

*IAG Presidential Oration***Geriatric heart failure: Physical, cognitive and psychological outcome**

SS Lehl

Professor, Department of General Medicine, Government Medical College, Chandigarh

Cardiovascular disease (CVD) is a major contributor to the non-communicable disease burden accounting for 52% of deaths in this category and it is the most frequent diagnosis as well as the leading cause of death in both men and women older than 60 years of age. Heart failure is a difficult clinical syndrome to diagnose and manage because unlike acute myocardial infarction or stroke, there is no single test or procedure that can confirm it, especially in the elderly HF patient with multiple co-morbid illnesses.

In the Indian context, there is paucity of data on factors responsible for adverse outcomes in elderly patients admitted with the diagnosis of heart failure and following their discharge from hospital.

In the present study 100 heart failure patients over the age of 60 years were evaluated at discharge and 3 and 6 months later. There was a predominance of male patients (65%). The mean age (\pm SD) of the total population was 65.13 ± 6.3 years with a range of range: 60-86 years. The major co-morbidities were hypertension (86%), coronary artery disease (69%), diabetes mellitus (37%) and COPD (21%). At 3 months over 50% patients were stable, and did not have any re-hospitalization. 91% patients with preserved EF were stable at 3 month. Acute decompensated heart failure accounted for 34% of re-hospitalizations and all had reduced EF. Exacerbation of COPD was seen in 9% patients. Two patients (females) with reduced EF died over a period of 3 months. Over 55% patients were stable at 6 months. During this period, 26% patients, majority of whom were males with reduced EF, had died.

Difficulty in performing any one of ADL or IADL task was taken as being dependent and on this basis patients were divided into dependent and independent group. Patients were evaluated in terms of ADL and IADL at discharge, 3 months and 6 months. At discharge, 74% patients were independent in terms of ADL; at 3 months 73% patients were independent while at 6 months 70% patients were independent with their activities of daily living. With reference to IADL, 72% were independent at 3 months and 69% at 6 months. All 26 patients who were dependent in terms of ADL at discharge had adverse outcomes in terms of re-hospitalization and death over a period of 6 months, irrespective of gender, LVEF, and co-morbidities. The Short Physical Performance battery (SPPB) is a useful measure and in the present study the difference between the median SPPB score at discharge, 3 months and 6 months was found to be statistically significant ($P=.000$). Based on Logistic regression analysis, risk factors of poor outcomes in terms of SBPP were urban background, LVEF $\leq 40\%$ and co-morbid conditions of DM, COPD and CAD. Patients who had better lower extremity performance (SPBB score of ≥ 6) at discharge had lower risk of adverse outcomes over a period of six months in terms of risk of re-hospitalization, and death compared with patients with SPPB score of <6 . In present study all 100 enrolled elderly heart failure patients were assessed by using Hindi version of geriatric depression scale (GDS) at discharge, 3 months and 6 months. The difference between the median GDS score at discharge, 3 months and 6 months was found to be statistically significant ($P=.000$). Female patients from urban background who were widowed and housewife were at higher risk of poor outcome in terms of GDS of ≥ 25 . Patients who had no adverse outcomes over a period of six months had improvement in their GDS scores. Female patients from urban background who were widowed were at higher risk of poor outcome in terms of GDS of ≥ 25 . Assessment of cognition by Montreal cognitive assessment scale (MoCA) at discharge, 3 months and one year may be useful.

*Association of Gerontology India Presidential Oration***Elder care and living arrangement in Kerala****S Irudaya Rajan**

Professor, Center for Developmental Studies, Thiruvananthapuram

Kerala is an aging society wherein population aging is proceeding at a very fast pace. Given the context of aging in Kerala, the living arrangements of the elderly have an important role, particularly when it comes to elder care. Using the Kerala Aging Survey, 2013, this paper evaluates the scenario of family care for the elderly, the perception of elderly about their care, association between health patterns and living arrangements and the determinants of living arrangements of the elderly. Bivariate analysis and multivariate logistic regression were used for the analysis. The findings of the study revealed that living arrangements of the elderly play an important role in elderly care. Among those who live with partners, more than 45 per cent were of the view that it is the duty of children to take care of their parents in old age. More than 43 per cent of the elderly who live with their partner consider living with their partner as the best option. Among those who live with married sons, nearly 60 per cent perceived that such a life is best for them. Among those who stayed with sons and daughters, the share of those who need special care is comparatively greater. Living arrangements determine the source of care provision at the time special care is required. Results of the regression analysis showed that compared to female elderly, male elderly are less likely to live alone. Further, it was found that compared to female elderly, male elderly are more likely to live with a daughter.

