

Smart robotic micro-drill used for cochlear implant surgery

The world's first intelligent micro-drill for surgery which could help save the hearing of patients was demonstrated at the Institution of Mechanical Engineers' 'Robotics in Surgery' conference. The device could potentially revolutionize micro-surgery and significantly improve patient recovery.

The medical robot, which has been successfully trialed in cochlear implant surgery, can intelligently distinguish between different types of tissues, identify the exact point of perforation and drill autonomously to a precise depth, all without having to be programmed. The sophisticated device is able to

respond to tissue type, behaviour and deflection in real time.

Surgical robots are increasingly being used as surgeons are demanding more accuracy with smaller incisions. The benefits of using them, including allowing surgeons greater precision, less excess tissue damage and fewer complications, all result in a reduced postoperative stay for patients.

Innovative medical technology being used to design swimming and crawling robots which can move freely within body cavities was discussed at the conference, providing a fascinating insight into surgeries in the future.

Professor Peter Brett from Brunel University, who developed the robot, said: 'Medical robots are significantly improving the experience of surgery for patients. With the greater accuracy enabled by the devices, patients experience decrease blood loss, less pain and a quicker healing time.'

He continued: 'For example, the smart micro-drill can detect tissue interfaces before penetration and then intelligently either control pene-

tration through such delicate structures or avoid penetrating altogether as required, reducing unnecessary tissue damage.'

The micro-drill in use.



Sleep apnoea link to cognitive difficulties and gray matter

Patients with obstructive sleep apnoea may blame their daytime difficulties on simple sleepiness, but new research suggests that their brains may be to blame (Canessa et al, 2010).

The cognitive challenges these patients face may be caused by structural deficits in gray matter, brought on by the intermittent oxygen deprivation that comes with obstructive sleep apnoea. These deficits may be partially or fully reversible with early detection and treatment, according to Italian researchers.

To determine whether there were quantifiable structural differences in the brains of obstructive sleep apnoea patients when compared to individuals without obstructive sleep apnoea, and whether any differences found could be reversed with treatment, researchers compared 17

treatment-naïve individuals with severe obstructive sleep apnoea and 15 age-matched controls.

They gathered baseline measurements of brain anatomy using magnetic resonance imaging, as well as individual performance on cognitive performance tests.

The researchers found significant reductions in gray matter in patients with obstructive sleep apnoea compared to those subjects without obstructive sleep apnoea. Moreover, the specific locations of the deficits indicated that specific brain functions were more strongly affected than others, including executive function and abstract reasoning.

Canessa N, Castronovo V, Cappa SF et al (2010) Obstructive Sleep Apnea: brain structural changes and neurocognitive function before and after treatment. *Am J Respir Crit Care Med* Oct 29 [Epub ahead of print]

NHS cardiac surgery death rates 25% lower than European average

NHS heart surgery patients in England and Wales have a greater chance of survival and recover more quickly than almost anywhere in Europe, according to the first ever comparative study of cardiac operations data from across the continent.

The figures, which track over 1 million cardiac operations from 23 countries, reveal that despite carrying out a high proportion of urgent operations and treating some of the oldest patients in Europe, mortality rates in England and Wales are significantly better than expected and some 25% lower than the European average.

The report also shows that hospital stays in England and Wales are around 10% shorter than the European average, translating to direct savings to the NHS in bed days of around £6.4 million for coronary artery bypass surgery alone.

Professor David Taggart, President of the Society for Cardiothoracic Surgery in Great Britain and Ireland, said: 'UK cardiac surgeons are very proud of the fact that they publish the most comprehensive cardiac surgery data in Europe. This not only demonstrates a strong commitment to quality and transparency but also provides enormous reassurance for patients. The results confirm that cardiac surgery in the UK is amongst the very best in Europe.'

The full EU aggregated report, lead by Mr Ben Bridgewater, Cardiac Surgeon at University Hospitals South Manchester, gives a complete breakdown of how cardiac surgery is developing across the UK, Europe, China and Hong Kong and highlights areas for future improvement. Bespoke reports are available for England and Wales at www.scts.org

Regular physical activity benefits mental health

People who engage in regular physical activity – however intense – are less likely to have symptoms of depression, according to new research published in the *British Journal of Psychiatry* (Harvey et al, 2010).

