<sup>2,\*</sup>, Mingming Fu<sup>1</sup>, Zhiqian Wang<sup>1</sup>, Zhiyong Hou<sup>2,3</sup>



Stratification Risk



## Conclusions

In summary, we observed that the overall incidence of perioperative AMI in older patients with hip fracture was 4.2%. Higher age, combined with diabetes,  $Hb \leq 100 \text{ g/L}$ ,  $CRP \geq 40 \text{ mg/L}$ , and  $ALB \leq 35 \text{ g/L}$  were the independent risk factors for perioperative AMI, and a readable nomogram is further formed to facilitate its use in practice, thus reducing the potential risk of AMI. Future prospective and multicenter design studies will help validate our findings.

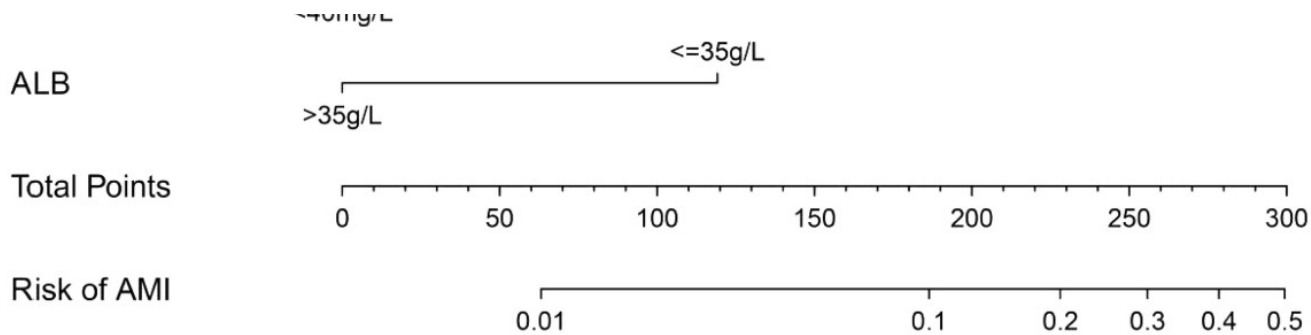
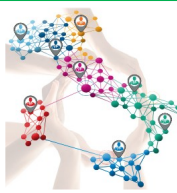


Figure 2 A model of risk prediction for AMI.





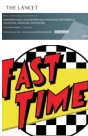


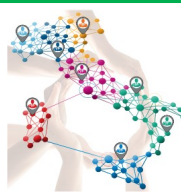
## Preoperative chest radiographs in hip fracture patients: is there any additional value?

Sverre A. I. Loggers<sup>1</sup> · Georgios F. Giannakopoulos<sup>1</sup> · Edwin Vandewalle<sup>2</sup> ·  
Micha Erwtman<sup>3</sup> · Ferco Berger<sup>4,5</sup> · Wietse P. Zuidema<sup>1</sup>

### Conclusion

The value of the POCR in patients with a hip fracture is limited. Only in 0.6% of all performed POCR's an abnormality leads to the adjournment of the operation. In these cases, the POCR matched the clinical findings. The known risk factors (GA, longer time till surgery and higher ASA classifications) for developing postoperative complications were not influenced by the POCR. The result of the POCR did not influence the rate of postoperative complications or mortality, and there were no cardiothoracic-related perioperative complications related to the results of the POCR. The preoperative screening in hip fracture patients is vital, though we think that the selective use of POCR in clinical abnormalities is safe and will reduce unnecessary delay and costs without compromising the quality of perioperative care.





