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Review Article

Urinary Catheterization Management in Older Adults with Hip Fracture: A Systematic Review

Stefano Cacciatore MD [a,b,c], Maria Cristina Ferrara MD [b,d,*], Maria Serena Iuorio MD [b,e], Linda Dall'Olio MD [f], Federico Bellelli MD [b,g], Daniele Elmi MD [a], Leonardo Bencivenga MD, PhD [b,h], Caterina Trevisan MD, PhD [b,f], Emanuele Marzetti MD, PhD [a,c], Chukwuma Okoye MD, PhD [b,d]

[a] *Department of Geriatrics, Orthopedics and Rheumatology, Università Cattolica del Sacro Cuore, Rome, Italy*
[b] *Young Epidemiologists of the Italian Society of Gerontology and Geriatrics (SIGG) (YES) working group, Italian Society of Gerontology and Geriatrics, Florence, Italy*
[c] *Department of Geriatrics, Orthopedics and Rheumatology, Fondazione Policlinico Universitario "A. Gemelli" IRCCS, Rome, Italy*
[d] *School of Medicine and Surgery, University of Milano-Bicocca, Milan, Italy*
[e] *Department of Medicine and Surgery, Università Campus Bio-Medico di Roma, Rome, Italy*
[f] *Department of Medical Sciences, University of Ferrara, Ferrara, Italy*
[g] *Specialty Training School in Geriatric and Gerontology, University of Milan, Milan, Italy*
[h] *Department of Translational Medical Sciences, University of Naples Federico II, Naples, Italy*

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A B S T R A C T

Objectives: Urinary catheterization is a common procedure in the perioperative management of patients with hip fracture. However, decisions on its insertion or removal are often variable. This systematic review aimed to synthesize current evidence on urinary catheterization management in older patients with hip fracture by thoroughly reviewing the implementation of structured programs.
Design: Systematic review.
Setting and Participants: Older adults hospitalized for hip fracture.
Methods: Studies published until April 1, 2023, were retrieved from MEDLINE (PubMed interface), SCOPUS (Elsevier interface), and Cochrane Central Register of Controlled Trials (EBSCO interface). Observational and interventional studies investigating the use of urinary catheterization in older adults with hip fracture were included and corresponding data on structured programs and associated results were extracted. The quality assessment of the studies was performed using the Critical Appraisal Skills Programme tool.
Results: Of the 674 articles identified through the literature search, 16 studies were included. The mean ages in the 16 studies ranged from 67 to 86 years. Studies on the implementation of structured programs were few and heterogeneous. These studies identified 24 to 48 hours as the appropriate duration of postoperative catheterization; intermittent catheterization was associated with a lower incidence of complications.
Conclusions and Implications: Our review revealed a lack of standardized perioperative urinary catheterization management in older patients with hip fracture and uncovered the need for a tailored approach, which is crucial to improving the quality of care and outcomes in these patients.

Perioperative urinary catheterization is a common procedure performed in older adults with hip fracture. However, decisions on the timing of insertion or removal of urinary catheters are often variable. Catheterization advantages lie in minimizing bladder distension and monitoring the urinary output during surgery.[1,2] Moreover, temporary urinary catheterization may be necessary to address postoperative urinary retention (POUR), a frequent issue in patients undergoing hip fracture surgery; this may be due to limited mobility, use of systemic analgesics, and occurrence of transient neurogenic bladder dysfunction.[3-5]

However, the use of urinary catheters is burdened with several risks, as they are a potential cause of complications.[3,6,7]

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* Address correspondence to Maria Cristina Ferrara, MD, School of Medicine and Surgery, University of Milano-Bicocca, Piazza dell'Ateneo Nuovo, 1, Milan 20126, Italy.
E-mail address: mcris.ferrara@gmail.com (M.C. Ferrara).

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Catheter-associated urinary tract infections (CAUTIs) constitute a significant concern in geriatric medicine,[7] given the higher susceptibility of older adults to infections and potentially associated adverse outcomes, such as sepsis, delirium, or prolonged hospitalization.[8] Indeed, normal urinary flow prevents the ascension of microbes from the periurethral skin, whereas indwelling catheters (IDCs) facilitate the transfer of bacteria to the bladder and increase the risk of urinary tract infections (UTIs).[9,10] Moreover, prolonged catheterization increases the risk of catheter-associated biofilm formation, potentially leading to encrustation, blockage, or colonization of multidrug-resistant organisms.[11] Urinary catheterization is also associated with other complications, such as urethral trauma, bladder injury, or catheter-associated subjective discomfort, which may occur especially in patients with frailty and/or cognitive impairment.[12,13]

To mitigate these risks, catheter care protocols with regular assessment and strict adherence to aseptic techniques are imperative. Given the high prevalence of hip fracture in older adults, these protocols should be developed based on a patient-centered, holistic approach that considers functional status of older adults rather than chronological age alone.

