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“TaiChi” Exercise for Elderly Care

SIU KAN LAW^{1*}, DAWN CHING TUNG AU¹, ALBERT WING NANG LEUNG², CHUAN SHAN XU³

Dear Editor,

“TaiChi” is a traditional Chinese exercise for over a thousand years ago in China. This is a mind-body sports activity for maintaining the body's health. It also consists of motion in quiescence or active which is suitable for the elderly as an exercise. “TaiChi” concept is similar to the traditional Chinese medicine “Yin-Yang” theory. The exercise inspires the internal energy (Qi) to achieve body regulation for enhancing the defence and combat diseases.¹

Growing evidence has shown that “TaiChi” benefited physical function and health-related diseases quality for the elderly. This was improved body balance, flexibility, and muscle strength as well as promoted confidence in the elderly less robust.² The long-term practice of “TaiChi” was effective to prevent and treatment of diseases (Table 1).

The above information demonstrates that a “TaiChi”

	Nguyen MH et al. (2012) ³	Lo HM et al. (2012) ⁴	Li F et al. (2012) ⁵	Lyu J et al. (2018) ⁶
Objective	Evaluating the effects of TaiChi exercise on physical fitness, blood pressure, and perceived health in community-dwelling elderly	A Tai Chi exercise programme improved exercise behaviour and reduced blood pressure in outpatients with hypertension	Tai Chi and Postural Stability in Patients with Parkinson's Disease	Efficacy of practising Tai Chi for older people with mild dementia: protocol for a randomised controlled study
Disease	Obesity, Blood pressure	Hypertension	Parkinson's	Mild dementia
Participants	96 participants with obesity or blood pressure	27 outpatients with hypertension	195 patients with Parkinson's	80 participants with mild dementia
Intervention	60-minutes TaiChi practice session twice a week for 6 months	Tai Chi exercise programme three times a week for 8 weeks	60-minutes exercise sessions twice a week for 6 months	20-minutes exercise sessions three times a week for 10 months
Results	TaiChi significant decreases in systole of 12 mmHg and heart rate of 6.46 bpm The body mass index and waist-hip ratio reduces to 1.23 and 0.04 respectively	TaiChi exercise offers outpatients with hypertension additional options, such as an adjunct to formal cardiac rehabilitation or an alternative in their management of hypertension	TaiChi training reduces balance impairments in patients with mild-to-moderate Parkinson's disease, also improves self-falls capacity	TaiChi is effective to prevent the onset of dementia, delaying age-related cognitive decline, and benefiting the prognosis of dementia

Table 1. A Simple Summary of Taichi Exercise on the Prevention and Treatment of Diseases for Some Published Papers.

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exercise is good for elderly care because this is a non-pharmaceutical therapy to prevent diseases and keep the body healthy. It is more suitable and further developed to combine with other therapies for preventing and combating diseases.

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REFERENCES

1. Wang D, Wang P, Lan K, Zhang Y, Pan Y. Effectiveness of Tai chi exercise on overall quality of life and its physical and psychological components among older adults: a systematic review and meta-analysis. *Braz J Med Biol Res.* 2020;53(10):e10196.
2. Zhang JG, Ishikawa-Takata K, Yamazaki H, Morita T, Ohta T. The effects of Tai Chi Chuan on physiological function and fear of falling in the less robust elderly: an intervention study for preventing falls. *Arch Gerontol Geriatr.* 2006;42(2):107-16.

3. Nguyen MH, Kruse A. The effects of Tai Chi training on physical fitness, perceived health, and blood pressure in elderly Vietnamese. *Open Access J Sports Med.* 2012;3:7-16.

4. Lo HM, Yeh CY, Chang SC, Sung HC, Smith GD. A Tai Chi exercise programme improved exercise behaviour and reduced blood pressure in outpatients with hypertension. *Int J Nurs Pract.* 2012;18(6):545-51.

5. Li F, Harmer P, Fitzgerald K, Eckstrom E, Stock R, Galver J, Maddalozzo G, Batya SS. Tai chi and postural stability in patients with Parkinson's disease. *N Engl J Med.* 2012;366(6):511-9.

6. Lyu J, Li W, Rong X, Wei L, Huang N, Champ M, Xiong Q, Chen X, Li M, Li F. Efficacy of practising Tai Chi for older people with mild dementia: protocol for a randomised controlled study. *BMJ Open.* 2018;8(5):e019940.

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Elderly for Dementia - “Mahjong”

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Dementia is a clinical syndrome characterized by a progressive cognitive decline. It interferes with the ability to function independently, such as impairing to remember, thinking, or making decisions.¹ There is no treatment available to cure dementia which occurs among people aged over 65, and the risk of dementia increases significantly with age. According to the Hong Kong Hospital Authority, the prevalence rates of dementia in the elderly are estimated to be at 5%-8% among persons aged over 65, and at 20%-30% among those aged over 80. As the population continues to age, the number of older adults with dementia will increase proportionally to 300,000 by 2039.²

“Mahjong” is a national quintessence in China who’s encouraged the elderly to play this for their brain practice to prevent dementia recently. Growing evidence has shown that mahjong helped improve elderly memory skills and sharpen the mind (Table 1).

