PUSHPAGIRI COLLEGE OF PHARMACY
We care God cures

An official publication of the Department of Pharmacy Practice, Pushpagiri College of Pharmacy, Thiruvalla, Pathanamthitta (Dist.) Kerala
Ph: 0469-2645450 Email: pcppharmacypracticenewsletter@gmail.com

Vol. 1 Issue. 2
2015 Dec. – 2016 Feb.

CLINICAL PHARMA PRACTICE NEWS ECHO

CONTENTS

Our Patron

H.G. Rev. Dr. Thomas Mar Koorilos
Metropolitan Archbishop of Tiruvalla
Catholic Archdiocese of Tiruvalla

Vision :

"We care..... God cures....."

Mission :

To work towards a knowledge society with a life in abundance, through science and technology, improving health care of our immediate community, state, country and the world at large.

Vice President

H.E. Rev. Dr. Philipose Mar Stephanos
(Auxiliary Bishop of Tiruvalla)

CEO's MESSAGE

Iam extremely delighted to know that Pushpagiri College of Pharmacy is releasing a special newsletter oriented on Clinical Pharmacy practice services. This newsletter is a product of an excellent team work with dedication, determination and discipline. Wishing you a grand success.

Rev. Dr. Shaji Mathews Vazhayil
(Chairman & Chief Executive)

FROM THE DIRECTOR OF ACADEMICS

I take this opportunity to congratulate all the devoted hands who worked behind this endeavor and I wish all the success to Clinical Pharma Practice News Echo.

Rev. Dr. Mathew Mazhavancheril
Chief Advisor & Director- Academics & Research

FROM THE DIRECTOR

I am very happy in publishing a newsletter from the department of Pharmacy Practice which highlights the clinical pharmacy oriented services. .

Rev. Fr. Mathew Vadakkekuttu
(Director Medicity)

FROM THE PRINCIPAL'S DESK

From the depth of my heart Iam very contended to declare that the Pharmacy practice department of our college is releasing the first issue of Clinical Pharma Practice News Echo. Heartful congratulations and appreciation for the team members for putting this forward.

Prof. Dr. Mathew George,
Principal

FROM THE EDITORIAL ADVISORY BOARD

It's my immense pleasure to congratulate the editorial team members for releasing the Clinical Pharma Practice News Echo which reflects the Pharmacy practice activities in enhancing better pharmaceutical care to the society.

Prof. Dr. Lincy Joseph, HOD
(Department of Pharmaceutical Chemistry)

EDITOR'S DESK

We, the editorial committee have great privilege on releasing the second issue of our Clinical Pharmacy Practice news letter of Pushpagiri College of Pharmacy. This news letter covers the information related to the clinical practice activities and achievements in the department of Pharmacy Practice. Clinical pharmacy is concerned with the science and practice of rational medication use. The practice of clinical pharmacy embraces the philosophy of pharmaceutical care; it blends a caring orientation with specialized therapeutic knowledge, experience, and judgment for the purpose of ensuring optimal patient outcomes. The overall goal of clinical pharmacy activities is to promote the correct and appropriate use of medicinal products and devices. We extend our sincere thanks to all the devoted hands worked behind this venture. Please drop your valuable suggestions and constructive critcism at: pcppharmacypracticenewsletter@gmail.com.

OSTEOPOROSIS IN MEN

Dr. Samson .S. Edayalamuriyil MS, Ortho
Associate Professor
Department of Orthopaedics
Pushpagiri Medical College Hospital

Osteoporosis is the disease that causes the skeleton to weaken and bones to break. It poses a significant threat to more than 2 million men in the United States .After age 50, 6 percent of men will experience a hip fracture and 5 percent will have a vertebral fracture as a result of osteoporosis. Despite these compelling figures, a majority of American men view osteoporosis solely as a "woman's disease", according to a 1996 Gallup Poll. Moreover among men whose lifestyle habits put them at increased risk, few recognize the disease as a significant threat to their mobility and independence. Osteoporosis is called a "silent disease" because it progresses without symptoms until a fracture occurs. It develops less often in men than in women because men have larger skeletons, their bone loss starts later and progresses more slowly and they have no period of rapid hormonal change and bone loss. However, in the last few years the problem of osteoporosis in men has been recognized as an important public health issue, particularly in light of estimates that the number of men above the age of 70 will continue to increase as life expectancy continue to rise. Clearly, more information is needed about the causes and treatment of osteoporosis in men, researchers are beginning to turn their attention to this long-neglected group. For example, in 1999, the National Institutes of Health launched a major research effort that will attempt to answer some of the many remaining questions. The 7-year, multisite study will follow more than 5000 men ages 65 and older to determine how much the risk of fracture in men is related to bone mass and structure, biochemistry, lifestyle, tendency to fall, and other factors. The results of such studies will help doctors to better understand how to prevent, manage, and to treat osteoporosis in men. This fact sheet describes the highlights of what is already known.