This systematic review aims to synthesize current evidence on urinary catheterization management in older patients with hip fracture by thoroughly reviewing the implementation of structured programs. Based on the available findings, we sought to outline strategies to reduce perioperative complications and improve outcomes in older adults with hip fractures, using a patient-centered approach that takes frailty and cognitive impairment into account.

Methods

Observational and interventional studies investigating the use of urinary catheterization in older adults admitted to the hospital for hip fracture were included. The study complied with the guidelines of the Cochrane Handbook for Systematic Reviews and Interventions and the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) (for details, please see Supplementary Table 1).[14]

Eligibility Criteria

The inclusion criteria were (1) observational (eg, case-control, cross-sectional, and cohort longitudinal studies) and interventional studies (eg, randomized controlled trials, non-randomized controlled trials, controlled before-after studies, quasi-experimental studies) that investigated the use of urinary catheterization in older adults with hip fracture; (2) studies including participants aged ≥65 years; and (3) studies published in English or Italian languages (according to the languages known by the investigators). Studies conducted on patients with pathological fractures or those undergoing arthroplasty for osteoarthritis were excluded.

Search Strategy and Selection Criteria

Studies published from inception to April 1, 2023, were retrieved from the following electronic databases: (1) MEDLINE (PubMed interface); (2) SCOPUS (Elsevier interface); and (3) Cochrane Central Register of Controlled Trials (EBSCO interface). Additional eligible articles were identified by checking the reference lists of the retrieved articles. In addition, citation searches of key articles were performed using Google Scholar and ResearchGate. The search strategy was based on keywords, MeSH terms, and free text words (eg, hip fracture, older adults, urinary catheterization) combined with Boolean operators (for details, please see Supplementary Table 2). The identified records were entered into EndNote software version 20 (Clarivate) for management and deduplication. The review and protocol have not been registered.

Data Extraction, Quality Assessment, and Risk of Bias

Titles and abstracts of the retrieved articles were independently screened for eligibility by 2 researchers (M.S.I. and L.D.O.). Selected full texts were reviewed by 2 authors independently (S.C. and C.O.). Two reviewers (S.C. and C.O.) extracted the coded variables (ie, study characteristics, methodological quality, and risk of bias) using a standardized form. The quality of each study was assessed using the Critical Appraisal Skills Programme (CASP) tool.[15] For each item of the tool, 1 point was assigned to "Yes" and no point was assigned to answers "No" or "Can't tell." A third researcher was consulted to resolve any disagreements (C.T.) if necessary. The agreement rate for quality assessment between the reviewers was 98%.

Results

A study flowchart of the systematic review is presented in Figure 1. Overall, the literature search yielded 674 articles; after deduplication, 505 articles were screened for titles and abstracts; 467 records were excluded and 35 manuscripts were subjected to full-text evaluation. Ten articles were further identified through citation searching; however, it was not possible to access the full text for one of them. Of the 35 records identified via databases and registries, 25 articles were excluded because they were not relevant to the research question, and 3 of 9 papers identified via citation searching were excluded. Ultimately, 16 articles were included in this review. All studies were published in English. The main characteristics of the included studies are reported in Table 1.

We found 8 prospective cohort studies, 4 retrospective cohort studies,[1,16-26] 1 single-group pre-post intervention study,[27] 1 randomized controlled trial,[28] 1 randomized open trial,[29] and 1 cross-sectional study.[30] The mean ages in the 16 studies ranged from 67 to 86 years. In 10 studies, the mean age of the participants was older than 80 years,[16-21,23-26] it was between 75 and 80 years in 4 studies,[1,22,28,30] and between 65 and 70 years in 1 study.[29] In all of the included studies, one-third or more of the participants were women (range 66%–81%). A single study did not provide explicit information on participants' age or sex,[27] but it was included due to its focus on urinary catheterization practices in a hip fracture population, which predominantly consists of older patients from an epidemiological standpoint. The prevalence of urinary catheterization in older patients with hip fracture was reported by all studies except Folbert et al and Pajulammi et al, and ranged from 20.1% to 100%.[19,24] The duration of urinary catheterization was reported by 8 of the included studies and ranged from 1.6 to 9.6 days.[1,17,20,23,25,28-30] The studies included in our systematic review were performed across various clinical settings. Eight studies were conducted in orthopedic units.[1,16,17,21,22,28-30] Five studies used an orthogeriatric model of care.[18,19,23-25] One study included patients from the emergency department, orthogeriatric wards, operating room, and intensive care unit.[20] One study each was conducted in rehabilitation units and in a skilled nursing facility.[25,26] The study by Ciaschi et al was conducted in 5 public hospitals, without specifying the setting of care.[27]

