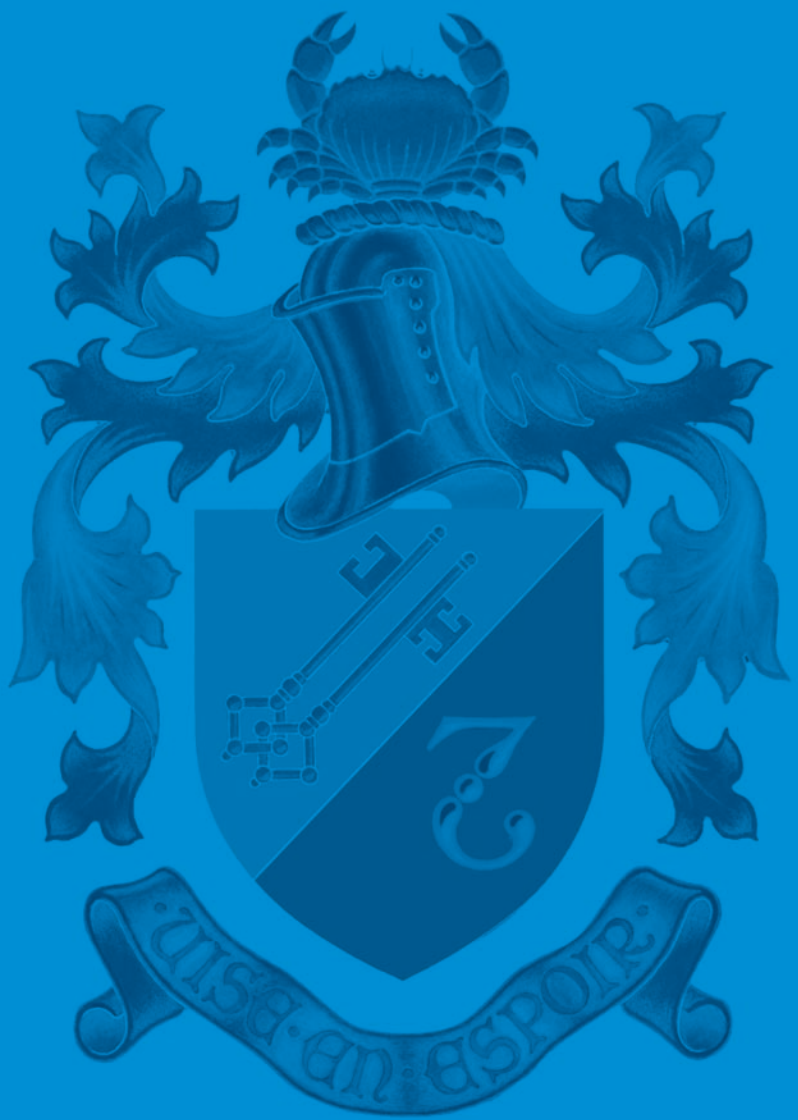
BASO ~ The Association for Cancer Surgery



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BASO ~ The Association for Cancer Surgery
Yearbook 2012

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Yearbook 2012

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BASO ~ ACS: The Association

2012 YEARBOOK

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Specialist Registrars, Clinical Assistants and Senior House Officers.

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- Affiliate membership of ESSO
- Reduced delegate rates at the BASO ~ ACS Scientific Conference

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Download the **BASO ~ ACS membership form** at www.baso.org.uk

President's Address

Mr Michael Hallissey
President of BASO ~ ACS
Consultant in Upper GastroIntestinal, Breast and Complex Pelvic Oncology Surgery and Deputy Medical Director, Queen Elizabeth Medical Centre, Selly Oak Hospital, Birmingham.

BASO ~ ACS has now been in existence for over 30 years having been founded by a group of Surgical Oncologists to provide a forum to discuss research into and the role of surgery in the treatment for cancer. The founding principles were to include surgeons from every discipline and this continues to be our vision.

The Association provides a focus for cross disciplinary interaction so that surgeons of different specialties are aware of all the advances in the understanding of the genesis and management of cancers. This provides the vital opportunity for cross fertilisation of ideas. The main focus for this remains the Annual Scientific Conference where speakers of international renowned and scientific presentations of new research findings combine to stimulate and inform discussion of the treatment of our patients with cancer. This year's meeting in November will again combine these facets together with insight into the national vision on cancer care.

The role of BASO ~ ACS in leading the College Cancer Committee provides a voice for all aspects of surgical cancer care. The importance of this aspect of our work is recognised by the support from Prof Sir Mike Richards, the National Cancer Lead, who attends the meetings and feeds the views of cancer surgeons into the national cancer strategy.

The vision for the future lies in our trainees and the formation of SOTA (Surgical Oncology Trainees Association) has been warmly received by trainees who see it as having a vital role in their development as the cancer surgeons of the future. The aim of this new group within BASO ~ ACS is to provide the trainees with an insight into the aspects of cancer care outside of surgery but also to help cross fertilisation of both research ideas and surgical approaches to enhance patient care. As trainees have become more focused on narrower areas of surgical skills, there will be an increasing role for the disciplines to work together to enhance patient care. The multidisciplinary nature of SOTA, which has members from all areas of surgical training, will aid in that development. Our support for the Surgical Oncologists of the future is also reflected in our funding of Research Fellowships with the Royal College of Surgeons of England, with the third Fellowship due to be awarded this year.

