

# Caring for the Geriatric Combat Veteran at the Veteran Affairs Hospital

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Published online: 29 October 2016  
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## Abstract

*Purpose of Review* The US population continues to grow older, and their needs pose a challenge to the healthcare system. The nation's aging veterans are no exception to this trend. *Recent Findings* The geriatric patient is physiologically distinct from younger adults. Geriatric veterans are unique in terms of their social history and the illnesses they risk encountering. Veterans of our recent conflicts will in the decades to come also have their own unique needs as they grow older that are yet to be fully understood.

*Summary* In this review, we discuss several conditions that clinicians who care for geriatric veterans may expect to encounter.

**Keywords** Veterans hospital · Medical care for veterans · Geriatric veteran · Combat veteran · Medical veteran affairs

## Introduction

The population aged 65 and greater presents the fastest growing segment of the US population [1]. In 2014, this age group made up 14.5 % of the population, and of that, US veterans numbered over 21.3 [2] million. Compared to their

predecessors, veterans now are healthier, more active, and more prone to injury. When elderly veterans get injured, they have longer hospital stays, incur greater medical expenditures, and have higher mortality rates [3, 4]. In 2014, among the general population, unintentional injury was the seventh leading cause of death and resulted in almost four million injuries and more than 865,000 hospitalizations [5]. Veterans also have unique considerations in trauma management, including management of combat-related diseases and injuries, higher rates of post-traumatic stress disorder (PTSD), substance abuse, and illness due to environmental and chemical exposures during deployments as well as the consequences of military sexual trauma.

## Physiological Effects of Aging

Aging results in multiple physiological and anatomic changes alters patterns of injury and recovery from major trauma. Neurological function declines as you age, resulting in weakness and gait instability and alterations in cognition, vision, reflexes, and proprioception. Cortical atrophy results in increased mobility of the brain within the cranial vault, increasing the risk of development of subarachnoid and subdural hemorrhage after trauma. Decreased myocardial compliance results in decreased maximal cardiac output and ejection fraction and intimal hyperplasia with decreased diastolic filling and increased afterload. Pulmonary compliance diminishes during aging with decreased forced vital capacity (FVC) and forced expiratory volume (FEV). Decreased airway sensitivity and mucociliary clearance also leads to higher susceptibility to aspiration and subsequent pneumonia. Renal reserve decreases, increasing the likelihood of acute kidney injury resulting from trauma-related hypoperfusion. Progressive loss of muscle mass and strength due to degeneration of myocytes,

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This article is part of the Topical Collection on *The Military Perspective*

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combined with joint stiffening and osteoporosis increases the risk and severity of injury in the aging population [6].

Aging also results in diminished physiologic reserve and an impaired ability to recover from post-injury complications. Pre-trauma frailty scores have been shown to be a major predictor of post-traumatic injury outcomes. Understanding these changes, minimizing pre-injury frailty, and optimizing post-trauma rehabilitation ultimately improves outcomes in elderly veterans.

As our veterans age, they face morbidity and mortality from mechanisms of injury that are relatively benign for younger people, in particular ground-level falls. Ground-level falls have an age-dependent morbidity and mortality that is disproportionate to the injury severity. Older patients are less likely to be discharged home and are more likely to require discharge to a facility. With increasing age, patients are more likely to experience cervical spine and pelvic fractures [7]. This patient population is also commonly on antiplatelet or anticoagulation therapy for a host of cardiovascular comorbidities. Ground-level fall patients on aspirin or warfarin have been demonstrated to have a higher incidence of both morbidity and mortality [7]. The geriatric patient population is increasingly using newer-generation oral agents that do not require frequent monitoring and are more convenient for patients. Although these agents may be safer for trauma patients in general compared to warfarin [8•], there remain valid concerns about the lack of effective reversal agents for most of these newer compounds.

### The Veteran Affairs Hospital

The USA has one of the most comprehensive health care systems dedicated to veterans in the world. Centralization of care for wounded veterans evolved beginning with the revolutionary war and spanned multiple combat missions including the most recent Middle East conflicts. The modern Veteran Affairs (VA) hospital system is a product of consolidation of efforts following World War I. Annually, VA hospitals nationwide service over 21 million eligible veterans. Care continues to expand at the VA network and the faces of veterans are continuously changing. Today, the VA is the largest component of the Department of Veterans Affairs with 152 comprehensive, acute hospitals, 800 community clinics, and 126 nursing homes. In 2014, nearly six million veterans utilized services at the VHA, the vast majority of such encounters are in the outpatient arena. While the overwhelming majority of patients are male, female veterans are increasingly utilizing women's services at VA hospitals across the country.