CLINICAL STUDY

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## Preoperative and intraoperative risk factors for acute kidney injury after hip fracture surgery: a cohort retrospective study

Bassem I. Haddad<sup>a</sup>, Abdulrahman A. Alhajjah<sup>b</sup>, Abdelrahman Altarazi<sup>a</sup>, Layla El-Amayreh<sup>b</sup>,  
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Stratification Risk

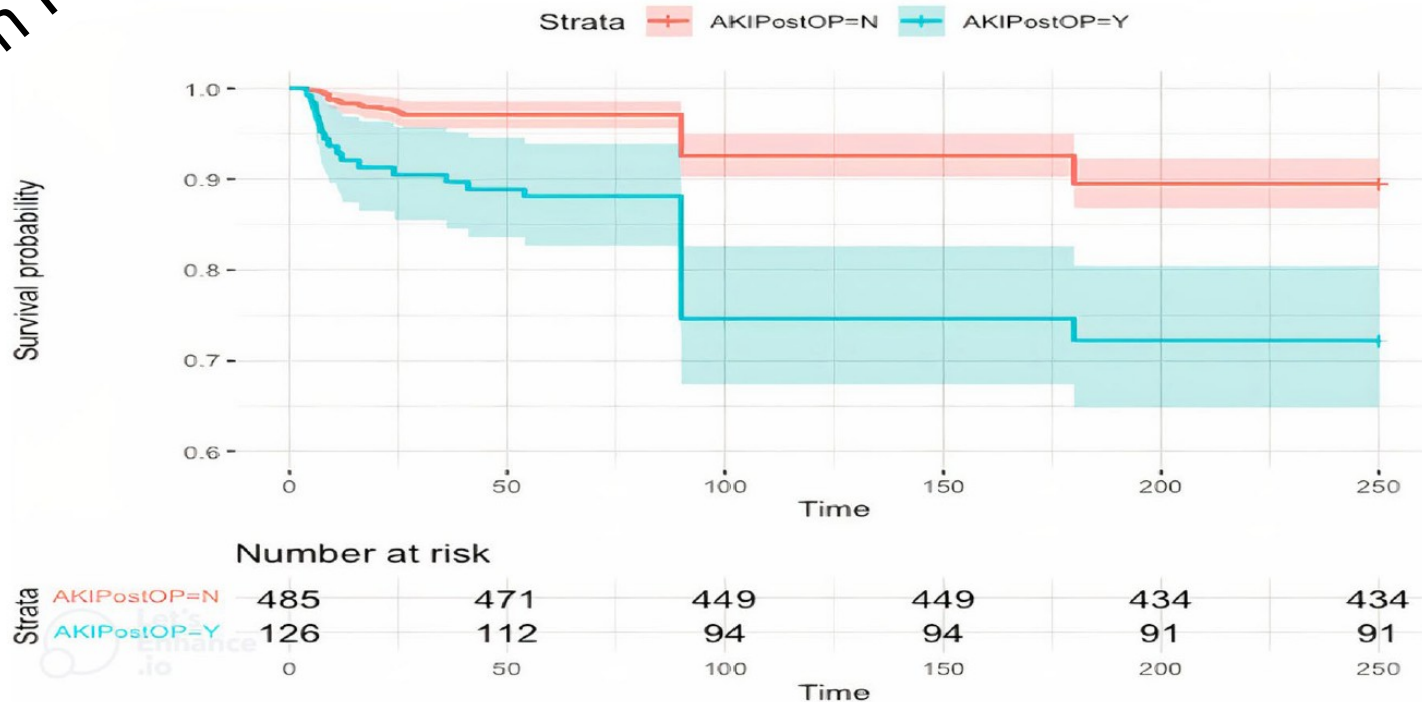
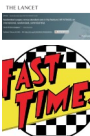


Figure 2. Kaplan Meier curve; AKIPostOP: acute kidney injury postoperatively; N: no; Y: yes; the red line represent the survival of the patients who didn't develop postoperative AKI; the blue one represent the survival of the patients who developed postoperative AKI.