Professor M.S. Kanungo Lifetime Achievement Award Lecture**Intervention in aging by dietary restriction and regular exercise:
Biological mechanisms and correlation with oxidative stress****Professor Sataro Goto**

Juntendo University Graduate School, Institute of Health and Sports Science & Medicine, Japan
Emil: gotosataro@gmail.com

Despite more than several decades of research, mechanisms of biological aging have not been clarified(1). Nevertheless, it is expected to cope with problems associated with old age. Most means so far tried to retard ageing has been of limited or no success in human. We have investigated mechanisms of interventions of ageing by dietary or caloric restriction (DR/CR) and regular exercise (RE) using middle-aged or aged rats and mice as models, focusing on detrimental or potentially beneficial effects invoked by oxidative stress. Oxidative stress has been regarded harmful since the proposal of Free Radical Theory of Aging by Denham Harman more than half a century ago. In fact, reactive oxygen species (ROS) produced in metabolic processes in mitochondrial and redox enzyme reactions cause alteration of proteins, DNA and membrane lipids that can lead to decline of cellular functions with age. We have shown that ROS can alter enzymes in such a way similar to that found in old animals. A method to detect protein carbonyl, a form of oxidative modifications, immunologically has been developed. Protein carbonyls are increased with age in a variety of tissues. They are reduced in middle-aged or aged animals subjected to DR/CR that accelerates protein turnover in liver cells by upregulation of proteasome activity(2). It also reduces DNA oxidation by increasing the activity of repair enzymes in the liver. RE increases proteasome activity, thereby reducing oxidatively modified proteins in the brain of aged animals(3). The regimen improved cognitive functions. It reduces oxidized DNA in the liver as well, apparently by increased repair enzyme activity. Based on the findings by us and other investigators, we thought that mild oxidative stress induced by RE might cause beneficial effects by reducing damage due to stronger oxidative stress even at older ages. We have proposed a term “exercise hormesis” for the effects of mild oxidative stress by RE. Such adaptive response might explain a mechanism of successful aging by habitual physical activity and other interventions in human.

References

- (1) Goto S. The biological mechanisms of aging: A historical and critical overview. In: *Aging Mechanisms* (eds. Mori N, Mook-Jung I, Springer 2015) pp.3-27
- (2) Goto S et al. Beneficial biochemical outcomes of late-onset dietary restriction in rodents. *Ann NY Acad Sci* 1100: 431-441, 2007
- (3) Goto S & Radak Z. Hormetic effects of reactive oxygen species by exercise. A view from animal studies for successful aging in human. *Dose Response* 8: 68-72, 2010

Professor M.S. Kanungo Oration**The Future of Biogerontology: Not more of the same****Suresh Rattan**

Laboratory of Cellular Ageing, Department of Molecular Biology and Genetics, Aarhus University, Denmark
(email: rattan@mbg.au.dk)

Past fifty years of biogerontology have been hugely successful in acquiring information in four areas: (i) description of the phenotype of ageing at the level of populations, individuals, organs, systems, tissues, cells, biochemicals and molecules; (ii) unraveling of some public and private mechanisms of ageing; (iii) identification of several genes that associate with longevity; and (iv) formalization of the evolutionary basis of ageing and limited lifespan. The knowledge originating from these studies emphasizes that ageing is highly individualistic and heterogeneous, and is an emergent phenomenon from the complex interacting networks of genes, proteins and environmental factors. However, this individualistic and heterogeneous nature of ageing is usually not taken into account while designing and performing new experiments, especially for the screening and testing of potential ageing-modulatory and healthspan-extending interventions. Continuing with more of the same approach by targeting a single pathway by a single molecule in a single system is restricting biogerontology to a never-ending circle. One of the reasons for this is the lack of a wholistic framework for experimental research, which could simultaneously handle multiple, interactive and compensatory variables. The future of ageing lies in breaking out of such strategies and developing wholistic approaches, which are scientific, testable, reproducible and universal. Mild stress-induced hormones is one such possibility, which could be applied to the three pillars of health and longevity, that is, food, physical activity and social-mental engagement.