PRIMARY AND SECONDARY OSTEOPOROSIS

There are two main types of osteoporosis: primary and secondary. In cases of primary osteoporosis, either the condition is caused by age-related bone loss (sometimes called senile osteoporosis) or the cause is unknown (idiopathic osteoporosis). The term idiopathic osteoporosis is used only for men less than 70 years old; in older men, age-related bone loss is assumed to be the cause. The majority of men with osteoporosis have at least one (sometimes more than one) secondary cause. In cases of secondary osteoporosis, the loss of bone mass is caused by certain lifestyle behaviors, diseases, or medications.

CAUSES OF SECONDARY OSTEOPOROSIS IN MEN

- Glucocorticoid medications
- Other immunosuppressive drugs
- Hypogonadism (low testosterone levels)
- Excessive alcohol consumption
- Smoking
- Chronic obstructive pulmonary disease and asthma
- Cystic fibrosis
- Gastrointestinal disease
- Hypercalciuria
- Anticonvulsant medications
- Thyrotoxicosis
- Hyperparathyroidism
- Immobilization
- Osteogenesis imperfect
- Homocystinuria
- Neoplastic disease
- Ankylosing spondylitis and rheumatoid arthritis

HOW IS OSTEOPOROSIS DIAGNOSED IN MEN?

Osteoporosis can be effectively treated if it is detected before significant bone loss has occurred. A medical workup to diagnose osteoporosis will include a complete medical history, x rays, and urine analysis and blood tests. The doctor may also order a BMD (bone mineral density) test. This test can identify osteoporosis, determine your risk for fractures (broken bones), and measure your response to osteoporosis treatment. The most widely recognized bone mineral density test is called a Dual energy X-ray absorptiometry or DXA test. It is painless: a bit like having an X-ray, but with much less exposure to radiation. It can measure bone density at your hip and spine. It is increasingly common for women to be diagnosed with osteoporosis or low bone mass using a BMD test, often at midlife when doctors begin to watch for signs of bone loss. In men, however, the diagnosis is often not made until a fracture occurs in or a man complains of back pain and consult doctor. This makes is especially important for men to inform their doctors about risk factors for developing osteoporosis, loss of height or change in posture, a fracture, or sudden back pain.

WHAT ARE THE RISK FACTORS FOR MEN?

Several risk factors have been linked to osteoporosis in men:

- Chronic diseases that affect the kidneys, lungs, stomach, and intestines or alter hormone levels
- Regular use of certain medications, such as glucocorticoids
- Undiagnosed low levels of the sex hormone testosterone
- Unhealthy lifestyle habits: smoking, excessive alcohol use, low calcium intake, and inadequate physical exercise
- Age- the older you are, the greater the risk

- Race- Caucasian men appear to be at particularly high risk, but all men can develop this disease.

WHAT TREATMENTS ARE AVAILABLE?

Once a man has been diagnosed with osteoporosis, his doctor may prescribe one of the medications approved by the FDA for this disease. Alendronate has been approved to treat the disease in men and postmenopausal women. Alendronate and Risedronate are approved for glucocorticoid-induced osteoporosis in both men and women. Teriparatide is approved to treat osteoporosis in men and women who are at increased risk of fracture. The treatment plan will also likely include the nutrition, exercise, and lifestyle guidelines for preventing bone loss listed at the end of this fact sheet. If bone loss is due to glucocorticoid use, the doctor may describe a bisphosphonate (e.g., Alendronate or Risedronate), monitor bone density and testosterone levels and suggest using minimum effective dose of glucocorticoid. The doctor may also suggest discontinuing the drug when practical, and/or administering it topically (through the skin). Other possible prevention or treatment approaches include calcium and/or vitamin D supplements and regular physical activity. If osteoporosis is the result of another condition (such as testosterone deficiency) or exposure to certain other medications, the doctor may design a treatment plan to address the underlying cause.

