The annual ESC congress arrived in London, UK, for the 2015 edition of this renowned event that remains the largest cardiology meeting in the world. London is a vibrant, metropolitan city immersed in history and was able to offer delegates a background of historic splendours alongside its more modern attractions; it proved to be a fitting host for such a prestigious gathering.

Over 11,300 abstracts were submitted, with more than 4,500 selected for presentation to an audience of over 32,700 healthcare professionals in attendance during the 5 days. Such a wide pool of interest underlines the ever-growing significance of revolutionary discoveries and emerging treatments across the field of cardiology, a trend that will only grow in the years ahead. The ESC President, Prof Fausto Pinto, used his address during the inaugural session to highlight the significant challenges currently facing cardiologists: “Cardiovascular disease is a major cause of death in Europe and worldwide and, despite recent decreases in mortality rates in many countries, it is still responsible for over 4 million deaths in Europe, close to half of all the deaths, at an annual cost to the region’s economy estimated at about €200 billion.”

Despite the scale of the task ahead, there is no doubt that cardiologists are rising to the challenges facing them, with evidence of the brilliant work currently being undertaken.
clearly evidenced during the awards ceremony that honoured exceptional individuals in the field. The ESC Gold Medal was awarded to three cardiologists recognised for their exceptional contributions to medicine: Prof Keith Fox (UK), Prof Michel Haissaguerre (France), and Prof Richard L. Popp (USA). The Nursing/Allied Professional Investigator Award, which aims to recognise outstanding contributions to the understanding, prevention, and treatment of cardiovascular diseases, was given to Dr Chi-Wen Chen (Taiwan) for the study ‘Health care needs in adolescents into young adults with congenital heart disease: A Delphi survey of patients, parents and healthcare providers’. The winner of the Challenging Case Report Award was Dr Enrico Ammirati (Italy) for his description of ‘Cardiac tamponade and circulatory shock due to eosinophilic myocarditis unmasking a pulmonary adenocarcinoma’.

The theme of ESC Congress 2015 was ‘Environment and the Heart’, which aimed to highlight the many various types of relationships connecting the environment and cardiovascular diseases. Many of the presentations on display were in keeping with this concept and made for some truly fascinating insights. One standout case was a study that investigated the association between prolonged television viewing and fatal pulmonary embolism. Other notable highlights included an analysis of the effect of midday naps on blood pressure, and a report describing how the presence of depressive symptoms and extremes of blood pressure can predict the occurrence of harmful vascular events in patients with existing heart disease, diabetes, or stroke.

There were also plenty of discoveries presented at the congress that should allow for the development of new treatment options in those with serious cardiovascular conditions, such as a study suggesting that immune cell-mediated thrombotic processes could comprise a realistic target for the treatment of stent thrombosis, following the discovery that the recruitment of leukocytes is a hallmark of the condition.

There was much on offer for cardiology professionals at ESC Congress 2015, and hopefully the results on show will serve to bolster the future care of patients with cardiovascular ailments. Next year’s congress will be held in Rome, Italy, and hopes are high that the developments displayed in London will be further built upon in one of Europe’s most historic cities.

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**HIGHLIGHTS**

**Positive Impact of Bystander CPR in Out-of-Hospital Cardiac Arrest Survivors**

RECEIVING cardiopulmonary resuscitation (CPR) from a bystander is associated with a 30% lower risk of nursing home admission or brain damage in those who survive an out-of-hospital cardiac arrest, according to new research presented at ESC Congress by Dr Kristian Kragholm of the Department of Anesthesiology, Cardiovascular Research Centre, Aalborg University Hospital, Aalborg, Denmark.

The study reported that there were 32,883 out-of-hospital cardiac arrests in Denmark between 2001 and 2011, with a total of 2,387 adults without prior brain damage and not living in a nursing home surviving more than 30 days. The association between the occurrence of death or a composite endpoint of nursing home admission or brain damage within 1 year of the cardiac arrest and a range of patient factors was evaluated in the survivors.