*Prof. PV Ramamurti Oration***Chronic non-communicable diseases in Low and Medium Income Countries (LMIC): Evidence from SAGE****P. Arokiasamy**

Professor & Head, Department of Development Studies, International Institute for Population Sciences, Mumbai

This paper examines the patterns of self-reported diagnosis and algorithm/measured test based, undiagnosed and untreated NCDs in China, Ghana, India, Mexico, Russia and South Africa. Nationally representative samples of older adults aged 50+ were analysed from WHO-SAGE Wave 1 (2007-10). Analyses focused on six conditions: angina, arthritis, asthma, chronic lung disease, depression, and hypertension. The outcomes for these NCDs were: (1) self-reported prevalence; (2) algorithm/measured test based prevalence; (3) undiagnosed disease prevalence; and, (4) proportion untreated. The algorithm/measured test based prevalence of NCDs was much higher than self-reported prevalence in all six countries indicating underestimation of prevalence of NCDs in Low and Middle Income Countries (LMICs). Of the six chronic diseases, undiagnosed prevalence of was highest for hypertension. The proportion untreated was highest for depression among all chronic diseases. Higher levels of education and wealth significantly reduced the odds of an undiagnosed condition and untreated morbidity. High prevalence of undiagnosed NCDs and even higher proportion of untreated NCDs highlight the inadequacies in diagnosis and management of NCDs in local healthcare systems LMICs.

Professor A Venkoba Rao Oration (2016)

Challenges of managing frail older persons

B. Krishnaswamy

Professor of Medicine, ACS Medical College, Chennai

The core of geriatric practice focuses on the management of frail older adults. The identification, evaluation and effective management of a frail person, to prevent loss of independence is a great challenge. Frail individuals constitute older adults who are at a higher risk for a number of adverse health outcomes, including disability, dependency, institutionalization, falls, injuries and mortality. As the population of older persons rapidly increases worldwide including India, the proportion of very old & frail elderly also increases exponentially, requiring specialised health care services, community support services and long term care. The prevalence of Frailty increases with aging, ranging from around 15% in 65 years to 40% after the age of 80 years. Caring for frail older people needs expertise in geriatric care with a core geriatric team trained in multidisciplinary Geriatric assessment and Rehabilitation. Managing frail elderly also needs exceptional skills and continued motivation of patient, care giver and support staff to avoid frustration and failure in achieving goals. Frailty results from underlying physiological and biological alterations that accompany aging resulting in a state of reduced reserve capacity-‘Homeo-stenosis’. Musculoskeletal, hormonal and immune systems are the three key components, age associated alterations in these system are thought to be involved in the development of frail state. Sarcopenia and fat deposition in muscle, low testosterone, insulin, DHEAS, IGF-2 levels, blunted diurnal variation of cortisol, insulin, elevated pro inflammatory markers IL6, CRP, anemia, low micro nutrients, decreased immune function: decreased T cell proliferation and altered cytokine production are associated with frailty phenotype. Chronic inflammation and rennin-angiotensin system also considered to play a role in pathogenesis of functional decline and frailty. Frailty is defined as a state of age associated decline in reserve and function across multiple physiological systems leading to increased vulnerability to cope up with acute stressors. The diagnostic criteria has been different, in different studies and needs refining. The presently used Fried’s criteria focuses on Physical Frailty and assesses, primarily muscle strength and endurance. Fried’s phenotypic criteria needs three out of five following components: low energy, low grip strength, slow walking speed, low physical activity and unintentional weight loss.

Lower limb strength and especially proximal muscle weakness manifesting as the difficulty in rising from lower level or floor is a more reliable indicator of Sarcopenia, than the hand grip in our population. Getting up from floor and gait speed are more sensitive indicators of frail and pre-frail states in older population. Our own studies and available Indian data have shown that the hand grip strength is lower in the Indian population (both in the young & old). The normative data for older person is not available for our population. The Frailty index, arrived by counting the number of deficits accumulated over time that includes various impairments, risk factors and geriatric syndromes, is a more sensitive predictor of adverse health outcome. Fear of fall and disability seems to be the major factor in restricting the physical activity leading to loss of muscle strength and balance. Psycho-social risk factors including loss of self-esteem, confidence, lack of care giver support can all lead to ‘reduced life space’. It has been shown that life space constriction, among community dwelling older women, increases the risk of frailty by three times. Management of frail older adults includes Geriatric inter disciplinary assessment, treatment and exercise program. Numerous studies have shown that regular exercise training improves muscle strength, balance and mobility & can reduce chronic elevations in inflammatory mediators. Progressive resistance exercise training improves muscle strength, gait speed and prevents Sarcopenia and physical frailty in the very old. Hormonal intervention including supplementing DHEA, Vitamin D and Androgens have not shown any efficacy in treating frailty. Comprehensive geriatric assessment with implementation of interdisciplinary treatment plan improves the clinical outcome of frail older adult. The objectives of this interventions are to improve physical and psychological function and the quality of life.