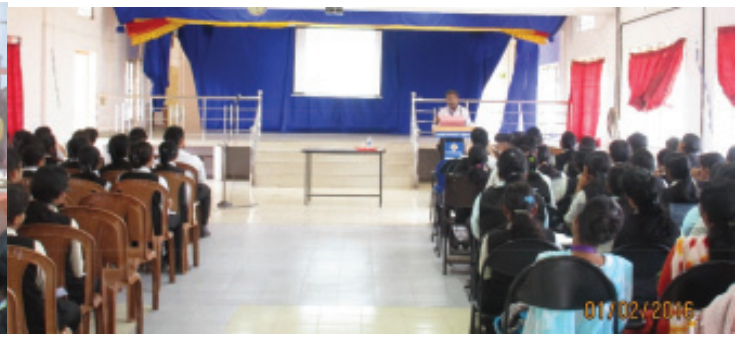
PREVENTION OF OSTEOPOROSIS:

- Avoid smoking, reduce alcohol intake, and increase your level of physical activity.
- Ensure a daily calcium intake that is adequate for your age.
- Ensure an adequate intake of vitamin D. normally, body makes enough vitamin D from exposure to as little as 10 minutes of sunlight a day. If exposure to sunlight is inadequate, dietary vitamin D intake should be between 200 and 600 IU (International Units) per day. 400 IU is the amount found in one quart of fortified milk and most multivitamins.
- Engage in a regular regimen of weight-bearing exercises in which bones and muscles work against gravity. This might include walking, jogging, racquet sports, stair climbing, team sports, lifting weights and using resistance machines. A doctor should evaluate the exercise program of anyone already diagnosed with osteoporosis to determine if twisting motions and impact activities, such as those used in golf, tennis or basketball, need to be curtailed.

RECOMMENDATIONS FOR CALCIUM AND VITAMIN D INTAKE:

Age	Calcium(mg)	Vitamin D(IU)
19-30	1000	200
31-50	1000	200
51-70	1200	400
70+	1200	600
Upper limit	2500	2000

Special classes by our doctors from PMCH, Dr. Suresh David, Dr.R.Kasiviswesaran, Dr. Robert Mathew from various departments (General Medicine, Nephrology, andNeurology) had been conducted in this month.The Topics were Toxicology,Alzhemiers Disease , Acute Renal Failure and Chronic Renal Failure



Recent Development in Cancer Therapy: Immunotherapy

Mrs.Rani Manju
Asst. professor, Dept of Pharmacy Practice
Pushpagiri College of Pharmacy, Thiruvalla

The immune system's natural capacity to detect and destroy abnormal cells may prevent the development of many cancers. However, cancer cells are sometimes able to avoid detection and destruction by the immune system. Cancer cells may:

- Reduce the expression of tumor antigens on their surface, making it harder for the immune system to detect them
- Express proteins on their surface that induce immune cell inactivation
- Induce cells in the surrounding environment (microenvironment) to release substances that suppress immune responses and promote tumor cell proliferation and survival

In the past few years, the rapidly advancing field of cancer immunology has produced several new methods of treating cancer, called immunotherapies, that increase the strength of immune responses against tumors. Immunotherapies either stimulate the activities of specific components of the immune system or counteract signals produced by cancer cells that suppress immune responses.

These advances in cancer immunotherapy are the result of long-term investments in basic research on the immune system—research that continues today. Additional research is currently under way to:

- Understand why immunotherapy is effective in some patients but not in others who have the same cancer
- Expand the use of immunotherapy to more types of cancer
- Increase the effectiveness of immunotherapy by combining it with other types of cancer treatment, such as targeted therapy, chemotherapy, and radiation therapy

What is Immunotherapy?

Immune Checkpoint Modulators

One immunotherapy approach is to block the ability of certain proteins, called immune checkpoint proteins, to limit the strength and duration of immune responses. These proteins normally keep immune responses in check by preventing over intense responses that might damage normal cells as well as abnormal cells. But, researchers have learned that tumors can commandeer these proteins and use them to suppress immune responses.