In general, VA medical centers are not trauma centers for acute injury; therefore, there is scarce-reported experience with acute trauma in the geriatric veteran population. Nevertheless, the VA hospital offers a wide array of services for combat and civilian post-injury services. Many VA

hospitals are affiliated with major teaching institutions and may have transfer agreements to facilitate acute trauma care in the civilian healthcare system. Although VA hospitals are not generally equipped for acute trauma management, the VA Polytrauma System of Care is designed to be a one-stop care for veterans who suffer from traumatic brain injury or other trauma in the rehabilitative phase (both combat and non-combat related). The injuries need not necessarily be combat or active duty related. Polytrauma rehabilitation centers are regional referral entities consisting of multiple polytrauma networks and clinic sites.

Recognizing the high prevalence of concomitant PTSD and substance abuse, VA trauma service programs developed special multidisciplinary teams to facilitate care. The Veterans Health Administration places significant emphasis on preventative psychology, offering services in crisis prevention, PTSD, and mental health.

## Common Veteran-Specific Medical Problems

### Post-Traumatic Stress Disorder

PTSD secondary to combat experience has long been articulated through military history. Although it has only recently been recognized as a clinical entity with standard treatment plans, it has long been described as “shell shock.” In 1980, the term post-traumatic stress disorder was introduced in the Diagnostic and Statistical Manual of Mental Disorders (DSM) III. PTSD has afflicted combat veterans of every conflict.

Estimates of the prevalence of PTSD among veterans vary and changes with each combat operation. Among World War II veterans, some estimate up to 24 % of older veteran's experience PTSD [9]. Similarly, Vietnam War era veterans are also aging and recent studies report up to 16.9 % of veterans over 60 years of age with PTSD [10, 11]. Overall, these figures likely underreport and do not account for veterans who do not seek medical attention or are underdiagnosed.

Much of ongoing discussion specific to geriatric veteran's center is around combat-related post-traumatic stress disorder, and specifically delayed or reemergence of PTSD. While geriatric veterans are not immune from “traditional” trauma such as motor vehicle collision and falls, little trauma literature is dedicated to this population. We recognize the difficulty in diagnosis of PTSD in the elderly, largely because it may present differently than young veterans who are closer to their combat experience [12]. There is some suggestion that disability and facing mortality as a result of aging may evoke memories of fallen comrades and lead to reemergence phenomenon. Diagnosis can be challenging. Symptoms of PTSD mimic those of traumatic brain injury and dementia [13]. Elderly veterans may not associate their current symptoms with

combat experience many years ago. It is recognized that PTSD has partial remission and a segment of veterans may experience reemergence of PTSD [14].

Unfortunately, PTSD may have delayed onset or exacerbated in geriatric veterans [15]. There is no longitudinal study that clearly defines the natural course of the disease. PTSD in the elderly has been associated with hypertension lending evidence to the concept that PTSD has physiologic consequences [16]. This poses particular challenges to the clinician both diagnostically and therapeutically as the patient's physiologic derangement may stem from neurobiological disturbances.

Veterans older than 65 years of age with PTSD also suffer higher incidence of dementia than their non-PTSD counterparts [17]. Although the exact mechanism is unknown, there is suggestion that PTSD, much like dementia, have neurobiological basis [18]. Interestingly, premorbid PTSD is strongly associated with post-intensive care unit survivor PTSD in a study of multiple VA hospitals [19].

The staple of treatment is a multimodal program of cognitive and behavioral therapy, social contact and support, and pharmaceutical therapeutics including selective serotonin reuptake inhibitors. Veterans are extraordinarily resilient. Many veterans exhibit post-traumatic growth, especially among patients who identify positive social networks [20]. Supplying PTSD veteran patients with a platform of shared experiences is a major focus of the VHA.

### Alcohol Use

More than 40 % of US veterans will experience lifetime alcohol use disorder [21]. Alcohol use disorder among veterans is also associated with increased risk of suicide. Young veterans are particularly susceptible to alcohol dependence, especially if there is concomitant traumatic brain injury [22]. This epidemic is not limited to men; significant portions of women veterans also demonstrate alcohol dependency [23]. While no specific information is available in the geriatric veteran population, this risk is considered lifelong.

For elderly patients who screened positive for alcohol use, but not dependence, there was an association with decreased mortality among male veterans older than 65. Physiologic dependence is also a major determinant of mortality, although interestingly, this relationship did not hold for elderly patients [24]. Veterans who screen for high risk of drinking also have higher readmissions rates to the hospital [25].