Kyung-Cheon Lee<sup>a</sup> and Il-Ok Lee<sup>b</sup>

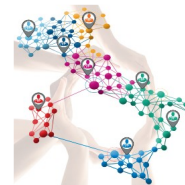
**Table 1.** Logistic regression analysis of variables predicting postoperative cognitive complication

## KEY POINTS

- Recently, several preoperative laboratory tests, known as blood and chemistry tests, have been reported to predict common postoperative complications in elderly patients.
- Most of these tests are relatively inexpensive and less harmful to elderly patients.
- It allows immediate treatment for some test results that can be corrected, providing an opportunity to reduce postoperative morbidity and mortality in elderly patients.

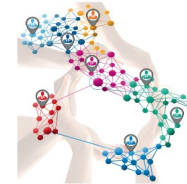
Low serum albumin (<2.9g/dL) [26 <sup>a</sup> ]	≥65	1,083	1.6 [1.2–2.4]	Early mortality after hip fracture surgery
<3.5g/dL [27]	≥65	611	2.76 [1.17–4.31]	Surgical site infection
High CAR (>3.3) [28]	≥65	1,068	1.94 [1.21–3.11]	Anastomotic leakage
>2.49 [29]	≥65	254	3.52 [1.49–8.3]	1 year mortality after hip fracture surgery
>1.47 [30]	>60	224		Post-THA contralateral hip refracture

AFR, albumin-to-fibrinogen ratio; CAR, C-reactive protein-to-albumin ratio; CI, confidence interval; OR, odds ratio; THA, total hip arthroplasty.



Stratification Risk





## Platelet aggregometry for hip fracture surgery in patients treated with clopidogrel: a pilot study

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### Abstract

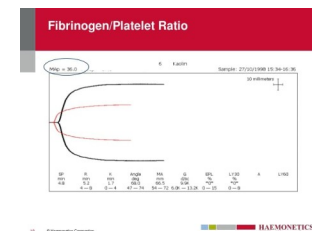
Surgery for hip fractures should be performed in patients on chronic antiplatelet therapy could delay surgery. The aim of this study was to assess platelet aggregation in patients treated with antiplatelet therapy. A patient's platelet aggregation was assessed using a platelet aggregation assay kit to assess platelet aggregation. A patient's platelet aggregation was within normal values, that is, less than 10%. If one of the two patients was on antiplatelet therapy, the patients were treated with analgesic blockade. Surgery was performed via general anesthesia. No complications were reported. A patient's platelet aggregation was within normal values. Nonetheless, in patients on antiplatelet therapy, the incidence of platelet aggregation was reduced. *Trial registration:* prospectively registered on ClinicalTrials.gov (NCT04380000) of registration: 23rd November 2020)

**Keywords** Thromboelastography · Aggregation · Anesthesia

Stratification  
Risk  
Management  
Monitoring

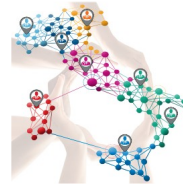
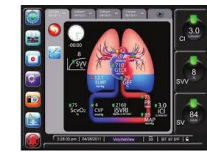
However, several factors including patients taking clopidogrel, up to 30% are resistant to platelet aggregation (TEG) with an ADP Platelet Mapping assay kit to assess platelet aggregation. A patient's platelet aggregation was within normal values, that is, less than 10%. If one of the two patients was on antiplatelet therapy, the patients were treated with analgesic blockade. Surgery was performed via general anesthesia. No complications were reported. A patient's platelet aggregation was within normal values. Nonetheless, in patients on antiplatelet therapy, the incidence of platelet aggregation was reduced.