Blocking the activity of immune checkpoint proteins releases the "brakes" on the immune system, increasing its ability to destroy cancer cells. Several immune checkpoint inhibitors have been approved by the Food and Drug Administration (FDA). The first such drug to receive approval, ipilimumab (Yervoy®), for the treatment of advanced melanoma, blocks the activity of a checkpoint protein known as CTLA4, which is expressed on the surface of activated immune cells called cytotoxic T lymphocytes. CTLA4 acts as a "switch" to inactivate these T cells, thereby reducing the strength of immune responses; ipilimumab binds to CTLA4 and prevents it from sending its inhibitory signal.

Two other FDA-approved checkpoint inhibitors, nivolumab (Opdivo®) and pembrolizumab (Keytruda®), work in a similar way, but they target a different

checkpoint protein on activated T cells known as PD-1. Nivolumab is approved to treat some patients with advanced melanoma or advanced lung cancer, and pembrolizumab is approved to treat some patients with advanced melanoma.

Researchers have also developed checkpoint inhibitors that disrupt the interaction of PD-1 and proteins on the surface of tumor cells known as PD-L1 and PD-L2. Agents that target other checkpoint proteins are also being developed, and additional research is aimed at understanding why checkpoint inhibitors are effective in some patients but not in others and identifying ways to expand the use of checkpoint inhibitors to other cancer types.

Immune Cell Therapy

Progress is also being made with an experimental form of immunotherapy called adoptive cell transfer (ACT). In one form of ACT, T cells that have infiltrated a patient's tumor, called tumor-infiltrating lymphocytes (TILs), are collected from samples of the tumor. TILs that show the greatest recognition of the patient's tumor cells in laboratory tests are selected, and large populations of

these cells are grown in the laboratory. The cells are then activated by treatment with immune system signaling proteins called cytokines and infused into the patient's bloodstream.

The idea behind this approach is that the TILs have already shown the ability to target tumor cells, but there may not be enough of them within the tumor microenvironment to eradicate the tumor or overcome the immune suppressive signals that are being released there. Introducing massive amounts of activated TILs can help to overcome these barriers and shrink or destroy tumors.

Another form of ACT that is being actively studied is CAR T-cell therapy. In this treatment approach, a patient's T cells are collected from the blood and genetically modified to express a protein known as a Chimeric Antigen Receptor, or CAR. Next, the modified cells are grown in the laboratory to produce large populations of the cells, which are then infused into the patient.

CARs are modified forms of a protein called a T-cell receptor, which is expressed on the surface of T cells. These receptors allow the modified T cells to attach to specific proteins on the surface of cancer cells. Once bound to the cancer cells, the modified T cells become activated and attack the cancer cells.

Vaccines in Cancer Treatment

The use of cancer treatment (or therapeutic) vaccines is another approach to immunotherapy. These vaccines are usually made from a patient's own tumor cells or from substances produced by tumor cells. They are designed to treat cancers that have already developed by strengthening the body's natural defenses against the cancer. . There are two types of cancer vaccines:

- Prevention vaccines
- Treatment vaccines

Cancer prevention vaccines

Doctors give cancer prevention vaccines to healthy people not to develop cancer. Like vaccines for the chicken pox or the flu, they protect the body from viruses that can cause disease. A person has to get the vaccine before the virus infects him or her. Otherwise, the vaccine won't work.

There are three cancer prevention vaccines approved by the U.S. Food and Drug Administration (FDA):

- Gardasil. The FDA approved Gardasil for people ages 9 to 26 to prevent:
- Cervical, vaginal, and vulvar cancers in girls and women
- Anal cancer in women and men
- Genital warts in men and boys

The vaccine protects against the Human PapillomaVirus (HPV). If the virus is long-lasting, it can cause the health conditions above. HPV can also cause other cancers the FDA hasn't approved the vaccine for, such as oral cancer.

- Cervarix. This vaccine also protects against HPV infection. The FDA approved it for the prevention of cervical cancer in girls and women ages 10 to 25.
- Hepatitis B vaccine. The vaccine prevents hepatitis B virus (HBV) infection. Long-lasting infection with HBV can cause liver cancer.

