Severe FH Course
Identifying and Treating Severe Familial Hypercholesterolemia
This activity was awarded 5.5 CME Credit Points
(DHA Accreditation No 1831/17)

October 14-15 2017
JW Marriott Marquis Hotel
Dubai, UAE
For further information please contact:

Oman Society of Lipid and Atherosclerosis (OSLA)
Khalid Al-Rasadi
President
E-mail: k.alrasadi@gmail.com

International Atherosclerosis Society (IAS)
Emanuela Folco
Executive Director
E-mail: emanuela.folco@athero.org
www.athero.org
On behalf of the International Atherosclerosis Society (IAS), the Oman Society of Lipid and Atherosclerosis (OSLA), the Gulf Heart Association (GHA), and the Emirates Cardiac Society (ECS), we would like to welcome you to Dubai, UAE and the Course on Identifying and Treating Severe Familial Hypercholesterolemia held on October 14-15, 2017.

The purpose of this closed-number residential Course is to increase the knowledge and experience of practicing clinicians from the Gulf Region interested in the management of lipid disorders. In particular the Course will discuss how to recognize, diagnose, and treat severe familial hypercholesterolemia (both HeFH and HoFH) in patients in accordance with current guidelines and will consist of two days of lectures and interactive sessions.

This Course will offer a unique opportunity to learn from the prestigious international, regional, and national faculty as well as your peers. We encourage you to actively participate to gain the most from the Course and to use the time to build collegial relationships with the faculty and other participants.

The benefits to be derived from your involvement over the next 3 days will not only enhance your career and your institution but will be ultimately allow you to provide better care for your patients, thus improving the healthcare of the MENA region.

Please feel free to reach out to any of the faculty members if you have any questions.

We are all looking forward to a very productive and successful Course.

Best regards,

Raul Santos
President-Elect, IAS

Khalid Al-Rasadi
President, OSLA

Wael Almahmeed
Board member, GHA
The INTERNATIONAL ATHEROSCLEROSIS SOCIETY (IAS) as a federation of 64 national and regional member organizations worldwide (representing 54 countries) is poised to face the challenges of the new century presented by the many scientific advances in the field, the ageing of the population in most countries, and the growing need for education of those in the medical and health care professions and of the lay population.

The IAS exists to coordinate the exchange of scientific information among the constituent societies, to foster research into the development of atherosclerosis, and to help translate this knowledge into improving the effectiveness of programs designed to prevent and treat this disease.

The goals of the IAS are several fold. Above all, the IAS aims to foster communication worldwide among researchers, educators, and health care professionals in the field of atherosclerosis and cardiometabolic disorders. The organization upholds high quality research and provides a forum for communication of this research among the leading investigators in many countries. Another important aim is to provide educational opportunities for younger researchers and health care professionals. The IAS is in a growth phase and now aims to expand its activities to other areas that will achieve a broader agenda, such as new approaches to guideline development and increasing the awareness and the exchange of ideas and data to improve access to care for patients with FH and severe lipoprotein disorders. Having achieved many of its goals, we have launched several initiatives to expand on those goals and to create a new environment for those in the field of prevention and treatment of atherosclerosis and cardiometabolic diseases.

The IAS is able to promote its mission and objectives from a more international perspective than other organizations due to its unique position throughout the world as a federation of many regional and national members, including new and emerging countries with substantively different cultures, environments, genetics, and diseases and is thus able to open the field to new ideas and interpretations from both developed and lesser-developed areas of the world. Concepts, medicine, and people are able to bridge in both directions, to enrich the world.
Oman Society of Lipid and Atherosclerosis (OSLA) shall advocate for quality patient concerning lipid disorders and atherosclerosis through education, research promotion, development and application of standards and guidelines to influence health care policy.

In-line with the mission statement, the OSLA’s objectives are:

Improvement as well as advancement of Patient Care- OSLA will augment medical understanding, clinical expertise, and allied occupational activities that deliver improved and effective patient outcomes. OSLA also aims to encourage patient involvement and understanding of lipid related disorders and atherosclerosis evolving to upkeep guideline based disease care and prevention. Service wellness programs with sound cardiovascular health information extend the patient-physician professional relationship.

Promotion of Multidisciplinary Translational Research (MTR)- OSLA aims to endorse translational research aims, to convert laboratory discoveries in manifold disciplines into therapeutic gains for patients. This concept débuted MTR, is a multifaceted process and is often elaborate necessitating colossal investment in time, money and expertise. OSLA aims to augment MTR by advocating for increased research resources to support translational lipid research from funding agencies such as the grant disbursement office(s) at different academic/medical institutions and Governmental grant organizations.
In 1999 the GCC Health Ministers meeting in Geneva formed a “Heart disease committee” composed of GCC cardiologists and requested me to chair it. The committee had its 1st meeting in Doha in February 2000 and planned a large GCC Cardiovascular Symposium in Doha.