Crucially, the researchers also found that this activity needs to be taken in people's leisure time if they are to feel the benefits: people who exert themselves at work, by doing lots of walking or lifting, are no less likely to be depressed than people with sedentary jobs.

Researchers from the Institute of Psychiatry, King's College London teamed up with academics from the Norwegian Institute of Public Health and the University of Bergen in Norway to conduct the study. They asked 40401 Norwegian residents how often they engaged in both light and intense physical activity during their leisure time.

Light activity was defined as an activity that did not lead to being sweaty or out of breath, while intense activity did result in sweating or breathlessness. The residents were also asked

how physically active they were at work, underwent a physical examination and answered questions regarding symptoms of depression and anxiety.

The team found an inverse relationship between the amount of leisure-time activity and symptoms of depression. People who were not active in their leisure time were almost twice as likely to have symptoms of depression compared to the most active individuals.

Interestingly, the intensity of the exercise did not seem to make any difference. Even people who took light exercise

Dr Samuel Harvey, Clinical Lecturer, Institute of Psychiatry, King's College London



were less likely to show symptoms of depression.

However, the researchers found no such relationship between workplace activity and symptoms of depression. Nor did they find any consistent relationship between physical activity and anxiety.

Lead researcher Dr Samuel Harvey said: 'Our study shows that people who engage in regular leisure-time activity of any intensity are less likely to have symptoms of depression. We also found that the context in which activity takes place is vital and that the social benefits associated with exercise, like increased numbers of friends and social support, are more important in understanding how exercise may be linked to improved mental health than any biological markers of fitness. This may explain why leisure activity appears to have benefits not seen with physical activity undertaken as part of a working day.'

Harvey SB, Hotopf M, Øverland S, Mykletun A (2010) Physical activity and common mental health. *Br J Psychiatry* 197: 357–64

Catheter system reduces blood pressure in hypertension

Data published in *The Lancet* showed that the Symplicity HTN-2 trial evaluating Ardian's Symplicity catheter system met its primary end point. After 6 months, patients treated with the device had an average drop in blood pressure of 32/12 mmHg compared to an increase in blood pressure of 1/0 mmHg in control patients treated with medical therapy alone ($P < 0.001$).

National Joint Registry adds one millionth record

The National Joint Registry, the world's largest hip, knee and ankle joint database, has added its one millionth record. The registry hopes to add shoulder and elbow joints to their database by the end of March 2011.

Remission maintained for 3 years in adults with Crohn's disease

Data from open label studies show that treatment with adalimumab (Humira) gives sustained remission for up to 3 years in patients with moderate-to-severe Crohn's disease. Most patients treated with adalimumab, who were in remission at 1 year, remained in remission after two additional years.

Diagnosis of atrial fibrillation 'inconsistent'

The lives of thousands of patients with atrial fibrillation could be at risk as a result of poor diagnosis, failure to follow treatment guidelines and lack of quality information for patients.

A report published by the AF AWARE partnership argues that poor diagnosis and treatment of atrial fibrillation may lead to increased risk of hospitalization, stroke and other

cardiovascular complications, as well as to unnecessary costs to individuals and to health-care systems in Europe.

Six million people across Europe are affected by atrial fibrillation, making it the most common cardiac arrhythmia. While common symptoms include palpitations, shortness of breath and dizziness, some patients with atrial fibrillation experience no symptoms. Atrial fibrillation

increases a person's risk of stroke by four to five fold.

The report reveals inconsistencies in adherence to treatment guidelines, inadequate patient resources, and a lack of country-level estimates of atrial fibrillation incidence and prevalence, which raises concerns that atrial fibrillation may be vastly underdiagnosed. This may hinder effective planning.

The report can be downloaded from www.world-heart-federation.org/about-us/support-us/corporate/corporate-partners/af-aware-initiative/



EUROPEAN SOCIETY FOR MEDICAL ONCOLOGY CONGRESS MILAN, 8–12 OCTOBER

Progression-free survival benefits in triple negative breast cancer

The addition of cetuximab to chemotherapy produced a significant reduction in risk of progression for women with metastatic triple negative breast cancer in comparison to treatment with chemotherapy alone, concluded the BALL-1 study, presented in the Presidential Symposium of ESMO.

Estimates suggest around 15–18% of breast cancers are 'triple negative' – lacking receptors for oestrogen, progesterone and HER – making them unresponsive to hormone or anti-HER-2 therapies. Cetuximab is a monoclonal antibody designed to specifically target epidermal growth factor receptor (EGFR), a protein expressed by around half of all breast cancer tumours.