The above information demonstrates mahjong is suitable for the treatment of elderly dementia. How can we enhance its effectiveness? There is a strategy briefly described. Why don’t we combine mahjong with tai chi or qigong in the next investigation for further development? The basic hypothesis is mahjong, tai chi, or qigong are mental and physical exercises that help to prevent and treat elderly dementia, measured by MMSE, FAB, TMT, and GDS over 12 to 24 weeks. Much more works need to be done to confirm the function of mahjong for dementia. Up to the present, dementia is no treatment, and drug with side effects, thus, mental and physical exercises are good choices for elderly care.

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REFERENCES

1. Chertkow H, Feldman HH, Jacova C, Massoud F. Definitions of dementia and predementia states in Alzheimer's disease and vascular cognitive impairment: consensus from the Canadian conference on diagnosis of dementia. *Alzheimers Res Ther.* 2013;5(Suppl 1):S2.
2. Yu R, Chau PH, McGhee SM, Cheung WL, Chan KC, Cheung SH, Woo J, Trends in Prevalence and Mortality of Dementia in Elderly Hong Kong Population: Projections, Disease Burden, and Implications for Long-Term Care. *Int J Alzheimers Dis.* 2012;406852:6.
3. Cheng ST, Chan AC, Yu EC. An exploratory study of the effect of mahjong on the cognitive functioning of persons with dementia. *Int J Geriatr Psychiatry.* 2006;21(7):611-7.
4. Machishima K, Sakamoto M, Oshima C, Kitajima K, Koba T, Gohara R, Sato A, Higashiuchi J, Horikawa E. The Effect of Mahjong on Healthy Elderly Persons' Cognitive Function. *Arch Clin Neuropsychol.* 2014;29(6):505.
5. Zhang H, Peng Y, Li C, Lan H, Xing G, Chen Z, Zhang B. Playing Mahjong for 12 Weeks Improved Executive Function in Elderly People With Mild Cognitive Impairment: A Study of Implications for TBI-Induced Cognitive Deficits. *Front Neurol.* 2020;11:178.
6. Cheng ST, Chow PK, Song YQ, Yu EC, Chan AC, Lee TM, Lam JH. Mental and physical activities delay cognitive decline in older persons with dementia. *Am J Geriatr Psychiatry.* 2014;22(1):63-74.



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	Cheng ST et al. (2006) ³	Machishima K et al. (2014) ⁴	Zhang H et al. (2020) ⁵	Cheng ST et al. (2014) ⁶
Objective	The effect of mahjong on the cognitive functioning of persons with dementia	Mahjong facilitate episodic memory, attention, and executive functions	Play mahjong may improve attention and memory in elderly people	Compare mahjong and physical exercises, such as tai chi on cognitive performance in persons with dementia
Participants	62 older persons with age 80	89 older persons with age 81	56 older persons with age 74	110 older persons
Duration of time	Fourth times per week over a six-month	Once a week over 20 weeks	Three times a week over 12 weeks	Three times a week over 12 weeks
Measurements	Mini-Mental State Examination (MMSE)	MMSE Frontal Assessment Battery at Bedside (FAB) Trail Making Test (TMT) Geriatric Depression Scale (GDS)	Montreal Cognitive Assessment—Beijing (MoCA-B) Shape Trail Test (STT) Functional Activities Questionnaire (FAQ)	MMSE
Results & Significance	Not require professional supervision Effective for the elderly from mild-to-moderate dementia, especially in verbal memory and social communication Constant practice for the older adults	Not only affected cognitive functions Show a positive effect on the brain Provide opportunities to enjoy social life among the healthy elderly	Slow down or reversed the progression of cognitive decline and suitable for traumatic brain injury	No significant change between mahjong and tai chi Preserve functioning or delay decline in certain cognitive domains, even in those with significant cognitive impairment

Table 1. Mahjong Exercise Related to Elderly Dementia.

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Improving Oral Health Through Mobile Dentistry

MANASI SHARMA^{*1}, AVNI MAHAJAN¹, ANSHITA BAGLWAN¹

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Oral health diseases are one of the major challenges faced by the general population. Dental caries and periodontal diseases have higher prevalence in the people living in rural areas. To address such population and to overcome the conventional oral health care strategies, Mobile Dental Van (MDV) was introduced. They are utilized in school-based programs, delivering oral health care to homeless, migrants, specially abled, old and poor individuals. Screening, treatment, health education and motivation all are carried out in the event.

KEYWORDS: Dentistry, Oral Health, Dental Care

INTRODUCTION

Mobile Dental Vehicle (MDVs) is assumed to interact with the dental needs of rural as well as urban populations, e.g. by conducting school-based oral health programs, and by providing dental care services to the homeless, migrants, residents of rural or remote areas, people from low socioeconomic communities and many more (Figure 1).



