The 2012 ESC Guidelines on Heart Failure

The latest Guidelines feature new evidence on diagnosis, drugs, and devices

The ESC Guidelines for the Diagnosis and Treatment of Acute and Chronic Heart Failure 2012 were developed by the European Society of Cardiology (ESC) in collaboration with the Heart Failure Association (HFA) of the ESC.

They were presented for the first time in May 2012 at the Heart Failure Congress in Belgrade, Serbia, and are published in full, in this EJH issue and in European Journal of Heart Failure. There are a number of new features since the last ESC Guidelines on this topic were published in 2008.

In the area of diagnostics, there is a new biomarker called mid-regional pro-A-type natriuretic peptide.

In pharmacological treatments, two new drugs are discussed: ivabradine and the mineralocorticoid receptor antagonist eplerenone. New evidence with the latter drug has extended the indication for mineralocorticoid receptor antagonists, meaning that for many patients, standard therapy should include three neurohumoral antagonists—an angiotensin-converting enzyme (ACE) inhibitor [or angiotensin receptor blocker (ARB)], a beta-blocker and, if symptoms persist, now a mineralocorticoid receptor antagonist as well.

In devices, there is a new indication for cardiac resynchronization therapy (CRT) in patients with mild symptoms. There is also more clarity about the effects of CRT—it is clear that patients with left bundle branch block QRS morphology and those who are in sinus rhythm have the greatest benefit from CRT; conversely, those who have a non-left bundle branch block QRS morphology, and patients in atrial fibrillation have less certain benefit. ‘This is because more evidence from new trials and further analysis of existing trials has emerged since the last Guidelines were published’, says Prof. John McMurray (Glasgow, UK), chairperson of the Guidelines Task Force.

Also in the device arena, new transcatheter valve interventions are discussed, offering the possibility of treatment for aortic stenosis in patients unsuitable for surgery.

In surgery, there is new information about the role of coronary artery bypass based on the long-awaited results of the Surgical Treatment for Ischemic Heart Failure (STICH) trial. Also, Left Ventricular Assist Device (LVAD) technology has improved; the devices are more reliable and lead to fewer complications. ‘Increasingly there is probably a place for these devices as a treatment in their own right, not just as a temporary support while awaiting transplantation’, says McMurray. ‘It is controversial and we had a lot of discussion about it’.

The Task Force took a new approach to lifestyle interventions, such as restricting salt intake, which sound good in principle, but do not have robust support from clinical trials. These interventions remained in the Guidelines but, unlike in 2008, did not receive a class of recommendation or level of evidence.

Another new approach was to link the class of recommendation or level of evidence more clearly to the effect of the intervention. The change came about because it seemed unfair to give two interventions the same grading when one lowers, say, pulmonary capillary wedge pressure whereas the other reduces all-cause mortality. This increased focus on whether treatments improve important clinical outcomes led to some treatments receiving a lower recommendation than in the previous Guidelines. For example, the use of nitrates in the management of patients with acute heart failure was downgraded from a class I, level A, to a class IIa, level B, recommendation. The original higher recommendation was based on the acute haemodynamic effects of nitrates. The lower recommendation in the 2012 Guidelines reflects the higher emphasis placed on symptoms, hospitalization and mortality in the grading process.

The Task Force readily agreed on 95% of the issues, while the remainder merited more discussion and received a lot of comment from the guideline reviewers. The relative value and place of different imaging modalities in the diagnosis of heart failure received the most comment. Transthoracic echocardiography is still recommended as the first-line imaging investigation in patients with suspected heart failure because of its wide availability, safety and because it is relatively inexpensive. However, the high-quality images generated by CMR and the value of this technique in the assessment of congenital heart disease and infiltrative myocardial diseases, as well as its growing role in the assessment of ischaemia and viability, were recognized. The role of other imaging modalities, including nuclear techniques and CT angiography, is also discussed in the Guidelines.

In pharmacological treatment, the two big discussion points were ivabradine and intravenous iron therapy. The concern about ivabradine was that it should not be added before beta-blocker dosing is optimized. ‘Beta blockers are longer established, more effective, certainly a lot less expensive, and really should be given first’, says McMurray. When attempting to reduce the heart rate, they felt it was important to maximize the dose of beta-blocker before giving ivabradine. However, patients with a persistently high heart rate, despite an evidence-based dose of beta-blocker, should then be considered for ivabradine.

