Air Marshal Subroto Mukerjee Oration 1990

Vertigo : Recent Advances

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Most respected Air Chief Marshal, Air Marshal Sundaram, the President of Indian Society of Aerospace Medicine, Mrs Sundaram, and distinguished colleagues.

The subject I have chosen for the Subroto Mukerjee oration (particularly in view of this audience), I am sure, would have pleased the late lamented Air Marshal who had done so much for the Indian Air Force and for its medical services. It was because of Air Marshal Mukerjee's forward thinking that, I learn, this Institute of Aerospace Medicine came into being and that it has become possible for us to hold the 32nd Annual Meeting of the Indian Society of Aerospace Medicine here today.

About 12 million years ago, one of our great great ancestors, Mr Australopithecus, started from his plantigrade to orthograde position; from the four limbs he stood up. By standing up he created history. But he created problems as well. Every step a human being takes in orthograde position is a miracle of balance, because his centre of gravity does not fall with in the base.

Man not only started walking; he started flying and started reaching for the moon. But then, along with it, came the problem of dizziness. His balancing, during movement, is based on the semicircular canals; and the balance is so unstable that a small banana peel is enough to make him fall down. In spite of all these hazards, he has become the master of the sky and has gone into space.

Definition

Vertigo is a medical parlance, but the common man uses the term dizziness. Any movement, sense of movement, either of himself or external objects, real or imaginary is defined as vertigo.

Etiology

Etiology of vertigo is a confusing subject. But to pin down the common causes, they are : i) Otological, ii) Neuro-otological, iii) Cardiac, iv) Psychological and Psychiatric, v) Visual and vi) Idiopathic.

A few of the commonly occurring conditions involving peripheral end organs are Benign Positional Vertigo (BPV), Meniere's Disease and Vestibular Insufficiency. Vertigo may occur from antibiotic hazard, trauma from accidents, cervical vertigo due to cervical spondylosis. Further, there are a few other occurrences which I would like to discuss at the end.

Table I : Vertigo - Aetiological Classification

Central		Peripheral - Endorgan
Vascular :	Stroke Vertebrobasilar insufficiency	BPV Trauma Meniere's disease Labyrinthitis
Epilepsy		
Drugs		
Tumour :	Accustic Neuroma	
Trauma :	Brainstem Cervical Vertigo	
Infections		
	Glial disease Ocular pathology	

Investigation

It was Gibson who said that a properly conducted investigation of vertigo takes longer than one hour. And it is no small wonder that a busy Otologist may find a slight decline in his spirit when confronted with such a patient. If you are not well organised as to the correct methodology of investigation, you would not know where to begin and more so where to end. And with all the gamuts of modern investigation, man has become poorer in the process.

From the point of investigation, taking

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history is very important. No other investigation is as important as history of the precipitating factors, time and rapidity of onset, duration etc. The patient may be a bit elaborate in the course of his talk. But one must be very patient and must pick up only those which are really informative.

We do caloric test for testing the vestibular labyrinths; it is done in various positions by simulating thermal variation of 7 degree celsius in between. The nystagmus is picked up by Electro Nystagmography (ENG), a very delicate and a decisive investigation.

Peripheral Vestibular Disorder

In cases of dizziness, our responsibility lies in differentiating organic from nonorganic disease process. In order to accomplish this task of differentiating normal from abnormal, the criteria for vestibular normalcy are of prime importance. Neuro-otological evaluation must include, Pure Tone and Bone conduction hearing tests. Also vestibular evaluation includes a neurologic evaluation, examination for spontaneous and positional nystagmus and a thermal caloric evaluation. These tests may be difficult to perform in all office situations because only the visual methods of vestibular evaluation are used. However rather rigid criteria for a normal vestibular system are determined easily when ENG is used. The 'dizziness' becomes organic

Table II : Spontaneous Vestibular Nystagmus

	Peripheral	Central
Latency	2-10s	None
Duration	30s or less	Continuous
Fatigue	Disappears on repetition	Repeatable
Adaptation	Disappears in 50s	Persists
Position	Present in only one position	Present in multiple Positions
Vertigo	Always present	Mild
Direction	Only one side With changes of position	Changes direction
Incidence	90% of total cases	10% of total cases.

when we detect i) Spontaneous nystagmus or (ii) Positional nystagmus or (iii) Unequal Caloric responses. We have to differentiate between Peripheral and Central nervous system problems.

Meniere's Disease (Endolymphatic Hydrops).

In 1861, Dr Meniere, a Frenchman, first found the association of deafness with vertigo. He called it Malady de Menieres. Meniere's disease is not very common in our country. It is more frequently seen in Western countries. Perhaps it has something to do with the living style. Classically, patients suffer from a triad of symptoms : episodic vertigo, Sensori-neural hearing loss and tinnitus. Variants are : (a) Endolymph Hydrops (Cochlear) (b) Endolymph Hydrops (Vestibular) (c) True Endolymph Hydrops. Treatment is medical.