When assessing the quality of the included studies, a mean CASP total score of 8.3 (range 2–10) was assigned, indicating medium quality of the retrieved records (for details, please see Supplementary Table 3).

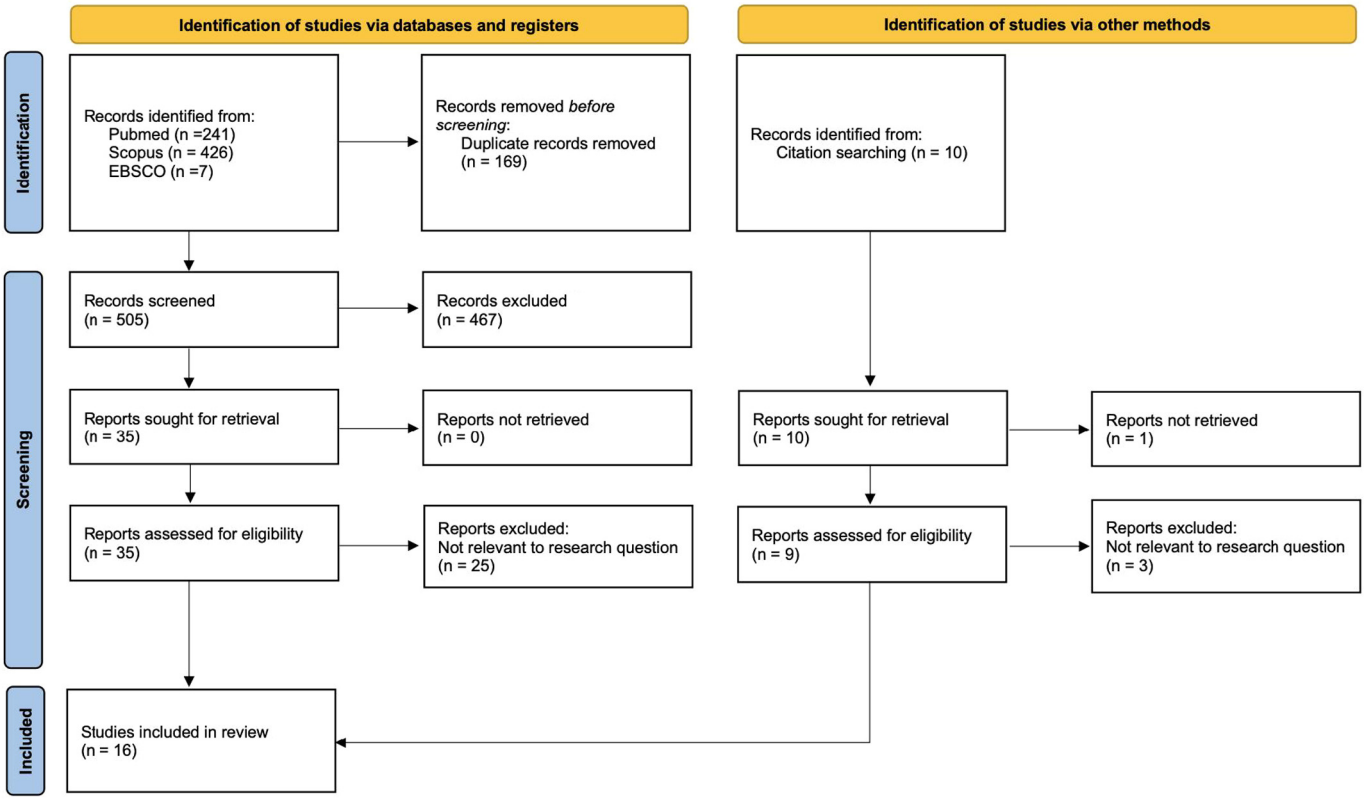

Fig. 1. PRISMA flow diagram of the screening and selection processes.