Figure 1. Mobile Dental Van

MDV'S USE IN ORAL HEALTH DELIVERY SYSTEM

A bus or a truck can be converted into a Mobile Dental Vehicle. Its components are generator compartment, driving compartment, registration counter and waiting area, and a dental surgery room. MDV has a generator

set and it supplies 3-phase power to hold up the electricity required by the dental clinic. So, A mobile dental vehicle also has a fresh water tank, a drain water tank, and a recycle water tank. The fresh water is for clinical use. Before the safe disposal of waste water, it is collected in the drain water tank. The recycle water tank constantly circulates and gives rise to a moving current which creates a vacuum environment. It is essential to produce a suction force for the clinical aspirator (Figure 2).



Figure 2. MDV'S Use in Oral Health Delivery System

USE OF MDV'S FOR DELIVERING DENTAL CARE TO RURAL POPULATION

MDV is considered to be self-reliant as it is able to

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deliver oral health care to the residents of rural areas. It is not necessary for the dentist to stay in the rural areas all the time to deliver MDV services, therefore urban-based dental practitioners can work temporarily, particularly who are taking advanced training in public health dentistry. MDV has proved to be of great benefit to the people living in outskirts of the city because of its mobile nature. For sparsely populated areas, multiple visits are arranged periodically. An MDV has a wheelchair-friendly design which makes it easier to treat those with disabilities and for people who can not commute long distance [Figure 3 (a) & (b)].



Figure 3 (a). Use Of MDV's For Delivering Dental Care to Rural Population

MERITS OF MDV

MDV has proved to be of great advantage to students of Public health dentistry as it is a dental clinic with four wheel, which makes it auspicious to deliver dental care to the residents of rural areas.

DE-MERITS OF MDV

The major disadvantage of an MDV is that it demands high maintenance. For the preservation of the vehicle a specialised team is needed. The team must have an accurate understanding of vehicle maintenance, building facilities, mechanics, hydraulics and equipment knowledge for the dental visit to run smoothly. One of the major disadvantage of MDVs is that complex and advanced facilities are not available, making it difficult to treat patients with compromised health. MDV services are highly affected by geographic and climatic conditions.



Figure 3 (b). Use Of MDV's For Delivering Dental Care to Rural Population

SOME OTHER MERITS OF USING MDV'S:

The treatments done in such MDV's cost less when compared with the treatments done in the hospital dental clinic. Hence, this economical service proves favourable to poor people who cannot afford to seek treatment in ordinary dental clinics. It not only satisfies rural population but also helps impart great amount of exposure to Dental Professionals. Maximum dentists wants to work in urban areas as their knowledge on rural dental care is quite limited. It provides a link between dental professionals and population of rural areas that provides dental professionals with a suitable and distinctive opportunity to engage in public health services that limits on the poor resources of rural areas. It develops affinity with the people living in rural section that have much more oral health needs. Hence, due to this MDV service, dentists are better engaged with the population of rural areas. So, this MDV program is an accommodation that provides benefit to both the residents of rural section and the participating dental staff.

CONCLUSION

There are different perspectives of residents of urban and rural areas about the oral health. Hence, the use of MDV service can be an encouraging strategy to provide dental care to the population of rural areas with their

high portability, self-sustaining and economical nature.

REFERENCES

1. Kassebaum N, Smith A, Bernabé E, Fleming T, Reynolds A, Vos T, et al. Collaborators GOH Global, regional, and national prevalence, incidence, and disability-adjusted life years for oral conditions for 195 countries, 1990–2015: A systematic analysis for the global burden of diseases, injuries, and risk factors. *J Dent Res*. 2017;96:380–7. <https://doi.org/10.1177/0022034517693566>.
2. Lee HH, Lewis CW, Saltzman B, Starks H. Visiting the emergency department for dental problems: Trends in utilization, 2001 to 2008. *Am J Public Health*. 2012;102:e77–e83. <https://doi.org/10.2105/AJPH.2012.300965>.
3. Gökalp S, Guciz Dogan B, Tekçiçek M, Berberoglu A, Ünlüer Ş. National survey of oral health status of children and adults in Turkey. *Community Dent Health*. 2010;27:12.
4. Ogunbodede EO, Kida IA, Madjapa H, Amedari M, Ehizele A, Mutave R, et al. Oral health inequalities between rural and urban populations of the African and Middle East region. *Adv Dent Res*. 2015;27:18–25. <https://doi.org/10.1177/0022034515575538>.
5. Wong M, Lo E, Schwarz E, Zhang H. Oral health status and oral health behaviors in Chinese children. *J Dent Res*. 2001;80:1459–65. <https://doi.org/10.1177/00220345010800051501>.
6. Yin W, Yang YM, Chen H, Li X, Wang Z, Cheng L, et al. Oral health status in Sichuan province: Findings from the oral health survey of Sichuan, 2015–2016. *Int J Oral Sci*. 2017;9:10. <https://doi.org/10.1038/ijos.2017.6>.
7. Varenne B., Petersen P.E., Ouattara S. Oral health status of children and adults in urban and rural areas of Burkina Faso, Africa. *Int Dent J*. 2004;54:83–9. <https://doi.org/10.1111/j.1875-595X.2004.tb00260.x>.
8. Gaber A, Galarneau C, Feine JS, Emami E. Rural-urban disparity in oral health-related quality of life. *Community Dent Oral Epidemiol*. 2018;46:132–4. <https://doi.org/10.1111/cdoe.12344>.
9. Petersen PE. The world oral health report 2003: Continuous improvement of oral health in the 21st century—The approach of the who global oral health programme. *Community Dent Oral Epidemiol*. 2003;31:3–24. <https://doi.org/10.1046/j..2003.com122.x>.
10. Varenne B, Petersen PE, Ouattara S. Oral health behaviour of children and adults in urban and rural areas of Burkina Faso, Africa. *Int Dent J*. 2006;56:61–70. <https://doi.org/10.1111/j.1875-595X.2006.tb00075.x>.