Cancer treatment vaccines

Cancer treatment vaccines, also called therapeutic vaccines, are a type of immunotherapy. The vaccines work to boost the body's natural defenses to fight a cancer. Doctors give treatment vaccines to people already diagnosed with cancer. The vaccines may:

- Prevent the cancer from coming back
- Destroy any cancer cells still in the body after other treatment
- Stop a tumor from growing or spreading

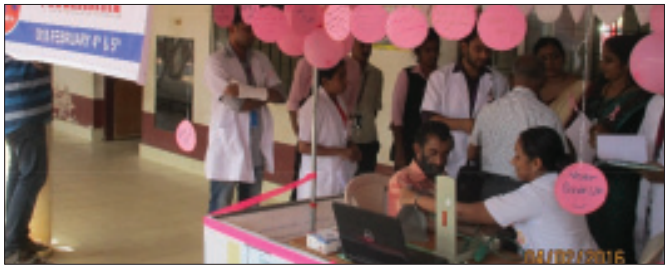
In 2010, the FDA approved the first cancer treatment vaccine, sipuleucel-T (Provenge®), for use in some men with metastatic prostate cancer. Other therapeutic vaccines are being tested in clinical trials to treat a range of cancers, including brain, breast, and lung cancer.

Immune System Modulators

Yet another type of immunotherapy uses proteins that normally help regulate, or modulate, immune system activity to enhance the body's immune response against cancer. These proteins include cytokines and certain growth factors. Two types of cytokines are used to treat patients with cancer: interleukins and interferons.

Dr. Steven A. Rosenberg, Chief of Surgery at the National Cancer Institute, developed the first effective immunotherapies and gene therapies for patients with advanced cancer.

Immune-modulating agents may work through different mechanisms. One type of interferon, for example, enhances a patient's immune response to cancer cells by activating certain white blood cells, such as natural killer cells and dendritic cells. Recent advances in understanding how cytokines stimulate immune cells could enable the development of more effective immunotherapies and combinations of these agents.



Health checkup during Cancer Awareness programme by our students at Thiruvalla railway station on World Cancer Day

Cosmetic Psychopharmacology

Dr Joice Geo
Assistant Professor, Department of Psychiatry
Pushpagiri Medical College, Thiruvalla

Cosmetic psychopharmacology is the use of psychoactive substances to effect changes in function in persons without psychiatric diagnosis or the use of drugs to move from a normal psychological state to another normal state that is more desired or better rewarded socially[1].

Could this be tried in behavior? The New York Times on October 7, 2014,carried an article , *"Did the Blockbuster Prozac(fluoxetine) Help or Hurt Medicine?" where* psychiatrists observed that in some cases altering the serotonin metabolism altered personality in profound ways, turning the shy into bold, the anxious into calm and the fragile into resilient. The term cosmetic psychopharmacology was coined by Peter Kramer in his bestseller "Listening to Prozac. "Prozac deficiency syndrome" has been reported in the American Journal of Psychiatry characterized by low mood, aggressive behavior, binge eating and impulsivity.

The drugs used in cosmetic psychopharmacology are widely classified as Mood enhancers (Happy *Pills*) and Cognitive Enhancers (Memory *Pills*). It has been seen that the serotonin levels are decreased in people with low mood (not amounting to acute depression), shyness, anxious temperament and aggressive impulsive behavior. There are several views against the use of cosmetic drugs to change mood, for the question is whether we are treating subclinical cases of depression or other mood disorders. These drugs may cause emotional flattening and even rob these persons of their unique beamness - dehumanizing a normal person. These drugs have a tendency to cause dependence (in persons with shyness, anxious temperament and impulsive behavior) and addiction.

The cognitive enhancers are the Cognitive brain stimulants or memory pills which include amphetamine, mehylphenidate, modafinil, carotenoids.galantamine. The smart drugs improve brain function, e.g. memory, cognition, motivation, attention in order to be "better than well" in their everyday life. Cognitive Enhancers are popular among college students in US as they help in sustained effort and resistance to distraction . There are many views against these enhacement drugs as they may badly affect cognitive development in young adults and in fact forgetfulness is often useful as it helps to cope with stressful events. In addition there are high chances of addiction with stimulants with pleasurable effects. Some views regarding cosmetic psychopharmacology is the hospice movement- drugs are given for symptomatic relief example in general medical conditions to alleviate pain and suffering.