Benign Paroxysmal Positional Vertigo

This is a benign self limiting condition and is a disease of the Utricle. Patient gets dizziness on turning his head to a specific position. It occurs after a short latent period, and dizziness occurs in more than one position but the patient feels as though he is turning in the same direction irrespective of the head position. The dizziness lasts for 20 seconds and stops completely. There will be no history of previous infections or toxicity. Only there may be a history of street accident. Hearing function tests will be normal. Confirmation will be by performing positioning tests of Hallpike. The head of the patient is held firmly in the examiner's grasp and the patient's torso and head and neck are quickly thrust into one or other of the lateral dependent positions following which the sequence of events just described will occur. Repetition causes no response at all. Treatment is conservative, patiently waiting for the abatement of symptoms which occur in 6 months time. Some people suggest vigorous head rolling exercises.

Acoustic Neuroma

Moderate, big and very big VIII nerve tumors are not uncommon. Diagnosis of acoustic neuroma is often made only at an advanced stage. When a patient comes with an early stage of sensori-neural deafness, acoustic neuroma has to be kept in mind. With the modern gadgets including CT-Scan, one can find an early stage of neuroma sprouting from the brain stem. Nuclear Magnetic Resonance is still more clinching.

Trauma

Vertigo is seen in head injury cases associated with transverse and longitudinal fractures of the temporal bone and in iatrogenic trauma following stapedectomy operation. Head injury cases with obvious fractures have dizziness in 20% of cases. ENG reveals it. Also in whiplash injuries of the neck following vehicular accidents, ENG can objectively substantiate the subjective symptoms of giddiness in the patient.

Cervical vertigo

It is one of the commonest condition after 50 years of age. When an elderly patient complains of severe giddiness appearing on getting up from lying down position, one can think of cervical vertigo occurring due to cervical spondylosis. When the vertebrobasilar artery gets kinked, an angiogram shows the kinking of the artery.

Discharging Ears and Cholesteatoma

Discharging ear may go on for a long time unattended as the patients do not take much serious view of it till the purulent discharge has become bloody. Only then he rushes to you. You look inside and find what is called Cholesteatoma, which goes on eroding the bone. We do not know the exact mechanism but it appears to be through an enzymatic digestion that this cheesy material goes on eating away the temporal bone till a stage comes when the patient develops facial paralysis and giddiness because of vestibular egress. Cholesteatoma needs immediate attention by ENT Specialist. If not handled early, it needs intervention by a Neurologist.

Sensory Conflict : Sea Sickness, Air Sickness

Three groups of sensory apparatus are responsible for controlling the balancing of a man. They are the vestibular organs, the eyes and the proprioceptive sensations from the feet, joints and muscles. If one of them goes away, it does not really matter. If the vestibules are knocked down by streptomycin, one can still balance himself with the help of the proprioceptors and the eyes. Imagine a person, who has lost his vestibular organ, is blindfolded and put in a swimming pool. He will drown, even though he may otherwise be a very good swimmer. He is called the 'Zeroman'.

These three sensory systems are very nicely interconnected and coordinated for man's orientation on the earth. But once he is airborne, the coordination is lost as he is not trained for that different environment and this leads to several complications.

The balancing mechanism of the vestibular apparatus is normally well coordinated with the ocular and proprioceptive instructions. When one of these command is dead, the others take over, though it takes time to readjust. But once you start getting confused commands from the three sensory systems, then it manifests in confusion or dizziness. Air sickness and sea sickness have been attributed to this state of anarchy in the nervous system i.e. order, contraorder and disorder from commands of various origin.

You must be familiar with what is called the Expectation Error. While flying over the sloping clouds one is accustomed to see the top of the clouds as horizontal one. After passing the clouds when he suddenly notices that he is on an acute angle, this information is in contrast to what he had stored in his mind when flying above the cloud level and there is going to be dizziness. Many accidents are attributed to this phenomenon.

When yawing is taking place and the pilot moves his head to look down to one of his gadget, the horizontal semicircular canal decelerates and the vertical semicircular canal accelerates. Thus there occurs a confusion in the messages received and it leads to what is known as 'Coriolis' phenomenon. Very many accidents have been reported to occur this way.

There is another interesting aspect of this sensory conflict dizziness. On continued exposure to turbulent environment as in sea, one gets conditioned to it. If however, he comes to land, vertigo is bound to start. I know of a sailor who comes back home after 2 years of stay on board. One fine morning while putting some nails on the wall, he fell down. He was immediately taken to a Neurologist and a petit mal epilepsy was

suspected. The sailor swore that he never fell down while on the ship. He was a case of dizziness due to non accomodation on the land. He had been accomodating for two years in the sea and now that he came back to land, he had to be accommodated for life on the land. Any violent movement during this accommodation period can lead to nystagmus and dizziness. That is precisely what happened to him.

Psychogenic Vertigo

According to my own statistics, 1/5th of the cases of dizziness coming to me had to be referred to Psychiatrists. I remember a few interesting cases, when I did not get any obvious clue. But our Psychiatrists are very clever people; they can get the story even out of stones. And I have seen remarkable results from such referral. Now when someone comes to me with the complaints of dizziness, I see him critically, very critically indeed. Then, if found necessary, I refer him to a Psychiatrist.

Ladies and gentlemen, I have just touched on the common conditions. I did not want to go into the Lateral Vestibular Syndrome and all that. With the distinguished persons from many walks of life in the audience, I thought I should better be dealing with the overall perspective and I had taken the liberty to be on the lighter side of the matter. In any case, dizziness is not as frightening as it appears to be and there is treatment for dizziness.

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