Another discussion point was the use of intravenous iron therapy in iron-deficient patients. The Task Force was uncertain about whether to make a recommendation based on a single trial with relatively small numbers of patients, short-term follow-up and ‘soft’ endpoints (symptoms, quality of life, exercise...
Heart Failure Congress 2012

The Congress highlights, including drugs and devices for treating heart failure, are summarized by Jennifer Taylor, MPhil

Four days of scientific sessions were devoted to the latest advances and controversies in heart failure at this year’s Heart Failure Congress 2012. Held 19–22 May 2012 in Belgrade, Serbia, the congress was organized by the Heart Failure Association (HFA) of the European Society of Cardiology (ESC) in conjunction with the European Section of the International Society for Heart Research and the ESC Working Group on Myocardial Function.

Devices are one of the hottest topics in heart failure today and were the subject of this year’s main theme, ‘Treatment of heart failure: integrating pharmacology and technology’. Traditionally, heart failure has been treated with drugs and weight control, but the advent of novel devices including implantable cardioverter defibrillators, cardiac resynchronization therapy (CRT), left ventricular assist devices, and telemedicine has revolutionized the field. ‘Pharmacology remains a fundamental part of management but extending it to include diagnostic technology, monitoring technology, and devices for treatment and management is of key importance’, says Professor Piotr Ponikowski, President of the HFA.

Heart failure specialists discussed emerging developments in the field including the new class of angiotensin receptor neprilysin inhibitors. Twenty-five years after, the landmark CONSENSUS trial showed for the first time that angiotensin-converting enzyme-inhibitors prolong life in patients with heart failure, a session tackled the question, ‘Are ACE inhibitors still the gold standard?’.

Sessions were devoted to new devices for therapy and patient monitoring and controversies over when to use CRT (e.g. patients with atrial fibrillation or a narrow QRS). ‘There are subgroups of patients where it’s controversial whether the benefit is there or not’, says Prof. Stefan D. Anker, President-Elect of the HFA. ‘There is a big cost argument also. These devices don’t come for free and of course many want to maximise the benefits to cost ratio when the number of devices they can implant is limited’.
Stefan D. Anker

The latest science in heart failure was presented in the abstracts. A study from Zurich, Switzerland, revealed that statins prevent cancer and reduce death from all causes in heart transplant recipients.

The study investigated the impact of statin therapy on the occurrence of cancer and death from all causes in heart transplantation recipients. It included all 255 patients who underwent heart transplantation at the University Hospital Zurich between 1985 and 2007 and were alive after the first year. The primary endpoint was the occurrence of any cancer and the secondary endpoint was overall survival.

During follow-up, cancer was diagnosed in 108 patients (42%). Statins reduced the risk of any cancer by 65% (P = 0.0001). Eight years after transplantation, the cumulative incidence of tumors was 34% in patients not receiving a statin compared with 13% in patients receiving a statin (P = 0.003). The benefit persisted at the 10-year (39 vs. 18%) and 12-year follow-up (42 vs. 22%).

Statins were associated with improved cancer free and overall survival (both P = 0.0001). The beneficial effect of statins on preventing cancer and reducing death from all causes was independent of patients’ cholesterol levels. This suggests that the benefit of statins was due to their immunomodulatory effects.

A study from Pristina, Kosovo, showed that obese adolescents with no symptoms of heart disease already have heart damage. They had damaged hearts with thicker walls, and the systolic and diastolic function of their hearts was impaired. Both structural and functional measures correlated with body mass index. These findings may explain why obesity is a risk for heart disease. More studies are needed to show whether the heart damage in obese adolescents can be reversed if they lose weight.

A study from Wroclaw, Poland, showed that Nordic walking enables heart failure patients to exercise more intensely than walking without poles. In patients with heart failure, compared with walking without poles, Nordic walking increased VO₂ by 2.9 ml/kg/min (14.7%) and respiratory quotient by 18%. The peak heart rate was 15 b.p.m. higher, maximal blood pressure was 10 mmHg higher, and the fatigue level was increased by two points. All results were significant (P = 0.05).

‘In Nordic walking we have a big workload because we use additional muscle groups’, says lead author and physiotherapist Andrzej Lejczak. ‘We walk with four limbs, so we’re exercising our arms and legs at the same time—that’s why we have such a beneficial response’.