In the year 2001, the GCC Health Ministers approved the committee’s recommendations including the proposed symposium in Doha, Qatar. So, Doha hosted the first GCC Cardiovascular Symposium on January 15 – 17, 2002.

That historic conference provided an opportunity for Gulf cardiologists, cardiovascular surgeons, and other cardiovascular specialists in the GCC states to meet, exchange ideas and build bridges for scientific and medical cooperation. During that meeting, we proposed to establish a professional society which we called Gulf Heart Association (GHA). The proposal was unanimously and enthusiastically endorsed by the entire group of cardiovascular specialists present during that meeting and so the GHA was born on January 16, 2002. Over three years the GHA became a landmark accomplishment for the GCC states.

The main aim of GHA is to improve the quality of cardiac care in the GCC states through its various activities.

The major aims of our association and what we hope to achieve are the following:
1. Raising the standard of cardiac care in the GCC states.
2. Conduct scientific conferences and symposia.
3. Carry on scientific research on cardiovascular diseases.
4. Publish professional periodicals and information. (GHA has Heart Views as its official journal).
5. Create professional, educational, and social ties among members of the GHA.
6. Create links and cooperation locally and with international medical institutions and professional societies.
7. The GHA hopes to establish criteria for GCC cardiovascular specialists to meet high standards of competence and expertise.
8. The GHA seeks to suggest laws to be adopted by the GCC countries for the prevention of cardiac disease and advance the care of patients with heart disease.
Emirates Cardiac Society (ECS) is a non-profit organization comprising of cardiologists within the UAE that work under the umbrella of the Emirates Medical Association.

ECS is striving to improve cardiovascular health through education, research and quality patient care. ECS helps people understand the importance of healthy lifestyle choices and provides science-based treatment guidelines to healthcare professionals to help them provide quality care to their patients.

VISION:
To establish a strong network for the management, education and research so as to improve the quality of life and longevity, through better prevention, diagnosis and treatment of heart disease.

MISSION:
To educate the public and healthcare professionals in reducing the burden of cardiovascular disease in the UAE. The Emirates Cardiac Society promotes health education within the community, raising awareness of health issues amongst the population and establishes strong partnerships with national and international health agencies and establishments.

VALUES:
Excellence: The Emirates Cardiac Society is flexible and is able to deal with the expectations of the members as well as the public and exceeds their expectations by answering queries as well as provides solutions for the problems. Quality: Complies with best standards and practices, ensuring that the Emirates Cardiac Society wins the trust of the members and the public.
Team Work: The Emirates Cardiac Society actively engages with its members and the public and provides support and advice to the community at large. Team spirit prevails and channels are always open for communication.
Financial Effectiveness: Optimal use of resources through good planning, and priority settings.
SCIENTIFIC AGENDA
## DAY 1 : 14TH OF OCTOBER 2017

**Defining, identifying and managing severe familial hypercholesterolemia**

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<tr>
<td>09.00</td>
<td>Welcome</td>
<td>Dr. Khalid Al-Rasadi</td>
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<td>Dr. Raul Santos</td>
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<td>09:10</td>
<td>Lipid metabolism in FH</td>
<td>Dr. Khalid Al-Rasadi</td>
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<td>Diagnostics and natural history of homozygous FH</td>
<td>Dr. Hani Sabour</td>
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<td>The genetics of FH : making things simple</td>
<td>Dr. Fahad Alzadjali</td>
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**COFFEE BREAK**

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<td>11:15</td>
<td>Family history, consanguinity and cascade screening: what are the implications?</td>
<td>Dr. Fahad Alzadjali</td>
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<td>11:50</td>
<td>Diagnosis and management of pediatric FH</td>
<td>Dr. Khalid Al-Rasadi</td>
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**LUNCH**
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<td>Defining the severe FH phenotype: Consensus from the International Atherosclerosis Society</td>
<td>Dr. Raul Santos</td>
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<td>Treatment of severe FH Forms 1: The role of statins and ezetimibe</td>
<td>Dr. Raul Santos</td>
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<td>Treatment of severe FH Forms 2: PCSK9 inhibitors</td>
<td>Dr Khalid Al-Waili</td>
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<td>Treatment of severe FH Forms 3: Lomitapide and Mipomersen</td>
<td>Dr. Raul Santos</td>
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<td>Treatment of severe FH Forms 4: LDL apheresis</td>
<td>Dr Khalid Al-Waili</td>
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<td>17:20</td>
<td>Management algorithm for severe FH: what do the guidelines say?</td>
<td>Dr Hani Sabour</td>
<td>UAE</td>
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## Severe Familial Hypercholesterolemia Case Discussions