The ethical issues in cosmetic psychopharmacology as summarized by Ackerman "" *Dealing with an organ that makes us unique individuals , that gives our personality, memories, emotion, dreams, creative abilities and our sinister self.*" However as Arthur Caplan had pointed out that, "*It is right of the individual whether to use a drug for cosmetic purpose*".

It is the responsibility of the physician should inform regarding the indication, contraindication, long term effects and possibility of dependence. The lurking danger of commercialization by the pharmaceutical industry always remains .

Concluding psychopharmacological enhancement has a possibility to increase opportunity and make our judgment sharper, making science easier and our lives, longer better and more pleasant.

However, Hippocrates once said that, "*life is short, science is long opportunity is elusive, experiment is dangerous, judgment is difficult.*"

RECENTLY APPROVED DRUGS BY FDA

SL.NO	DRUG NAME	INDICATIONS	MONTH OF APPROVAL
1	Zurampic (lesinurad)	Hyperurecimia asocciated gout	December 2015
2	Basaglar inj (insulin glargine)	Type I and II Diabetes mellitus	December 2015
3	Vistogard (uridine tri acetate granules)	For fluorouracil overdose	December 2015
4	Bridion (sugammadex inj)	Reversal of Non depolarizing muscle relaxant	December 2016
5	Adzenys XR-ODT (amphetamine)	ADHD Attention (deficit hyperactivity disorder)	January 2016
6	Emverm(mebendazole)	Pinworm, hookworm whipworm infections	January 2016
7	Zepatier (elbasir and grazoprevir)	Chronic hepatitis C	January 2016

PHARMACY PRACTICE DEPARTMENT ACTIVITIES DURING DECEMBER 2015 -FEBRUARY 2016

SL.NO	ACTIVITIES	NO: OF ACTIVITIES
1	No: of Patients Counseled	300
2	No: of Queries Answered	45
3	Adverse Drug Reaction Reported	03
4	Pharmacist Interventions	65
5	Medication History Interview	170

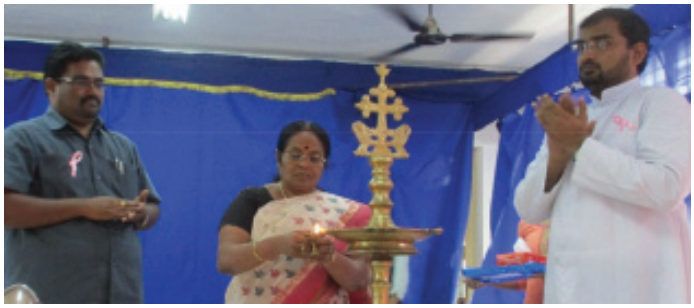
Our M.Pharm pharmacy practice, Pharm.D regular and Pharm D P.B students are involved in various patient care activities such as;

- **Patient counselling**
- **Drug information**
- **Medication history interview**
- **Bed side counselling**
- **Ward round participation (General medicine, Cardiology, Pulmonary, Nephrology, Neurology & Pediatrics)**

Pharmacy Practice Activities in the month of February 2016

1. A Cancer Awareness Programme was held by the department on World Cancer Day (4th of February) in the college as well as at Thiruvalla railway station on 4th and 5th of February 2016.The programme was inaugurated by Mrs Annapurna Devi Pathanamthitta District Panchayat President with a lamp lighting ceremony and Sri Sam Eapen Pathanamthitta District Panchayat Member with a felicitation. The awareness programme included a detailed information on various types of Cancer,early detection, its signs and symptoms,diagnosis and lifestyle modification to prevent the disease,Free BP Check up and counselling is also arranged for the public on both days.

Inauguration of Cancer Awareness Programme by Sri. Sam Eapen Pathanamthitta District Panchayat member.



