

Frailty, geriatric assessment and prehabilitation in elderly patients undergoing urological surgery – is there a need for change of the daily clinical practice? Synthesis of the available literature

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Introduction The population of older people is heterogeneous and constantly growing. Over 50% of urological operations are performed in elderly patients. Some elderly patients present with frailty syndrome – a state of increased vulnerability to external stressors resulting in increased risk of hospitalizations, adverse treatment outcomes and death. Currently, there is no widely accepted system of qualification and preparation for surgical treatment developed specifically for elderly patients.

Material and methods We searched Medline/Pubmed, Embase and Cochrane Libraries databases from 2000–2020 (week 5). The following medical subject headings (MeSH) terms were used to ensure the sensitivity of the searches: geriatric assessment, frailty, urology, and prehabilitation. Relevant articles were also identified through a manual search of the reference lists of potentially relevant articles.

Results A total of 23 papers met the criteria and were included in the current study. Screening for frailty seems to be promising in predicting adverse outcomes, but frail patients should undergo detailed geriatric assessment (GA) which may indicate a need for preoperative intervention which can be unavailable during the hospitalization. The concept of prehabilitation is becoming increasingly discussed in thoracic and abdominal surgery, but only a few studies are available in the field of urology.

Conclusions Geriatric assessment seems to be a valuable tool for urologists in daily clinical practice. A proper form of prehabilitation may provide enhanced recovery after surgery.

Key Words: geriatric assessment ↔ urological surgery ↔ frailty ↔ elderly

INTRODUCTION

The population of elderly people is constantly growing and forming a big and heterogeneous group having a variety of co-morbidities and often diminished biological reserves [1]. Half of cancer cases and two thirds of cancer deaths occur in patients over the age of 65 [2]. With the fact that the population is ageing,

it is obvious that the elderly population requires surgery. As for urological patients, they require surgical intervention in over 50% of cases [3]. Currently, there is no widely accepted system of qualification for surgical treatment developed specifically for the elderly, so often the question ‘to operate or not?’ has no clear answer and we must still use our experience to judge who is fit enough for major surgery.

[4] In addition, older people often require a higher level of perioperative care than younger patients. As a result, the elderly are less likely to receive surgical treatment than younger patients [5].

Some elderly patients present with frailty syndrome that is a state of increased vulnerability and loss of resistance to external stressors. The frailty phenotype was described by Fried and colleagues as a decline in physical functioning is based on five pre-defined criteria: weight loss, exhaustion, low physical activity, slowness and weakness. The sum score of these criteria classifies people as not frail (score 0), pre-frail (score 1–2) and frail (score 3–5) [6]. Another approach represented by the Frailty Index, developed by Rockwood and colleagues [7], considers frailty as the accumulation of deficits across various domains (e.g. cognition, physical functioning, self-rated health, smoking history, and laboratory tests). Ultimately people with frailty syndrome are at an increased risk of hospitalizations, adverse treatment outcomes and death.

A routine preoperative assessment of urological patients developed for younger patients does not provide enough data to recognize frailty syndrome. Screening for frailty can be provided by using a variety of screening tests, is quick-to-administer and seems to be promising in predicting adverse outcomes, but patients identified as frail should undergo detailed geriatric assessment (GA), which is time-consuming, needs to be performed by qualified staff and may indicate a need for preoperative intervention which can be unavailable during the hospitalization.

A process of improving the functional capacity and the patient's tolerance to upcoming physiologic stress before elective surgery has been termed prehabilitation [8] and is becoming increasingly discussed in thoracic and abdominal surgery, but only a few studies are available in the field of urology.

There is evidence that frailty-screening is a valuable risk-stratification tool and should be incorporated in daily clinical practice.

Therefore, the aim of this study was to review the available literature on preoperative management of elderly urological patients undergoing elective surgery.

MATERIAL AND METHODS

We searched Medline/PubMed, Embase and Cochrane Libraries databases from 2000-2020 (week 5). The following Medical Subject Headings (MeSH) terms were used to ensure the sensitivity of the searches: geriatric assessment, frailty, urology, and prehabilitation. Relevant papers were also identified through a manual search of the reference lists of po-

tentially relevant papers. A total of 23 papers met the criteria and were included in the current study.