Evidence on Urinary Catheterization Management in Older Patients With Hip Fracture

The included studies provided an overview of strategies and implications of urinary catheterization management in older patients with hip fracture, particularly regarding the risk of UTI and POUR, according to the use of intermittent catheterization (IC) or IDC.

Johansson et al demonstrated a significant reduction in UTIs with IC compared with IDC at hospital admission.[21] Notably, patients who developed UTIs typically had longer hospital stays, thus suggesting a potential benefit of IC in reducing the hospitalization timing. However, owing to the lack of data on the duration of IDC, it is difficult to draw definitive conclusions. Conversely, Street et al and Thomas et al found no significant differences in UTI rates, although IC was associated with quicker return to normal voiding.[1,25] In line with this, Skelly et al showed that patients undergoing IC were more likely to resume normal voiding within 5 days than patients who had IDC for the first 48 hours.[29] Moreover, Thomas et al[1] found that leaving IDC in place for more than 24 hours doubled the risk of POUR. Another retrospective study suggested a 3.5-day threshold for catheter removal, but this threshold lacked both sensitivity and specificity in predicting the occurrence of POUR.[30] Acknowledging the link between the extended use of IDC and the increased risk of POUR and UTIs, most studies included recommendations to remove the IDC as soon as reasonable, with 24 to 48 hours from surgery being a reasonable target.[20,31] As demonstrated by 2 retrospective studies, early catheter removal was also associated with a reduced incidence of pressure ulcers.[16,17]

Furthermore, Lynch et al pointed out constipation (indirectly defined by the initiation of laxative treatment) as a predictor of unsuccessful catheter removal, whereas Street et al noted that non-modifiable risk factors such as dementia and decreased overall functional status were the only predictors of unsuccessful urinary catheter removal.[23,25]

Structured Program Implementation

Some of the included studies focused on the implementation of structured programs, conducted by nursing professionals, for managing IDC after hip fracture surgery in older patients. Frodin et al demonstrated the success of a nurse-led catheterization protocol, which improved the recording of reasons for catheter use and plans for its removal.[20] They used a standardized approach for assessing preoperative urinary retention, setting a threshold of a preoperative residual volume of ≥200 mL (measured via bladder scan) for immediate catheterization (within 24–48 hours) and organizing follow-up assessments according to the residual volume (ranging from 100–150 mL every 3 hours to 300–400 mL in the next hour). This method, combined with an educational program focused on managing hip fractures in older patients, led to a marked decrease in both the duration of hospital stay and incidence of urinary retention.[20] In line with a systematic review and meta-analysis on catheterization following total joint arthroplasty, Frodin et al determined that reasonable criteria for catheter use included placing the IDC for 24 to 48 hours in high-risk cases, minimizing unwarranted catheterization.[20,31] The implementation of the protocol decreased the frequency of straight in and out catheterizations, thus preventing unnecessary interventions. The "Pull the Foley program" achieved a significant 50% decrease in the use of IDC and a nearly 30% relative reduction in the incidence of hospital-acquired UTIs.[22] Patients who did not use a Foley catheter had a reduced likelihood of developing hospital-acquired UTIs, greater chances of being discharged to their homes, shorter waits for surgery, reduced hospital stays, and lower overall inpatient

