

SEXUAL MEDICINE REVIEWS

Frailty Assessments in Surgical Practice: What is Frailty and How Can It Be Used in Prosthetic Health?

Matthew S. Brennan, DO, Ryan M. Barlotta, BS, and Jay Simhan, MD

ABSTRACT

Introduction: Surgical frailty is a previously unrecognized clinical entity that objectifies a multiorgan decrease in physiologic reserve in those undergoing surgery. Although penile implantation has been demonstrated to be an effective means of restoring erectile function in patients whose previous conservative measures have failed, there are limited data regarding the assessment of frailty in patients undergoing penile implantation.

Aim: To review the various objective methods used to describe surgical frailty in medical and surgical disciplines, report on methodologies of frailty assessment, and discuss the relevance of surgical frailty in the preoperative evaluation of patients undergoing implantation of an inflatable penile prosthesis.

Methods: A literature review was performed through PubMed regarding surgical frailty in the disciplines of medicine, surgery, and urology. Key words and phrases included *frailty*, *elderly*, *aging*, *erectile dysfunction*, *penile implantation*, and *penile prosthesis*.

Main Outcome Measure: Critical assessment of frailty in medicine and its application to male prosthetic health.

Results: Frailty has been assessed by different metrics in multiple fields. Validated modalities to determine physiologic reserve include an accumulation of deficits and phenotypic objective assessments that are reviewed in detail. Frail patients experience longer length of stay, postoperative complications, unplanned returns to the operating room, and readmissions and are less likely to be discharged to home. Novel frailty assessments objectified through grip strength measurements from our institution demonstrate that a considerable number of patients, young and old, undergoing penile implantation exhibit surgical frailty.

Conclusion: There is a growing need to incorporate frailty assessment in the preoperative risk stratification of patients undergoing penile implantation. Grip strength evaluation seems to be an obvious standard because it is likely the easiest to measure and is clinically relevant given the user's dependence on manual dexterity to use the device. Screening for frailty does not create a substantial time, financial, or resource burden for the urologist.

Brennan MS, Barlotta RM, Simhan J. Frailty Assessments in Surgical Practice: What is Frailty and How Can It Be Used in Prosthetic Health? Sex Med Rev 2017;X:XXX–XXX.

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Key Words: Erectile Dysfunction; Penile Prosthesis; Elderly; Frailty

INTRODUCTION

Erectile dysfunction affects an estimated 30 million men in the United States¹ and up to 153 million men worldwide.² Multiple treatment options exist, including phosphodiesterase type 5 inhibitors, vacuum pump erection devices, intracavernosal injections, urethral suppositories, and penile prostheses.³ Penile prostheses, malleable or inflatable, are most commonly offered to

men with multiple failed treatment modalities or those with concomitant penile curvature,^{3–5} and as such, implantation is an effective strategy for restoring erectile function.⁶ Importantly, patient and partner satisfaction rates have been shown to be superior to phosphodiesterase type 5 inhibitors and intracavernosal injections.^{7,8} In a multi-institutional European series of 185 patients, investigators reported 98% patient and 96% partner satisfaction rates.⁹

Originally developed in 1973, the inflatable penile prosthesis (IPP) was often placed only in the most medically fit patient.¹⁰ However, with contemporary advancements in penile implantation technology coupled with expanding surgical indications for the procedure, penile implantation has increasingly been used in patients with advanced age and medical comorbidities in

Received May 29, 2017. Accepted June 29, 2017.

Department of Urology, Einstein Healthcare Network/Fox Chase Cancer Center, Philadelphia, PA, USA

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<http://dx.doi.org/10.1016/j.sxmr.2017.06.006>

recent years.^{11,12} In a large series using the National Inpatient Sample, Mirheydar et al¹³ reported that more than 72% of patients undergoing placement of an IPP were older than 60 years.