Lamp lighting ceremony by Annapurna Devi Panchayat President

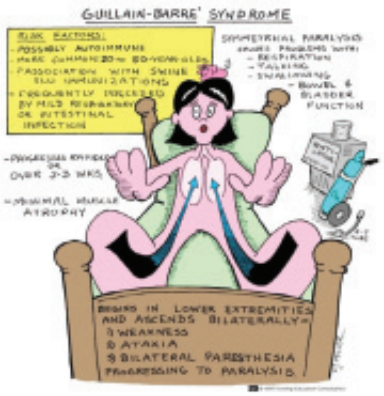
A Skit 'SWANTHANAM' Performed by 4th PharmD student on World Cancer Day

An Update to Guillain-Barre Syndrome (GBS)

Dr. Tom P Thomas
Asst. professor, Dept of Pharmacy Practice
Pushpagiri College of Pharmacy, Thiruvalla

Guillain-Barré syndrome (GBS) is a rare disorder in which a person's own immune system damages their nerve cells, causing muscle weakness and sometimes paralysis. GBS can cause symptoms that usually last for a few weeks. Most people recover fully from GBS, but some people have long-term nerve damage. In very rare cases, people have died of GBS, usually from difficulty breathing

Many things can cause GBS; about two-thirds of people who develop GBS symptoms do so several days or weeks after they have been sick with diarrhea or a respiratory illness. Infection with the bacterium Campylobacter jejuni is one of the most common risk factors for GBS. People also can develop GBS after having the flu or other infections (such as cytomegalovirus and Epstein Barr virus). On very rare occasions, they may develop GBS in the days or weeks after getting a vaccination.



Guillain-Barré syndrome (GBS) was first described in 1916 (Guillain G, 1916) and is approaching its 100th anniversary. Our knowledge of the syndrome has hugely expanded since that time. GBS is now considered to be a clinical syndrome of an acute inflammatory neuropathy encompassing a number of subtypes with evidence of different immunological mechanisms. Some of these are clearly understood while others remain to be fully elucidated.

Our understanding of the Guillain-Barré syndrome has improved greatly over the last decade with a much clearer idea of the clinical subtypes of the syndrome and the pathogenesis of some of the rarer variants. 2016 will mark the centenary of the original description by Guillain, Barré and Strohl [1]. They described a rapidly progressive motor disorder associated with absent reflexes and a raised CSF protein in the absence of expected cerebrospinal fluid (CSF) pleocytosis that characterised poliomyelitis. It became clear, over the ensuing years that the syndrome varied in severity so that in its severest form it could lead to respiratory paralysis and death

GBS has an incidence of about 1/100,000 across several studies in a number of countries. It increases in incidence with age and there is a small predominance of males. Sensory symptoms in the legs usually mark the onset of the disease followed by rapidly progressive distal weakness that soon spreads proximally. Lumbar pain is common and may represent inflammation in the nerve roots and may coincide with the breakdown in the nerve CSF barrier that allows protein to leak into the CSF. The weakness of GBS is typically "pyramidal in distribution" with ankle dorsiflexion, knee and hip flexion often severely affected and likewise the weakness in the arms is usually more severe in shoulder abduction and elbow extension. While sensory signs are usually minor and may be limited to loss of vibration and proprioception. The significance of reduced or absent reflexes with no objective large fibre sensory loss and yet complete paralysis leads to a frequent misdiagnosis of hysteria.

Respiratory involvement may be sudden and unexpected but usually the vital capacity falls steadily and intubation and ventilation are required at level of approximately 1 litre.

Other Synonyms;

- **Acute inflammatory demyelinating polyradiculoneuropathy (AIDP)**
- **Acute motor axonal neuropathy (AMAN)**
- **Acute Motor and Sensory Axonal Neuropathy (AMSAN)**
- **Miller Fisher syndrome**

Supportive aspects of management have been the major factor in improving mortality in GBS with the advent of good ITU care and modern methods of ventilation.

Active immune modulation with IVIG or plasma exchange is the mainstay of treatment with IVIG being preferred in most circumstances due to ease of availability and greater safety in patients with unstable blood pressure and pulse. IVIG is usually given at a dose of 0.4 gm/kg for 5 days although the optimum dose has never been established. Recent studies suggest that metabolism of IVIG is faster in patients with a worse prognosis and there are studies in place to see whether a higher dose of IVIG would benefit some patients. Better treatments of GBS are clearly needed to reduce the proportion of patients that are left disabled. Since much of the damage to nerves occurs early in the course of the disease it may be more effective to look at chemicals capable of improving nerve regrowth and regeneration. Such neuroprotective drugs would clearly be of value in a number of diseases with a common end point of axonal damage.

Complement inhibitors such as eculizumab have been shown to be effective in animal models of Miller Fisher syndrome and to be safe in man but have yet to be the subject of a controlled trial….