The continued support of you the members of BASO ~ ACS for the future of cancer surgery both in its science and the practice is a testament to the strength of cancer surgery in the UK. Working together we will see the continuing improvement in the management and understanding of this disease even if "victory in the war on cancer" declared by Richard Nixon may still be a little way away.

The yearbook is a reflection of the breadth of the Association's work with articles covering a wide area of oncology practice and research and testifies to the advances in both surgical management and research progress that the body of surgical oncologists are making. Let us congratulate ourselves on the progress we have made but temper that with the recognition of how much further we have to travel.

Honorary Secretary's Report

Mr Zenon Rayter
BASO ~ ACS Honorary Secretary
Consultant Surgeon, Bristol Royal Infirmary

This is the second yearbook to be produced since BASO ~ ACS and the Association of Breast Surgery have split and I would like to thank Lynda Wyld for all her efforts for producing last year's Yearbook and for editing this edition for 2012.

I have been the Honorary Secretary for five years and have now had the honour of serving with my third President, Mike Hallissey following my time with Malcolm Reed and Andrew Baildam. I am confident that Mike will continue taking the Association forward in the same way as his predecessors, not only by facing the challenges that lie ahead but also grasping new opportunities that may come along as cancer surgery develops in terms of technical advances, new models of delivery, new opportunities in training and our continuing dialogue with the government via the Cancer Services Committee of the Royal College of Surgeons.

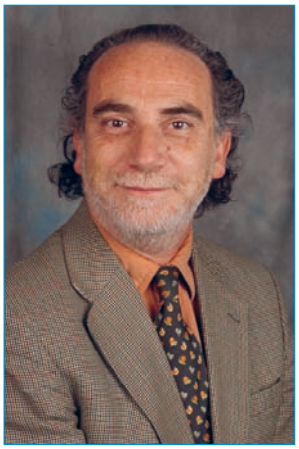
The last year has been one of consolidation for BASO ~ ACS in some ways. We have only seen a small drop in membership but can still count on 600 members and it will be interesting to see what happens to the membership when the current arrangement for collecting subscriptions changes. Both Associations will collect their fees separately and the Association of Breast Surgery have already stated in their yearbook that it is inevitable that their subscriptions will rise to cover the cost of their Annual Scientific Conference. Currently, we have no plans to increase our subscription charges as our Annual Scientific Conference continues to be very well attended and solvent. Indeed the last scientific meeting in November was attended by close to 300 delegates. The meeting had a wide-ranging content and plenary lectures were given by International experts in their field, including Professor Umberto Veronesi, Dr Armando Guiliano and Lord Ajay Kakkar. The topics had a wide range from the management of metastatic cancer to key hole surgical oncology and cancer commissioning to controversies in reconstruction. The prize paper sessions were a delight to mark given the novelty and ingenuity of some of the studies presented and the submitted paper sessions spanned the whole breadth of surgical oncology. The forthcoming Scientific Conference on 19th and 20th November, organised by our new Meetings Secretary Charlie Chan promises to be as good, if not better, than ever.

However, what of the future? One initiative that has been started is the creation of the Surgical Oncology Trainees Association (SOTA). This initiative was started by Andrew Baildam and Charlie Chan by engaging the trainees of all the cancer subspecialty associations. It became apparent that a generic surgical association like BASO ~ ACS might be able to offer training in various aspects of surgical oncology that current subspecialty associations have not provided outside their own narrow subspecialty fields. We have been very encouraged by the level of interest shown by trainees in creating this organisation and intend to put on a training day for SOTA as an add-on to our main annual Scientific Conference.

BASO ~ ACS continues its interaction with the Government in partnership with other surgical specialties in keeping surgical oncology high up on the agenda in the provision of cancer services and there may be a great deal that the Association can do to ensure that the new commissioning arrangements for cancer services are robust and meaningful to our patients.

Lastly BASO ~ ACS will continue to promote teaching, training and research by continuing to award prizes at our annual conference, sponsoring the Ronald Raven Travelling fellowship and, working jointly with the Royal College of Surgeons, to award research fellowships for innovative research into cancer and its management. The next few years will be a challenge, but one I think the Association can meet.

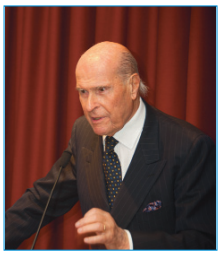
Conference Report 2011



Professor Riccardo Audisio
Vice President of BASO ~ ACS
Professor of Breast Surgery

The 2011 Scientific Conference of BASO ~ The Association for Cancer Surgery, was a resounding success. Numerous prominent lecturers attracted an audience of close to 300 attendee delegates from the UK and abroad.

Building on a theme of surgical advances and achievements in the treatment of cancer, keynote speakers included some of the foremost surgical innovators of the past 30 years, whose vision, drive and courage in challenging established dogma have resulted in huge improvements in patient care.