The current study shows that the benefits of bystander CPR seem to go beyond survival and also impact on the physical and mental health of survivors. This novel and important finding demonstrates how vital it is that CPR is promptly initiated to increase not only chances of survival but also reduce brain damage and nursing home admission in survivors. Initiatives that improve bystander recognition of arrest and willingness to initiate CPR hold the potential to improve the chances of survival with intact function and enable survivors to carry on with their lives as before the arrest,” stated Dr Kragholm in a press release dated 30th August.

**Ongoing CPR Aids Better-Than-Expected Survival in Refractory Cardiac Arrest**

SURVIVAL and recovery rates in cases of refractory cardiac arrest brought to hospital with ongoing cardiopulmonary resuscitation (CPR) and treated without the use of extracorporeal life systems have been shown to be higher than expected, according to
Our results indicate that maybe resuscitation attempts should be extended as the prognosis for patients with refractory cardiac arrest is not as poor as we previously thought.

The Danish study included 3,992 individuals who all experienced an out-of-hospital cardiac arrest in a large urban area between 2002 and 2011, and who were treated by physician-based emergency medical services. Of these 3,992 cases, 1,285 (32%) were successfully resuscitated outside the hospital or continued whilst transporting patients to hospital. Currently, only 10% of the individuals who suffer an out-of-hospital cardiac arrest survive.

The rate of survival in patients with refractory cardiac arrest who received ongoing CPR was 20%, compared with 42% in those who were resuscitated before arrival at the hospital (p<0.001). Of the survivors with high functional status (86% of those who received ongoing CPR and 84% of those successfully resuscitated prior to arrival at hospital) and subsequently discharged from hospital, approximately 90% displayed sufficient function for carrying out independent daily activities.

“Our results indicate that maybe resuscitation attempts should be extended as the prognosis for patients with refractory cardiac arrest is not as poor as we previously thought,” stated Dr Helle Søholm in a press release dated 29th August. The researchers therefore suggest that, due to the survival and recovery rates they observed, patients with refractory cardiac arrest should be brought to the hospital with ongoing CPR.

Treating Left Atrial Appendage May Diminish Long-Standing Persistent AF

ADDITIONAL electrical isolation of an area called the left atrial appendage (LAA) may improve freedom for carrying out independent daily activities.

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ICD Monitoring Identifies Gene Associated with Sudden Cardiac Death

MONITORING of data from the use of implantable cardioverter-defibrillators (ICDs) has identified a gene polymorphism predictive of ventricular tachyarrhythmias and sudden cardiac death (SCD) in the general population, according to a study presented at ESC Congress. SCD is one of the leading causes of death in the Western world and the use of ICDs is indicated for patients who have either survived a life threatening cardiac arrhythmia or are at high risk of SCD.

“We believe this is the first time a gene variant has been identified by monitoring ventricular tachyarrhythmia in patients with ICDs and then confirmed in a wider population.”
The new research, which utilised data from participants in the DISCOVERY trial and the Oregon Sudden Unexpected Death Study (Oregon-SUDS), revealed that a specific single-nucleotide polymorphism (SNP) in the GNAS gene is predictive of ventricular tachyarrhythmias and SCD.

The study authors collected cardiac arrhythmia data from 1,145 ICD patients included in the DISCOVERY trial to identify, after adjustment for non-genetic covariates, genes associated with increased risk of potentially life-threatening ventricular tachyarrhythmias. They identified and genotyped seven SNPs in three genes encoding G-protein subunits. The association between these polymorphisms and the occurrence of SCD were then evaluated in 1,335 patients included in the Oregon-SUDS trial. The researchers found that one SNP in the GNAS gene, GNAS c.393C>T, was significantly associated with SCD in both additive (odds ratio [OR]: 1.2, 95% confidence interval [CI]: 1.0–1.4; p=0.039) and recessive (OR: 1.5, 95% CI: 1.1–2.1; p=0.01) genetic models.

“We believe this is the first time a gene variant has been identified by monitoring ventricular tachyarrhythmia in patients with ICDs and then confirmed in a wider population. The findings may help to identify patients at increased risk of SCD,” said principal investigator Prof Heiner Wieneke, Chief Physician, Department of Cardiology, Contilia Heart and Vessel Centre, St. Marien-Hospital Mülheim an der Ruhr, Mülheim an der Ruhr, Germany, in a press release dated 31st August.

