

Benjamin Chitambira*

Department of Physiotherapy, East Kent Hospitals
University NHS Foundation Trust, Ashford, UK

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***Corresponding author:** Benjamin
Chitambira, Department of Physiotherapy,
Richard Stevens Stroke Unit, William Harvey
Hospital, Kennington Road, Ashford, Kent,
UK, TN24 0LZ, Tel: +44-1233-616242; Email:
bchitambira@nhs.net

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Case Report

Novel Use of Optokinetic Chart Stimulation with a One -Off Epley's Manoeuvre in a Bed-Ridden, Difficult to Rehabilitate, Care of the Elderly Patient with Undiagnosed BPPV: A Case Report

Abstract

Background and objective: Unrecognized BPPV leads to activity limitations. This case report aims to report on use of optokinetic chart stimulation and one off Epley's manoeuvre to treat unrecognized BPPV in chronic Ménière's disease.

Methods: This is a single case study in a care of the elderly rehabilitation ward. An 85 year old patient was admitted with abdominal pain, vomiting, clamminess and sweating. She was treated with one off right ear Epley's manoeuvre and daily optokinetic chart stimulation.

Results: The Barthel index improved from 5/100 pre-intervention to 50/100 post-intervention and the Elderly Mobility Scale improved from 2/20 to 11/20.

Conclusions: Recognising and treating BPPV and co-morbidities in elderly patients is important to ensure treatment is patient-centred, improve cost-effectiveness and reduce unnecessary disability.

Abbreviations

BPPV: Benign Paroxysmal Positional Vertigo; ECG: Electrocardiogram; SDH: Subdural Hemorrhage; WZF: Wheeled Zimmer Frame

Introduction

Eighty percent of elderly patients presenting to accident and emergency with unexplained falls have vestibular impairment [1]. Older patients presenting with multiple falls not caused by syncope have peripheral vestibular impairment in 80 percent of fallers [2]. Unrecognized BPPV leads to activity limitations, falls and depression [3]. BPPV occurs in the same ear as Ménière's disease. This may be due to hydroppically caused damage to the maculae of otolith organs [4]. Unrecognized vestibular impairment in elderly patients is costly due to unnecessary neuro-imaging, medical tests and increased length of stay with costs found to be as high as \$2009.63 per patient in the US [5].

Treatments for peripheral vestibular impairment include virtual reality [6,7] and neuro-feedback [8]. There is scarcity of literature on interventions when co-morbidities include stroke and subdural hemorrhage (SDH). Optokinetic chart stimulation was successfully used to restore muscle strength and mobility in dizzy bed bound

patients with critical care myopathy [9] and SDH [10]. This case report aims to add preliminary evidence for treatment of unrecognized BPPV in chronic Ménière's disease when co-morbidities such as stroke, SDH and pneumonia co-exist.

Case Presentation

This is a single case study in a care of the elderly rehabilitation ward. The patient consented to her case being used as a case report and this case report has been prepared in accordance to institutional review body guidelines. The subject was an 85 year old female who had been admitted with abdominal pain, vomiting, clamminess sweating and shortness of breath. X-rays showed bilateral lower lobe pneumonia, which was her main diagnosis. An ECG also revealed chronic lateral ischaemia which was being treated by oramorph. Her laboratory data were as follows: HB 129; WCC 20.7; neutrophils 18.8; Na⁺ 139; K⁺ 3.2; Urea 4.9; creatinine 73; CRP 65.

Her clinical history consisted of stroke 3 years ago; transient ischaemic attacks (TIAs), 4 SDH four years ago (as a result of falls), Ménière's, osteoarthritis and asthma. Her pre-admission Barthel Index, in the community, was 7/20 (equivalent to 35/100). While in hospital she then deteriorated to a Barthel Index of 5/100 at the time of commencement of Epley's manoeuvre and optokinetic chart



stimulation. She was allergic to penicillin. She was also medically treated with the following drugs: oxytetracycline; omeprazole; quinine sulphate, betahistine, adcal, viscotears, acetaminophen nystatin, oxycontin, seretide puffs, tiotropium, metoclopramide and cyclizine.

The patient's mobility and left upper limb voluntary movements gradually deteriorated over 17 days of conventional physiotherapy which mainly consisted of 2 therapists assisting her to mobilise out of bed with a wheeled zimmer walking aid (WZF). By the 17th day the patient was bed bound and unable to move her left upper limb. The therapists had noted that she reported dizziness on attempting transfers but did not change their intervention approach. Her consultant then referred her to the author who noted her subjective experience of room spinning on moving as well as her history of stroke and SDH. She was right ear Dix-Hallpike positive.

The author intervened with one off right ear canalith repositioning with Epley's manoeuvre and daily optokinetic chart stimulation [9,10]. Once she could stand, sensory interaction for balance on balance pads was added to the optokinetic chart stimulation. The duration of this rehabilitation intervention was 2 weeks. During the 2 weeks she received 9 minutes of optokinetic chart stimulation daily for 5 days per week. On a daily basis this was followed by 3 minutes of standing on an airex balance pad. Optokinetic chart stimulation was used to restore voluntary movements of the left upper limb as it has been successfully used to restore voluntary movements in dense strokes [11] and SDH [10]. Optokinetic stimulation is already known to be beneficial in reducing visual vertigo in patients with peripheral vestibular impairment [12]. This occurs by reduction of visual dependence [12].

Results

The patient was able to mobilise to the toilet and back with a WZF and assistance of one by time of discharge. She could use her left upper limb for activities of daily living. Her room spinning sensation had resolved. (Table 1) shows her pre-treatment and post-treatment scores.

Discussion

Recognising and treating co-morbidities in care of the elderly patients is important both to ensure treatment is patient-centred as well as to improve cost-effectiveness. The knowledge of causes of fear of falling, poor balance and reduced mobility in the elderly are now much better understood. It is thus not in the interest of elderly patients to receive therapy treatment in which the goal of making them mobile again becomes the actual intervention without therapeutic intervention on the underlying cause. The evidence base is so strong in showing that 80 per cent of elderly patients presenting to accident and emergency with unexplained falls have vestibular impairment [1]. Elderly patients presenting with multiple falls not caused by syncope have peripheral vestibular impairment in 80 per cent of fallers [2]. Use of cost-effective and evidence based interventions such as Epley's manoeuvre [5] and up-coming interventions such

Table 1: Pre-treatment and post-treatment Elderly mobility scale and Barthel Index scores.

Pre-treatment score	Post-treatment discharge score
Elderly Mobility Score 2/20	11/20
Barthel Index 5/100	50/100

as optokinetic chart stimulation [9,10] is recommended to reduce costly unrecognised vestibular impairment in elderly patients. It is no longer justifiable to just mobilise elderly patients and return them home only for them to be re-admitted with the same problems.

Conclusion

Recognising and treating co-morbidities in care of the elderly patients is important both to ensure treatment is patient-centred as well as to improve cost-effectiveness. Use of cost-effective and evidence based interventions such as Epley's manoeuvre [5] and up-coming interventions such as optokinetic chart stimulation [9,10] need further research on their cost-effectiveness in reducing length of stay and unnecessary activity limitations in care of the elderly patients.

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