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Rivaroxaban Induced Hallucinations: A Case Report

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Hallucinations induced by rivaroxaban are not much described in literature. This case report describes the occurrence of a specific adverse event during rivaroxaban use in an elderly male who developed hallucinations few months after starting rivaroxaban. Other possible causes for these events were ruled out through comprehensive medical examination. Drug discontinuation led to resolution of adverse drug reaction. The mechanism involved in rivaroxaban-induced hallucinations is not known. The adverse event in our patient was possibly caused by rivaroxaban. Although there is still no strong evidence that can associate hallucinations to rivaroxaban use, and others unknown factors might be involved, this adverse event should be kept in mind when prescribing this drug to older patients.

KEYWORDS: Hallucinations, Adverse Event, Drug Reaction

INTRODUCTION

Rivaroxaban inhibits activated coagulation factor Xa and belongs to the group of direct acting oral anticoagulants (DOACs). Together with vitamin K antagonists, DOACs are first choice drugs for the prevention of thromboembolic events in atrial fibrillation. The number of rivaroxaban users is increasing, and it has been added to WHO's Essential Medicines List.¹

A hallucination, defined by the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders, is a sensory experience that does not correspond to what actually happens.² In a hallucination as perception, the stimulus from the outside world is missing. Hallucinations can affect all the senses namely visual, auditory, smell, taste and somatic and can be caused by the use of hallucinogenic drugs, alcohol, medication, sleep deprivation or delirium, among others. The occurrence of hallucinations without the use of drugs or medication or outside influences is a symptom that usually indicates a serious psychological or physical problem.²

To date, except for intracerebral hemorrhage, headache and dizziness, adverse effects on the central nervous system are not part of the adverse event profile of rivaroxaban and other DOACs. In this article, we describe hallucinations in rivaroxaban use based on a case study from our own practice. We suspect that the medicine has contributed to the symptoms. Already published literature does not say much about the

chance of occurrence or getting an adverse event or the frequency of occurrence.

CASE REPORT

A 69-year-old man with a history of atrial fibrillation, heart failure, hypertension and well controlled sleep apnea was referred to us for an analysis of his cognitive decline. The patient was taking rivaroxaban, metoprolol, bumetanide, omeprazole, simvastatin, perindopril and digoxin at home. The patient was a past smoker, did not take alcohol and had no known allergies. Rivaroxaban has been in use for the indication of atrial fibrillation for six months.

The course of the disease was short, in which the symptoms had only existed for six months and in the last eight weeks there were additional visual hallucinations and suspicion. The differential diagnosis was delirium and subdural hematoma. No underlying somatic substrate for delirium was found during repeated physical examinations and additional lab tests and urinalysis. The MRI showed no fresh hemorrhage or ischemia. Memory and concentration disorders had been observed at some other clinic. There was a positive temporal relationship between starting rivaroxaban and these adverse events. Rivaroxaban was discontinued on an outpatient clinic basis in consultation with the cardiologist. The hallucinations disappeared approximately 48 hours after stopping. Olanzapine was started a few days before stopping rivaroxaban and discontinued approximately 10 days



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after starting due to the improved psychological picture. Few weeks later, the patient reported that he is doing a lot better, and hallucinations have disappeared after stopping rivaroxaban. He was referred to cardiologist for guidance regarding treatment of atrial fibrillation.

DISCUSSION

The mechanism by which rivaroxaban causes hallucinations is unknown. Animal studies have shown that, despite their lipophilic nature, DOACs barely cross the blood-brain barrier.^{3,4} This could be partly explained by the fact that DOACs are substrates for P-glycoprotein, an ATP-dependent membrane protein that pumps all foreign substances out of the cell, limiting cerebral tissue perfusion.⁵ In order to determine whether hallucinations in our case are related to rivaroxaban use, the Naranjo score was determined.⁶ This score ranges from ≤ 0 to > 9 whereby the certainty of a link between the use of rivaroxaban and the occurrence of hallucinations increases with an increasing score. In our case, the Naranjo score in the scale falls between 1 and 4 indicating a possible link. A positive dechallenge after drug discontinuation also favorably supports our diagnosis. Not much data was found in literature that have recorded hallucinations in the case of rivaroxaban use or that warn for this. This is in contrast to adverse events on the central nervous system, such as headache and dizziness, which occur much more often and can possibly be detected more quickly in smaller populations. The exact mechanism of our patient's adverse reaction is unclear. However, as these superior and safer drugs become the standard of care for many large patient populations requiring chronic anticoagulation, post-marketing peer-reviewed reports of idiopathic adverse drug reactions

to these, such as that experienced by our patient, are critical.