In BALL-1, 173 patients with metastatic breast cancer and

triple negative disease were randomized to receive either cetuximab plus up to six 3-weekly cycles of cisplatin ($n=115$) or cisplatin alone ($n=58$). The study's primary end point was the overall response rate.

An overall response rate of 20% was seen in patients receiving the cetuximab/cisplatin combination compared to a response rate of 10.3% in the cisplatin alone arm ($P=0.11$). Adding cetuximab to cisplatin more than doubled the median length of progression-free survival, from 1.5–3.7 months (hazard ratio 0.675, $P=0.032$).

'While the study did not meet its primary end point, we saw a doubling in progression free survival so to my mind it was a positive study. The take home message is that I'm convinced that cetuximab has a

role in treating breast cancer, but I think that we need to design a more appropriate trial,' said José Baselga, the principal investigator, from the Massachusetts General Cancer Center (Boston, USA). 'In this advanced-disease population, this type of improvement is rarely seen and is highly significant.'

Cetuximab in colorectal cancer

Another study at ESMO featuring cetuximab in a different indication was the further analysis of the CRYSTAL trial, showing that patients with KRAS wild-type metastatic colorectal cancer who experienced early tumour shrinkage (defined as 20% or greater tumour reduction within 8 weeks) during first-line cetux-

imab-based treatment lived for a median of 28.3 months.

Such a correlation between early tumour shrinkage and long-term survival was not observed in the control arm receiving chemotherapy alone where survival did not exceed 21 months. The phase III CRYSTAL trial had previously demonstrated that metastatic colorectal cancer patients with KRAS wild-type tumours achieved a median survival of 23.5 months.

'These new data indicate that early tumour shrinkage with personalized cetuximab therapy correlates with significantly improved survival,' said the study author, Eric Van Cutsem from the University Hospital Gasthuisberg, Leuven, Belgium.

Janet Fricker

Sunitinib use is justified for pancreatic neuroendocrine tumours

An independent review of the benefit of sunitinib in a phase III trial in pancreatic neuroendocrine tumours has confirmed that the drug results in a clinically significant improvement in progression-free sur-

vival compared with placebo.

The study was stopped early following a planned review in February 2009, which recommended that all patients should be offered sunitinib because of its efficacy. However, as Dr

Juan Valle of the Christie Hospital in Manchester, explains, the positive results were questioned.

'The results were based on investigator assessments and once the trial was stopped,

some commentators suggested that the results could have been biased because sunitinib can have some very particular and obvious side effects, therefore investigators may have been able to tell who was taking the active drug rather than placebo. An independent review was necessary to determine if the results stood up, irrespective of any unintentional unblinding,' added Dr Valle.

A retrospective, blinded, independent central review of imaging studies was conducted, which supported the original findings of the investigator-assessed progression-free survival. A review of the whole population in the original trial will be presented later this year.

Rhonda Siddall

EGFR mutation survival benefits confirmed in lung cancer trial

Final results of the IPASS study confirm that patients with EGFR mutation-positive advanced non-small cell lung cancer have better outcomes than those with EGFR mutation-negative disease. IPASS included 1217 East Asian non-small cell lung cancer patients randomized to first-line gefitinib or chemotherapy with carboplatin and paclitaxel.

In the gefitinib arm, median

survival was 21.6 months in EGFR mutation-positive patients *vs* 11.2 months in patients without the mutation. Mutation status had a similar effect in the chemotherapy arm, with 21.9 months median survival in mutation-positive patients *vs* 12.7 months for mutation-negative patients.

There was no overall survival difference between gefitinib (18.8 months) and chemother-

apy (17.4 months), possibly because of a 60–70% crossover between the study arms.

Lead investigator Dr Chih-Hsin James Yang, Taiwan, concluded: 'Molecular testing is now an important part of clinical practice. We are only starting personalised medicine in lung cancer, and in future there will be more mutations needing separate regimens.'

Sue Lyon

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Abiraterone improves survival in advanced prostate cancer

Men with metastatic, castration-resistant prostate cancer, who have progressed after chemotherapy, live a highly significant 3.9 months longer when treated with abiraterone acetate compared to placebo, according to the phase III COU-AA-301 study. Abiraterone was developed in the UK at the Institute of Cancer Research and the Royal Marsden Hospital, London.