A LEADLESS cardiac pacemaker that received a CE mark in 2013 has demonstrated “good safety and reliable function” throughout the initial 6 months of follow-up in the prospective, non-randomised, pre-marketing LEADLESS II trial, according to results presented at ESC Congress.

The new findings suggest that immune cell-mediated thrombotic processes could constitute an achievable target for novel therapies in the prevention of stent thrombosis (ST), according to data from the PRESTIGE study presented at ESC Congress.

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The LEADLESS II trial included 526 patients with a mean age of 75.8 years and from 56 sites across three countries. All patients had indications for permanent, single-chamber, ventricular pacing and were implanted non-surgically with an active-fixation, rate-adaptive pacemaker using a steerable delivery catheter. The primary effectiveness endpoint was defined as clinically acceptable pacing capture thresholds (≤2.0 V at 0.4 ms) and sensing (R wave ≥5.0 mV or ≥ implant value) at 6 months, with the primary safety endpoint being freedom from serious adverse device effects (SADEs) over the same period. The primary effectiveness and safety endpoints were met in 90.0% and 93.3% of cases, respectively, among the 300 patients included in the intention-to-treat primary analysis, with effectiveness met in 93.4% of successfully implanted patients. The rate of SADEs over the 6-month period was 6.7%, including cardiac perforation (1.3%), device dislodgement with successful percutaneous retrieval (1.7%), and capture threshold elevation requiring percutaneous retrieval and placement of a new leadless pacemaker (1.3%). There were no device-related infections or chronic electrical failure.

“Leukocyte Recruitment is Key Feature of Stent Thrombosis”

IMMUNE cell-mediated thrombotic processes could constitute an achievable target for novel therapies in the prevention of stent thrombosis (ST), according to data from the PRESTIGE study presented at ESC Congress.

“Our results suggest that immune cell-mediated thrombotic processes may be a realistic target for novel therapies to prevent ST.”
Neutrophil extracellular traps (NETs), which are prothrombotic extracellular DNA released by neutrophils, were found in 23% of samples. Eosinophils were present in all stent types, with higher numbers in patients with late ST in sirolimus-eluting and everolimus-eluting stents. "The presence of NETs supports their pathophysiological relevance in ST, while eosinophil recruitment suggests an allergic component to the process of ST," said principal investigator Prof Steffen Massberg, director of the Department of Cardiology, Ludwig-Maximilians University (LMU), Munich, Germany, in a press release dated 30th August.

He concluded: "Our results suggest that immune cell-mediated thrombotic processes may be a realistic target for novel therapies to prevent ST. Inhibition of triggers, such as extracellular nucleic acids activating the contact phase, may not only result in efficient anticoagulation in the setting of ST but might also yield less therapy-associated bleeding. Future studies should evaluate whether inhibition of immune cell-driven thrombotic pathways are effective and safe in clinical practice."

Depression and Extremes of Blood Pressure Increase Risk of Vascular Events in Heart Disease Patients

EXTREMES of blood pressure and depressive symptoms are predictive of a high risk of harmful vascular events in patients with existing heart disease, diabetes, or stroke, according to research presented at ESC Congress by Dr Shuangbo Liu, Adult Coronary Resident at the University of Manitoba, Winnipeg, Manitoba, Canada. The 6-year study found that each 10°C drop in temperature was associated with a 7% increased risk of ST-elevation myocardial infarction (STEMI).

Colder Weather Linked to Greater Risk of STEMI

COLD weather is associated with an increased risk of serious heart attack, according to research presented at ESC Congress by Dr Bhautesh Jani, Clinical Academic Fellow, Institute of Health and Wellbeing, University of Glasgow, Glasgow, UK.