Professor Umberto Veronesi, Milan

Professor Umberto Veronesi from Milan is one of the World's leading breast surgeons and, along with Professor B Fisher in the USA, was one of the early pioneers of breast conservation surgery. At a time when such ideas were heresy, he successfully led research which proved that mastectomy was not the only way to cure breast cancer and achieve local control. He has also developed intra-operative radiotherapy as a safe alternative to whole breast radiotherapy and been instrumental in leading research into sentinel node biopsy. Other notable achievements have included founding the European School of Oncology, (ESO) with Laudomia Del Drago in 1982. The ESO today thrives and provides the highest quality education in oncology through a wide range of courses across Europe.

Professor Veronesi proffered an overview of his vision of breast cancer surgery, form his early scientific achievements in the 70's to the future of this specialty, focusing on how best to deliver effective treatment with the least number of un-necessary side effects.

The Society was also privileged to welcome Dr. Armando Guiliano to the Congress. Dr. Giuliano, executive Vice Chair of Surgery the Cedars Sinai Medical Centre, has pioneered

Dr Armando Giuliano, Cedars Sinai Medical Centre

research into many aspects of surgery for breast cancer and most recently triggered major worldwide debate with his paper on the lack of necessity of completion clearance for some women with positive axillary nodes on SLNB. Dr. Giuliano gave an overview of axillary surgery and how practice has changed along with his recent findings and their implications for modern breast surgeons.

Professor Richard Satava presented a visionary talk on the future of Surgery. Senior Science Advisor to the US Army Medical Research and Materiel Command, Professor Satava is a world leading expert in robotics and virtual technology. He gave an awe inspiring overview of the very latest technological advances in surgery and how these will develop in the near future to revolutionise surgical practice. He demonstrated how computer modeling and simulation can assist in remote site diagnostics,

> *"Keynote speakers included some of the foremost surgical innovators of the past 30 years, whose vision, drive and courage in challenging established dogma have resulted in huge improvements in patient care."*

Professor Richard Satava, University of Washington

how haemostasis can be achieved non invasively with high intensity ultrasound, how micro robotic technology can facilitate cancer diagnostics, the role of the cyberknife in accurate tumour therapy and lastly, how tissue engineering will soon permit organ replacement. The audience was left spell bound by the bredth of this vision of the future.

The congress also welcomed one of the UK's foremost experts on thrombosis, Professor the Lord Ajay Kakkar , Professor of Surgery, University College London. He presented an overview of the interaction of cancer and thrombosis and how the risk of thromboembolic disease can be minimised in cancer patients.

The congress held a symposium contrasting two different techniques for intra-operative radiotherapy. Jayant S. Vaidya presented the leading UK experience on Targeted Intraoperative Radiotherapy for Breast Cancer (TARGIT) while Dr. Erik Van Limbergen described his experience with alternative IORT modalities which are presently being tested and implemented.

A symposium was devoted to the "State of the Art" in surgical interventions for metastatic disease which is increasingly playing a role in either curing certain advanced stage cancers and also in prolonging life and enhancing quality of life for those affected with advanced cancer. Lectures covered 4 main areas of practice: bone metastases, surgery to the primary site in stage IV breast cancer, lung metastases and liver metastases.

Dr. Iain McGilchrist, Bethlem Royal and Maudsley Hospital,

Controversies on reconstructive surgery were discussed by Dick Rainsbury (Skin Sparing Mastectomy), Dr. Gilles Toussoun (Lipofilling) and Sat Parmar (facial reconstructions for oral cancer).

The usefulness of sophisticated imaging techniques, and it's crucial role in assisting surgical management was the topic of a dedicated Symposium: experimental technique on Sentinel Node Biopsy Using Microbubbles was introduced by Peter A. Jones; the value of PETCT in Colorectal Cancer was critically assessed by Rohit Kochhar; Dr. Gina Brown disclosed her findings of MRI Rectal Cancer Imaging and how this can Improve Surgical Outcomes; Chris Stone informed the audience on his experience on Computer-aided Surgical Planning in the Treatment of Soft Tissue Sarcoma.

As a counterpoise to a meeting heavily focused on evidence based scientific practice and high tech surgery, Dr. Iain McGilchrist, presented his work on the physical, neurochemical and functional differences between right and left hemispheres. The right, which has a global, intuitive perspective and the left which is focused, mechanistic and factual. He argued that there are parallels in modern society and modern medicine with an increasing tendency to focus of factual, mechanistic and narrow issues and ignore the holistic, empathic bigger picture. It was a very thought-provoking lecture to round off the first day of the congress.

Delegates at the Conference Exhibition in 2011

"A symposium was devoted to the "State of the Art" in surgical interventions for metastatic disease which is increasingly playing a role in either curing certain advanced stage cancers and also in prolonging life and enhancing quality of life for those affected with advanced cancer."

The Great Hall at the Worshipful Society of Apothecaries

The social aspects of the meeting were started with a drinks reception at the College accompanied by classical music and followed by the official dinner in the splendid Great Hall of the Worshipful Society of Apothecaries. This beautiful building dates back to the 15th century and was built in the precinct of a Dominican Priory. It was bought by the society in 1632, but destroyed by the great fire of London in 1666.

