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The cost of untreated vestibular conditions: the role of otolaryngology & rehabilitation

Abstract

It is estimated that dizziness, vertigo, and falls are the third most common complaints heard by physicians from all age groups only proceeded by headache and lower back pain.[1] Equilibrium disorders can affect individuals throughout the lifespan resulting from congenital, familial to acquired conditions. The symptoms from most acquired conditions, however, are the number one complaint of patients aged 65 years and older.[2] This is further demonstrated by the number one fear of older adults is loss of independence and ability to age in place. This is strongly associated with fear of falling. Given the exponential growth of this older cohort group worldwide, this is a significant and growing segment of the population. This older population is also confronted with numerous medical co-morbidities complicating their management with the increased prevalence of falls. This contributes to considerable morbidities and mortality, with balance-related falls being the number one cause of accidental death for this population.[3] This paper will review the high cost of undiagnosed and untreated vestibular-balance conditions, versus the cost savings of early detection, assessment and intervention and the role of otolaryngology and audio-vestibular medical specialists.

Keywords: balance, equilibrium, fall prevention, fractures, neurodiagnostic, vestibular rehabilitation, fall-prevention

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Abbreviations: BPPV, benign paroxysmal positional vertigo; ED, emergency department; PCP, primary care physician; VN, vestibular neuritis; VRT, vestibular rehabilitation therapy

Introduction

Otolaryngology has become the most well-recognized medical specialty for referral for patients with disorders affecting equilibrium, specifically acute, chronic dizziness, vertigo, and history of imbalance including falls. An investigation[4] of referrals by Primary Care physicians (PCP) reported as high as 24% of their patients were referred to otolaryngology for dizziness consultation. Historically however, the majority of otolaryngology departments and practices, do not offer comprehensive in-house neurodiagnostic services beyond audiology. Hearing tests alone, rarely provides the genesis or best triage and management strategies for the equilibrium disordered patient. Likewise, availability of trained and experienced physiotherapists in vestibular rehabilitation (VRT) may be limited. This article will provide readers with an overview of the economic burden placed on the health care system and the cost-savings and reduction of perceived disability should patients be referred to otolaryngology practices that provide neurodiagnostic vestibular-balance testing offering a clinical pathway to efficient and efficacious patient-centered rehabilitation therapies. Alipour et al.,[5] reported in a meta-analysis of 456 articles of which 16 were included, that despite success in reducing falls, they were not necessarily cost-effective. The authors suggest that if elevated fall-risk individuals can be properly evaluated to identify their specific functional impairments for which diagnosis-based strategies[6] can be applied in a patient-centered therapy, a more cost-effective approach can be implemented rather than a one-size fits all approach to fall risk management.

Scope of the problem: medical costs emergency department visits, hospitalizations, and treatment

It is estimated that the annual expenditures in the USA for treatment of injuries sustained from falls is in excess of $48 billion.[7] Annually in the USA, there are over two million emergency department visits and nearly one million hospitalizations costing approximately $20 billion.

The authors do not suggest that the suggested clinical pathway and appropriate triage of testing and therapy would reduce the dollar figure to zero dollars, but even a reduction of 12% would be a savings of about $6 billion dollars. This is in addition to elimination of pain, suffering and loss of independence and ability to age in place for thousands of older adults. Table 1 presents the associated costs for a variety of fall-related injuries. ED visits for fractures are among the most prevalent costs, followed by hospitalizations and the highest expenses related to the long-term costs associated with mTBI including the need for life-changing reduction in ability to live unassisted complicated by cognitive decline (Figure 1).

Table 1 Cost of fall related injuries in U.S[9-12]

Fall-related Injury	Medical Treatment Costs per Individual	Annual National Costs USA
Emergency Department (ED) & Hospitalizations	$2,500- $70,000	$20 Billion
Wrist Fracture	$8.4K-$13.3K	$740 Million
Hip and Femur Fracture	$39.4K-$46.6K	$10.3-$15.2 Billion
mTBI/Concussion	$2.1K-401.8K	$40.6 Billion

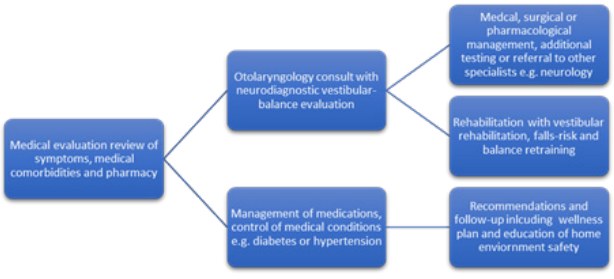

Figure 1 Clinical pathways to reduce balance-related falls through triage and intervention