Over a follow-up period of 4 years, the study from Scotland investigated the occurrence of further stroke, heart attack, heart failure, or death due to heart disease in 35,537 community-dwelling patients with existing heart disease, diabetes, or stroke. A total of 3,939 patients (11%) experienced at least one major harmful event during the follow-up period, with depressive symptoms displaying a significant interaction with systolic blood pressure (SBP) in predicting an event ($p=0.03$). Compared with those with normal blood pressure and no depressive symptoms (and after adjustment for a range of other factors known to influence the risk of vascular events), patients categorised as having high blood pressure and depressive symptoms had an 83% higher risk of a major harmful event at 4 years (hazard ratio [HR]: 1.83; 95% confidence interval [CI]: 1.46–2.30; $p<0.001$) and those categorised with low blood pressure and depressive symptoms had a 36% higher risk (HR: 1.36; 95% CI: 1.15–1.62; $p<0.001$).

“Our findings suggest that focussing resources on monitoring blood pressure and providing treatment in patients with associated depressive symptoms could improve health outcomes by reducing the risk of further strokes or heart attacks, having heart failure, or dying from heart disease. They also indicate that patients with high or low blood pressure might benefit from screening and treatment for depression. To date there are no studies showing that treatment of depression changes or improves cardiovascular outcomes and more research is needed in this area. Studies are also needed to further understand how blood pressure and depression interact,” concluded Dr Jani in a press release dated 29th August.
Winnipeg is famous for its freezing winters and hot and dry summers, making it ideal for studying the effect of temperature and the environment on cardiac events. The researchers from the University of Manitoba, led by supervisor Dr James Tam, conducted a retrospective review of all STEMI events in Winnipeg over the last 6 years.

Throughout the 6-year period, there were 1,817 STEMI events. The daily temperature high was the strongest predictor of STEMI. On days with daily high <0°C, STEMI events rates were 0.94/day, compared with 0.78/day when the daily high was >0°C. Despite yearly fluctuation, the average STEMI rate across the study period had a statistically significant linear trend of STEMI. Daily temperature can predict STEMI risk 1 or 2 days before it happens. These findings create an opportunity for future research studies to examine whether there are treatment strategies that can temper the effects of climate on the risk of heart attacks.

Environmental Factors Influence Heart Attack Outcomes

POST-HEART ATTACK outcomes can be influenced by pollution and the weather, according to new research presented at ESC Congress. The study from Poland examined the relationship between a number of environmental factors and the severity of clinical status and short-term prognosis in patients with non-ST-segment elevation acute coronary syndromes (NSTE ACS), including NSTE myocardial infarction (NSTEMI) and unstable angina.

“Weather changes like rain or heat affect our daily activity and even our productivity at work,” said Ms Aneta Cislak, Research Fellow, Silesian Centre for Heart Diseases, Medical University of Silesia, Zabrze, Poland, in a press release dated 29th August. “Since this influence is so noticeable we were interested to see if weather has any connection with cardiovascular (CV) diseases including acute coronary syndromes. Moreover, air pollution affects our health, especially in highly industrialised areas. We performed our research in Silesia, the most urbanised and industrialised region in Poland.”

“Our study suggests that environmental factors may affect the severity of clinical status and short-term prognosis in patients with NSTE ACS.”

A total of 2,388 patients admitted to hospital for NSTE ACS between 2006 and 2012 were enrolled in the study, and data on a number of environmental influences were obtained on the day of admission. These factors included the atmospheric pressure, air temperature, wind speed, humidity, and total solar radiation intensity; the concentrations of the most common air pollutants were also recorded. These data were then correlated with the clinical status of the patients. The researchers found that those with a high risk of myocardial infarction and bleeding, and low left ventricular ejection fraction were admitted for NSTE ACS on warmer, sunnier, drier, and windier days with higher carbon monoxide and nitric oxides.

“It should be remembered that not only do humans influence the environment, but the environment also influences humans. Our study suggests that environmental factors may affect the severity of clinical status and short-term prognosis in patients with NSTE ACS. We are now investigating the impact of meteorology and air pollution on 600,000 patients in the Silesian CV Database who were hospitalised with CV diseases in the last 10 years in Silesia,” concluded Ms Cislak.
The study recruited 1,201 non-diabetic patients aged 18–45 years from the prospective HARVEST study who had untreated Stage 1 hypertension. Coffee consumption was categorised by the number of caffeine-containing cups per day: non-drinkers (0 [26.3% of participants]), moderate (1–3 [62.7%]), and heavy drinkers (4 or more [10.0%]).