### Day 2 Objectives
- **09:00 - 09:10**
  - **Day 2 Objectives**
  - **Dr. Khalid Al-Waili**
  - **Oman**

### Cases 1: GROUP A
- **09:10 - 10:10**
  - **Pharmacological treatment of severe FH**
  - **Dr. Raul Santos**
  - **Brazil**
  - **Dr. Khalid Al Waili**
  - **Oman**

### Cases 2: GROUP B
- **09:10 - 10:10**
  - **Cases on LDL apheresis**
  - **Dr. Khalid Al-Rasadi**
  - **Oman**

### Coffee Break
- **10:25 - 11:25**
  - **COFFEE BREAK**

### Cases 1: GROUP B
- **10:25 - 11:25**
  - **Pharmacological treatment of severe FH**
  - **Dr. Raul Santos**
  - **Brazil**
  - **Dr. Khalid Al Waili**
  - **Oman**
  - **Dr. Fahad Alzadjali**
  - **Oman**

### Cases 2: GROUP A
- **10:25 - 11:25**
  - **Cases on LDL apheresis**
  - **Dr. Khalid Al-Rasadi**
  - **Oman**
  - **Dr. Hani Sabbour**
  - **UAE**

### Discussion and wrap up
- **11:25 - 12:00**
ABSTRACTS
Dr. Khalid Al-Rasadi (Oman)

Lips metabolism in familial hypercholesterolemia

The metabolism of plasma low-density lipoprotein (LDL-C) is tightly regulated in humans to distribute cholesterol through the circulatory system and into cells that require extracellular cholesterol. Cholesterol absorption is achieved through passage across brush border membranes and into intestinal enterocytes in the jejunum through the Niemann-Pick C1-Like 1 (NPC1L1) transport protein. On the other hand ATP binding cassette G5 and G8 proteins (ABCG5/8) appear to negatively regulate cholesterol transport into enterocytes. Mutations in the ABCG5/G8 genes are associated with sitosterolemia, which is characterized by increased absorption of plant sterols. Cholesterol is transported from the liver into the circulation by very low density lipoprotein (VLDL) which undergo further metabolism to LDL and then cleared by the liver through the LDL receptors.

Familial hypercholesterolaemia (FH) is genetic defect in the LDL receptors (LDLR) which can lead to the lifelong accumulation of LDL-C in the plasma and eventually lead to premature coronary heart disease (CHD).

Proprotein convertase subtilisin/kexin type 9 (PCSK9) is another a key new player in cholesterol homeostasis. PCSK9, by direct interaction with the hepatic LDLR, enhances its degradation by targeting it for destruction in the lysosome, disallowing its natural recycling loop. Thus, Gain-of-function mutations in PCSK9 are a cause of high plasma LDL-C and Loss-of-function mutations can lead to low plasma LDL-C and markedly reduced cardiovascular risk.

References

Dr. Nasreen AL-Sayed (Bahrain)

**Diagnosis and natural history of homozygous familial hypercholesterolemia**

Familial hypercholesterolemia (FH) is a genetic disorder of lipoprotein metabolism resulting in elevated serum low-density lipoprotein (LDL) cholesterol levels leading to increased risk for premature cardiovascular diseases (CVDs). The diagnosis of this condition is based on clinical features, family history, and elevated LDL-cholesterol levels aided more recently by genetic testing. As the atherosclerotic burden is dependent on the degree and duration of exposure to raised LDL-cholesterol levels, early diagnosis and initiation of treatment is paramount. This talk discusses in depth the clinical features, diagnostic criteria and natural history of familial hypercholesterolemia.

Dr. Fahad Alzadjali (Oman)

**Family history, consanguinity and cascade screening: what are the implications?**

Data from Dutch Lipid Clinic Network suggest that the prevalence of heterozygous familial hypercholesterolemia (HeFH) high as 1 in 200. Familial hypercholesterolemia (FH) is underdiagnosed in most countries specially those with high consanguinity rate like Arabian Gulf. HeFH is caused either by heterozygous loss-of-function mutations in low density lipoprotein receptor (LDLR), heterozygous mutations in apolipoprotein B (APOB) that affect the LDL receptor-binding domain of apolipoprotein B, or heterozygous gain-of-function mutations in proprotein convertase subtilisin/kexin type 9 (PCSK9). Heterozygous LDLR, APOB, and PCSK9 mutations are found in >90, ≈5, and ≈1%, respectively, of heterozygous FH subjects with a causative mutation. Other rare mutationoccurs in autosomal recessive hypercholesterolemia (ARH) genes also called LDLR adapted protein (LDLRP1). Cascade genetic screening program to trace family members with FH has been successfully implemented by certain population specially in the Netehrlands. With cascade screening, identified cases received early cholestoerol lowering therapy in which year follow up showed a dramatic improvement of their survival and therefore a very cost-effective strategy.
Diagnosis and management of pediatric familial hypercholesterolemia