IN  
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Future





## Perioperative Management of Elderly patients (PriME): recommendations from an Italian intersociety consensus

Table 3 (continued)

Statement	Quality of evidence	Strength of recommendation
If the patient is taking inappropriate medications (e.g., according to STOPP criteria), we recommend prudent withdrawal of these medications	Low	A
To reduce the incidence of postoperative delirium, we recommend: • Identifying predisposing and precipitating risk factors early • Adapting surgical and anesthetic techniques • Avoiding medications that promote postoperative delirium • Using opioid-free anesthesia or low-dose opioid anesthesia • Monitoring for delirium (CAM, 4AT)	Moderate	A
Every older patient should undergo a standardized pain history and physical examination	Low	A
For patients with cognitive disorders, we recommend the use of specific scales (PAINAD, NOPPAIN) for the evaluation of pain	Low	A
We suggest screening for depression using validated scales (e.g., the Geriatric Depression Scale), and treatment where possible	Low	B
Where possible, we suggest preventive counseling (goal setting, advanced directives) in selected cases	Low	B
It is recommended that the availability of family and social support be investigated during the preoperative assessment to allow planning of substitutive support measures	Low	A
<b>Intraoperative management</b>		
When positioning an older patient on the operating table, we suggest that attention be paid to conditions of the skin (e.g., atrophy, injury) and the musculoskeletal system (e.g., bone deformities, joint stiffness, and presence of prostheses)	Low	B
It is recommended that positioning be adjusted according to the patient's problems, taking care to place adequate padding at bony prominences	Low	A
It is recommended that the choice of anesthesia (technique/drugs/dosage) be individualized based on the characteristics of the patient and the type of intervention, in order to reduce the incidence of postoperative delirium and facilitate recovery	Moderate	A
We recommend dose adjustment to avoid overdose, adverse hemodynamic effects, or inadequate depth of narcosis	Moderate	A
For induction and maintenance of general anesthesia with propofol, we recommend that the dosage be reduced by 20–50% in older patients	Moderate	A
For halogenated anesthetics, we recommend that the minimal alveolar concentration be calculated according to patient age	Moderate	A
Because the effect of anesthetics on the central nervous system is age-dependent, we recommend that halogenated and intravenous anesthetic dosages be modulated using an anesthesia depth monitoring system	Moderate	A
During general anesthesia, we recommend EEG-based monitoring to avoid excessive anesthesia depth, which is associated with increased risk of postoperative delirium	High	A
It is recommended that EEG-based monitoring is extended to procedures performed under sedation	High	A
In patients undergoing general anesthesia with neuromuscular block, we recommend that neuromuscular function be monitored quantitatively, and its complete recovery (train-of-four ratio > 0.9) be facilitated at the end of the intervention	Moderate	A
We recommend that residual neuromuscular block always be antagonized	Moderate	A
We recommend the use of sugammadex when complete and fast recovery of rocuronium-induced neuromuscular block is required	Moderate	A
We recommend the use of sugammadex when anticholinesterases are ineffective for reversing rocuronium-induced neuromuscular block	Moderate	A
We recommend body-temperature monitoring and active warming of the patient, preferably with a forced-air system, during the pre-, intra- and postoperative periods	High	A
If forced-air heating is only partially efficacious (e.g., during prolonged open abdominal surgery), we suggest that warm intravenous fluids be administered	High	B
We recommend adequate monitoring to maintain a "near-zero" fluid balance	High	A
We recommend that transfusion in geriatric patients follows a restrictive transfusion strategy (red blood cell transfusion threshold: Hb < 8 g/dl)	High	A
We recommend red blood cell transfusion when symptoms of intraoperative hypoxia and/or lactic acidosis and hemorrhage are present, regardless of the severity of anemia	High	A
We suggest using minimally invasive techniques in older patients, to reduce the endocrine/metabolic response to stress and improve postoperative outcomes	Moderate	B

Review Article

Goal-directed fluid therapy and goal setting

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Management Monitoring

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**CORRESPONDENCE | VOLUME 97 | NUMBER 9 | OCTOBER 2019**

Problems defining 'hypotension' during anaesthesia

Stuart M. White • Richard Griffiths

[Open Archive](#) • Published: October 03, 2019 • DOI: <https://doi.org/10.1016/j.bja.2019.09.002>