CONCLUSION

Despite the fact that the mechanism of hallucinations with rivaroxaban is unknown and that several trigger factors are possible including age, cognitive decline, drug interactions, major life events, it remains something to be taken into account in clinical practice, especially if it concerns elderly patients.

REFERENCES

1. Di Cesare M, Jarvis JD, Scarlatescu O, Leng X, Zaidel EJ, et al. NOACs Added to WHO's Essential Medicines List: Recommendations for Future Policy Actions. *Glob Heart*. 2020;15(1):67. <https://doi.org/10.5334/gh.774>.
2. Diagnostic and Statistical Manual of Mental Disorders (DSM V), Fifth Edition, American Psychiatric Association 2013.
3. Gnoth MJ, Buetehorn U, Muenster U, Schwarz T, Sandmann S. In vitro and in vivo P-glycoprotein transport characteristics of rivaroxaban. *J Pharmacol Exp Ther*. 2011 Jul;338(1):372-80. <https://doi.org/10.1124/jpet.111.180240>.
4. Wang L, He K, Maxwell B, Grossman SJ, Tremaine LM, et al. Tissue distribution and elimination of [¹⁴C] apixaban in rats. *Drug Metab Dispos*. 2011 Feb;39(2):256-64. <https://doi.org/10.1124/dmd.110.036442>.
5. Wessler JD, Grip LT, Mendell J, Giugliano RP. The P-glycoprotein transport system and cardiovascular drugs. *J Am Coll Cardiol*. 2013 Jun 25;61(25):2495-502.
6. Naranjo CA, Busto U, Sellers EM, Sandor P, Ruiz I, et al. A method for estimating the probability of adverse drug reactions. *Clin Pharmacol Ther*. 1981;30(2):239-45.

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Neurological Toxicity Following Treatment with Chemotherapeutic Medicines: A Short Case

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Central nervous system toxicity associated with chemotherapeutic agents has been reported in the past. Many potentially promising chemotherapeutic agents are unusable because of central nervous system toxicity. We report a case of neurological complications observed in a subject with a retroperitoneal fibromyxosarcoma treated with Adriamycin and Vincristine. The neurological symptoms started an hour after drug administration and rapidly declined with appropriate therapy.

KEYWORDS: Cancer Therapy, CNS Toxicity, Neurological Toxicity

INTRODUCTION

Neurotoxicity from cancer treatment has been widely recognized. Chemotherapy or radiotherapy may have significant effects on the central or peripheral nervous systems that can limit the course of treatment. With the development of biological and immunotherapeutic agents to treat cancer, there are new patterns of neurotoxicity that are less well-described. Sudden cerebral hemorrhages three to four weeks after the last course of chemotherapy in patients with disseminated malignant melanoma, and no evidence of brain metastases, who had undergone treatment with dimethyl triazeno imidazole carboxamide and actinomycin D has been described before.¹ Gams and Carpenter, using a combination of Adriamycin and dimethyl triazeno imidazole carboxamide, observed convulsions in two patients with malignant melanoma and one with soft part sarcoma. These phenomena appeared shortly after treatment.²

CASE REPORT

A 53-year-old female patient, in very poor general condition, loss of 10 kg in weight in one month, with severe painful symptoms, underwent an exploratory laparotomy an year back for a rapidly growing abdominal neoforation located deep in the mesogastrium: the laparotomy showed an inoperable retroperitoneal neoplasm located between the kidneys. The histological examination performed on a biopsy sample demonstrated it to be a myxofibrosarcoma.

Antiblastic chemotherapy was started according to the

protocol proposed in literature³, with a reduction in dosages in relation to the poor condition of the organs, i.e., Adriamycin 40 mg/m² on day 1, vincristine 1 mg on days 1 and 5.

The patient had a gradual, clear improvement in her general condition with a gradual disappearance of the painful symptoms, but the cycle of therapy could not be repeated because of the hematological conditions. At this time, about an hour after the drugs were administered, the patient began to feel a bilateral sensation of muscular tension in her neck, and a feeling of chest tightness followed in rapid succession by shuddering tremors in her upper limbs in flexed position, frequent rhythmic rotations of her head to the right, and shuddering contractions of the chest wall. She also felt muscular rigidity of the entire right lower limb without any involuntary motor activity; she did not lose consciousness and did not foam at the mouth. However, the patient noted visual disturbances (disorders of accommodation with a lack of clear vision), difficulty articulating words, and a sense of mental confusion. Intravenous benzodiazepines and phenobarbitone were rapidly administered, which led to a total regression of her symptoms within approximately 50 minutes. A neurological examination was carried out the morning after. This was totally negative, and the electroencephalogram was within normal limits. Brain scintigraphy performed two days later did not highlight any pathological alteration. After this cycle of chemotherapy, the patient repeated



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the three-drug combination three times without experiencing any particular neurological manifestations. The electroencephalogram also remained within normal limits. The patient is currently in complete remission.