Professor A Venkoba Rao Oration (2014)**Immunosenescence****Indrajeet Singh Gambhir, Rohit Singh, SS Chakrabarti**

Division of Geriatrics, Department of General Medicine, Institute of Medical Sciences,
Banaras Hindu University, Varanasi

Immunosenescence refers to the gradual deterioration of the immune system brought on by the natural advancement of age. It results in altered host responsiveness to pathogens, vaccines and impaired immuno-surveillance of tumorigenesis. A wide range of changes occur in innate and adaptive immunity constituting an immune risk phenotype enhancing morbidities. Chronic thymus involution and decline in marrow function with ageing alters the production of immune cells of various lineages. Further the decreasing level of growth hormone with age plays an important role in immune decline in the elderly. Loss of naïve T-cells, increased numbers of terminally differentiated T-cells, inverse CD4/CD8 ratio, oligoclonal expansion of virus specific T-cells, re-modeling of different NK-cell subsets and decreased production of cytokines constitute hallmarks of immunosenescence. This dysfunctionality of immune system contributes to the increased severity of infections. Studies have shown that in the elderly, humoral and cell-mediated influenza specific responses are lower following vaccination than in young adults. Limitation of vaccination in preventing infections is due to inability of adaptive immunity to generate protective responses. Adjuvant to vaccines: Recombinant and synthetic antigens used in modern vaccines are less immunogenic than older live attenuated/ killed organisms. Thus the potency and efficacy of these vaccines are improved by incorporating immunomodulators or adjuvants and by the use of modified delivery vehicles like liposomes, immune stimulating complexes (ISCOMs), micronanospheres, virus like particles (VLPs) and montanides. A recent area of focus is the development of better delivery routes for vaccines such as intra-nasal and oral. The use of adjuvants is all the more significant in elderly owing to natural immune decline. Cancer in the elderly : Age itself is a major risk factor for cancer. The decreased immune response in elderly people may result in poor tumorigenic cell immune surveillance in the elderly and an increased incidence of neoplasms, both benign and malignant.

*Mohan Dhar Diwan Lecture***Ageing and health: A societal perspective****Mathew Cherian**

CEO, HelpAge India, New Delhi

We understand that Ageing is a triumph of our times and a product of improved public health and development. Older people are still contributing to the families and society. So they should not be viewed as a burden to the community. However, over 1600 million people live in object poverty across the world and many of them are older people. Industrialized countries have developed relatively comprehensive health care policies and programs for older persons, including community based and residential services. In India, older people are still supported mainly by families. Government and community are now working together to fulfill the needs of the growing number of older people based on the concept of active and healthy ageing. However this is changing very rapidly. Here, I would like to explain a few things on religious, cultural back ground and ageing in India. In India religion and culture are closely linked together and play a central role in care of the elderly. Traditionally care of the elderly is considered as a noble practice. Younger family member serve the needs of the elderly with great pride. People used to live in extended family pattern with younger generations. The nature of the family structure enable family member to take care of the elderly. Elderly people also have some meaningful role as advisors, community leaders within their capacities. However, traditional family care system is fast eroding due to decreased childbirth, migration of younger people in large numbers, engagement of more family member in job and rapid urbanization. The traditional values are being destroyed at a very fast pace. One study showed that social problems like elder abuse were prevalent in nearly 35% of the study population indicated that which highlighted to study more of social issue in detail so as to be able to develop appropriate policy and measures to intervene. The Maintenance and welfare of Parents Bill 2007 has had no or very little impact on the prevalence of abuse. One of the much needed values "highlighted to maintain the traditional family care system for the elderly" Other care models other than institutional care is required for the frail elderly. Long term care is the other crying need of the hour. It highlighted the need of comprehensive geriatric services comprising home visit, outreach activities, out patients care, in patients care and long stay rehabilitation services. At present, Alzheimer's disease and late-life depression are age-related disorders and one of the contributing factors for these diseases is chronic stress Decreasing stress is very important to live a longer and better life. Social support protects against functional decline, either generally or selectively, in the most severely depressed elderly patients. Therefore, psychosocial support from family and community is utmost importance for reducing stress in older people. We need to recognize that active and healthy ageing does not only focus on health services, but is concerned with the overall quality of life of the elderly. WHO also supports this approach. The role of older people has to be recognized more in the future and it is crucial to encourage old age oriented approach in health policy development. I believe that this conference will bring valuable exchange of knowledge and experiences on elderly care and I would like to wish success of this conference.