# Clinical effectiveness and safety of spinal anaesthesia compared with general anaesthesia in patients undergoing hip fracture surgery using a consensus-based core outcome set and patient-and public-informed outcomes: a systematic review and meta-analysis of randomised controlled trials

Setor K. Kunutsor<sup>1,2</sup>, Pravakar B. Hamal<sup>2</sup>, Sara Tomassini<sup>3</sup>, Joyce Yeung<sup>3,4</sup>, Michael R. Whitehouse<sup>1,2</sup> and Gulraj S. Matharu<sup>2,\*</sup>



## 1. Introduction

The number of new cases of hip fracture is projected to exceed two and a half million worldwide by the first quarter of the 21st century [1]. Hip fracture is associated with a substantial perioperative complication rate of 6–19% overall [2,3] and a mortality rate of 3–8% [4–7]. Among complications, hypotension poses a particular concern, especially in the frail elderly population, given its association with elevated mortality at 30 days [8,9]. Different methods of anesthetic techniques, fluid therapy, and vasopressors are used to maintain the stability of the mean arterial pressure (MAP) [10,11]. Moreover, directing fluid and vasopressor administration based on a thorough hemodynamic evaluation, conducted through preoperative echocardiography and noninvasive monitoring, is crucial due to the potential adverse events associated with hypo- and hypervolemia. Hypovolemia may lead to decreased preload, resulting in cardiac output reduction and inadequate organ perfusion, while hypervolemia can cause systemic and pulmonary congestion, leading to decreased

organ function. Currently, there are several approaches to monitoring fluid responsiveness. One option is the visualization of the inferior vena cava (IVC) diameter with echocardiography from the subcostal region or using a coronal trans-hepatic approach, although more research is needed to determine the appropriate thresholds for fluid responsiveness when employing the latter [12]. Alternatively, continuous noninvasive blood pressure monitoring can be used as it has been associated with a lower incidence of hypotension and hypertension during general anesthesia compared to intermittent cuff measurement [13]. Furthermore, the use of artificial intelligence for continuous noninvasive monitoring of blood pressure during general anesthesia has demonstrated promising results in hemodynamic assessment [14]. Despite the various attempts to prevent hypotensive events and other adverse outcomes, a definitive agreement on the best anesthesia approach for this surgery has not been reached.

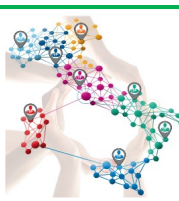


General anesthesia (GA) is still widely used in hip fracture surgery, yet multiple regional anesthetic (RA) techniques are also gaining popularity. Thus, spinal anesthesia (SA) is often favored over general anesthesia in patients with a higher susceptibility to complications due to its effectiveness, simplicity, and minimal impact on cognitive and pulmonary function [15]. In fact, between 2007 and 2017, the usage of SA for hip fracture surgery increased by 50% [16]. However, SA is associated with severe hypotension, as it reduces the body's ability to compensate for changes in blood pressure, particularly in frail populations with numerous underlying health conditions [17]. On the other hand, continuous spinal anesthesia (CSA) has been shown to more effectively maintain hemodynamic stability compared with single-shot SA or GA thanks to low-fractionated administration of local anesthetic [10,11,18]. A recent meta-analysis also demonstrated that a 6.5 mg dose of SA was effective and associated with a lower incidence of hypotension compared to a 10.5 mg dose [19]. The authors suggest that a smaller dose provides an effective sensory block in conjunction with opiates through synergistic action of the two while minimizing systemic effects, including hemodynamic outcomes [19]. Similarly, multiple nerve blocks (MNBs) have been used as a GA alternative to minimize hypotensive episodes with some studies reporting promising results [20,21].

This systematic review with meta-analysis (SR&MA) aims to answer two main questions: Are there differences in death rates between the general and regional (SA, CSA, MNB) anesthesia groups? Are there differences in hypotension and other intraoperative and postoperative complications between the two groups?