CONCLUSION

The speed of onset and resolution of the neurological picture, without any apparent objective support, seems to be suggestive of a type of pharmacodynamic toxicity. Neurological issues are the most feared complications of cancer and therapy. Recognition of these patterns of toxicity is important as drug discontinuation or dose adjustment may prevent further neurologic injury. Also, knowledge of these toxicities helps to differentiate treatment-related symptoms from

progression of cancer or its involvement of the nervous system.

REFERENCES

1. Gerner RE, Moore GE, Didolker MS. Chemotherapy of disseminated malignant melanoma with dimethyl triazeno imidazole carboxamide and dactinomycin. *Cancer* 1973;32:756-60.
2. Gams RA, Carpenter JT. Central nervous system complications after combination treatment with adriamycin (NSC-123127) and 5-(3,3-dimethyl-1-triazeno)imidazole-4-carboxamide (NSC-45388). *Cancer Chemother Rep.* 1974 (58):753-4.
3. Gottlieb JA. Proceedings: Combination chemotherapy for metastatic sarcoma. *Cancer Chemother Rep.* 1974;58(2):265-70.

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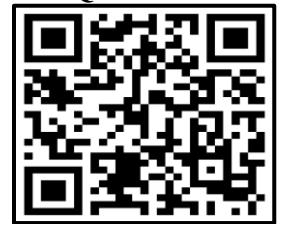
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Prevalence of Haller's Cells in OPG and Its Clinical Correlation: A Retrospective Study

ANURADHA YADAV¹, UPASNA SETHI AHUJA², ACHINT GARG³, KESARI SINGH⁴

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INTRODUCTION: Haller's cells arise with the pneumatization of the lateral crus. Although Haller's cells are anatomical variations in the development of the nose and paranasal sinuses, they are found responsible for the patient's symptoms and are thus clinically significant.

AIM: The purpose of the present study is to emphasize the appearance of Haller's cells on panoramic radiographs and their clinical correlation.

MATERIALS AND METHOD: OPG scans of 700 subjects of either gender in the age range of 16 to 60 years were evaluated for the presence of Haller's cells and retrospectively patient's clinical features were seen. Gender, age, and clinical relevance were observed. A Chi-square test was used to evaluate the prevalence of Haller's cell in panoramic radiograph (OPG), its occurrence in males and females, and its clinical correlation. The software used for statistical analysis was SPSS version 21.0 and the p-value, of less than 0.05 was considered significant.

RESULTS: Haller's cells were detected in 95 scans of 700 OPGs, the overall prevalence of Haller's cells was 13.5 % with an overall p-value less than 0.05 rendering it significant. Of the 95 cases with Haller's cells, 55 (57.89%) were in males and 40 (42.10%) were found in females. The p-value was 0.32 (> 0.05) rendering it non-significant.

CONCLUSION: . More prospective analysis with thorough medical history and examination, with the larger group of the population, might further confirm the appearance of Haller's cells on panoramic radiographs.

KEYWORDS: Haller's cells, Radiograph, Panoramic

INTRODUCTION

Infraorbital ethmoid cells are extensions of the anterior ethmoid sinus into the floor of the orbit and superior aspect of the maxillary sinus. This entity is also known as Haller's cell, named after anatomist Albrecht von Haller, who in 1765 had described this ethmoidal pneumatization of the floor of the orbit, also named as orbitoethmoidal cells or maxillo-ethmoidal cells. However, the name infraorbital ethmoid cell is recommended because it describes the location and origin of the entity.^{1,2} Infraorbital ethmoid cells have been described as well-defined, round, oval, or teardrop-shaped radiolucencies (single or multiple), unilocular or multilocular with a smooth border that may or may not appear corticated, and are located medial to the infraorbital foramen according to a solitary panoramic radiographic study.³

In addition to distressing oro-facial pain and sinusitis, numerous pathologies and symptoms associated with this entity include nasal obstruction, impaired nasal breathing, headache, chronic cough, and mucocoeles.^{1,3,4} Haller's cells can also restrict access to the maxillary sinus or the anterior ethmoidal cells during endonasal

procedures, making it imperative for the surgeon to be aware of such variations that may incline the patient to increased risk of intraoperative complications.^{1,5}

Haller's cells are usually detected radiologically as they cannot be seen during a normal nasal endoscopy, except one performs in addition to maxillary sinusoscopy. They may not only contribute to the development of maxillary sinusitis by narrowing the natural sinus ostium but they can also be diseased themselves as well.

CT is commonly used for imaging infraorbital ethmoid cells⁶, although maxillary sinus endoscopy⁴ may also reveal this structure. Panoramic radiographs often show Haller's cells and as a dental professional panoramic radiograph is the basic radiographic investigation that we can perform for screening purposes. Therefore, panoramic radiographs can be used to identify these anatomic variations avoiding other imaging modalities which are rather expensive, involve higher patient radiation exposure, and are invasive.