Throughout the 12.5 year follow-up there were 60 CV events, 80% of which were heart attacks. In multivariate analyses including other lifestyle factors such as age and sex, moderate and heavy coffee drinkers were independent predictors of CV events, with hazard ratios of 4.3 (1.3–13.9) for heavy coffee drinkers and 2.9 (1.04–8.2) for moderate drinkers.

In a press release dated 29th August, Dr Mos concluded: “Our study shows that coffee use is linearly associated with increased risk of CV events in young adults with mild hypertension. This relationship seems to be at least partially mediated by the long-term effect of coffee on blood pressure and glucose metabolism. These patients should be aware that coffee consumption may increase their risk of developing more severe hypertension and diabetes in later life and should keep consumption to a minimum.”

Too Much Television May Be Fatal

PROLONGED television viewing is associated with a greater risk of fatal pulmonary embolism (PE) according to the results of a Japanese study presented at ESC Congress 2015. Lengthy periods of time spent sitting have previously been associated with increased risk of PE, such as in ‘economy class syndrome’ (ECS) associated with long-haul flights, but this was the first study to investigate the association between television viewing habits and risk of fatal PE.

The study included 86,024 participants aged 40–79 years who were followed-up for a median of 18.4 years and who were categorised into one of three groups based of their television viewing habits: <2.5 hours/day, 2.5–4.9 hours/day, or ≥5 hours/day. The risk of death from PE was calculated for each of the three groups after adjusting for baseline age, gender, history of hypertension, history of diabetes, smoking status, drinking status, body mass index, sport and walking habits, and menopausal status. The risk of fatal PE in those who spent ≥5 hours/day watching television was shown to be twice that in those who watched <2.5 hours/day (hazard ratio [HR]: 2.38). The increase in risk relative to individuals who watch <2.5 hours/day was even more prominent in participants <60 years of age: the risk trebled in those who watched 2.5–4.9 hours/day (HR: 3.14) and increased 6-fold in those who watched ≥5 hours/day (HR: 6.49).

“We showed that prolonged television viewing may be a risky behaviour for death from PE.”

Midday Naps Associated with Lower Blood Pressure

MIDDAY naps are associated with reduced blood pressure (BP) levels and prescription of fewer antihypertensive medications, according to results from a study presented at ESC Congress by Dr Manolis Kallistratos, a cardiologist at Asklepieion Voula General Hospital, Athens, Greece.

The study aimed to assess the effect of midday napping on BP levels in hypertensive patients. The study...
This is the first study to establish a link between residence in a city with a very high air pollution and cardiovascular risk in young adults, in whom cardiovascular risk is typically not yet considered and who have not had contact with health services before.

Having accounted for other factors that could influence BP, the researchers found that midday sleepers had 5% lower average 24 hour ambulatory systolic BP (6 mmHg) compared with patients who did not sleep at midday. The nappers’ average systolic BP readings were 4% lower whilst awake (5 mmHg) and 6% lower while they slept at night (7 mmHg) than non-midday nappers.

“Although the mean BP decrease seems low, it has to be mentioned that reductions as small as 2 mmHg in systolic BP can reduce the risk of cardiovascular events by up to 10%,” said Dr Kallistratos in a press release published on 29th August. The researchers also found that pulse wave velocity levels in midday sleepers were 11% lower and left atrium diameter was 5% smaller.

The length of midday sleep was linked to the burden of arterial hypertension. Patients who slept for 60 minutes at midday had 4 mmHg lower average 24-hour systolic BP readings and a 2% higher dipping status compared with patients who did not sleep at midday. Dippers had an average of 17 minutes’ additional sleep than non-dippers.

Dr Kallistratos concluded: “We found that midday sleep is associated with lower 24-hour BP, an enhanced fall of BP in night, and less damage to the arteries and the heart. The longer the midday sleep, the lower the systolic BP levels and probably fewer drugs needed to lower BP.”

Young adults living in polluted cities may be at increased risk of cardiovascular disease

POLLUTED cities may increase young adults’ risk of future cardiovascular disease (CVD), according to new research describing significantly elevated levels of inflammatory markers in the blood of young citizens.