The Congress also hosted the first presentation of the ESC Guidelines for the Diagnosis and Treatment of Acute and Chronic Heart Failure 2012 by Prof. John J.V. McMurray (Glasgow, UK) [see CardioPulse article issue X]. Prof. Gregory Y.H. Lip (Birmingham, UK) launched ‘Thromboembolism and antithrombotic therapy for heart failure in sinus rhythm’, a consensus document from the HFA which has been endorsed by the ESC Working Group on Thrombosis.

The Congress attracted cardiologists, internists, general physicians, basic scientists, epidemiologists, nurses, and industry affiliates. For the first time at any of the ESC congresses, there was an entire track of sessions in the local language (Serbo-Croatian).

Heart Failure Congress 2012 promotes integration of pharmacology and technology

Highlights of Heart Failure 2012, from Belgrade, Serbia (19–22 May), included the launch of new guidelines on diagnosis and treatment, and a consensus document on antithrombotic therapy for heart failure (HF) patients in sinus rhythm. The meeting, organized by the Heart Failure Association (HFA) of the European Society of Cardiology (ESC), additionally featured original research in the form of 14 late-breaking clinical trial updates presented over two sessions, and 1078 abstract studies.

Hosting the meeting in Serbia was a deliberate policy of the HFA. ‘We went out of our way to facilitate participation from Eastern European cardiologists, as we’re aware the system of management of heart failure patients in the East lags behind Northern Europe’, explained Professor Petar Seferovic, the Scientific Chairperson of the Programme Committee. To attract local participants, six sessions were held in the Serbo-Croatian language, covering the most important diagnostic and therapeutic aspects in HF, including guidelines.

The theme for Heart Failure 2012 was the integration of pharmacology and technology in the era of personalized HF management. Indeed, both themes featured prominently in the meeting’s 71 scientific sessions and also in the 2012 ESC Guidelines for the Diagnosis and Treatment of Acute and Chronic Heart Failure. The HF Guidelines were presented for the first time at the Heart Failure congress as opposed to the annual ESC congress. ‘This offered us much more
opportunity for detailed discussions’, said Piotr Ponikowski, the out-going president of the HFA.

In the pharmacological section of the guidelines, the two main changes compared with the 2008 edition concerned an expanded indication for mineralocorticoid (aldosterone) receptor antagonists and a new indication for the sinus node inhibitor ivabradine (Procoralan). The guidelines recommended mineralocorticoids for all patients with persistent symptoms and reduced ejection fractions despite treatment with an angiotensin-converting enzyme-inhibitor (or, if not tolerated, an angiotensin receptor blocker) and a β-blocker. Furthermore, the guidelines recommended ivabradine as an add-on treatment for patients who remain symptomatic with reduced ejection fractions and elevated heart rates. But when attempting to reduce heart rate, the guidelines stressed, the dose of β-blocker should be maximized before prescription of additional medications to reduce heart rate.

In the device section, left ventricular assist devices (LVADs), which until now have been used as a temporary measure for patients awaiting heart transplants, were hailed as ‘a step change’ in the management of HF that could be used as a treatment in their own right, not just a temporary support while awaiting transplantation.

Cardiac resynchronization therapy (CRT) gained a class I, level A indication for treating non-arrhythmic, moderate-to-severe HF patients with a QRS duration of 130 ms or longer, left bundle branch morphology, and ejection fraction of 35% or less.

For diagnosis, the guidelines added the new biomarker mid-regional atrial (or A-type) natriuretic peptide (MR-pro ANP), as well as newer imaging methods such as 3D echocardiography and strain/speckle imaging.

On Sunday Gregory Lip, from Birmingham UK, launched ‘Thromboembolism and antithrombotic therapy for heart failure in sinus rhythm, a consensus document from the HFA, endorsed by the ESC Working Group on Thrombosis’. Giving the background to the consensus document, Lip explained that epidemiological data have linked HF to an increased risk of thrombosis, leading to sudden death, stroke, and systemic thromboembolism. Indeed, the incidence of ischaemic stroke has been reported to be 18 per 1000 patients in the first year following HF diagnosis, increasing to 47 per 1000 patients by 5 years.

The Task Force, convened to produce a joint consensus, concluded that patients with HF should be proactively screened for atrial fibrillation (AF).