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MATERIALS AND METHOD

Panoramic radiographs of dental outpatients visiting the Department of Oral Medicine and Radiology, I.T.S Dental College And Hospital, Greater Noida, U.P. The study group comprised 700 subjects of either gender in the age range of 16 to 60 years selected by simple random sampling. OPGs with normal dentition and bone trabecular patterns were selected and the Exclusion criteria were OPGs with an altered trabecular pattern suggestive of systemic diseases which had/have affected the growth. OPGs with clinical or radiographic evidence of developmental anomalies of the maxillofacial region. OPGs with clinical or radiographic evidence of bony pathologies involving the maxillofacial region. OPGs with clinical or radiographic evidence of fractures of the oral and maxillofacial region and/or treatment received for the same. OPGs with the clinical or radiographic evidence of tumors/cysts of the odontogenic region.

Ethical clearance was obtained from the institution prior to conducting the study. Digital Panoramic radiographs were obtained from Planmeca Proline XC panoramic X-rays unit. Analysis of the same was done with the Planmeca Romexis imaging software on LED screens.

Retrospectively digital panoramic radiographs which falls within the criteria mentioned in the study were selected and viewed. The presence of Haller's cells on the panoramic radiograph was carefully studied on screens of LCD monitors.

The identification of the same was made if an anatomic variation fulfilled all of the following criteria as suggested by Ahmad et al.³:

1. Well-defined round, oval, or tear-drop-shaped radiolucency, single or multiple, unilocular or multilocular, with a smooth border, which may or may not appear corticated.
2. Located medially to the infraorbital foramen.
3. All or most of the border of the entity in the panoramic section is visible.
4. The inferior border of the orbit lacks cortication or remains indistinguishable in areas superimposed by this entity.

The data collected were tabulated and subjected to statistical analysis namely Frequencies/percentages, Descriptive Statistics, Chi-square test, and Cross

tabulation (contingency table analysis) using SPSS for windows to obtain the results.

RESULTS

The study group comprised of 700 subjects of either gender in the age range of 16 to 60 years, from the outpatients visiting the Department of Oral Medicine and Radiology, I.T.S. Dental College and Hospital, Greater Noida.

The data were tabulated and subjected to statistical analysis. The results obtained and the observations are as follows: Overall Distribution of Study subjects with respect to gender was like the total sample size of the study was 700, consisting of 455 males and 245 females, with male to the female ratio being 1.8:1. (figure 1)

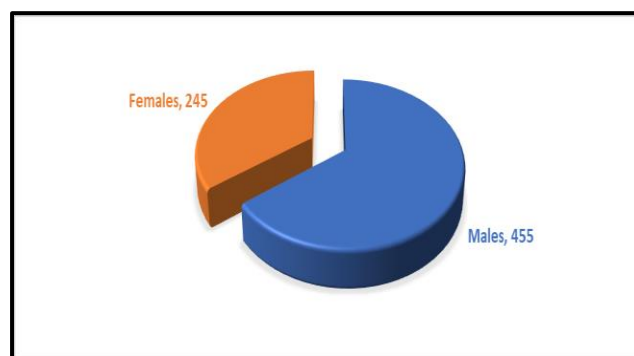


Figure 1. Overall distribution of study subjects with respect to gender

Of the 700 study subjects, Haller's cells were found in 96 subjects. The overall prevalence of Haller's cells was 13.5 % and the p-value was found to be 0.00 (< 0.05) which is significant. (Table 1)

	Frequency	Percentage
Absent	605	84.0
Present	95	13.5
Total	700	100
Chi sq = 277.4 , degree of freedom = 2 , p = 0.00 (< 0.05)		

Table 1. Overall distribution of study subjects with respect to gender

Of the 95 cases with Haller's cells, 55 (57.89%) were in males and 40 (42.10%) were found in females. The p-value was 0.32 (> 0.05) rendering it non-significant,

which was consistent with the findings of Solanki. J et al.⁷ (Table. 2)

GENDER	Haller's cells present		Total
	Absent	Present	
Male Count % within sex	400 66.2%	55 57.89%	455 63.8%
Female Count % within sex	205 33.8 %	40 42.10 %	245 36.2%
Total Count % within sex	605 100 %	95 100 %	700 100%
Contingency coefficient value 0.040, P = 0.320 (> 0.05)			

Table 2. Overall distribution of Haller's cells with respect to gender

Out of 95 cases of Haller's cells, only 18 (18.94%) gave a positive history of clinical disease whereas 77 (81.05%) were asymptomatic. The p-value was 0.366 and was found non-significant (Table 3).

Presence of Clinical Symptoms	18	18.94%
Absence of Clinical Symptoms	77	81.05%
Total	95	100%

Table 3. Correlation of Clinical symptoms and Haller's Cells

Among 65 cases that gave a positive history of clinical diseases only 18 (27.69%) showed the presence of Haller's cells whereas in 47 (72.30%) Haller's cells were absent (Table 4).

Presence of Haller's Cells	18	27.69%
Absence of Haller's Cells	47	72.30%
Total	65	100%

Table 4. Presence or absence of Haller's Cells

DISCUSSION

Previous studies using panoramic radiographs, done by

Ahmad et al.³ in 2006 showed 38.2 %, Raina et al.⁸ in 2012 showed 16%, Khayam et al.⁹ in 2013 showed 32.5% and Solanki et al.⁷ in 2014 was 19.2%. The overall prevalence in our study was only 13.5% which was very less. This variation can be due to different groups of the population.

