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Ongoing CPR can achieve survival with good brain function in refractory cardiac arrest

Ongoing cardiopulmonary resuscitation (CPR) achieves better survival with good neurological function than previously thought in patients admitted to hospital with refractory cardiac arrest, shows a Danish study reported at the congress.

Dr Helle Søholm, Cardiologist, Copenhagen University Hospital Righospitalet, Denmark

The study included consecutive patients suffering refractory out-of-hospital cardiac arrest and treated by emergency services between 2002 and 2011. Emergency physicians could either terminate active therapy before arriving at hospital or transport patients to hospital with ongoing CPR.

CPR was used in 3992 patients included in the study. One third of these (1285 patients, 32%) were successfully resuscitated outside hospital and 108 (3%) had ongoing CPR after arriving at hospital with refractory cardiac arrest. Nearly half of these patients (52) were resuscitated and CPR was stopped in the remaining patients after more than 1 hour, on average.

The rate of 30-day survival in patients with refractory cardiac arrest who received ongoing CPR was 20% compared to 42% in those who were resuscitated before arrival at hospital ($P<0.001$). Approximately nine in every ten patients in both of these groups had sufficient functioning for independent daily activities when they were discharged from hospital, with a high functional status (86% in the ongoing CPR group and 84% in patients with prehospital resuscitation, $P=0.7$).

'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,' reported Dr Helle Søholm, a cardiologist at Copenhagen University Hospital Righospitalet, Denmark. 'In general we recommend that cardiac arrest patients are given post-resuscitation care in dedicated cardiac arrest centres with highly specialized treatment options and experienced physicians.'

Susan Mayor

Spironolactone effective in treating resistant hypertension

The diuretic spironolactone is significantly more effective than other antihypertensives in treating patients with resistant hypertension, according to the PATHWAY-2 trial results.

The study included 335 patients with drug-resistant hypertension (mean 157/90 mmHg) that was uncontrolled despite maximal tolerated doses of an ACE inhibitor or angiotensin-receptor blocker plus a calcium-channel blocker and a diuretic. They were randomized in a cross-over design to four 12-week treatment cycles: spironolactone (25–50 mg), doxazosin (4–8 mg), bisoprolol (5–10 mg) and placebo. Patients' blood pressure was measured at home at 6 and 12 weeks.

Spironolactone caused the largest reduction in systolic blood pressure, which decreased by a mean of 8.7 mmHg over 12 weeks ($P<0.001$ *vs* placebo) compared to 4.03 mmHg with doxazosin and 4.26 mmHg with bisoprolol. The average blood pressure on spironolactone was 134.9 mmHg (just below the 135 mmHg target).

'These results have broad international relevance and applicability,' explained lead author Professor Bryan Williams, chair of medicine at University College London.

He concluded: 'The PATHWAY-2 study showed that spironolactone was overwhelmingly the most effective blood pressure-lowering therapy compared to bisoprolol or doxazosin... This establishes, for the first time, a clear hierarchy for drug treatment of resistant hypertension which should influence future treatment guidelines and clinical practice globally.'

Susan Mayor

Depressed patients show increased rates of chest pain

Depressed patients have more frequent chest pain even in the absence of coronary artery disease, according to a study investigating 5825 adults on a prospective registry of patients undergoing cardiac catheterization at three healthcare sites in Atlanta, USA, between 2004 and 2013.

Patients completed the Patient Health Questionnaire-9 to assess depression and the Seattle Angina Questionnaire to assess chest pain frequency in the previous month. Those with depression were three times more likely to experience frequent chest pain, after adjusting for confounding factors.

Patients with depression who underwent revascularization showed no improvement in chest pain frequency at 1-year follow-up. However, a reduction in the severity of depression was associated with decreased chest pain frequency.

'The fact that chest pain frequency decreased in patients whose depressive symptoms improved indicates that treating depression may help alleviate chest pain, after obstructive coronary artery disease has been ruled out,' suggested Dr Salim Hayek, from Emory University School of Medicine, Atlanta.

Susan Mayor

Imaging software could speed up breast cancer diagnosis

New software could speed up breast cancer diagnosis with 90% accuracy without the need for a specialist, according to research from a team in the USA (Dobbs et al, 2015). This could improve breast cancer management, particularly in developing countries where pathologists are not routinely available.