For those found to have AF, oral anticoagulation was recommended. However, the CHA2DS2-VASc and HAS-BLED scores should be used to determine the likely risk—benefit ratio of oral anticoagulation, i.e. thrombo-embolism prevention vs. risk of bleeding.

If anticoagulation is used, the combination of an oral anticoagulant with an antiplatelet agent was not recommended in patients with chronic coronary or other arterial disease due to the high risk of serious bleeding and lack of clear benefit. Given no overall benefit for warfarin on rates of death and stroke, taken together with the increase in major bleeding, the consensus felt there to be no compelling reason to use warfarin routinely for all HF patients in sinus rhythm. But this does not prevent new anticoagulants with different risk—benefit profiles from offering attractive therapeutic options. But the benefit will need confirmation in clinical trials.

New for 2012 were the Rapid Fire Sessions, where the 16 best original abstracts were presented in a new format over two sessions. ‘Each presenter was given just four minutes to sum up their data and the chairman just a minute for questions and comments. This novel approach made everyone really concise’, said Ponikowski, from the Military Hospital, Wroclaw, Poland.

Rapid Fire presentations included the optimal testing of HF patients in care homes, catheter renal denervation in the treatment of patients with advanced HF and a systematic review of HF patients reporting side effects from β-blockers.

On Tuesday, one session focused on the new approach of ‘person-centred care’, involving the development of partnerships between health providers and patients and shared decision-making. Another on Monday looked at the evolving field of cardiovascular biomarkers in HF (with new biomarkers including ST-2, Galectin-3 and high-sensitivity troponin) which are guiding therapy of both acute and chronic HF.

Professor Stefan Anker, who became president of the HFA at the General Assembly, outlined his plans to develop the association’s online education platform which was launched at the meeting. Anker, from the Charité Medical School, Berlin, explained how he hoped to raise public awareness of HF as a major health-care problem requiring more research, clinical testing, political attention, and innovative therapies. ‘Raising awareness would undoubtedly help patients achieve a quicker diagnosis, and encourage more young physicians and scientists to enter the field’, he said.

Janet Fricker
Novel pharmacotherapies for heart failure

Could inotropic drugs end the drought in novel pharmacotherapies for heart failure?

It has been around 20 years since a new drug for acute heart failure was launched in Europe. But it’s not due to inactivity. A number of drugs have been tested, including cAMP-related inotropes, nesiritide, tolvaptan, endothelin antagonists, TNF-α antagonists, moxonidine, flosequinan, and adenosine antagonists. Many seemed biologically plausible, but the results of large trials were neutral or even harmful. People argued about the reasons for the disappointing findings, saying they were due to the wrong dose, receptor subtype, population or timing, or that there were off-target effects.

Drug companies have spent hundreds of millions of dollars developing agents that fail to reach the market and heart failure specialists are becoming increasingly cynical that a new drug will ever materialize. Regulators on both sides of the Atlantic—the US Food and Drug Administration and European Medicines Agency (EMA)—have met with trialists and heart failure experts in an effort to discover why developing new drugs for acute heart failure is so difficult.

‘Our understanding of the body’s response to acute heart failure and how to restabilise a patient is not as good as it should be’, says Professor Martin R. Cowie, professor of cardiology at Imperial College London and honorary consultant cardiologist at the Royal Brompton Hospital in London, UK.

‘It’s a complex syndrome’, he adds. ‘We’re not clear what endpoints we should be measuring nor how to identify promising agents at a phase II level. We need to understand the biology better’.

Many drugs improve haemodynamics in the short term but increase risk in the longer term. One question is how long patients need to be followed up in order to identify this increased risk.

Some drug companies have lost interest in the field, while others are investing in it because hundreds of thousands of patients could potentially use such therapies. Smaller companies have tended to develop a molecule and do the animal studies but license the agent out to larger companies when it is ready for a large trial.

It’s not all doom and gloom. In the last 12 months, two major studies have delivered positive results in chronic heart failure. In EMPHASIS-HF eplerenone, an aldosterone antagonist, reduced the risk of hospitalization for heart failure or death from cardiovascular causes among patients with systolic heart failure and mild symptoms by 37%. The SHIFT study showed that lowering heart rates with ivabradine led to an 18% reduction in the risk of cardiovascular death or hospitalization for worsening heart failure. Eplerenone and ivabradine are likely to be licensed for chronic heart failure by the EMA in the near future.