Out of 95 cases of Haller's cells, only 18 (18.94%) gave a positive history of clinical disease whereas 77 (81.05%) were asymptomatic, the p-value was non-significant. Alkire and Bhattacharyya¹⁰ evaluated the effects of septum deviation, conchae bullusa, and Haller's cells on the occurrence of acute rhinosinusitis, and their results showed that just obstruction caused by Haller's cells can lead to the disease. Also, are view article reported the headache related to Haller's cells, and also has been said that Haller cells may also cause sinus disease such as mucocoele. Sebrechts et al.¹¹ acknowledged Haller cell inflammation can be as a potential reason for orbital unilateral edema and can be the main reason for it.

On the other hand, some studies suggested that the presence of Haller's cells automatically doesn't predispose an individual to sinus disease.^{2,12,13,14} In our study, 65 cases reported the presence of clinical symptoms like chronic orofacial pain, chronic headache, chronic rhinitis, and chronic sinusitis but among these only 18 (27.69%) cases showed the prevalence of Haller's cells whereas in 47 cases (72.30%) it was absent.

The present study was unique as the prevalence of Haller's cells on panoramic imaging was correlated retrospectively with the clinical case history data. The prevalence was low, which can be attributed to a different group of the population and different methods of scanning OPG than previous studies on OPG. Large variation between the prevalence of Haller's cells on CT and Panoramic images can be attributed to the specific criteria which were followed³ and also it is 3-dimensional imaging with more specification.

CONCLUSION

Though in literature the appearance of Haller's cells has been associated with some type of chronic inflammation of the osteo-meatal complex but result obtained in this study was non-significant. More prospective analysis with thorough medical history and examination, with the larger group of the population, might further show a clear picture.

REFERENCES

1. Kantarci M, Karasen RM, Alper F, Onbas O, Okur A, Karaman A. Remarkable anatomic variations in paranasal sinus region and their clinical importance. *Eur J Radiol.* 2004;50(3):296-302. <https://doi.org/10.1016/j.ejrad.2003.08.012>.
2. Yanagisawa E, Citardi MJ. Endoscopic view of the infraorbital ethmoid cell (Haller cell). *Ear Nose Throat J.* 1996;75:406-7.
3. Ahmad M, Khurana N, Jaber J, Sampair C, Kuba RK. Prevalence of infraorbital ethmoid (Haller's cells) on panoramic radiographs. *Oral Surg Oral Med Oral Pathol Oral Radiol Oral Endod.* 2006;101:658-61.
4. Yanagisawa E, Marotta JC, Yanagisawa K. Endoscopic view of a mucocele in an infraorbital ethmoid cell (Haller cell). *Ear Nose Throat J.* 2001;80:364-8.
5. Lang J. Paranasal sinuses. In: Lang J, editor. *Clinical Anatomy of the Nose, Nasal Cavity and Paranasal Sinuses.* New York: Thieme, 1989; pp. 88-9.
6. Basic N, Basic V, Jukic T, Basic M, Jelic M, Hat J. Computed tomographic imaging to determine the frequency of anatomical variations in pneumatization of the ethmoid bone. *Eur Arch Otorhinolaryngol.* 1999;256:69-71.
7. Solanki J, Gupta S, Patil N, Kulkarni VV, Singh M, Laller S. Prevalence of Haller's Cells: A Panoramic Radiographic Study. *J Clin Diagn Res.* 2014;8(9):RC01-4. <https://doi.org/10.7860/JCDR/2014/10334.4894>.
8. Raina A, Guledgud MV, Patil K. Infraorbital ethmoid (Haller's) cells: a panoramic radiographic study. *Dentomaxillofac Radiol.* 2012;41(4):305-8. <https://doi.org/10.1259/dmfr/22999207>.
9. Khayam E, Mahabadi AM, Ezoddini F, Golestani MA, Hamzeheil Z, Moeini M, et al. The prevalence of ethmoidal infraorbital cells in panoramic radiography. *American Journal of Research Communication* 2013; 1(2):109-18
10. Alkire BC, Bhattacharyya N. An assessment of sinonasal anatomic variants potentially associated with recurrent acute rhinosinusitis. *Laryngoscope.* 2010 Mar;120(3):631-4. <https://doi.org/10.1002/lary.20804>.
11. Sebrechts H, Vlaminck S, Casselman J. Orbital edema resulting from Haller's cell pathology: 3 case reports and review of the literature. *Acta Otorhinolaryngol Belg.* 2000;54(1):39-43.
12. Zinreich SJ, Kennedy DW, Rosenbaum AE, Gayler BW, Kumar AJ, Stammberger H. Paranasal sinuses: CT imaging requirements for endoscopic surgery. *Radiology* 1987; 163:769-75.
13. Earnwaker J. Anatomic variants in sinonasal CT. *Radiographics* 1993;13:381-415.
14. Lloyd GAS. CT of the paranasal sinuses: a study of a control series in relation to endoscopic sinus surgery. *J Laryngol Otol.* 1990;104:477-81.

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