RESULTS

Routine model of qualification for treatment

Traditionally, preoperative care for elective surgery is led by a urological department with anaesthetic support and the decision 'to operate or not?' is often limited to marking a patient with the label 'fit' or 'unfit' for anaesthesia and surgery without any fitness improvement plan. Referrals to organ-specific specialities are based on already diagnosed conditions and once again – 'fit' patients are referred back to the urological department. On one hand, fit patients may be underdiagnosed with their subclinical conditions which can cause delay in the surgery or postoperative complications, while on the other hand there is a danger of being excluded from all future surgical interventions. The aforementioned model works well in younger groups, but not in elderly, often frail patients. In the clinical setting, age remains the main criterion in qualification of elderly patients to urological surgery. The metrical age is often different to biological age – it sounds like a truism, but the accuracy of the estimation of biological age by doctors is poor. Eyeballing or empirical estimation is the most common method to estimate the further life expectancy [9]. The routine preoperative assessment of urological patients [based on medical history, physical examination, American Society of Anaesthesiology score (ASA), Eastern Cooperative Oncology Group scale (ECOG) and laboratory tests] does not provide data to qualify older patients for surgery with full regard for their specific, often subclinical physiologic, nutritional or cognitive deficits. Aronson et al. [10] showed that doctors overestimate the preoperative risk and that there is high inter-observer variability in assigning ASA scores. Comorbidity indexes are based only on already diagnosed conditions and cannot detect subclinical conditions. Thus, despite the elderly accounting for more than half of operated patients, in the qualification and preparation processes, urologists often use tools developed for and working in younger groups of patients.

Frailty

The prevalence of frailty among elderly undergoing urological surgery increases with age. The prevalence varies between studies. Rosiello et al. [11] in a large study found it to be 16% in a group undergoing radical nephroureterectomy. In the group undergoing radical cystectomy in the study of Michel

et al. [12] it was 7%, while in the study of Yao-Dan Liang et al. [13] the prevalence in different surgical wards was 18.8% to 41.9%.

The term of frailty was established by Vapuel in 1979 for geriatric usage, but it was rapidly adopted into the clinical decision-making process [14]. Frailty is a syndrome of decreased physiologic reserve and diminished capacity to adapt to physiologic and pathologic stressors. Frailty predisposes to poor health outcomes, including functional decline, falls, increased risk of hospitalization and death.

In many studies screening for frailty was superior to traditional evaluating methods in predicting poor clinical outcomes. Lascano et al. [15] searching the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database retrospectively compared a modified frailty index predicting poor surgical outcomes with other risk stratification tools among 41,681 patients undergoing urological oncological surgery. Patients with a high frailty index score (>0.20) were at an almost 4-times higher risk of a Clavien-Dindo grade IV complication and an almost 6-times greater risk of 30-day mortality than non-frail patients. Modified frailty index was comparable or superior to the Charlson Comorbidity Index and associated with the ASA was superior in all aspects in comparison to other tools.

Suskind et al. [16] searched the NSQIP database and identified 95,108 patients undergoing common urological procedures. The rate of complications increased with increasing of frailty index regardless of patient's age. For an NSQIP Frailty Index of 0.09, the adjusted OR was 1.28 (95% CI 1.21, 1.36) and for an NSQIP FI of ≥ 0.18 , the adjusted OR was 1.74 (95% CI 1.21, 1.36).

Also in the NSQIP database, Isharwal et al. [17], identified 42,715 patients who underwent a urological procedure. Preoperative frailty was assessed with the use of the Risk Analysis Index (RAI). The mortality rate increased from 0.47% in patients with RAI score <6 to 29.51% in patients with RAI score >35 .

Dal Moro et al. [18] recruited to a prospective study 78 urological patients aged over 70 years who were evaluated for postoperative complications and frailty with Edmonton Frail Scale (EFS). Patients with complications were significantly frailer than those without complications.

In a prospective study, Revening et al. [19], confirmed the usefulness of presence of frailty as a risk factor for complications and poor surgical outcomes. In the above-mentioned studies, frailty-screening was performed using different screening tests, the populations also differed – elderly patients were included, but younger individuals were also included. There was no detailed GA and preoperative interventions, however,

coherently with studies on other surgical disciplines, frailty syndrome was confirmed as a broadly accepted risk factor for poor surgical outcomes in many surgical settings [20] including urological procedures.

Geriatric assessment

Frailty can be assessed using one of many screening tests e.g. Vulnerable Elders Survey (VES-13) or Geriatric 8 (G8) [21], that are quick-to-administer but the gold standard is a detailed geriatric assessment which is an efficient and objective assessment tool that can identify frail older patients [1]. However, the aim of GA is not only to identify a frail individual but also to recognize the subclinical conditions (GA identify up to 40% of new age-related problems that were not detected in standard clinical management) [22], specific health needs of older patient and to design an intervention that can decrease the frailty and allow safe surgical treatment. GA in preoperative assessment is well described in general surgery, thoracic surgery, and orthopaedics [23], but not in urology. In most studies GA is used as risk-stratification tool, and in only a few studies geriatric assessment was followed with an intervention for which frailty concept and GA was developed.