Presenting the results of the study in Milan, lead investigator Dr Johann de Bono, UK, said: 'Prostate cancer is a critically important, unmet medical need. In the history of prostate cancer only four other drugs have ever shown a survival benefit.'

The randomized, double-blind, placebo-controlled COU-AA-301 study included 1195 men whose prostate cancer had been previously treated with docetaxel. Overall survival was 14.8 months in the abiraterone arm *vs* 10.9 months in the placebo group ($P < 0.0001$). Time to prostate-specific antigen (PSA) progression, radiographic progression-free survival and PSA response were also significantly better in the abiraterone arm than in the placebo arm ($P < 0.0001$).

Sue Lyon

Future potential for radium treatment in prostate cancer

Results from a combined phase I and II study, presented by Chris Parker from the Institute of Cancer Research and Royal Marsden Hospital, London, show treatment of castration-resistant prostate cancer with radium 223 chloride resulted in

a low incidence of adverse effects. Radium 223 chloride is a first in class agent where bone targeted radium 223 emits alpha particles with an ultra-short range (2 to 10 cell diameters) causing highly localized cytotoxic effects. This helps to minimize toxicity to adjacent healthy tissue, particularly bone marrow.

In the latest analysis fewer than 1% of patients experienced severe grade 4 haematological toxicity, 4% experiencing grade 3 anaemia and fewer than 3% had grade 3 toxicity for platelets or white blood cells.

The lack of toxicity, write the authors, suggests that radium 223 chloride can be safely used with myelosuppressive chemotherapy. ALSYMPCA, a randomized phase III survival study using radium 223 chloride, is ongoing, and a phase I study combining radium 223 chloride with docetaxel has just started.

Janet Fricker

Potential for investigational HER inhibitor in non-small cell lung cancer

The investigational agent PF-00299804 has shown an ability to prevent disease progression when given as a first-line treatment in patients with advanced non-small cell lung cancer.

Preliminary results from an ongoing phase II trial showed that nearly 85% of patients whose cancers harboured mutated forms of the EGFR gene remained progression-free for at least 9 months, according to Dr Tony Mok from the Chinese University of Hong Kong.

PF-00299804 (PF-299) is an oral, once-daily, pan-HER (pan-human epidermal growth factor receptor) inhibitor that irreversibly inhibits several members of the HER family, including HER 1(EGFR), HER-2 and HER-4. Drugs such as erlotinib and gefitinib are effective against cancer in patients with a

mutation activating just EGFR.

Dr Mok said that PF-299 is of great interest because it targets multiple receptors on the HER pathway. 'It also inhibits signalling in both wild-type and mutant EGFR, including forms of non-small cell lung cancer that are resistant to EGFR inhibitors such as erlotinib and gefitinib,' he added.

The trial included patients with advanced non-small cell lung cancer and no prior systemic treatment for their disease. All were either non-smokers or light smokers, or were known to have EGFR mutations. Patients received either once daily PF-299 30 mg or 45 mg. Nine months later, 57.1% of the overall group and 84.7% of those with EGFR mutations remained progression-free.

Rhonda Siddall

Focus on elderly women with breast cancer

Two leading oncologists have called for increased attention on the treatment of elderly women with breast cancer.

Professor Robert Coleman, Honorary Consultant Medical Oncologist at the Academic Unit of Clinical Oncology, Weston Park Hospital, Sheffield, said: 'Breast cancer patients that generally receive less attention are elderly patients with metastatic breast cancer. This group of patients tends to be under-treated though endocrine treatment could play a key role in this group.'

Professor Coleman was speaking at a Pfizer-sponsored briefing about endocrine treatment in breast cancer. Also speaking, Dr Matti Aapro, Dean of the Multidisciplinary Oncology Institute, at Genolier in Switzerland and an Executive Director of the International Society for Geriatric Oncology, agreed: 'Co-morbidities should not be a reason to not treat elderly women with breast cancer. So long as consideration is given to selecting the breast cancer therapy for an elderly woman, to co-morbidities, to

detecting frailness, to the impact of any adverse events and to patient expectations, then physicians should consider treating this group.'

Professor Coleman added that as there is a high occurrence of ER+ tumours among elderly patients and as aromatase inhibitors are associated with superior efficacy compared to tamoxifen in advanced disease, these should be considered as a treatment option for elderly women with breast cancer.

Rhonda Siddall