Concomitant substance dependence and PTSD is common. Alcohol dependency likely potentiates the psychologic and physiologic effects of PTSD [26]. Not surprisingly, treatment which involves detoxification, rehabilitation, and psychiatric care is multidisciplinary in nature. The VA system offers extensive rehabilitation programs where veterans undergo intensive cognitive behavior therapy. Combination therapy programs offered through VA have demonstrated promising

results. In one longitudinal study, participants reported improvement in PTSD symptoms and suicidal ideation [27].

### War Era-Specific Disease

Each generation of veterans had faced unique challenges during deployment and combat. Campaigns in various continents under specific conditions have exposed veterans to diseases and conditions that have lasted long past their service period. Familiarity with conditions from each time period will help the clinician recognize and take care of the broad patient population seen at the VA from different eras of our history. Apart from alcohol abuse and post-traumatic stress disorder that are common across generations of veterans, certain diseases are more prevalent among veterans depending on their period and location of service.

During World War II, service personnel deployed in the Far East endured harsh tropical conditions. The increased sunlight exposure can predispose for melanoma among veterans of this era [28]. The incidence of squamous and basal cell carcinoma is higher among pacific theater veterans compared to their counterparts in Europe which is attributed to high-intensity sun exposure [29]. The difference in sun exposure has been demonstrated to be associated with long-term mortality on 50 years follow-up. Veterans who were prisoners of war are at higher risk for melanoma compared to non-prisoners of war due to difference in sun exposure [30].

Veterans with extensive soil exposure from trench digging in South East Asia have reported to experience a constellation of symptoms including pruritus ani, abdominal pain, indigestion, heartburn, and diarrhea caused by strongyloidiasis. Chronic strongyloidiasis is a rare condition characterized by recurrent creeping skin eruption, abdominal pain, and eosinophilia which can be seen decades after deployment in endemic areas [31]. Patients will demonstrate the presence of larvae in stool samples on microscopy. Therapy with thiabendazole or albendazole had been demonstrated to be effective in such cases [31, 32]. It is estimated that up to 5 % of veterans from the Far East theater may have chronic nutritional neuropathic syndromes most commonly optic atrophy or sensory peripheral neuropathy as a result of untreated exotic diseases [33].

The USA was involved in the Vietnam War from 1959 to 1975. During the campaign, the USA and its allies used herbicide agents to clear the jungle foliage which could be used by enemy combatants to their advantage. Phenoxy herbicides were used during this time period and were coded as Agent Orange, Green, White, Pink, and Purple. Mixtures of 2,4-dichlorophenoxyacetic acid (2,4-D), 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), picloram, and cacodylic acid were the most common herbicides sprayed. Agent Orange was a mixture of 2,4-D and 2,4,5-T. The chemical 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) was a

contaminant generated during the manufacturing of 2,4,5-T and was present in Agent Orange and some other similar agents used [34]. Agent Orange has been associated and suspected to be responsible for a slew of medical problems. Agent Orange has been associated with several malignancies including dermatological, hematological, bladder, thyroid, and prostate [35–38]. Agent Orange has also been implicated as risk factor for birth defects and malignancy in the offspring of veterans exposed to the chemical [38, 39].

The 1990–1991 Gulf War was a successful military campaign by the USA and its allies to liberate Kuwait from Iraqi occupation that achieved its military objectives with relatively low combat casualties. However, in the aftermath of the war, many returning veterans from several countries experienced a constellation of disorders that gave rise to the term Gulf War Illness or Multisystem Illness. Several environmental as well as drug exposure factors are believed to have contributed to the illness. Contributing factors include exposure to drugs for prophylaxis against chemical warfare, exposure to oil well fire fumes, exposure to depleted uranium exposure from munitions, and exposure to pesticides [40, 41]. The constellation of symptoms includes the presence of functional gastrointestinal issues without anatomical cause, fibromyalgia, chronic fatigue syndrome, and undiagnosed illnesses with symptoms that may include but are not limited to abnormal weight loss, fatigue, cardiovascular disease, muscle and joint pain, headache, menstrual disorders, neurological and psychological problems, skin conditions, respiratory disorders, and sleep disturbances [42]. Veterans of this era may present with vague and seemingly unrelated symptoms. Clinicians taking care of this patient population need to be cognizant of the disorder and its non-specific presentation.