Partridge et al. [24] performed a systematic literature review on the impact of geriatric assessment on postoperative outcomes in elderly across surgical disciplines including only prospective studies with preoperative evaluation, intervention and evaluation of postoperative outcomes. Studies with GA as a risk-stratification tool only were excluded. Five studies met the inclusion criteria and only 2 of these were randomized controlled trials. Urological patients were enrolled in only one of included studies. The results were encouraging – GA can decrease postoperative complications rate, length of stay, institutionalization after discharge and mortality, but both preoperative assessment and patient-specific intervention are required to be GA successful [25].

GA is time-consuming (30–120 minutes) and ideally should be performed by a geriatrician or other trained and experienced staff [23]. The proper assessment requires the evaluation of the main domains of GA, which are presented in Table 1 [26].

Problems in particular domains should be marked as 'red flags' and discussed by a multidisciplinary team to design an appropriate intervention.

Prehabilitation

Postoperative rehabilitation is currently the main strategy for returning patients to preoperative fitness, however elderly frail patients have poorer re-

Table 1. Components of comprehensive geriatric assessment. Modified from Partridge et al. [24]

Domain	Items to assess
Somatic assessment	Co-morbidities, polypharmacy, nutritional problems
Functional assessment	Activities of daily living, instrumental activities of daily living, gait, balance
Mental assessment	Cognitive impairments, depression, fears
Social assessment	Family support, friends, visitors, home comfort, facilities, accessibility to care resources, accessibility to transportation, safety

serves often causing delay in discharge due to decompensation of subclinical undiagnosed conditions and, if discharged home, they will take a longer time to recover compared to younger, non-frail patients [27]. The term ‘prehabilitation’ describes a form of preoperative intervention aimed at preparing the patient for upcoming physiological stress and was primarily developed for cardiovascular surgery [27], but currently it is increasingly discussed as being useful in many surgical disciplines, also as a form of intervention decreasing frailty in elderly patients. A variety of interventions to reduce frailty may be undertaken, including strengthening exercises, physical therapy programs, improving of nutrition, and psychological consultations. The optimal protocol of prehabilitation is unknown and varies depending on the type of surgery and recognized deficits of patients. In a systematic review and meta-analysis of studies on prehabilitation in patients undergoing colorectal surgery, Gillis et al. [28] confirmed the beneficial role of nutrition alone or combined with exercise preoperative intervention in significant reduction of length of stay and acceleration of postoperative recovery. Moran et al., in a meta-analysis on prehabilitation in patients undergoing intra-abdominal surgery [29], concluded that preoperative intervention consisted of inspiratory muscle training, aerobic exercise, and/or resistance training can decrease all types of postoperative complications after intra-abdominal operations. However, the authors of the current study found the methodologic quality of included studies to be ‘very low’. The literature on prehabilitation in a urological setting is sparse. In the pilot study on prehabilitation in patients undergoing radical prostatectomy due to prostate cancer, Santa Mina et al. [30] designed an intervention consisting of home-based, unsupervised exercise 3–4 days per week for 4–8 weeks before radical prostatectomy. The outcomes published in 2018 [31] were promising, suggesting that patients who underwent prehabilitation were fitter postoperatively. Gadzinski et al. [32] in the recently published study regarding patients

undergoing radical cystectomy, suggest that tailored prehabilitation should be a standard preoperative intervention following GA.

The optimal moment for GA during preoperative management and following intervention is unknown. Clearly it has to allow for the implementation of an intervention to decrease frailty, but also it should not delay surgery, especially in patients with malignancy. Dronkers et al. [33] stated that 2–4 weeks of prehabilitation is too short to achieve any benefits. In most studies, the 2–8 weeks protocols were used. The robust data regarding urological elderly patients are lacking. In available studies the period of 4–8 weeks is presented as sufficient [34].

Guidelines

Available literature on preoperative geriatric assessment followed by an intervention in elderly urological patients is sparse but growing, however this assessment is still poorly present in guidelines addressed to urological clinicians.

In patients with prostate cancer [35], the estimation of life expectancy with use of available tables or gait speed test with 10 years of expected survival as a threshold is advised. In management of patients over 70 years old the authors recommend the use of the G8 test which is a quick-to-administer screening tool for frailty. Patients with a score of 14 or less should undergo detailed geriatric assessment and if impairment is considered reversible, proper intervention is recommended. After resolution of the geriatric problems, this group of patients should receive standard treatment, if life expectancy exceeds 10 years. However, it is not explained who, where and when should perform the geriatric assessment. Also, no intervention protocol is mentioned. On the other hand, in patients with muscle invasive bladder cancer, a malignancy affecting mainly elderly patients, in assessment preceding radical treatment authors suggested that chronological age is of limited relevance and recommended the use of comorbidity scales such as Charlson Comorbidity Index [36]. However, as previously mentioned, comorbidity indexes are based only on already diagnosed conditions and are insufficient in preoperative care of elderly patients. The concept of GA is mentioned in the text of guidelines, but no specific recommendation on geriatric evaluation is given.