There are potentially as many as 4.5 million individuals in Europe with heterozygous familial hypercholesterolemia (HeFH) and probably 35 million worldwide (Figure 1B), of whom 20–25% are children and adolescents. Children with untreated HeFH have a dramatic increase in risk of premature CHD after age 20 years. Individuals with homozygous FH (HoFH) are at extremely high risk and, if untreated, many will manifest coronary or other cardiovascular disease in childhood or adolescence. FH is diagnosed either on phenotypic criteria, involving an elevated plasma low density lipoprotein cholesterol (LDL-C) level plus a family history of elevated LDL-C, premature coronary heart disease (CHD), and/or genetic diagnosis, or with genetic testing. A child of a parent with FH has a 50% probability of inheriting FH, thereby emphasizing the importance of a family pedigree to identify relatives for screening. Statins are safe and effective in lowering LDL-C in children,15 restore endothelial function, and regress thickening of the intima of the vessel wall at a young age. Simvastatin, lovastatin, atorvastatin, pravastatin, fluvastatin and rosuvastatin are approved in the USA and Europe for use in children with FH. Ezetimibe is approved for use from age 10 years in the USA and Europe, and is very well tolerated with minimal side effects. The bile-acid sequestrants cause gastrointestinal side effects; colesevelam is the best tolerated of these agents and is approved in the USA from age 10 years although not in Europe. For HoFH treatment with a statin and ezetimibe must be started at diagnosis. If available, lipoprotein apheresis should be started as soon as technically possible; this may be as early as age 2 years in specialized centers. Two new agents, oral lomitapide, a microsomal triglyceride transfer protein inhibitor, and injectable mipomersen, an antisense RNA therapy, both of which target hepatic production of atherogenic apoB-containing lipoproteins, were recently approved in the USA as adjunct therapy for HoFH in patients aged ≥18 and ≥12 years, respectively. Of novel therapies in development, monoclonal antibody therapies to PCSK9 (alirocumab and evolocumab) show the most promise, lowering both LDL-C and Lp(a), although patients homozygous for LDLR-null mutations showed a poor therapeutic response, as expected from the mechanism of action. Paediatric trials of these agents are underway or planned.
References


Dr. Raul Santos (Brazil)

Defining the severe familial hypercholesterolemia phenotype: Consensus from the International Atherosclerosis Society (IAS)

Familial hypercholesterolemia (FH) is associated with an elevated lifetime risk of atherosclerotic cardiovascular disease (ASCVD) however, there is heterogeneity on this risk. Classically FH is divided in heterozygous (He) and homozygous (Ho) forms and the former present a significantly higher risk not only of ASCVD but also aortic valvular and supra-valvular disease. Recent evidence has shown that there is overlap on the phenotypic manifestations between He and Ho FH forms and this fact bears prognostic implications. The IAS therefore developed a consensus document in order to better identify higher risk FH patients considering the greater unmet needs for LDL-cholesterol reduction on this population and the high monetary cost of available therapies for these more severe forms of FH. Severe FH is defined not only based on very high LDL-C blood levels but also on the presence of clinical ASVCD, severe burden of coronary subclinical atherosclerosis and association of risk factors like smoking, diabetes, low HDL-C, hypertension, high Lipoprotein(a) levels and renal failure among others. Those higher risk individuals who do not attain recommended LDL-cholesterol goals are the natural candidates for PCSK9 inhibitors, lomitapide and mipomersen (in the case of HOFH) and lipoprotein apheresis.

Reference:
Dr. Nasreen AL-Sayed (Bahrain)

Treatment of severe familial hypercholesterolemia forms 1: The role of statins and ezetimibe

Statins are presently the mainstay in the management of FH patients, although newer drugs, LDL apheresis, and other investigational therapies may play a role in certain subsets of FH, which are challenging to treat. Together these novel treatments have notably improved the prognosis of FH, especially that of the heterozygous patients. Despite these achievements, a majority of patients fail to attain targeted lipid goals owing to persistent shortcomings in diagnosis, monitoring, and treatment. This talk aims to highlight goals of therapy, and management options in patients with FH with focus on statins and ezetimibe as agents of choice.