*Jodhpur Oration***Promoting Functional and Nutritional Health in Aging****Shanthi Johnson**

Professor, Faculty of Kinesiology and Health Studies, University of Regina, Canada

As we grow older, many changes occur including changes to our body composition. We tend to lose lean body mass and bone mass and experience a concomitant increase in fat mass, affecting our functional capacity and our ability to perform daily activities. These changes are perceived as unavoidable consequences of the aging process. However, research shows that many of these changes are due to inactivity and poor eating habits rather than a direct consequence of aging. A majority of research has examined the beneficial effect of optional nutrition and regular physical activity separately. Regular physical activity and healthy eating are inseparable parts of the overall health equation, yet these domains are seldom explored together. This presentation will review the current status of knowledge in promoting functional and nutritional health in seniors.

*Professor VS Natarajan Oration***Burden and management of metabolic syndrome in ageing population****Y S Raju**

Department of Medicine, Nizam's Institute of Medical Sciences, Hyderabad

Metabolic syndrome is a constellation of central obesity, hypertriglyceridemia, low high-density lipoprotein (HDL) cholesterol, hyperglycemia, and hypertension. The prevalence of metabolic syndrome in an elderly population has ranged from 11% to 43% (median 21%), and 23% to 55 % (median 31%) according to the WHO and NCEP definitions respectively. Several age-related physiologic mechanisms lead to increased risk of metabolic syndrome in the elderly. Globally, the prevalence of metabolic syndrome is increasing, probably related to the increase in obesity, sedentary lifestyle, changes in dietary habits and the important process of ageing. Metabolic syndrome results in a 2.5-fold risk increased risk of cardiovascular disease and a five-fold risk for development of diabetes mellitus. Further, in the elderly, metabolic syndrome is an important risk factor for mobility alterations, cognitive deficits and depression. Given the increase in the geriatric population and the emergence of metabolic syndrome globally, an epidemic of metabolic syndrome in the elderly seems likely. Proactive and preventative efforts are required to tackle this menace. Personalized approach is key to managing type 2 diabetes in the elderly, especially in the presence of co-morbidities. A decade of evidence supports the effective use of DPP4-inhibitors in elderly with type-2 diabetes. While these drugs are generally safe from major adverse effects, chronic pancreatitis, immunological hypersensitivity may be relevant considerations in the elderly.

*Trivandrum Oration***Assessment of falls in elderly and its prevention****G. S. Shanthi**

Professor of Geriatric Medicine, Madras Medical College Chennai

Falls is one of the major problems of elderly and is considered as a “Geriatric Giant”. Recurrent falls is a marker of poor physical and cognitive status. It is usually multi-factorial, requiring multidisciplinary approach for treatment and prevention of future falls. About 1/3 of the community living elderly fall in a year and 50% of them have multiple falling episodes. The incidence increases as age advances, and is a leading cause of death due to its complications like fractures, SDH, infection following soft tissue injury etc. The morbidity include restricted mobility and psychological trauma (post Fall syndrome). More than 80% of hip fractures in the elderly are due to falls. Falls and their sequel are potentially preventable and hence annual screening for falls is recommended. For individuals who have experienced one or more falls, a further evaluation is recommended. It is essential to remember that a single fall may have multiple causes, and repeated falls may each have a different etiology. Assessment includes a complete detailed history regarding the fall, individual’s fear of falling, the presence of acute or chronic illness and medications. Falls occur frequently in elderly with increased morbidity. A number of intrinsic and extrinsic risk factors are associated with a fall. Falls are often multi-factorial. Hence a detailed evaluation is mandatory, particularly in those with recurrent falls. Falls may be effectively prevented by targeted, multifaceted interventions.