## Clinical effectiveness and safety of spinal anaesthesia compared with general anaesthesia in patients undergoing hip fracture surgery using a consensus-based core outcome set and patient-and public-informed outcomes: a systematic review and meta-analysis of randomised controlled trials

Setor K. Kunutsor<sup>1,2</sup>, Pravakar B. Hamal<sup>2</sup>, Sara Tomassini<sup>3</sup>, Joyce Yeung<sup>3,4</sup>, Michael R. Whitehouse<sup>1,2</sup> and Gulraj S. Matharu<sup>2,\*</sup>



### 5. Conclusions


Existing evidence showed that the rate of mortality in patients undergoing hip fracture surgery did not differ significantly between general anesthesia and regional anesthesia. There was no statistically significant difference between RA and GA in cardiac and cerebral complications, including myocardial infarction, cardiac failure, cerebrovascular accident, deep vein thrombosis, postoperative pulmonary embolus, renal failure, postoperative pneumonia, intraoperative hypotension, intraoperative blood loss, intraoperative blood transfusion, or duration of hospital length of stay.

# No difference!!!!



Article

# Effect of General vs. Regional Anesthesia on Mortality, Complications, and Prognosis in Older Adults Undergoing Hip Fracture Surgery: A Propensity-Score-Matched Cohort Analysis

Guolei Zhang<sup>1,2,†</sup>, Huihui Chen<sup>3,†</sup>, Junpu Zha<sup>1,2</sup>, Jingtao Zhang<sup>1,2</sup>, Jun Di<sup>1,2</sup>, Xiaoqing Wang<sup>1</sup>, Xin Hu<sup>1,2</sup>, Xin Xu<sup>4,5,6,\*</sup> and Junfei Guo<sup>1,2,\*</sup> 

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- † These authors contributed equally to this work.

**Abstract:** The choice of the type of anesthesia (TOA) used in hip fracture surgery in older adults is still controversial. The main question is not whether regional anesthesia (RA) or general anesthesia (GA) is superior, but in which patients the type of anesthesia may affect the outcome after surgery. In this retrospective analysis of surgically treated intertrochanteric fracture patients, we used propensity score matching (PSM) to investigate whether clinically relevant differences in outcomes were observed in mortality, complications, and functional outcomes between RA and GA. After screening 2934 consecutive patients, 2170 were ultimately included, including 841 in the GA group and 1329 in the RA group. After PSM, 808 remained in each group. Patients receiving GA were more prone to have a shorter duration for their operation and higher total hospital costs than patients with RA ( $p = 0.034$  and  $0.004$ , respectively). We also observed that the GA group has a higher rate of pulmonary complications, while the RA group has a higher rate of cardiac complications ( $p = 0.017$  and  $0.011$ , respectively). No significant difference was observed in mortality, functional outcomes, and other complications (all  $p > 0.05$ ). The clinical innovation of this study was the potential value of GA for patients with cardiac diseases and of RA for patients with pulmonary diseases.

**Keywords:** anesthesia; hip fracture; older adults; mortality; complications; functional outcomes; propensity score matching; cohort



**Citation:** Zhang, G.; Chen, H.; Zha, J.; Zhang, J.; Di, J.; Wang, X.; Hu, X.; Xu, X.; Guo, J. Effect of General vs. Regional Anesthesia on Mortality, Complications, and Prognosis in Older Adults Undergoing Hip Fracture Surgery: A Propensity-Score-Matched Cohort Analysis. *J. Clin. Med.* **2023**, *12*, 80. <https://doi.org/10.3390/jcm12010080>





REVIEW

# Regional anesthesia techniques and postoperative delirium: systematic review and meta-analysis

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Faraj W. ABDALLAH <sup>5, 6</sup>, Edward R. MARIANO <sup>7, 8</sup>

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## ABSTRACT

**INTRODUCTION:** Postoperative delirium is a frequent occurrence in the elderly surgical population. A comprehensive list of predictive factors remains unknown, and an opioid-sparing approach incorporating regional anesthesia has been suggested to decrease its incidence. Due to the lack of conclusive evidence on the topic, we conducted a systematic review and meta-analysis to investigate the potential impact of regional anesthesia and analgesia on postoperative delirium.