Dr Khalid Al-Waili (Oman)

Treatment of severe Familial Hypercholesterolemia: PCSK9 inhibitors

Hyperlipidemia is a well-established risk factor for developing cardiovascular disease (CVD). The recent American College of Cardiology and American Heart Association guidelines on lipid management emphasize treatment of individuals at increased risk for developing CVD events with 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitors (statins) at doses proven to reduce CVD events. However, there are limited options for patients who are either intolerant to statin therapy, develop CVD despite being on maximally tolerated statin therapy, or have severe hypercholesterolemia. Recently the Food and Drug Administration approved two novel medications for low-density lipoprotein (LDL)-cholesterol reduction: Evolocumab and Alirocumab. These agents target and inactivate proprotein convertase subtilisin-kexin type 9 (PCSK9), a hepatic protease that attaches and internalizes LDL receptors into lysosomes hence promoting their destruction. By preventing LDL receptor destruction, LDL-C levels can be lowered 50%-60% above that achieved by statin therapy alone. The addition of evolocumab to statin therapy over several years significantly reduced cardiovascular morbidity and mortality in patients with clinically evident atherosclerotic cardiovascular disease, according to results from the FOURIER trial.
Dr. Raul Santos (Brazil)

Treatment of severe familial hypercholesterolemia forms 2: Lomitapide and Mipomersen

Lomitapide and mipomersen are 2 medications approved for LDL-C reduction in homozygous familial hypercholesterolemia. Lomitapide reduces VLDL and chylomicron production by inhibiting the microsomal triglyceride transfer protein (MTP) respectively in the liver and the gut. Therefore, lomitapide can reduce blood LDL-C by up to 50%. Due to its unique action mechanism lomitapide can induce reduction in fat absorption in the intestine and induce liver steatosis. Recent of an open label long-term extension study (mean duration 5 years) as shown that lomitapide maintains its lipid lowering efficacy with good tolerability however, it increased the amount of liver fat. During the extension trial, 21.1% patients experienced a ≥5× upper limit of normal increase in alanine aminotransferase or aspartate aminotransferase. Increases ≥5× upper limit of normal were typically associated with concomitant use of cytochrome P450 3A4 inhibitors or excess alcohol use. However, they were easily managed.

Mipomersen is a second-generation antisense oligonucleotide (ASO) that binds to apolipoprotein B (apoB) messenger RNA and therefore blocks translation. Mipomersen reduces VLDL, LDL and Lp(a) concentrations by around 25%. A recent study suggests that mipomersen can reduce cardiovascular events in severe familial hypercholesterolemia patients. However, the tolerability of this medication is very low due to injection site reactions and flu-like symptoms. Mipomersen, can also induce liver fat accumulation and raise liver enzymes. Both drugs can be used on patients undergoing lipoprotein apheresis.

References:

Santos RD et al. Eur Heart J. 2015;36:566-75
Familial hypercholesterolemia (FH) is an autosomal co-dominant disorder characterized by a marked elevation of serum low-density lipoprotein (LDL) cholesterol (LDL-C) concentration, which in turn is associated with a greatly increased risk of premature cardiovascular disease. International consensus recommends the use of statins as the first line of treatment for patients with this condition. However, homozygote FH patients with persistently elevated LDL-C levels are usually resistant to multiple-drug therapy. Fortunately, LDL apheresis (or simply ‘lipoprotein apheresis’) provides a treatment option for patients who are refractory or intolerant to lipid-lowering medications, or if there is progressive cardiovascular disease despite maximal drug therapy.

Lipoprotein apheresis is an extracorporeal LDL-C-lowering treatment similar in concept to renal dialysis. There are now five main methods for extracorporeal lipoprotein apheresis in use, namely dextran sulfate adsorption (DSA), heparin extracorporeal LDL precipitation (HELP), polyacrylate full blood adsorption (PFBA or DALI system) using hemoperfusion, immunoadsorption, and filtration plasmapheresis.

The high cost and invasive nature of lipoprotein apheresis limits uptake; however, it is an important treatment modality that should be considered in carefully selected patients.

At present, lipoprotein apheresis, combined with high-dose statin and ezetimibe therapy, is the best available means of treating patients with homozygous and statin-refractory heterozygous familial hypercholesterolaemia (FH).
Dr Hani Sabour (UAE)

Management algorithm for severe FH what do the guidelines say?

Severe familial hyperlipidemia can be recognized by particularly high levels of LDL-C in the range of 5–10 mmol/L (~200–400 mg/dL) in adulthood. Generally TG levels are normal, but can occasionally be raised in adults, particularly if they are obese. The typical HeFH patient may not in appearance conform at all to the clinician’s concept of a coronary-prone individual. CVD risk estimation methods based on multivariate risk equations alone are not sufficient to estimate the risk of individuals with FH. Furthermore, the risk related to HeFH can be substantially ameliorated by early treatment. Untreated, the majority of affected men and women will have symptomatic coronary disease by 60 years and half of the men and 15% of the women will have died. On the other hand, patients who start attending a lipid clinic before they develop clinical CAD may enjoy a normal life expectancy if well managed.