Table 1
Main Characteristics of the Studies Included in the Systematic Review

Author, Year	Country	Study Design	Sample Characteristics	Sample Size	Mean Age, y	Clinical Setting/Location	Prevalence of Urinary Catheterization, %	Postoperative Indwelling Catheterization, d	Objectives	Results
Chiari P. et al, 2017	Italy	Prospective, cohort study	Patients underwent hip fracture surgery, aged ≥ 65, 75% women	1083	84	Orthopedic Unit	96.6	NA	To evaluate the incidence of pressure ulcers and potential predictive factors.	Early removal urinary catheter was associated with decreased incidence of pressure ulcers.
Ciaschi A. et al, 2011	Italy	Single-group pre-post intervention	Patients underwent hip fracture surgery	176	NA	Public hospital, setting not specified	72.2	NA	To evaluate a continuing medical education program to improve hip fracture treatment in 5 hospitals from Latium, Italy.	The intervention increased the percentage of patients who received surgery within 48 hours of admission and quality indicators, while reduced LOS. Routine urinary catheterization was still used.
Cumming D. et al, 2007	United Kingdom	Retrospective, Cohort study	Patients underwent hip fracture surgery, 81% women	54	81	Orthopedic Unit	55.6	4.6	To investigate the relationship between urinary catheterization and deep wound infection.	Urinary catheterization, particularly long-term catheterization, was significantly associated with the development of deep wound infections.
Ferrara M.C. et al, 2020	Italy	Retrospective, Cohort study	Patients underwent hip fracture surgery, aged ≥ 65 years old, 77% women	3017	86	Orthogeriatric model of care	79.1	NA	To describe the results of the 3-year activity of the Italian Group of Orthogeriatrics (GIOG).	Management of urinary catheterization across the 14 centers showed high variability.
Folbert E.C. et al, 2017	Netherlands	Prospective, Cohort study	Patients underwent hip fracture surgery, aged ≥ 65 years old, 76% women	452	83	Orthogeriatric model of care	NA	NA	To evaluate the incidence of complications in hip-fractured older adults undergoing orthogeriatric intervention.	CAUTIs are one of the most frequent complications in both high-risk (ASA ≥3) and low-risk (ASA 1−2) patients.
Frodin M. et al, 2022	Sweden	Retrospective, Cohort study	Patients underwent hip fracture surgery, aged ≥ 65 years old, 71% women	3078	84	Emergency department, orthogeriatric wards, operating room, intensive care unit	57	4.2	To investigate the impact of a nurse-driven urine catheterization protocol on bladder distension in hip fracture patients.	The intervention reduced the proportion of bladder distension over 5 years and was associated with improved documentation of catheter indications and removal plans.
Johansson I. et al, 2002	Sweden	Prospective, Cohort study	Patients underwent hip fracture surgery, older adults, 73% women	144	84	Orthopedic Unit	20.1	NA	To describe the occurrence of UTI. To investigate the use of ICs or IDCs. To appraise if UTI significantly increases the LOS.	Among patients free from UTI on admission (n = 89), 32% developed UTI and 71% were treated with intermittent urinary catheters. Indwelling catheterization was associated with bacteriuria in 61% of patients. UTI and bacteriuria significantly increased LOS.
Konda S.R. et al, 2020	USA	Retrospective, Cohort study	Patients underwent hip fracture surgery, aged ≥ 55 years old, 67% women	577	79.6	Orthopedic Unit	43.5	NA	To evaluate a hospital-wide Foley catheter reduction policy.	The policy reduced indwelling catheter use by 50% and hospital-acquired UTI by 30%. Patients without indwelling Foley had a greater likelihood of home discharge, shorter time to surgery, shorter LOS, and reduced hospital costs.
Kwak D. et al, 2019	South Korea	Cross-sectional	Patients underwent hip fracture surgery, aged ≥ 70 years old, 76% women	214	78.7	Orthopedic Unit	100	3.4	To investigate the incidence and risk factors for POUR, including the timing of indwelling catheter removal following hip fracture surgery in older patients.	A longer permanence of indwelling urinary catheter and male sex were risk factors for POUR. The AUC for the timing of catheter removal was 0.64, and the cutoff value was 3.5 days after surgery.
Lynch G. et al, 2016	Australia	Retrospective, Cohort study	Patients underwent hip fracture surgery, 80% women	110	82	Orthogeriatric model of care	100	2	To describe the current practice of indwelling catheter postoperative removal and the variables associated with a successful removal.	Bowel regimen was the only factor that significantly impacted a successful postoperative removal of indwelling catheter.
Nyman M.H. et al, 2010	Sweden	RCT	Patients underwent hip fracture surgery, aged ≥ 50 years old, 73% women	113	79	Orthopedic Unit	100	1.6	To investigate the effect of clamping the urinary catheter before its removal in patients with hip fracture.	There were no significant differences between the groups regarding the time required to regain normal bladder function, the number of patients requiring re-catheterization, and the mean LOS.
Pajulammi H. M. et al, 2017	Finland	Prospective, Cohort study	Patients underwent hip fracture surgery, aged ≥ 65 years old, 74% women	1644	84	Orthogeriatric model of care	NA	NA	To evaluate how a CGA affects quality-related care practices during orthogeriatric hip fracture program establishment and development.	CGA increased delay from admission to surgery <24 h and urinary catheter removal before discharge. However, the interaction of CGA with follow-up time increased urinary catheter removal and red blood cell transfusions but had no effect on the delay in time to surgery.
Skelly J. M. et al, 1992	Canada	Randomized open trial	Patients underwent hip fracture surgery, aged ≥ 60 years old, 82% women	67	67	Orthopedic Unit	52.2	2	To compare the use of IDCs and ICs in the management of POUR.	IC patients had a significantly greater proportion of voiding during the 5-day postoperative interval, and a shorter time to resume voiding. There were no significant changes in the incidence of UTI.