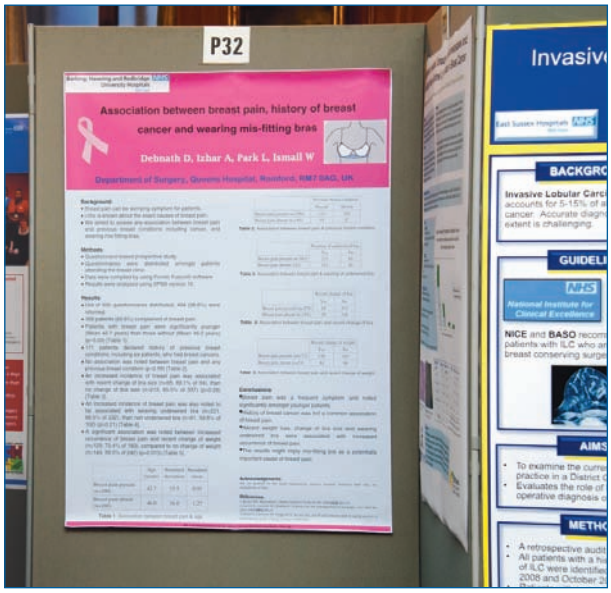
The society rebuilt the hall over the following 12 years and it has remained in much the same form with continual care lavished on its maintenance and renovation. As always, with excellent food, wine and company the evening was a great success.

The 2012 conference will be held on the 19th and 20th November at the Royal College of Surgeons, London.

We hope to see you there.

Delegates viewing poster boards

Posters on display



Meeting Secretary's Report

Mr Charlie Chan
BASO ~ ACS Meeting Secretary
Consultant Surgeon, Cheltenham

Following in Professor Riccardo Audisio's smart Ferragamo soled footsteps has not been an easy task. Over the last five years, he has produced a series of Annual Scientific Conferences which have appealed to people in many specialties, but which have been linked with a series of strong running themes.

In this Diamond Jubilee year, it is fitting that this year's EJSO lecture is to be given by someone from the Commonwealth. Professor John Thompson from the Sydney Melanoma Unit will be coming to give us his thoughts on this increasingly common disease. This is particularly apt, as Professor Thompson was until recently an Associate Editor at the EJSO, where his input was always well appreciated.

During the 60 years of our current Monarch's reign, we have witnessed a new Elizabethan era. In the beginning, there was post war austerity. The subsequent six decades have seen a flourish of cultural enrichment, reassertion of British creativity, increasing multicultural integration and economic prosperity, all set against a stable and approachable constitutional Monarchy.

Over a very similar time period, numerous advances have been made in cancer surgery, leading to better outcomes with reduced morbidity. At the forefront of this movement has been the National Surgical Adjuvant Breast and Bowel Project (NSABP). This pioneering co-operative group from North America has led the way and has been responsible for the modern era of evidence-based cancer surgery. It has enrolled over 110,000 patients in numerous clinical trials and changed the face of cancer surgery.

Prof. Norman Wolmark is the current Chairman of the NSABP and is based at the Allegheny University of Health Sciences. I am delighted that Prof. Wolmark has accepted our invitation to give the BJS lecture. He will be outlining the "Future of Cancer Surgery Trials" as seen through the crystal ball of the world's premier cancer surgery cooperative research group.

After many attempts over several years, I am pleased to report that Sir Mike Richards has kindly agreed to come and talk about his vision of how to improve cancer outcomes in the UK. To contrast this, Prof Peter Naredi, the current President of ESSO, will give us an European perspective on the same problems, and how improvements in the training of cancer surgeons has helped.

A major theme to this year's meeting is that of "Uncertainty and Indecision". Several of our keynote speakers this year will be exploring these themes including the perception of cancer risk (Professor David Spiegelhalter – the Professor for the Public Understanding of Risk At Cambridge University) and the difference in priorities for patients and doctors (Mr Martin Burton –the first clinician to be Director of the UK Cochrane Centre).

There will also be a series of talks on controversial topics where there is lack of certainty about the best treatment. This mini symposium on controversial topics will include low-grade DCIS/pleomorphic LCIS in breast disease (Professor Sarah

> *"Several of our keynote speakers this year will be exploring the theme of Uncertainty and Indecision, including the perception of cancer risk and the difference in priorities for patients and doctors."*

Pinder), the management of Barrett's oesophagus, (Professor Hugh Barr) Anal Intra-Epithelial Neoplasia III (Professor John Scholefield), low Gleason grade prostate cancer (Professor Freddie Hamdy) and skin lesions of unknown malignant potential. Continuing this theme of uncertainty will be the Ernest Miles Lecture given by Professor Sir John Burn on the "management of the high-risk family history colorectal patient".

Somewhat unwittingly, this year's programme is packed with speakers who are either Professors or Knights of the Realm. Hence, fittingly our programme this year is completed by two people, who are both Professors and Knights of the Realm. Professor Sir Richard Peto will be speaking about the latest update to the "Oxford Overview" in breast cancer, and Professor Dame Val Beral will enlighten us about cancer risks in the diet and the environment.