It cannot be overemphasized that the management of HeFH does not simply involve advice about a healthy lifestyle and the prescription of lipid-lowering drugs, but also involves ensuring that patients have prompt access to investigations to detect the presence of significant atherothrombotic disease. Ideally management of HeFH should involve a lipid clinic. Lifestyle advice, particularly about diet and the avoidance of smoking, is important in HeFH.

HoFH is always an extremely serious disease, which untreated leads to death typically in adolescence or early adulthood due to myocardial ischaemia or aortic stenosis. The worst prognosis occurs when both mutations lead to complete failure of expression of LDLR rather than to defective LDLR expression. Patients with suspected HoFH are promptly referred to specialist centres for a comprehensive ACVD evaluation and clinical management. Lifestyle intervention and maximal statin therapy are the mainstays of treatment, ideally started in the first year of life or at an initial diagnosis, often with ezetimibe and other lipid-modifying therapy. As patients rarely achieve LDL-C targets, adjunctive lipoprotein apheresis is recommended where available, preferably started by age 5 and no later than 8 years. The number of therapeutic approaches has increased following approval of lomitapide and mipomersen for HoFH. Given the severity of ACVD, we recommend regular follow-up, including Doppler echocardiographic evaluation of
the heart and aorta annually, stress testing and, if available, computed tomography coronary angiography every 5 years, or less if deemed necessary. We will review the guidelines emphasizing the need and methods of screening and assessment for atherosclerosis that are required in these patients and stepwise approach to early treatment and specialized lipid clinics.
FACULTY GUESTS
Dr. Fahad AL Zadjali has obtained PhD degree in molecular endocrinology in 2011. Currently Dr. Al-Zadjali is an assistant professor at Department of Biochemistry, College of Medicine & Health Science, at the Sultan Qaboos University. Dr Al-Zadjali research focus is on proteomic profiling of cellular proteins involved in modulation of hormonal sensitivity. Research involved on role of Growth hormone on disease modulation in non-alcoholic steatohepatitis and inflammatory bowl disease. Hormonal therapy in thymic rejuvenation in elderly subjects undergoing immunization and patients undergoing chemotherapy.

Dr Al Zadjali has expertise in complex heritability studies on metabolic syndrome and study lipid and blood glucose variability in extended families using measured genotype analysis. Similarily, analysis monogenic disorders using next generation sequencing. Technical expertise on complex genomic data analysis, proteomic analysis, Laboratory animal microsurgery, generation of genetic modified animals. Dr. Fahad is a national member of science commission at UNESCO. Dr Fahad is a focal point collaborator between Sultan Qaboos University and other European and American Universities.
Hani M. Sabbour is currently Consultant Cardiologist and Electrophysiologist at SKMC and also former Internal Medicine Residency Program Director at Al Ain Hospital, Al Ain, United Arab Emirates. He served as Director of Cardiac Arrhythmia and Electrophysiology at Landmark Medical Center in Rhode Island USA from 2003 until 2012.

Since January 2013, he has held an academic appointment as Clinical Assistant Professor Cardiovascular Disease at Warren Alpert School of Medicine, Brown University. He established a comprehensive Pulmonary Hypertension Center and PH registry at SKMC as well as leading the SEHA PH guideline writing team to complete the SEHA clinical practice guidelines in PAH.

Dr. Sabbour received his medical training at the Faculty of Medicine, Kuwait University, culminating in a medical doctorate in 1994 and awarded His Highness The Emir's Gold Medal with First Class Honors. He completed residencies at Kuwait Institute for Medical Specializations and SUNY Stony Brook – East Meadow Campus in 1995 and 1998, respectively. He was also Clinical and Research Fellow in clinical cardiac electrophysiology at Massachusetts General Hospital – Harvard Medical School, where he received ABIM Clinical Cardiac Electrophysiology Certification in 2003. He is ABIM certified in Internal medicine, Cardiovascular Disease, Cardiac Electrophysiology, Advanced Heart Failure and Cardiac Transplant, ECHO and Nuclear Cardiology. Dr. Sabbour has been involved in multiple clinical trials; his extensive research on cardiovascular diseases has been published in a number of industry-related publications. His clinical interests include integrated device therapy and CHF, correlative cardiac imaging, nuclear cardiology, arrhythmia management particularly atrial fibrillation, management of valvular heart disease, drug monitoring and management program and etc. Dr. Sabbour is currently a Fellow of the American College of Cardiology, Heart Rhythm Society and the American College of Physicians, and Egyptian American Medical Association.
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Dr. Khalid Al Rasadi was born in Oman where he studied medicine and obtained his Medical Degree in 1998. Dr. Al Rasadi got his postgraduate training in Medical Biochemistry at McGill University in Canada during the period of 2002-2006. He spent another two years in Canada, working as scientist at the Royal Victoria Hospital, McGill University, under the direct supervision of Prof. Jacques Genest. There he was able to perform a number of studies on the molecular genetics of familial hypercholesterolemia and hypoalphalipoproteinemia. In that period Dr. Al Rasadi also received strong training at the lipid clinic of the Royal Victoria Hospital, McGill University. He was also awarded a certificate in Clinical Lipidology by the National Lipid Association in the United State in 2008.