Novel inotropes are another area of development. Inotropes have traditionally worked by raising levels of cyclic AMP within the myocyte and increasing the force of contraction. But while they could save a patient at death’s door, they also increased arrhythmias and the risk of death in the medium term. ‘In the past inotropes have got a very bad name because although they improve the haemodynamics the evidence is that they actually shorten life, so we try and avoid them unless we’re in a rescue situation’, says Cowie. A number of novel inotropes are in various stages of development.

(i) Istaroxime works on the sarcoplasmic reticulum calcium pump and on the potassium sodium exchange pump in the cell membrane. In animal models, it increases contraction and improves relaxation without increasing myocardial oxygen consumption. The Phase II dose-ranging study HORIZON-HF of 120 patients showed that it increased blood pressure and dropped wedge pressure with no change in ejection fraction. Development was put on hold because the intravenous therapy produced pain at the site of injection. Discussions are underway about delivering the drug via a liposomal complex.

(ii) Ryanodine receptor stabilizers are creating a lot of excitement in the basic science world. The ryanodine receptor controls the release of calcium from the sarcoplasmic reticulum into the cell cytosol. In heart failure, the receptor is leaky. Calcium oozes out, reducing stores required for good contraction and increasing levels during diastole which inhibits relaxation.

Drug companies believe that the ryanodine receptor stabilizer could be anti-arrhythmic and could potentially improve cardiac contraction. Several agents are being developed, including Servier’s S44121 which is being evaluated in a Phase II study.

(iii) Myosin activators stimulate the cardiac myosin motor protein, increasing cardiac contractility without changing intracellular calcium levels or increasing arrhythmia. They
differ substantially from the old inotropes, which increased contraction but also increased calcium flux and potential to arrhythmias. A Phase IIb trial of 600 patients with systolic acute heart failure is investigating the effects of 48 h of intravenous therapy and is expected to complete at the end of 2013.

Inotropes are not the only hope for heart failure. Other potential therapies include Relaxin (a vasodilator) and gene therapy. Cowie believes that novel inotropes look promising but is cautious about being too optimistic. He says: 'I would be surprised if we don’t get something new for acute heart failure in the next 10 years or so'.

Jennifer Taylor, MPhil

References

Heart failure: a vision for the future

With the unrelenting rise in heart failure, there is a growing consensus of the need for a new type of physician, better skilled and equipped to deal with this 21st Century epidemic

Prof. Lüscher, MD, FRCP, Chairman of the Department of Medicine and Cardiology, and Director of Cardiovascular Research at the Institute of Physiology, both of Zurich University, Switzerland, believes that there is an urgent need for doctors skilled not only in traditional treatments and drug therapies, but also in utilizing and optimizing an increasingly sophisticated array of invasive devices to deal with the challenges of an ageing and increasingly heart failure-prone population.

‘The field has changed substantially and we need a new doctor who knows about drugs and also how to be able to deal with implantable defibrillators and pressure devices which have become increasingly sophisticated over recent years’.

That heart failure patients are by nature unstable and often cared for in emergency room scenarios reinforces the argument for equipping doctors with specialist and hands-on knowledge of new devices. Relying on four or five doctors with different specialities to treat heart failure patients is neither realistic nor in the best interests of the patient or physician.

A new type of doctor, according to Prof. Lüscher also calls for an overhaul in the training system and for the establishment of specialist departments or institutes based on a one-stop-shop approach to caring for heart failure patients.

Skills wise, the new doctor will need to dovetail therapy with the skills of an expert in imaging and devices and this requires the creation of a new sub-speciality. It is envisaged that training would start at the point of specialty training and cover not only a stint in the heart failure clinic, but more in-depth training in imaging and devices. The ideal would be a sub-specialization similar to interventional cardiology with a new curriculum.

‘In the past, doctors just attended a heart failure clinic after their basic training, now they need to go to the echocardiography laboratory and learn more about dyssynchrony and all the parameters that are essential to assess whether patients are suitable for cardiac resynchronisation therapy (CRT). They also have to learn to programme devices optimally because drugs and devices make for a very fine interplay. It’s similar to when angioplasty was introduced and the doctor moved from diagnosing the problem to actually treating it’.

Prof. Lüscher suggests that a 2-year curriculum would be appropriate to equip a doctor with a broad enough expertise to start making a real impact. If the new training regime were to begin within a year, it would take between 3 and 5 years for the new doctors to come through.