Street P. et al, 2015	Australia	Retrospective, Cohort study	Patients underwent hip fracture surgery, 71% women	310	83	Rehabilitation Unit	100		9.6	To examine current practices and factors associated with outcomes of urinary catheter removal (TOV) in patients following hip fracture.	Most patients can remove an indwelling catheter in the immediate postoperative period without voiding complications. The TOV result was not independently related to any modifiable factors. The presence of a new indwelling catheter on discharge independently increased institutionalization risk.
Thomas S. et al, 2021	Canada	Retrospective, Cohort study	Patients underwent hip fracture surgery, 66% women	583	77.3	Orthopedic Unit	77.2		4.7	To compare current practices with clinical guidelines, describe the incidence of POUR and UTI, and identify factors that increase the risk of these complications.	POUR occurred in 16.8% of patients but did not alter LOS. Having IDCs for more than 24 hours after surgery increased POUR incidence. UTI occurred in 10.6% of the patients. UTI risk increased with catheter usage. IDCs did not increase UTI rates compared with IC. UTI patients used catheters longer than non-UTI patients.
Wald H. et al, 2005	USA	Retrospective, Cohort study	Patients underwent hip fracture surgery, aged ≥65 years old, 78% women	111,330	84	Skilled Nursing Facility	32.3		NA	To explore the relationship between extended indwelling urinary catheterization and outcomes for patients sustaining hip fracture discharged to skilled nursing facilities and to describe patient and hospital predictors of extended indwelling urinary catheterization.	The prevalence of urinary catheterization was 32%. These patients had greater odds of rehospitalization for UTI and 30-day mortality than patients without catheters.

ASA, American Society of Anesthesiologists score; AUC, area under the curve; CAUTI, catheter-related urinary tract infection; CGA, comprehensive geriatric assessment; LOS, length of stay; POUR, postoperative urinary retention; TOV, trial of void; UTI, urinary tract infection; NA, not available.

costs than those with an IDC.[22] Furthermore, the use of the comprehensive geriatric assessment in the study by Pajulammi et al led to increased catheter removal and reduced time to surgery from emergency department admission.[24]

Discussion

This systematic review highlights that only a few studies have examined structured programs for urinary management in older patients with hip fracture, and those available are quite heterogeneous. Nevertheless, urinary catheterization protocols can reduce perioperative complications such as UTIs, POUR, and length of hospital stays. Key strategies include early catheter removal (within 24 to 48 hours) and comprehensive assessment for urinary retention, applying a patient-centered approach to favor better clinical outcomes.

As highlighted in this review, managing urinary catheters in older patients with hip fracture is still critical in clinical practice. Few general recommendations are available, such as those provided by the US Centers for Disease Control and Prevention Healthcare Infection Control Practices Advisory Committee, the Quality-Based Procedures Clinical Handbook for Hip Fracture, the National Hip Fracture Toolkit, or the ones contained in the textbook by the Fragility Fracture Network, which recommend minimizing catheterization, particularly the indwelling one.[32–35] However, there are no standardized international guidelines, and a consensus on a definitive or tailored timeline for the insertion and removal of the urinary catheter is still lacking.

Studies on nurse-led protocols in surgical and non-surgical settings demonstrated the efficacy of nurses' empowerment to manage urinary catheters autonomously, thus allowing timely assessments and removals without requiring physician orders.[36,37] These strategies can reduce catheter usage and infection rates, enhancing personalized care by minimizing unnecessary catheterization and associated complications.[37] Additional measures such as bundled approaches and computerized reminders can improve quality, reduce costs, and enhance patient safety.[36]

Despite these benefits, several barriers can impact protocol implementation, including nurse deference to physicians, physician control over catheter decisions, and miscommunication. Conversely, facilitators include comprehensive training to build nurse confidence, regular round discussions to support real-time decisions in a collaborative and multidisciplinary approach, and daily electronic alerts to reinforce protocol adherence.[38] It is well-known that hip fracture management in older adults requires a collaborative approach involving anesthesiologists, geriatricians, orthopedic surgeons, physiotherapists, and nursing staff to ensure better outcomes.[39] Complications arising from the extended use of catheters are multifaceted and equally require prompt multidisciplinary response. However, the studies included in this review indicate a lack of collaborative approach, being the structured programs typically focused on a single discipline without cross-specialty cooperation.