Dr. Al Rasadi is the Head of Department of Biochemistry at the Sultan Qaboos University Hospital in Oman. Dr. Al Rasadi is one of the founder members of the Oman Society of Lipid & Atherosclerosis (OSLA), and since then he contributed significantly in the recognition of OSLA as an active society nationally and internationally as key player in promoting scientific education and general awareness relating to lipid disorders and atherosclerosis through organizing conferences delivered by veritable experts in the field of lipid research, as well as public outreach activities.

Dr. Al Rasadi is a member of national and international medical associations and a member of Oman Medical Journal and BBA-Clinical journal editorial board. He has 32 publications and 1 chapter book (total Citations 156, H-Index: 8).
Dr. Khalid Al-Waili was born in Oman. He studied medicine in Oman and obtained his Medical Degree in 2001. Dr. Al Waili got his training in Medical Biochemistry at McGill University in Canada 2009. Then he spent two years in Canada, working as a fellow and Scientist in clinical Lipidology at the Royal Victoria Hospital, University of Canada, under the direct supervision of Prof. Jacques Genest, MD. There he was able to perform a number of studies on the molecular genetics of familial hypercholesterolemia and hypoalphalipoproteinemia. In that period Dr. Al Waili also received strong training in the Lipid Clinic of the Royal Victoria Hospital University of McGill, under the direct supervision of Prof. Jacques Genest, MD from 2009-2010. The National Lipid Association in the United States also awarded him a certificate in Clinical Lipidology in 2010.

Dr. Al Waili is a Senior Consultant at the Sultan Qaboos University Hospital (SQUH) and he is the Deputy Head of Department of Biochemistry at the Sultan Qaboos University Hospital (SQUH) in Oman. Moreover, he is a member of the Unit of Lipid and LDL-Apheresis at SQUH. Dr. Al Waili is a founder of Lipid & Atherosclerosis (OSLA) in 2012. In addition, he was trying to improve the recognition of OSLA as an active society nationally and internationally as a key player in promoting scientific education and general awareness relating to lipid disorders and atherosclerosis through mini-conferences, organization of plenary lectures delivered by veritable experts in the field of Lipid research, as well as public outreach activities.