I hope that this year's programme will provoke thoughtful debate and an opportunity to challenge some of our current perceptions. At the beginning of Queen Elizabeth II's reign, cancer surgery was dominated by dogma. The last six decades have seen numerous challenges to the old ways and this has been led by the unstinting efforts of the NSABP. I trust that this meeting will challenge some of us to review how and why we do things.

It is never wrong to question, but maybe it is wrong never to question.

BASO ~ ACS International Links

Passages to India: The ACS and the Indian Association for Surgical Oncology

Mr David Rew
BASO ~ ACS Council Member
Consultant Surgeon, Southampton University Hospitals

For more than 250 years, the histories of India and of the United Kingdom have been intertwined. For centuries, the flow of humanity and expertise was largely from Britain to the outposts of Empire. From 1947, which marked both Independence and the tragedy of Partition of India, the flow of peoples has been very much in the reverse, with Indian professionals moving in large numbers to the UK.

Much good has come of the engagement between Britain and India. We have exported durable institutions, governance and a common language to India. In return, Anglo-Indians have brought energy, cultural diversity, a strong work ethic and wealth to the UK, and Indian doctors have made a remarkable contribution to the work of the NHS over decades.

Since 1947, the focus of UK politics and energy has largely and necessarily been upon Europe, rather than upon the wider English speaking world. This focus has been reflected in the history of BASO ~ ACS, where our partnership with the European Society for Surgical Oncology, (ESSO) has been most important since our founding in 1972.

Following the progressive liberalisation of its economy and the release of its commercial instincts over the past 20 years, India is now a nation and economic powerhouse on the move. India has a population of some 300 million people who are enjoying growing prosperity and a recognisably middle class life style. Its best urban hospitals are impressive for their efficiency and excellence in health care. India is also a country with massive challenges in an impoverished rural population approaching 800 million people, with limited access even to primary health care, let alone the health systems that we now take for granted, but with rapidly rising expectations. A technological revolution in the media, internet and mobile telephony has reached all strata of society and is promoting rapid social change.

There is a huge opportunity for UK based professionals to re-engage with India and to build upon the historic connections. Our large population of Anglo-Indian colleagues provide a social bridge back to the subcontinent, where goodwill and hospitality towards British visitors is remarkable, and where friendships are easy to build.

Indian Surgical Oncologists are represented through the Indian Society for Surgical Oncology (www.iasoindia.in), which has a similar history, membership and constitution to BASO ~ ACS. IASO was founded as the Oncology Section of the Association of Surgeons of India in 1977, and it now has some 650 members from across India. Meetings are held in major centres around the country, and IASO has long promoted links with BASO ~ ACS, the (US) Society for Surgical Oncology, SSO, and the World Federation of Surgical Oncology Societies, WFSOS. More recently, it has also developed links to ESSO. Two years ago, IASO launched the Indian Journal of Surgical Oncology, published by Springer.

> *"Anglo-Indians have brought energy, cultural diversity, a strong work ethic and wealth to the UK, and Indian doctors have made a remarkable contribution to the work of the NHS over decades."*

Professional links have included the exchange of representatives at conferences, invited lecturers and guest speakers. The links with BASO ~ ACS have been particularly strong over many years. BASO ~ ACS officers have been regular attendees at IASO National Conferences, and vice versa. We have also supported travelling fellowships for UK trainees to attend IASO conferences in India, and for Indian trainees to visit the UK. At the 2011 BASO ~ ACS Conference, Mr Devendra Patel, who is a former president of IASO and who directed the Gujarat Cancer Institute between 1993 and 2002, produced a list of eminent UK surgeons who had attended an inaugural joint meeting of BASO ~ ACS and IASO in 1984. Devendra himself holds the remarkable record of having been a BASO ~ ACS Conference delegate continuously between 1984 and 2011, and is our strongest supporter on the Indian subcontinent.

Members of BASO ~ ACS who have not yet taken up the opportunity to visit India and to attend IASO Conferences are strongly encouraged to do so. There is an enormous appetite for education and professional engagement among our Indian colleagues, and there is a massive opportunity for worthy contributions to the development of health care in a challenging and extraordinarily diverse country. The activities of IASO and the key personalities are readily accessible through the IASO website, and for those looking for a starting point to India, the location of the 2012 conference in October in Goa should provide an attractive inducement to a first or further Passage to India.

Surgical Oncology Trainee Association (SOTA)

In 2010, Mr Andrew Baildam (BASO ~ ACS Past President) and Mr Charlie Chan (BASO ~ ACS Meetings Secretary) put forward the concept of a special Association for trainees in Surgical Oncology that was cross disciplinary and would facilitate the cross fertilisation of new ideas. This year, the Association is proud to announce the inception of the Surgical Oncology Trainees Association, SOTA. We have gathered the support of the existing specialist trainee Associations and will officially launch the new Association at the November 2012 BASO ~ ACS meeting with the first SOTA meeting. The following are a series of articles produced with the needs of the surgical oncology trainee in mind.