The need for a new vision is based on Prof. Lüscher’s clinical experience and his long-standing involvement in the European Society of Cardiology (ESC). The logistics involved in re-organizing institutions would only require adaptation of the curriculum for the heart failure subspecialist to enable doctors to train in devices and imaging in the lab alongside the theoretical and practical training.

Heart failure doctors have themselves come forward to support the proposals, and the heart failure committee of the ESC has identified a need to improve the care of sick and unstable heart failure patients. It is argued that these patients have distinct needs from relatively stable rhythm disorder patients who are generally dealt with by electrophysiologists and a single heart failure doctor.

Thomas F. Lüscher
would be better equipped to treat them than a range of healthcare practitioners.

While the benefits will need to be demonstrated at a later date, Prof. Lüscher has no doubt that patients will reap better outcomes from being treated by this new kind of doctor and that it will prove a more efficient way of organizing care.

Another advocate of the proposals is Frank Ruschitzka MD, FESC, FRCP, Prof. and Head of Heart Failure at the University Hospital in Zurich. He says it is imperative that heart failure physicians make the transition from drug doctor to being able to manage a range of therapies ranging from diagnosis, through to implantation, to follow-up and optimalization. Prof. Ruschitzka’s argument for training plumbers to become electricians is a compelling one, born of experience.

He says: ‘Device implantation was traditionally done by electrophysiologists who were themselves not specialised in treating heart failure symptoms, but the development of new device-based technology, particularly in the case of CRT and implantable cardioverter defibrillators, which measure and monitor a range of variables such as pulmonary pressure and water content with a view to optimising treatment, suggest the hybrid approach is a sensible one’.

‘So called invasive monitoring devices that after implantation deliver data would normally have been fitted by electrophysiologists, but as the data is of no interest to them, we should enable the heart failure doctor to implant them and then he can interpret the data for the benefit of the patient. Device doctors should be part of the heart failure team and not part of the electrophysiology team; modern device therapy requires a doctor who is a heart failure doctor, imaging specialist, and device therapist hybrid’.

Prof. Ruschitzka acknowledges that there may be reluctance on the part of some electrophysiologists to support a venture which on the surface appears to propose putting them out of business, but he points to many of the leading electrophysiologists who are supportive. ‘We’re just bringing everyone together in the interests of the patient who gets a one-stop-shop and benefits from it’.

‘This is something new and interesting and the cake is big enough for everyone to take a share. In the end we will have a lot more patients who get life saving therapy and I think we have to overcome any hurdles in our way to achieve this’.

Judy Ozkan, MA
Book review

Cardiac Biomarkers—Expert Advice for Clinicians

Editor: Alan S. Maisel, University of California, San Diego
Publisher: Jaypee Brothers Medical Publishers (P) Ltd.

It was my pleasure to review the book Cardiac Biomarkers—Expert Advice for Clinicians edited by Alan Maisel. Those who know Alan personally will not be surprised to see the outstanding faculty he was able to group together as authors for this book. Alan has terrific networking skills, a talent that is of utmost importance when it comes to editing a great book.

According to good scientific practice, I would like to highlight my potential conflicts of interest for this review at the very beginning. Alan and many of the experts contributing as authors to this book have become close colleagues and friends over the last decade. This could potentially make me a too enthusiastic reviewer.

On the other hand, I had the privilege to work with other experts in the field and edit a book on a very similar topic, which was also published just recently. This could potentially make me a too critical reviewer.

The purpose of the book is nicely worded in the introduction: ‘make good doctors better’. I very much hope that this review will help to bring this fantastic book to the attention of as many clinicians as possible and motivate them to use it to obtain up-to-date background knowledge regarding tools they use every day clinically, such as cardiac troponin and natriuretic peptides. Biomarkers have become essential clinical tools in the early diagnosis of acute myocardial infarction and the early diagnosis of heart failure, as well as potentially helpful tools in many other indications. Beyond doubt, Cardiac Biomarkers—Expert Advice for Clinicians will achieve its purpose. Congratulations Alan & co-workers!

Cardiac Biomarkers—Expert Advice for Clinicians is divided into five sections: markers of cardiac risk, markers of cardiac ischaemia, natriuretic peptides for heart failure, biomarkers in cardio-renal disease, and looking into the future. The book combines an update on established markers and established indications, as well as a detailed discussion of markers that are considered more experimental and may still have some way to go to become clinically useful, such as, the OxPL/apoB assay, the kidney injury markers, Galactin-3, ST2, and others.

