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Point of view

Consensus-based clinical practice recommendations for the examination and management of falls in patients with Parkinson's disease

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ABSTRACT

Falls in Parkinson's disease (PD) are common and frequently devastating. Falls prevention is an urgent priority, but there is no accepted program that specifically addresses the risk profile in PD. Therefore, we aimed to provide consensus-based clinical practice recommendations that systematically address potential fall risk factors in PD. We developed an overview of both generic (age-related) and PD-specific factors. For each factor, we specified: best method of ascertainment; disciplines that should be involved in assessment and treatment; and which interventions could be engaged. Using a web-based tool, we asked 27 clinically active professionals from multiple relevant disciplines to evaluate this overview. The revised version was subsequently reviewed by 12 experts. Risk factors and their associated interventions were included in the final set of recommendations when at least 66% of reviewing experts agreed. These recommendations included 31 risk factors. Nearly all required a multidisciplinary team approach, usually involving a neurologist and PD-nurse specialist. Finally, the expert panel proposed to first identify the specific fall type and to tailor screening and treatment accordingly. A routine evaluation of all risk factors remains reserved for high-risk patients without prior falls, or for patients with seemingly unexplained falls. In conclusion, this project produced a set of consensus-based clinical practice recommendations for the examination and management of falls in PD. These may be used in two ways: for pragmatic use in current clinical practice, pending further evidence; and as the active intervention in clinical trials, aiming to evaluate the effectiveness and cost-effectiveness of large scale implementation.

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1. Introduction

Falls in patients with Parkinson's disease (PD) are common and often devastating. Prospective surveys have revealed high rates of falls that exceed those of the community-dwelling elderly. A meta-analysis concluded that the risk of sustaining a fall was

considerably increased in moderately affected patients with PD as compared with healthy age-matched peers. Almost 50% of patients fell during a brief follow-up of only 3 months [1].

Falls in PD are associated with a poor prognosis. Injuries are common, and patients with PD with hip fractures face high morbidity and mortality [2]. Minor injuries such as bruises or lacerations are even more common [3]. Moreover, the disease appears to become more severe and difficult to treat once falls are present, usually because of fall-related injuries and cognitive dysfunction, and overall survival of fallers is reduced [4]. Falls also commonly induce a fear of renewed falls [3], which can lead to secondary immobilization and a reduction in general fitness, thereby increasing the risk of cardiovascular disease [5]. Lack of physical activity is also associated with constipation, pressure sores,

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Table 1
Overview of generic and disease-specific risk factors for falls in Parkinson's disease.

	Risk factor	Background	Method of ascertainment	Who should be involved	Suggested intervention	Key references
Generic	Age	Fall risk increases with age	Interview patient; medical history taking	–	–	[37]
	Gender	Female gender is associated with an increased risk of falling		–	–	[37]
	(Sedative) medication	(Chronic) use of neuroleptics, antipsychotics, anticholinergics, antidepressants, anti-inflammatory drugs, sedatives and hypnotics, and benzodiazepines, in particular multiple benzodiazepines, increases risk of falls	Medical history taking Review of clinical notes	General practitioner ^a Neurologist Internist PD nurse specialist Geriatrician Rehabilitation specialist Clinical pharmacist ^c	Avoid interaction between medications with sedative effect Stop or minimize use of (multiple) benzodiazepines Lower dose as much as possible if stopping is impossible	[5,37–39]
	Polypharmacy	Use of ≥ 4 drugs, other than anti-Parkinson drugs, increases risk of falls	Medical history taking Review of clinical notes	General practitioner ^a Neurologist Internist PD nurse specialist Geriatrician Rehabilitation specialist Clinical pharmacist ^c	Reduce overall number of drugs Minimize drug interactions with negative outcome Consult geriatrician, general practitioner or internist	[31,37,40,41]
	Postural hypotension, orthostatic syncope, autonomic dysfunction	Orthostatic hypotension can lead to falls preceded by syncope	Medical history taking Record blood pressure in recumbent and standing position Tilt table testing if needed	General practitioner ^a Neurologist ^a PD nurse specialist Geriatrician Clinical pharmacist ^c	Decrease hypotensive medication Increase dietary salt and fluid intake Raising the cranial end of the bed Frequent small meals Pressure stockings or abdominal band Anti-orthostatic maneuvers (if balance is good) Fludrocortisone ^b Midrodine ^b Decrease anti-Parkinson medication Domperidone ^b Physostigmine ^b	[31,42–45]
	Cardiac arrhythmia	Can lead to syncope and subsequent falls	Medical history taking ECG Holter ECG Provocative tests ^b	General practitioner ^a Geriatrician Cardiologist ^d	Tailored to specific cardiac pathology Refer to cardiologist	[46]
	Arthrosis	Arthrosis may lead to inactivity of affected joints, which in turn predisposes patients to gait abnormalities and loss of bone mass, which commonly results in falls and fractures	Medical history taking Joint examination Muscle strength testing X-rays of affected joints	General practitioner ^a Neurologist Physiotherapist Rehabilitation specialist	Exercise therapy within limits set by joint capabilities Advise about load and load-bearing capacity Advise about orthopedic aids (when needed) Analgesic medication Cryotherapy (only for the knee; if necessary for shoulder ^c) Consult orthopedic surgeon or rheumatologist	[16,47]
	Use of an assistive device	Proper use can reduce falls Incorrect use can worsen gait and increase risk of falling	Gait examination while using various different assistive devices	Physiotherapist ^d PD nurse specialist	Stimulation use of assistive device Train safe and adequate use of assistive device	[48]
	Anxiety	Fear of renewed falls common, even after single falls Even more common in PD	Medical history taking FES-1 questionnaire ABC-6 scale	General practitioner Neurologist PD nurse specialist ^a Physiotherapist Geriatrician Rehabilitation specialist Clinical pharmacist ^c	Balance confidence training Cognitive behavioral therapy Training program aimed at improvement of mobility Promote active lifestyle Prescribe anxiolytics ^b (note: possibly increased risk of falling as side-effect)	[16,24,49–56]
Weakness due to inactivity	Is associated with decreased functional independence, loss of mobility and increased risk for falls and injuries	Neurological examination	Neurologist Physiotherapist ^a General practitioner	Promote active lifestyle (including aerobic conditioning, strength and flexibility exercises) Muscle strengthening	[16,57–61]	

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