Another significant point of debate is the preference for IC vs IDC in older adults with hip fracture. Although some studies report an increased risk of UTIs with IDCs, they are often a practical solution for managing POUR.[1,3,4,29] Conversely, other studies indicate that, although less invasive, IC may carry a higher infection risk due to repeated insertions.[1,21,40] The meta-analysis by Zhang et al on bladder management in patients undergoing total joint arthroplasty demonstrated that IDC with early removal (24–48 hours) provided more benefits than IC in preventing POUR.[31] Even though these findings may not be fully applicable to older adults with hip fracture—being total arthroplasty patients typically younger and with better functional status than patients with hip fracture—the use of IDC for the shortest time possible (24–48 hours) is likely to be

beneficial to prevent POUR and to reduce the risk of urinary infections.[41,42] Furthermore, implementing bladder scans or bedside ultrasound as part of a structured protocol for postoperative management of hip fracture surgery may facilitate a more targeted and effective catheterization approach, reducing complications and improving patient outcomes.[20] Bladder scan is a noninvasive and reliable method for assessing bladder volume and residual urine, which enables timely intervention.[43]

Although a comprehensive and tailored approach, based on patient functional and cognitive status, would be advisable, none of the included studies addressed the relevance of frailty in the perioperative care of older people with hip fracture or the possible challenges arising in patients living with dementia. Managing older patients with frailty presents unique challenges. Although geriatricians are trained to balance individualized treatment with the structured framework of evidence-based medicine, this approach can be challenging for other health care professionals. As highlighted in a recent comprehensive review, frailty should be used as a framework to tailor interventions and optimize care strategies for older adults.[44] Integrating tailored toolkits for non-geriatricians in orthogeriatric care, along the lines of Flaherty's "glidepaths," can help standardize the use of frailty as an adaptive tool rather than an exclusionary criterion, allowing for proactive urinary management across specialties.[45] For robust patients, the focus should be on maintaining or enhancing autonomy; therefore, the approach should emphasize early mobilization, minimal catheter use, and autonomy preservation, reducing the risk of catheter-associated complications like CAUTIs.[45] For vulnerable or frail patients, the perioperative approach should aim to mitigate the higher risks of adverse outcomes, including delirium and prolonged hospitalization.[46-48] Comprehensive geriatric assessment can help identify specific vulnerabilities, guiding individualized urinary management with proactive monitoring, structured bladder scans, and shorter catheter use periods. In patients with dementia, cognitive impairment makes it challenging to assess urinary retention and detect infections.[49,50] Implementing non-verbal distress assessments, involving caregivers, and simplifying communication can help adapt catheter care to cognitive limitations, thereby enhancing adherence and improving outcomes. Such insights could guide the development of tailored protocols or practical guidelines for pre-frail, frail, and cognitively impaired individuals (Figure 2).

Future research should focus on the relationship of bladder management with geriatric syndromes, exploring how frailty and cognitive impairment may influence catheter-related complications. There is a clear need to encourage an interdisciplinary approach to share knowledge and explore the effectiveness of novel strategies. Investigating models that foster collaboration among geriatricians, urologists, nurses, physiotherapists, and caregivers may optimize outcomes by improving catheter management, reducing complications, and enhancing patient satisfaction. In addition, studies on noninvasive bladder management techniques, such as bladder scans, timed toileting, and portable ultrasound, could reduce catheter reliance, especially for frail and cognitively impaired patients. Finally, research evaluating quality of life and patient-reported outcomes will help align care with older adults' values and autonomy.