The Polish study, which was presented at ESC Congress in London by Dr Krzysztof Bryniarski from the Jagiellonian University Medical College, Krakow, Poland, compared the levels of a range of inflammatory markers, including C-reactive protein (CRP), high-sensitivity CRP (hsCRP), homocysteine, and fibrinogen, in the blood of 826 randomly selected young adults living in the cities of Lublin (n=362) or Krakow (n=444). The mean age of the study participants was 18 years (range 16–22) and all had lived in their home city since birth; all were from similar types of schools and social backgrounds.

“We have shown that living in a highly polluted city can have an impact on cardiovascular risk markers even at an early age. This may occur through chronic low grade inflammation. This is the first study to establish a link between residence in a city with a very high air pollution and cardiovascular risk in young adults, in whom cardiovascular risk is typically not yet considered and who have not had contact with health services before,” concluded Dr Bryniarski.

CPR For At Least 35 Minutes Benefits Out-of-Hospital Cardiac Arrest

Emergency medical services (EMS) should provide out-of-hospital cardiac arrests with cardiopulmonary resuscitation (CPR) for at least 35 minutes (if resuscitation is not achieved before this point) but no longer than 53 minutes, according to new research reported at ESC Congress by Dr Yoshikazu Goto, Associate Professor and Director of the Department of Emergency and Critical Care Medicine, Kanazawa University Hospital, Kanazawa, Japan.

One of the greatest predicaments facing EMS personnel and clinicians is deciding when to stop resuscitation efforts in cardiac arrest patients whilst not ‘giving up’...
on patients prematurely; there are concerns that lengthy resuscitation efforts could be futile and may impede provision of vital treatment to other emergency cases. The aim of the study was to ascertain for how long CPR should be provided so that both maximum survival and favourable neurological outcomes are achieved.

“We hope our findings give EMS personnel and clinicians the confidence that if they stop CPR after 35 minutes they have done everything they can do for a patient.”

The Japanese study included 17,238 out-of-hospital cardiac arrests who received CPR by EMS personnel in 2011 and 2012. It was found that, whilst the probability of survival declined with each minute of CPR provided, 99.1% of all survivors and 99.2% of all survivors with favourable neurological outcomes achieved return of spontaneous circulation within 35 minutes of EMS-initiated CPR. However, CPR showed little benefit beyond this time point and no patient who received CPR for ≥53 minutes survived 1 month after the cardiac arrest.

“We hope our findings give EMS personnel and clinicians the confidence that if they stop CPR after 35 minutes they have done everything they can do for a patient. This should help them know when it is appropriate to move on to the next medical emergency,” Dr Goto commented.

STEMI Risk Increased By Air Pollution Levels Within European limits

AMBIENT air pollution levels within the recommended range of the European air quality standard are associated with an increased risk of ST-segment elevation myocardial infarction (STEMI), according to new research presented at ESC Congress by Dr Jean-Francois Argacha, University Hospital Brussels, Brussels, Belgium.

Ambient air pollution is a mixture of particulate matter (PM) and gaseous pollutants, such as NO, and O. Fine particle pollution (PM2.5) has the ability to reach the lower respiratory tract and carry high levels of toxic compounds into the body. The Belgian study analysed data describing the levels of air pollution from 2009-2013 in order to provide a real-time evaluation of air pollution exposure, adjusted for population density, in each region of the country. These data were then cross-referenced with data reporting the incidence of STEMI within the same timeframe in order to establish if there may be any relationship.

There were 11,428 hospitalisations for STEMI during the study period. The researchers found that each 10 µg/m³ increase in ambient PM2.5 concentration was associated with a 2.8% increase in risk of STEMI, while each 10 µg/m³ rise in NO, was associated with a 5.1% greater risk.

“The association between STEMI and air pollution was observed within 1 day of exposure,” said Dr Argacha. “This was despite the fact that concentrations of air pollutants were within the European air quality standard. It’s possible that only men were affected because of the under-representation of women in our study population (less than 25%). Nevertheless, previous studies have demonstrated that blood pressure, arterial stiffness, and heart rate variability abnormalities secondary to air pollution exposure are more pronounced in men. Sex differences in obesity and blood inflammation may worsen air pollutant effects, but this hypothesis requires further investigation.”