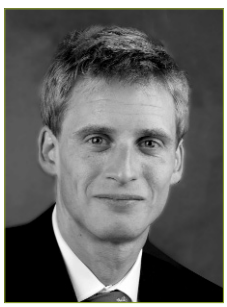
SOTA - Affiliated Groups and Officers

The Duke's Club for Colorectal Surgical Trainees	Katie Adams
The Association of Surgeons in Training (ASiT)	Edward Fitzgerald
The Association of Upper Gastrointestinal Surgeons of GB and I (AUGISt)	John Hammond
British Orthopaedic Trainees Association (BOTA)	Ben Caesar
British Neurosurgical Trainees Association (BNTA)	Tim Jones
ENT (Trainees in Ear Nose and Throat)	Stuart Gillett
Mammary Fold	Wail Al Sarakbi
Max Fax (Maxillofacial Trainees Group)	Rishi Bhandari
Obs & Gynae (Obstetrics & Gynaecology Trainees)	Paul Mills
PLASTA (Plastic Surgery Trainees)	Sof Rimouche
Urology Trainee Group	Mary Garthwaite

The SOTA National Committee


Katie Adams


Stuart Gillett


John Hammond


Wail Al Sarakbi

SOTA: An overview

Mr John Hammond
AUGISt Representative for SOTA, Speciality Trainee

Mr Wail Al Sarakbi
Mammary Fold Representative for SOTA, Speciality Trainee

The Surgical Oncology Trainee Group (SOTA) was formed in 2011 to provide a forum for training and education to trainees in surgical oncology from all disciplines. Increasing sub-specialisation between and within surgical specialities, changes in training structure and a reduction in the number of trainees with postgraduate research training has resulted in the current generation of surgical trainees with an interest in cancer surgery having very little exposure to the latest advances in surgical oncology in general and the current practice and guidelines in other surgical subspecialties.

BASO ~ ACS have recognised this gap in the surgical curriculum and have set out to develop new training opportunities for surgical trainees with the aim of improving standards of training, encouraging interaction and exchange of ideas across specialities and to provide a framework though which current limitations in training in surgical oncology can be addressed.

The SOTA committee currently comprises representatives from the various speciality trainee organisations: the Association for Surgeons in Training (ASiT), the Association of Coloproctology Trainees (Duke's Club), the Association of Upper Gastrointestinal Surgeons Trainee group (AUGISt), the Association of Breast Surgeons Trainee Group, the British Neurosurgical Trainees Association (BNTA), the British Association of Urological Surgeons Trainee group and the ENT trainee association. This close link with the different trainee groups will ensure that the profile of SOTA increases amongst the different disciplines.

The aim of SOTA is to develop a range of new educational opportunities that address the current deficiencies in surgical oncology training within the curriculum. The first of these will be the inaugural SOTA training day, which will be run in parallel with the BASO ~ ACS Scientific Conference in November 2012 and will focus on the principles of surgical oncology, with sessions led by experts in the field. This meeting will also host the first official forum of SOTA and elections of a new committee to represent all sub-specialties. Nominations will be invited prior to the start of the conference with details on the BASO ~ ACS website and emailed to trainees through their representative bodies.

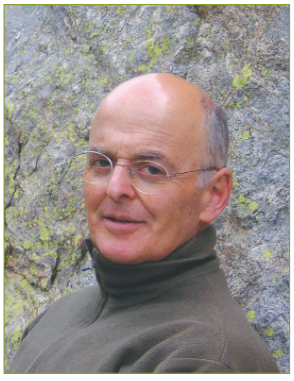
SOTA in conjunction with BASO ~ ACS will support an annual trainee prize at each of the specialist meetings to promote the development of research and audit interests in surgical oncology. The inaugural BASO ~ ACS prize was awarded to Mr Naveen Kachroo for his paper entitled *Clinical value of the number of positive diagnostic biopsy cores in predicting biochemical relapse in men treated for prostate cancer*. Over the next year we will see the launch of the new SOTA micro-site available on the BASO ~ ACS website www.baso.org/sota.aspx, that will host educational content together with details of fellowship and other training opportunities.

Membership of SOTA is now open to any U.K. based surgical trainee with an interest in cancer surgery. Membership is free and includes a subscription to the European Journal of Surgical Oncology and reduced BASO ~ ACS conference registration fee. Registration can be made at www.baso.org/sota/membership-form.aspx. We look forward to seeing you in London.

Mission statement:

- To promote a high standard of training and education in cancer surgery across all disciplines.
- To endorse interaction between trainees from all surgical subspecialties and promote dissemination of recent advances in cancer surgery to all members.
- To advance the understanding of cancer surgery and the current developments in each surgical field.
- To encourage interaction with colleagues outside the subspecialty and foster greater awareness of the roles and tasks of the modern Cancer Surgeon.
- To represent views and interests of cancer surgery trainees on other appropriate forums.

The Importance of Collaborations and Teamwork Between Oncological Disciplines



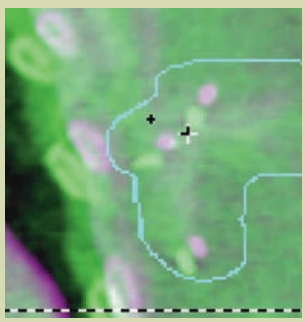
Professor John Yarnold
Professor of Clinical Oncology, Institute of Cancer Research and Royal Marsden NHS Foundation Trust

An article discussing scope for more collaborative working, research and training between surgical and radiation oncological disciplines has many topics to select from. Weekly multidisciplinary meetings, the clearest manifestation of collaborative working, have long become a way of life, and few of us can imagine working effectively any other way.