The chapters are written by world experts in their fields and often co-authored by local co-workers. The book is well structured and uses ‘American textbook-style’ with all its advantages and disadvantages. Reading takes some time, but provides many important details. Most chapters are extremely well written, very up-to-date, well illustrated, and well referenced. Unmet clinical needs are nicely highlighted. Some may argue that some chapters including the one on OxPL/apoB appear somewhat too long and off target for clinicians. Still, most of the 230 pages describe aspects that are of high clinical relevance. The more background knowledge we as clinicians have regarding the tools we are working with, including the patient history, physical examination, the ECG, and biomarkers, the more successful we will be able to prioritize and integrate all the information provided by all these tools, to the benefit of our patients.

Christian Mueller, MD
Level of education and heart failure

Dr Eva Prescott discusses the increase in heart failure with lower levels of education

In contrast to coronary heart disease and cerebrovascular disease, heart failure has increased in recent decades: in the US hospital admissions for heart failure increased by 131% between 1980 and 2006. With the ageing population, the absolute number living with heart failure will continue to rise. Thus, the prevention of heart failure represents an important challenge.

It is well accepted that there is a socioeconomic divide in coronary heart disease in most if not all countries, but very little is known of the link between socioeconomic deprivation and heart failure. A handful of studies indicate that there is a socioeconomic gradient in hospital admissions and mortality from heart failure, the size of which is not negligible: Reported hazards range between 22 and 100% of increased risk comparing low with high socioeconomic levels. Based on more than 18,000 participants free of heart disease at the baseline who were followed for 21 years, we recently reported a similar gradient with educational attainment in the Copenhagen City Heart Study. The age-adjusted hazard ratio for high level of education vs. low was 0.52 and was equally present in men and women. The magnitude of the risk attributable to socioeconomic disparity is thus comparable to the risk associated with life-style risk factors such as smoking and physical inactivity.

With coronary heart disease, the aetiology behind 50–70% of systolic heart failure, the socioeconomic gradient seen in coronary heart disease should translate to heart failure. As in other studies, the Copenhagen study participants with lower levels of education were more likely than people with higher education to have an unhealthy lifestyle: to smoke, be sedentary, have higher alcohol consumption, higher body mass index (BMI), higher cholesterol levels, and more psychosocial stress. A large study recently published found that persons with four healthy life styles (BMI < 25, adequate vegetable consumption, non-smoking status, and physical activity) vs. none had a 70–80% reduced risk of developing heart failure during a 14-year follow-up. Consequently, there is a huge potential for primary prevention of heart failure particularly in the economically deprived.

Not all heart failure is related to life style. In the Copenhagen study, the socioeconomic gradient was equally found in heart failure unrelated to coronary heart disease. Further, when adjusting for life style-related cardiovascular risk factors, the protection offered by higher levels of education was only slightly attenuated, indicating that only a minor part of the social gradient would be amenable to intensified life-style intervention. Thus, the education level is also a proxy for other unspecified risks. These include differences in access to and use of health-care facilities and compliance with medical treatment. It is well documented from cardiac rehabilitation studies that the likelihood of successful completion of cardiac rehab and of life-style modification depends on socioeconomic factors such as the educational level.

The Copenhagen study also points towards new potential pathways. Echocardiography was performed in a random subset of 3589 participants and demonstrated a socioeconomic gradient in findings indicative of both systolic and diastolic dysfunction. Thus, a socioeconomic gradient seems to be apparent even in the early stages of heart failure, years before the development of clinical heart failure. This is similar to other studies reporting early echocardiography changes related to cholesterol levels and BMI in apparently healthy subjects from the general population and may be seen as a parallel to studies showing that life-style factors such as obesity and sedentariness, even in children and adolescents, is associated with vascular dysfunction.

Unfortunately, the decline in coronary heart disease seen in recent years is accompanied by widening inequalities in several countries. The same is likely to be true for heart failure. Preventive measures to reduce heart failure need to address these disparities. Future studies will elucidate how socioeconomic factors such as educational attainment impact cardiovascular health at early stages and how this knowledge may be implemented in primary prevention. Meanwhile, increased awareness of the socioeconomic divide in heart failure is a first step.

Eva Prescott, MD, DMSc

References


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