In addition to the economic burden and strain on the health care system, it changes the trajectory of the quality of life for the older adult who may no longer be able to age in place. Estimates of up to 40% of all admissions into nursing or long-term care facilities is associated with inability to any longer live alone or unassisted due to mobility and activities of daily living challenges (ADL). Nursing home care in the USA can range up to $120,000 a year. Most Americans and their families however will be unable to pay for private care and will depend on the Federal Medicaid program to pay for their nursing home care. In 2023, the cost to the Medicaid system was estimated at approximately $904 million.[8]

Early Intervention, evaluation, and treatment

The early identification of those patients with acute or chronic complaints of dizziness, vertigo or history of falls who present a high-risk profile, should be evaluated to better triage, and initiate the most efficacious patient-centered management. This is not a recommendation to screen all individuals over age 65, but rather those with elevated risk factors, especially with those medical co-morbidities and conditions most associated with increased fall risk. Specifically, functional impairments affecting vestibular, vision and somatosensory function. For example, patients with diabetes and cardiovascular disease often have dysfunction and impairment of one or more of the three senses of balance; vision, vestibular and somatosensory.

Following a complete medical examination, and review of pharmacological influences which can often be the cause of transient dizziness, a neurodiagnostic vestibular evaluation is a cost-effective and non-invasive protocol to establish best treatment options. This historically may be available within an otolaryngology practice or audiology clinics also providing this service.

Neurodiagnostic vestibular testing and rehabilitation in fall risk management

A list of diagnostic protocols with the greatest diagnostic efficiency and predictive value for conditions within the peripheral and central vestibular system, are shown in Table 2. Most importantly the protocols are non-invasive, easily performed in most otolaryngology practices, requiring only space equivalency of a large examination room. In the U.S. these protocols are covered by government insurance programs e.g., Medicare as well as all major insurance payers. Two of the most commonly seen conditions in the older adult, particularly post-shingles, are Benign Paroxysmal Positional Vertigo (BPPV) and vestibular neuritis (VN). Each of these will present with very specific manifestations and can debilitating and long associated with increased fall risk. Fortunately, both can be successfully treated and managed through the vestibular rehabilitation process.

The cost savings of the above referenced neurodiagnostic testing and rehabilitation protocols shown in Table 3, provides significant savings to health systems for patients with elevated fall-risk due to undiagnosed and untreated vestibular conditions. Excluding physician office visits, the cost of neurodiagnostic testing and rehabilitation may range from a low of $709 for uncomplicated BPPV to a higher amount of $2,059, for complex cases. When compared to the potential costs of ED visits, hospitalization, and long-term care, early evaluation and rehabilitation management is among the most cost-effective means of reducing expenses and pain and suffering.

Table 2 Neurodiagnostic vestibular tests by cpt code and u.s. average medicare reimbursement rates

CPT Code	Description of Test	Medicare National Average Reimbursement in USD
92519	Combined VEMP	$111
92537	Caloric x 4	$43
92540	VNG-basic vestibular eval.	$116
92546	Rotary Chair (sinusoidal rotation)	$129
92547	Vertical channel recording	$11
92584	Electrocochleography	$119
92653	Auditory Evoked Potential (ABR) Neurodiagnostics	$90
	Total	**$619**

Table 3 Conditions, number of rehabilitation visits and cost

Condition	Number of outpatient rehabilitation visits	Range of Cost
Benign Paroxysmal Positional Vertigo (BPPV)	1-3	$90-180
Unilateral vestibulopathy	4-6	$360-540
Bilateral Vestibulopathy	6-12	$540-1,080
Complex Dysequilibrium (multifactorial disequilibrium)	8-16	$720-1,440

Conclusion

The high health care costs of falls for older adults as well as unnecessary pain and suffering may be reduced in part with early intervention with neurodiagnostic testing and rehabilitation. Otolaryngologists and audiology departments have an opportunity to play a key role in this process. Inclusion of these services within practices can serve as a valuable ancillary service through the application of high sensitivity tests, and referral and implementation of diagnosis-based strategies by rehabilitation specialists. While the authors are not suggesting elimination of falls for the entire older adult population, even a reduction of 12% for a certain high-risk component would produce significant savings and improved quality of life.

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None.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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