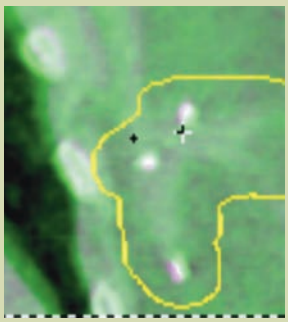
So, what about research? Both disciplines are very active in the planning and delivery of clinical trials, although there is plenty of scope to expand the portfolio of research. Some research focuses beyond the specific roles of surgery and radiotherapy, an example being the role played by surgeons investigating predictive biomarkers of response to primary medical therapy with chemotherapeutics, biologicals and endocrine agents.

There is certainly much more that each of our specialities can do, but how do closer collaborations develop? They typically start with informal contacts between individuals that have relationship of trust, if not friendship, before developing via more formal channels. An important example relates to the IMPORT HIGH protocol, a radiotherapy trial that depends on accurate localisation of the tumour bed after breast conservation surgery. Based on the results of a pilot study involving BASO ~ ACS members of the trial management group and some UK breast clinics, the willingness of BASO ~ ACS to add ligaclip marking of the resection cavity to its guidelines was highly influential in promoting this clinical trial. The widespread adoption of this simple procedure has a major impact on non-trial patients too. Using linear accelerators that increasingly resemble robots in important respects, it is now possible to adjust treatment to the positions of titanium markers in real time. This reduces the margins of healthy tissue exposed in order to ensure coverage of the tumour bed, and the greater accuracy is predicted to reduce the risks of local relapse as well as adverse effects. The collaboration between BASO ~ ACS and radiation oncologists in the IMPORT trials has been practice-changing, and very few of us feel confident to plan breast radiotherapy without markers in position nowadays. The TARGIT trial initiative represents another example of successful collaboration, this time led by surgical colleagues.

Restricting this discussion to the management of local-regional breast cancer, another emerging area of collaboration focuses on falling local relapse rates after breast conservation surgery in the older population with early stage disease. We all recognise that the majority of women need no radiotherapy, and it may now be possible to propose prognostic biomarkers of local relapse that allow stratification of patients to observation after primary surgery without radiotherapy. A proposal currently



Planned position of 3 tumour bed ligaclips & adjacent ribs (green) within 1 radiotherapy beam compared to actual locations (pink)



Automatic 3mm couch movement quenches colour (white) before delivery of daily dose.

being developed within the Breast International Group is for a single arm cohort study that aims to recruit low-relapse risk women defined in terms of age, tumour size, grade, ER, node status and endocrine therapy. The protocol is linked to translational research that seeks prognostic biomarkers of local relapse risk within the cohort of several thousand women. If this initiative continues to develop within the UK breast oncology community, it will represent a powerful collaboration between surgical and radiation oncology.

> *"There is much that we can learn from each other, both in our day to day clinical practice and in furthering our understanding of cancer and its treatment"*

A long-standing area of potential collaboration concerns the interaction between radiotherapy and breast free- or pedicle-flap reconstruction. The clinical literature is mostly retrospective and conflicting, but there may be a trade-off to investigate between convenience to patient and surgeon of a one-stage procedure completed before radiotherapy and the possibility of enhanced radiation adverse effects. The potential benefits of completing radiotherapy before reconstruction include the obvious one of protecting the flap, but there may be more to it. Tissue responses to radiation include atrophy, and at worst necrosis, reflecting depletion of the cellular components and surrounding matrix. The pathogenesis represents both direct effects on glandular and adipose cell populations and indirect effects via microvascular damage. Tissue damage may be reduced by the pluripotent stem cells introduced into irradiated areas by tissue flaps. If so, comparable processes may operate when fat cells are injected to compensate for tissue deficits after breast conservation therapy. Such healing processes would be well worth investigating in collaboration, since they would offer ample scope for reducing the problem of radiation adverse effects at multiple primary cancer sites.

Radiation fibrosis is a clinical problem at many anatomical sites, with significant implications for subsequent surgery. The traditional model envisages fibrosis as the passive stromal remnant of a tissue depleted of parenchymal cells, but this is obsolete. Radiation fibrosis may have more in common with surgical fibrosis than we currently realise. The surgical wound model of fibrosis is probably relevant to subcutaneous fibrosis following radiation-induced moist desquamation of the skin, for example. The pathogenesis of radiation fibrosis is likely to vary between organ and tissues, as well as over time. There are a number of models under investigation, including an early DNA damage response in myofibroblasts that involves myofibroblast activation and upregulated fibrogenesis. Another model of early-onset fibrosis postulates redox cleavage and activation of extracellular matrix-bound latent TGF,1. Early endothelial responses that enhance coagulation have also been identified that increase platelet adhesion and the release of multiple fibrogenic cytokines, including TGF,1. Vascular mechanisms relevant to late-onset fibrosis include radiation-induced atherosclerosis of large vessels, the tissue hypoxia representing a stimulus of fibrogenesis in some diseases, for example, interstitial renal tubular fibrosis. Whatever combinations of mechanisms are important in a particular anatomical site after radiotherapy, none will be specific to ionizing radiation, raising the likely-hood that joint approaches to researching a problem in common would be fruitful.