As our aging population continues to increase, older patients are increasingly presenting for surgical evaluation¹⁴ and are at increased risk for postoperative complications.¹⁵ Surgical complications can lead to a cascade of events that can lead to loss of independence, disability, increased cost, diminished quality of life, and mortality.¹⁶

“Frailty” is an estimation of patient fitness and is a direct consequence of multifactorial physiologic decline in populations of advanced age. Frail patients are rendered more vulnerable to poor resolution of homeostasis after a stressor such as surgery, thus resulting in a disproportionate decline in their overall health status.¹⁷ Nevertheless, the prevalence of frailty has been shown to increase steadily with age. In a review of 21 community based cohort studies involving 61,500 older people, Collard et al¹⁸ reported a staggering exponential increase in frailty as age increased: 4% for those 65 to 69 years old, 7% for those 70 to 74 years old, 9% for those 75 to 79 years old, 16% for those 80 to 84 years old, and 26% for those older than 85 years. Surgical decision making is increasingly difficult because of the heterogeneity of comorbidities in the elderly and the relative paucity of tools for predicting preoperative risk. Commonly used predictors of postoperative complications have limitations in assessing surgical frailty; most are based on a single organ system or contain subjectivity and fall short of estimating a patient’s physiologic reserve.¹⁹ For example, the widely recognized American Society of Anesthesiology score is determined by a highly subjective estimate of organ system disease and likelihood of survival.²⁰

In this review, we assess various methods of assessing frailty in urologic and non-urologic disciplines and further report on pilot frailty assessments in patients with IPP from our institution. Similar to the direct relation observed with increasing surgical frailty and the incidence of postoperative complications, we believe that increasing surgical frailty might be directly related to poorer IPP device maneuverability because mechanical pump inflation requires a patient who is not only surgically fit at the time of surgery but also can operate the IPP consistently after surgery. Because of the high prevalence of frailty in the aging population, it is essential that urologists develop objective tools to identify at-risk candidates for penile implantation because this could inform shared decision making before penile implantation. This important assessment also can aid in prognosticating postoperative course and recovery.

Frailty assessments in male sexual health are lacking in historic and contemporary cohorts. Our goal in writing this review is to demonstrate the extraordinary amount of important work done in all surgical fields and further relate the importance and implications of frailty in male sexual prosthetics practice. In addition, by demonstrating the impact of frailty assessments on postsurgical outcomes in different fields, our intent is to

stimulate similar large-scale assessments by our sexual health colleagues for IPP recipients.

FRAILITY ASSESSMENT IN MEDICINE AND SURGERY

Previous studies have concluded that robotic-assisted surgeries for patients older than 75 years do not add significant risk of developing perioperative and postoperative complications compared with younger patients.²¹ However, the impact of frailty in particular in those undergoing robotic surgery is less well known. Although age alone might be a sign of increasing comorbidity, surgical frailty has recently been described as an important surrogate for patient “fitness” in the perioperative procedure.^{22,23} Importantly, surgical frailty is directly correlated with increasing age, but frailty also can be identified in those who are younger.²⁴

Frailty has been assessed in multiple surgical and medical subspecialties.^{25–27} Its most simple definition is a multiorgan system decline in physiologic reserve. It is often assessed by the accumulation of deficits (physical signs, the ability to care for self, and illness) or phenotypic objective assessments (grip strength, gait speed, falls, or bone density).²⁸ The Fried Frailty Phenotype was one of the first proposed assessments of frailty. In this large assessment of more than 5,000 patients with longitudinal follow-up, the investigators defined frailty to include at least three of the following metrics: unintentional weight loss, self-reported exhaustion, weak grip strength, slow walking speed, and low physical activity.²⁹

Using the deficit accumulation model, the Canadian Study of Health and Aging Frailty Index (CSHA-FI) was first created as an inventory of frailty.³⁰ This index incorporates 70 different deficits to calculate a measurement of frailty. The inventory includes deficits regarding symptoms, signs, disabilities, and diseases. As one might expect, quantifying all 70 items for each patient is a barrier to its clinical use in surgical patient populations. More recently, several investigators have revised the original CSHA-FI to construct a modified frailty index (mFI) to create a more concise and practical clinical tool. These abbreviated indices have been shown to accurately predict postoperative complications, prolonged hospital length of stay, and discharge disposition. Furthermore, there has been good correlation between the use of more simplified 11-item and 5-item mFIs than the unabridged indices.^{31,32}

In a prospective report assessing preoperative frailty in 594 patients older than 65 years, Makary et al³³ established the Hopkins Frailty Score and validated its use to assess patients undergoing minor and major elective surgery. The proposed scale accounted for weakness, recent weight loss, slowed walking speed, decreased physical activity, and exhaustion. The investigators also demonstrated the impact of frailty on commonly measured postsurgical parameters including 30-day surgical complications, length of stay, and discharge disposition. Preoperative frailty was

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