The researchers used high speed optical microscopy of intact breast tissue specimens to analyse breast tissue. This automated method for diagnosing breast cancer from tissue samples is performed without the need for complex tissue sample preparation or assessment by a specialist pathologist.

The programme analyses images of freshly cut human breast tissue samples taken using a confocal fluorescence microscope to determine certain parameters typically used in breast tissue analysis. These parameters are then inputted into a classification tree the researchers have developed to determine whether the tissue sample is benign or malignant.

Dr Rebecca Richards-Kortum, Department of Bioengineering, Rice University, Houston, Texas, USA

Although this could have substantial clinical relevance, there are limitations that need to be overcome before the software can be regularly used. Certain criteria are reliant on the user's observations, which could lead to incorrect classification of breast tissue. Optical microscopy is not frequently used in patient care because it is costly and has high maintenance requirements.

'To evaluate fresh breast tissue at the point of care could change the current practice of pathology,' said lead author Dr Rebecca Richards-Kortum, from Rice University, Houston, Texas. 'We have developed a faster means to classify benign and malignant human breast tissues using fresh samples and thereby removing the need for time-consuming tissue preparation.'

Dobbs JL, Mueller JL, Krishnamurthy S et al (2015) Micro-anatomical quantitative optical imaging: toward automated assessment of breast tissues. *Breast Cancer Res* **17**: 105 (doi: 10.1186/s13058-015-0617-9)

Extreme cold weather causes more deaths than extreme heat

Systematic assessment across the whole temperature range in populations exposed to different climates had not previously been undertaken. An international group of researchers aimed to quantify the total mortality burden attributable to non-optimum ambient temperature, and the relative contributions from heat and cold and from moderate and extreme temperatures (Gasparrini et al, 2015).

Data for 384 locations in Australia, Brazil, Canada, China, Italy, Japan, South Korea, Spain, Sweden, Taiwan, Thailand, UK, and USA were studied, and the authors analysed 74 225 200 deaths in various periods between 1985 and 2012.

The study found that more temperature-attributable deaths were caused by cold (7·29%, 7·02–7·49) than by heat (0·42%, 0·39–0·44). Extreme cold and hot temperatures were responsible for 0·86% (0·84–0·87) of total mortality.

Most of the temperature-related mortality burden was attributable to the contribution of cold. The effect of days of extreme temperature was substantially less than that attributable to milder but non-optimum weather.

Gasparrini A, Guo Y, Hashizume M et al (2015) Mortality risk attributable to high and low ambient temperature: a multicountry observational study. *Lancet* **386**(9991): 369–75 (doi: 10.1016/S0140-6736(14)62114-0)

Need for stronger infection control in cystic fibrosis centres

Pseudomonas aeruginosa acquisition in patients with cystic fibrosis can occur via person-to-person transmission. Cross-infection of shared cystic-fibrosis-specific *P. aeruginosa* strains has been reported across large geographical distances, so a cross-sectional study assessed movement of patients with cystic fibrosis who were infected with *P. aeruginosa* at 18 Australian cystic fibrosis centres (Kidd et al, 2015).

Dr Tim Kidd, Child Health Research Centre, The University of Queensland, Brisbane, Queensland, Australia

The connectivity of cystic fibrosis centres, as measured by the movement of patients, seems to be a risk factor for the acquisition of shared *P. aeruginosa* strain infections. This shows the important role of infection control (e.g. prospective molecular surveillance for shared *P. aeruginosa* strains, strict universal infection control precautions, and hospital design and ventilation) to limit *P. aeruginosa* cross-infection between patients.

Dr Tim Kidd, of the Child Health Research Centre, University of Queensland, Brisbane, Australia, commented: 'Our study shows that the movement of patients with cystic fibrosis between different health-care settings seems to be an important risk factor for the acquisition of transmissible *P. aeruginosa* infections.

He added: 'Our findings highlight the importance of prioritising infection control interventions to reduce the potential for cross-infection.'

Kidd TJ, Magalhães RJ, Paynter S, Bell SC; ACPinCF Investigator Group (2015) The social network of cystic fibrosis centre care and shared *Pseudomonas aeruginosa* strain infection: a cross-sectional analysis. *Lancet Respir Med* **3**(8): 640–50 (doi: 10.1016/S2213-2600(15)00228-3)