Dr. Al Waili is a member of national and international medical associations. He has several publication and one chapter book in the field of lipid and atherosclerosis.
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Dr. Al-Sayed graduated from Arabian Gulf University, college of Medicine in Bahrain. She is American Board Certified. She completed her Residency training in Internal medicine at Sinai-Grace Hospital, Wayne State University, Detroit, Michigan, USA and Fellowship training in Endocrinology and Diabetes at Cleveland Clinic Foundation, Ohio, USA. Dr. Al-Sayed is also American Board Certified in Clinical Lipidology and a fellow of American College of Physicians and fellow of American College of Endocrinologists. She has worked as assistant professor at Arabian Gulf University and is currently the Medical Director at Gulf Diabetes Specialist Center in Bahrain. Dr. Al-Sayed is a member of the National Lipid Association and other Diabetes and Endocrine Associations and has several research publications. She is a member of Board of Directors of the American Association of Clinical Endocrinologist, Gulf Chapter and a member of expert panel for Middle East Familial Hypercholesterolemia guidelines and FH Gulf registry. She is the national lead investigator for FH in Bahrain. Dr. Alsayed participated with expert panel and published first consensus recommendation for management of plasma lipid disorders for Middle East 2016.
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Raul D. Santos, MD, MSC, PhD, is Director of the Lipid Clinic of the Heart Institute (InCor) of the University of São Paulo, Brazil. He is associate professor of the Cardiopulmonary Disease Department at the University of São Paulo medical school and one of the coordinators of the “Hipercol Brasil” Familial Hypercholesterolemia Genetic Cascade Screening Program. He is also Scientific Advisor of the Preventive Medicine Centre and Cardiology Program of the Hospital Israelita Albert Einstein in São Paulo. After completing his training in cardiology Dr. Santos obtained master and PHD degrees in food science at the University of Sao Paulo. His research interests include lipid metabolism, severe forms of genetic dyslipidemias, especially familial hypercholesterolemia and HDL deficiency, non-alcoholic fatty liver disease and imaging in atherosclerosis especially detection of vascular calcification. He has published more than 200 papers in peer-review journals like the Lancet, The New England Journal of Medicine, Atherosclerosis, ATVB, Circulation, The European Heart Journal, JACC, Journal of Lipid Research, Lancet Diabetes & Endocrinology and Current Opinion of Lipidology among others. Dr. Santos has coordinated and participated in many Brazilian and International guidelines on dyslipidemia, familial hypercholesterolemia, atherosclerosis prevention, metabolic syndrome, obesity, diabetes and coronary heart disease. He is the current scientific director (2016-2017) of the Brazilian Society of Cardiology (SBC), president elect (2019-2021) of the International Atherosclerosis Society (IAS), a member of the Consensus Panel on Dyslipidemias of the European Atherosclerosis Society (EAS) and is the vice president of the Iberoamerican Familial Hypercholesterolemia network (IBAFHN). In addition, he is one of the associate editors of Atherosclerosis, the Journal of Clinical Lipidology and the European Journal of Preventive Cardiology.
Dr Wael Abdulrahman Almahmeed is a Consultant Cardiologist at the Heart and Vascular Institute in Cleveland Clinic Abu Dhabi. He is also a Clinical Associate Professor at the UAE University and has an Adjunct Staff position at Cleveland Clinic, Ohio.

Dr Almahmeed completed his undergraduate medical training at the Medical School in the University of Southampton, England. He continued his postgraduate studies in Internal Medicine and Cardiology at the University of British Columbia, Vancouver, Canada. This was followed by a fellowship in Echocardiography at the same institution.


He is a foundation member of the Gulf Heart Association and the Emirates Cardiac Society. Under his leadership in the Emirates Cardiac Society, the Society won the bid to host the World Congress of Cardiology in Dubai in 2012, the World Tobacco or Health Congress in Abu Dhabi in 2015, the Asia Pacific Congress of Cardiology in Abu Dhabi in 2015 and World Congress of Pediatric Cardiology in 2016. He also established an annual meeting for the Emirates Cardiac Society in UAE. He is the past president of the Emirates Cardiac Society and the Gulf Heart Association. He is the current president Elect of the Asia Pacific Society of Cardiology and the current Governor for the American College of Cardiology Gulf Chapter. In 2000, he initiated World Heart Day in the UAE. Today it is celebrated by many institutions across the country.

During his tenure as Deputy Chief Medical Officer, at Sheikh Khalifa Medical City (SKMC) he was chair of the Quality steering committee. Under his leadership,
SKMC was one of the first hospitals in Abu Dhabi to receive Joint Commission International Accreditation in 2008.

Under his leadership, SKMC was the first center in the Middle East to be accredited as a Chest Pain Center in 2009, and again in 2012. In 2012, SKMC Echo department was accredited by the European Association of Echocardiography. His hospital was the first overseas center to participate in the American College of Cardiology’s NCDR Action and Cath PCI Registries.

In 2004, he established the first center in the Middle East that provided 24/7 Primary PCI. Following that, his department became the most comprehensive cardiac department in the UAE, providing all the necessary services from Electrophysiology, Adult Congenital Heart Disease to Rehabilitation. In 2014, his department was awarded as a center of excellence, by the American College of Cardiology.

In 2013, he initiated the first Cardiology Fellowship Program in the UAE. As Chair of the CME committee, at the Health Authority, he established mandatory CME hours for health care professionals and also established a system for CME accreditation.

Dr Almahmeed's research interests include Coronary Artery Disease prevention in the developing countries, Hypertension, Dyslipidemia, and Registries on Acute Coronary Syndromes, Heart Failure and Atrial Fibrillation. He was the national coordinator for the Inter-Heart Study. He was on the steering committee of the Gulf Race, Gulf Coast, Gulf Care and Gulf Safe Registries. He has over 150 publications to his credit, and was the national coordinator for a number of Multi-Center Trials including Elixa, Examine and Garfield Trials. He is currently a Co-Investigator of the Gulf FH registry and the Gulf Dyspnea study.

Dr Almahmeed's expertise is in non-invasive Cardiology/Echocardiography and Heart Disease in Pregnancy.
NOTES
This activity has been made possible thanks to the sponsorship of Amryt and Amgen.