**EVIDENCE ACQUISITION:** PubMed, Embase, and the Cochrane central register of Controlled Trials were searched for randomized trials comparing regional anesthesia or analgesia to systemic analgesia in patients having any type of surgery. This systematic review and meta-analysis followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. We pooled the results separately for two applications by random effects modelling. Grading of Recommendations Assessment, Development and Evaluation (GRADE) system was used to evaluate the certainty of evidence and strength of conclusions.

**EVIDENCE SYNTHESIS:** Eighteen trials (3361 subjects) were included. Using regional techniques for analgesia failed to reduce the risk of postoperative delirium, with a relative risk (RR) of 1.21 (95% CI: 0.79 to 1.84). In contrast, regional analgesia reduced the relative risk of perioperative delirium by a RR of 0.53 (95% CI: 0.33 to 0.84, P<0.0001), when compared to systemic analgesia. *Post-hoc* subgroup analysis for hip fracture surgery showed similar findings.

**CONCLUSIONS:** These results show that postoperative delirium may be decreased when regional techniques are used during the postoperative period as an analgesic strategy. Intraoperative regional anesthesia alone may not decrease delirium since there are other factors that may influence this outcome.

(Cite this article as: Fanelli A, Balzani E, Memtsoudis S, Abdallah FW, Mariano ER. Regional anesthesia and postoperative delirium: systematic review and meta-analysis. *Minerva Anestesiologica* 2022;88:499-507. DOI: 10.23736/S0375-9393.22.16076-1)

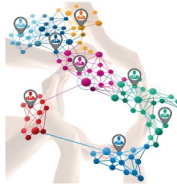
**KEY WORDS:** Conduction anesthesia; Postoperative complications; Delirium; Perioperative care.

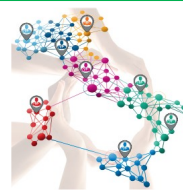
## Conclusions

Based on this updated systematic review and meta-analysis, we can conclude that regional analgesia may reduce the incidence of POD in patients undergoing various types of surgery. Further high quality RCTs should be performed defining the type and timing of peripheral blocks used. Validated POD tests should consistently be used to improve study quality. Regarding the intraoperative management, insufficient data are available to support regional anesthesia rather than general anesthesia purely for the prevention of POD, but other benefits of neuraxial anesthesia have been described. The choice of anesthetic technique remains a shared decision between patients and their physicians.