### Future Geriatric Populations

The large-scale combat operations in Iraq and Afghanistan, as well as the numerous smaller forward combat operations, have created a significant pool of future geriatric veterans that will come to the VA for medical care. Approximately 51,000 soldiers were injured serving in these locations between 2003 and 2014 [42]. Veterans of these campaigns will be different from previous generations. Improvements in body armor and immediate medical care have improved survivability in the field. Soldiers that would not have survived in previous decades are now rescued. Veterans of these campaigns are more likely to have experienced blast injuries from improvised explosive devices (IED) that have been widely used by enemy combatants during these campaigns. Injury from this mechanism is caused in five different ways. Injury caused by the blast wave directly, injury from shrapnel, injury due to

acceleration or deceleration of body parts, injury due to explosive related heat or chemicals, and psychological trauma [43]. Many veterans will deal with the sequela of blast injuries for the decades to come. The Institute of Medicine report from 2014 noted a causal relationship between blast injuries and penetrating eye injuries and some long-term effects on genitourinary organs, such as hypogonadism, infertility, and voiding dysfunction as well as post-traumatic stress disorder, endocrine dysfunction related to traumatic brain injury, post-concussive symptoms and persistent headache, permanent neurologic disability, and long-term dermal effects such as cutaneous granulomas [44]. A particularly devastating pattern of IED trauma, now termed “complex dismantled blast injury,” is characterized by multiple amputations, complex pelvic/perineal wounds, spine or spinal column injuries, and multiple penetrating fragment wounds. These patients obviously require incredibly intense initial care and early multimodal rehabilitation therapies to maximize their level of function and ability to return to some semblance of normalcy. We anticipate that their future care needs as they age will be equally challenging and will require well-coordinated multidisciplinary teams at specialized VA centers to help prevent rapidly escalating disability or near-complete loss of function and complete dependence of assistive care. As our understanding of this injury mechanism evolves, recognition of a wide variety of conditions associated with blast injury will be encountered by clinicians caring for veterans.

### Women Veterans and Military Sexual Trauma

There are currently over 1.5 million female veterans in the USA, comprising over 8 % of the total veteran population [45, 46]. Military sexual trauma (MST) is an under-recognized and prevalent experience in female veterans. MST is defined as sexual abuse or repeated, threatening harassment that occurred during time served in the military. Prevalence rates reported in the literature to range from rates of 21 to 25 % for sexual assault and 25 to 60 % for sexual harassment [47]. Consequences can be longstanding and debilitating. MST is strongly associated with post-traumatic stress disorder (PTSD) and other psychiatric and physical disorders such as major depressive disorder, alcohol abuse, eating disorders, suicidality, and non-military trauma [23, 48–51]. The Veterans Administration provides free and confidential services for victims of military sexual trauma (MST), including counseling and treatment for physical and mental conditions related to MST. Treatment modalities such as acceptance and commitment therapy (ACT) may be of benefit, but additional research is needed to best care for victims of MST [52].

## Rehabilitation and Palliative Care

With improved medical care and the aging of the veteran population, more and more veterans are able to lead active and fulfilling lives. With appropriate medical care and a collaborative approach to rehabilitation, many are able to achieve excellent functional recovery and quality of life after trauma [53]. For veterans suffering from military or civilian trauma, the Veterans Administration Polytrauma System of Care provides a multidisciplinary, integrated system of specialized rehabilitation programs that provide evaluation, treatment, case management, education and training, and psychosocial support.

For those patients with poor prognoses and medical deterioration, discussions with patient and families regarding goals of care, limitations of care, and withdrawal of care should be performed early to optimize comfort and compassionate care for these patients. Use of scoring systems such as the Trauma-Specific Frailty Index (TSFI) and Geriatric Trauma Outcomes (GTO) scores may help identify patients in need of early palliative care consultation and evaluation for end of life needs [54–56]. Optimal discussions regarding extent and limitations of care require engaging all members of the health care team including physicians, nursing, religious ministries, social work, rehabilitation and physical medicine, palliative care services, and hospital ethics committees to help facilitate communication and decision-making in difficult cases.

## Conclusion

The VAH sees a broad patient population with varying medical needs. The profile of the elderly veteran is ever changing and will continue to change in the future in ways that are not fully understood yet. Keeping in mind the background, special conditions and previous exposures, and the longer-term effects of service-related trauma on our elderly veterans will help the clinician address the needs of this unique patient population in the decades to come. These are patients who frequently made incredible sacrifices for their family, friends, and country, and we owe them nothing but the absolute best comprehensive care possible.

## Compliance with Ethical Standards

**Conflict of Interest** Drs. Bhattacharya, Pei, Lui, Rosenthal, and Davis declare no conflicts of interest relevant to this manuscript.

**Human and Animal Rights and Informed Consent** This article does not contain any studies with human or animal subjects performed by any of the authors.

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