However, the literature on GA in elderly patients is constantly growing and the need and benefits of personalized preoperative care with tailored intervention allowing proper qualification to treatment, including urological surgery are increasingly encouraging to design studies of better quality.

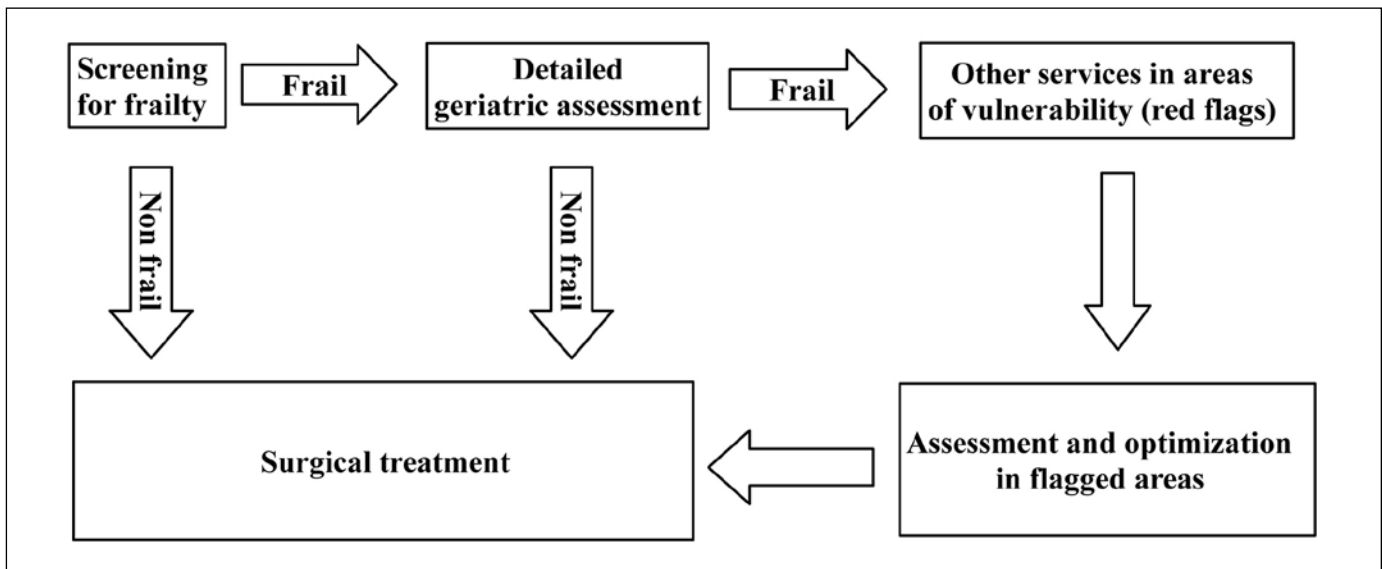


Figure 1. Proposed pathway of preoperative management of an elderly urological patient – adopted from Gadzinski et al. [32].

The optimal model of preoperative care

The important role of screening for frailty and proper evaluation of elderly patients is well described across surgical disciplines, but the optimal model of preoperative care, including interventions, remains unclear. The literature is sparse and incoherent, so the meta-analyses are precluded because of different study designs, different populations, screening methods, interventions used, and surgical settings. The proposed pathway of preoperative management of elderly urological patient is presented in Figure 1.

Therefore, prehabilitation, a concept addressed not only for elderly patients can become the bridge over the gap in current preoperative care. In many surgical settings, the debate is, not about ‘should prehabilitation be implemented?’ but about ‘what protocol is optimal?’. In colorectal surgery, good quality studies allow for the attempt at meta-analyses [37] whose outcomes should encourage the development of similarly designed studies in other surgical settings, including urology, keeping in mind that over half of urologically operated pa-

tients are elderly and this percentage is constantly growing.

CONCLUSIONS

The literature concerning GA and prehabilitation in elderly urological patients is limited. Although full GA is time-consuming, simple screening for frailty seems to be a valuable tool for urologists in daily clinical practice. Even though there is no optimal protocol as of yet, some form of prehabilitation tailored for individual patients may provide enhanced recovery after urological surgery.

The future goals are to implement the need for proper preoperative evaluation of elderly urological patients not only into the guidelines, but most importantly, to daily clinical practice in a busy urological ward, as well as to adapt the prehabilitation protocols to specific needs of urological elderly patients and to link them to enhanced recovery after surgery (ERAS).

CONFLICTS OF INTEREST

There is no conflict of interest relating to Authors. The manuscript was prepared according to scientific and ethical rules.

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