To our knowledge, this is the first systematic review designed to gather available evidence on the urinary catheterization management within the geriatric population hospitalized for hip fracture. Given the increasing focus on this critical issue as a key performance indicator of

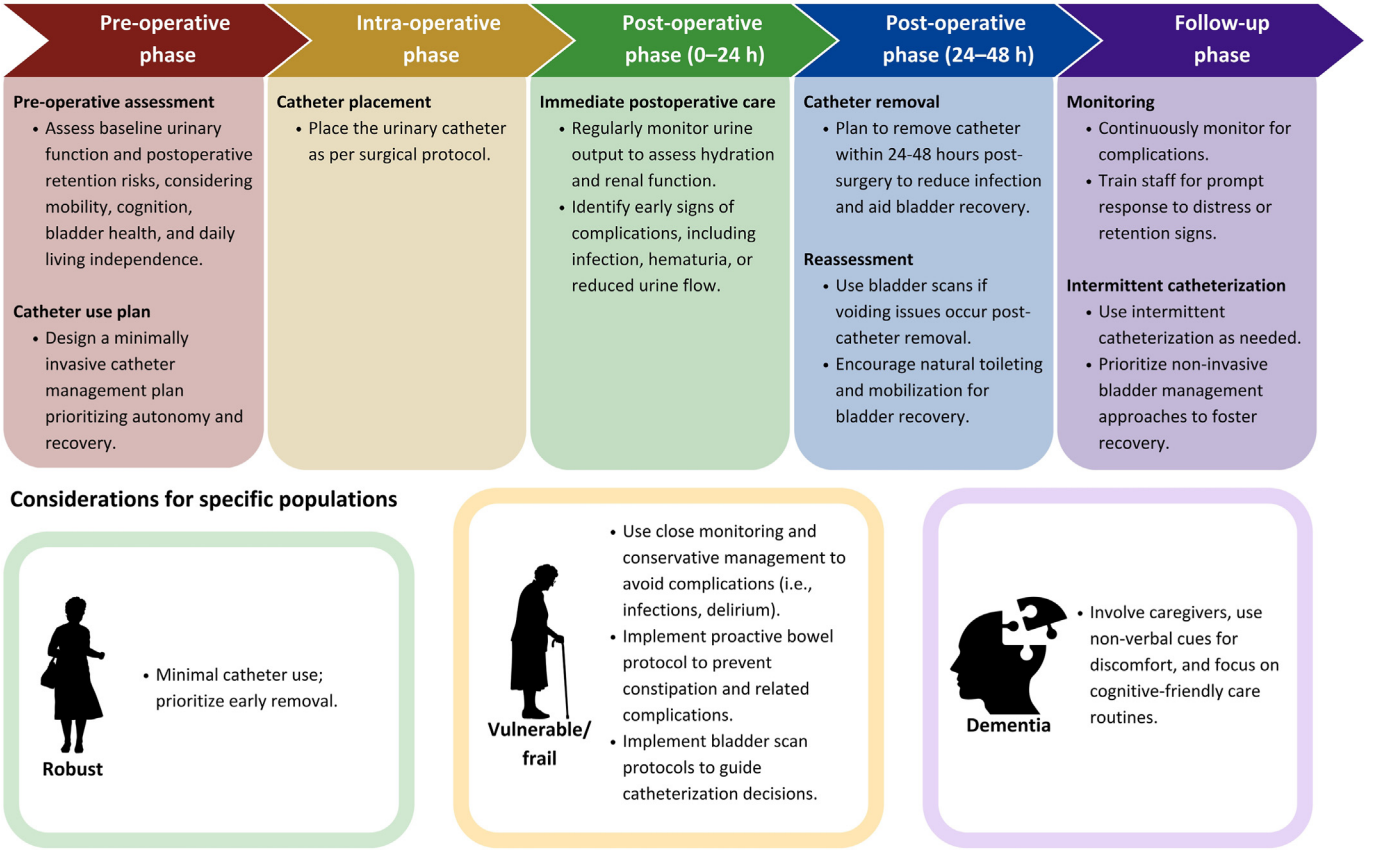

Fig. 2. Proposed perioperative pathway for urinary catheterization management, according to frailty and dementia.

orthogeriatric care, the proposed perioperative pathway could help the routine clinical management of urinary catheterization among older adults undergoing hip fracture surgery.

However, there are some limitations that should be mentioned. First, the heterogeneity of the selected studies prevented the collection of uniform data that are necessary for conducting a meta-analysis. Second, the full text of one article could not be located. Third, the studies did not include specific data on frailty or dementia, thus not allowing for subanalyses in these patient groups.

Conclusions

The present systematic review revealed a lack of harmonized evidence regarding perioperative urinary catheterization management in older patients with hip fracture. The considerable heterogeneity of timings and procedures suggests the urgency of defining bladder management protocols for older adults with hip fracture, uncovering the need for a tailored approach, which is crucial to improving the quality of care and outcomes in these patients.

Disclosure

The authors declare no conflicts of interest.

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Supplementary Data

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