## Key messages

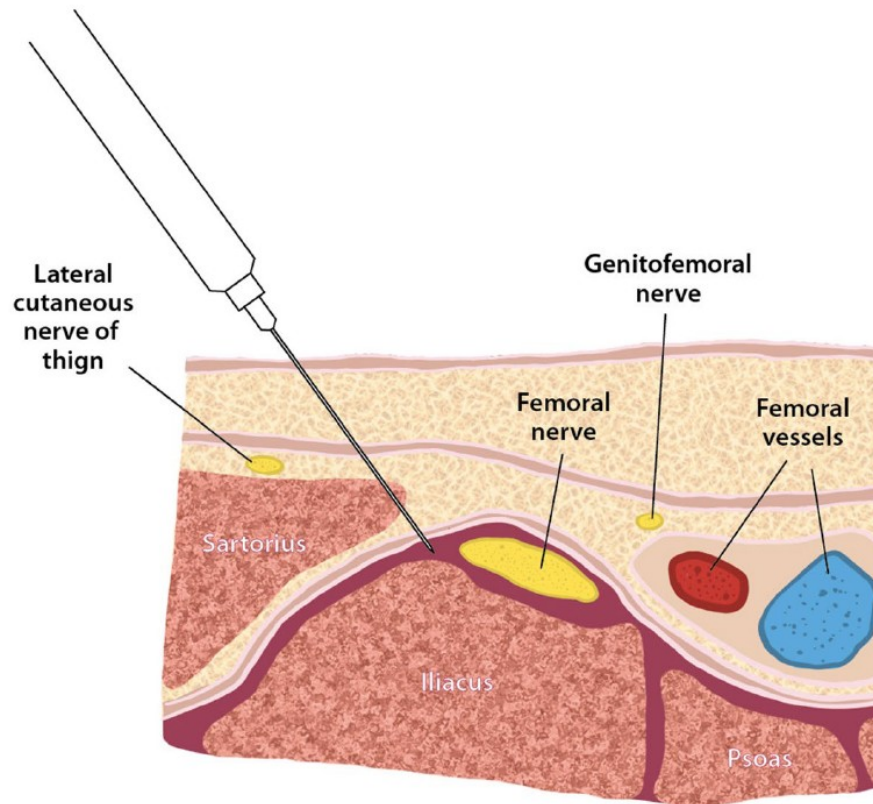
- Postoperative delirium (POD) continues to be a poorly understood and multifactorial adverse outcome.
- Intraoperative regional anesthesia alone does not seem to affect the incidence of POD.
- Applying regional analgesia in the postoperative period may reduce the incidence of POD in patients undergoing various types of surgery.





## Total intravenous anesthesia for geriatric hip fracture with severe systemic disease

Yu-Yi Huang<sup>1,2</sup> · Chung-Kun Hui<sup>3</sup> · Ngi-Chiong Lau<sup>1,2</sup> · Yuet-Tong Ng<sup>3</sup> · Tung-Yi Lin<sup>1,2</sup> · Chien-Hao Chen<sup>1,2</sup> · Ying-Chih Wang<sup>1,2</sup> · Hao-Che Tang<sup>1,2</sup> · Dave Wei-Chih Chen<sup>1,2</sup> · Chia-Wei Chang<sup>1,2</sup>



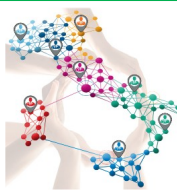
### Conclusion

For geriatric patients with ASA grade IV undergoing hip fracture surgery, FICB + TIVA showed several advantages over GA, such as lesser ICU requirement and shorter lengths of ICU stays. Moreover, less postoperative opioid use promoted earlier postoperative rehabilitation, shorter length of hospital stay, and optimized clinical outcomes. Although well-designed, randomized controlled trials with a large sample size are necessary to elucidate the long-term mortality, we recommend FICB + TIVA for geriatric patients undergoing hip fracture surgery, especially those with poor general health status and high surgical risk.

Fig. 1 Anatomy of a fascia iliaca compartment block



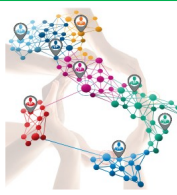
GRANDE OSPEDALE METROPOLITANO REGGIO CALABRIA  
Monitoraggio percorso intraospedaliero del paziente con frattura di femore  
Anno 2023



Indicatori	Tot.
Tot. pazienti ricoverati con diagnosi di frattura di femore (diagnosi ICD-9-CM 820)	277
Pazienti ricoverati con età maggiore di 65 aa	258
Tot. pazienti operati (DRG chirurgici)	268
Pazienti operati con età maggiore di 65 aa	249
Pazienti >65 anni operati entro 48 h	209
Pazienti operati oltre le 48 h	40
Percentuale pazienti con frattura di femore operati entro le 48 h	83.94 %



# TAKE HOME MESSAGE



## Stratification Risk

16

## Manar

*How Can We Prevent Falls?*

Hubert Blain, Stéphanie Miot, and Pierre Louis Bernard

## Monitoring