As can be seen from the above brief insight into some of the current and potential future areas where surgeons and radiation oncologists collaborate, there is much that we can learn from each other, both in our day to day clinical practice and in furthering our understanding of cancer and its treatment.

Masterships in Surgery: Post Graduate Education for Cancer Surgeons

Professor Jerome Peireira
Programme Director, Masterships in Surgery Degree Programmes – Norwich Medical School, University of East Anglia (UEA) and Norwich/Consultant Oncoplastic Breast Surgeon James Paget University Hospital NHS Foundation Trust

Surveys have been undertaken by the University of East Anglia (UEA) on the views of Mammary Fold, Duke's Club and ASiT members on higher surgical education and training. The results demonstrate that more than 61% of breast, and 80% of colorectal trainees are dissatisfied with current training programmes, confirming the results of previous surveys among surgical trainees [1, 2].

In addition, the training needs and competencies required to practice as a year one Consultant Cancer Surgeon in the 21st Century have changed, with increasing responsibilities in the following areas: MDT leadership, advanced decision making, clinical governance, audit, service evaluation, management and service delivery.

The 48-hour time limit imposed by the European Working Time Directive requires us to have a new mind-set on Education and Training. Post graduate education for cancer surgeons requires expertise, commitment, time and vision. The Intercollegiate Surgical Curriculum Programme (ISCP) is well designed, but the main challenge is delivery of education and training to meet learning outcomes.

We need a paradigm shift in our philosophy and delivery from; surgeon master to surgical educator, apprenticeship to post-graduate studentship and NHS organisational model to University based systems. In addition, trainees need to actively drive their own learning, using opportunities outside their normal working environment and utilising modern educational methods, including e-learning and simulation. Trainers and trainees need to identify new ways of using "lost" opportunities in training, consequent upon current shift patterns and new rotas. [3]

The aim of the UEA Masterships Programmes is to prepare, assess and endorse a surgical trainee for year-1 level consultant specialist practice. Currently these are the only programmes to formally qualify specialists in Oncoplastic Breast Surgery and Coloproctology.

Advantages of specialist Masterships for cancer surgeons:

- Our first year's experience of running the MS Oncoplastic Breast Surgery course has proven that it is now possible to successfully deliver an on-line, speciality-focused curriculum to strengthen the existing surgical training programmes.
- This e-learning initiative allows flexible study. Importantly the work undertaken for this University based programme does not impinge on the time limitations imposed by EWTD.
- The course syllabus and design are linked to the ISCP curriculum and complement the FRCS exit exam. However, the MS is set at a higher standard than the FRCS exit, aimed at producing a more highly trained specialist.

> *"The 48-hour time limit imposed by the European Working Time Directive requires us to have a new mind-set on Education and Training. More than 61% of breast, and 80% of colorectal trainees are dissatisfied with current training programmes"*

- There is a comprehensive syllabus with well-defined learning outcomes promoting in-depth knowledge. Skills assessments including assessment of communication, technical and operative skills are an integral part of the course.
- One of the key strengths of the programme is the training and assessment of decision-making skills. In addition, there are opportunities to gain additional expertise in areas like research, audit, service evaluation, management, service delivery and clinical education.

Course Delivery and Faculty Support:

The theoretical component of the course is delivered by e-learning through a dedicated Internet Based Virtual Learning Environment, supported by a strong network of e-tutors, particularly for mediating discussion forums. The practical/surgical skills component is supported by local educational supervisors. Trainees are expected to attend training days at the Royal College of Surgeons, London, for didactic lectures, seminars, cadaveric dissections and simulation training.

Table 1 ~ Certification and Entry Requirement.

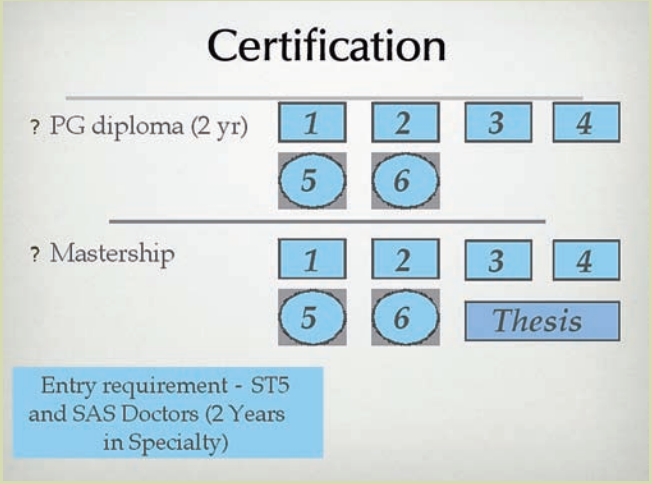


Table 2 ~ MS in Oncoplastic Breast Surgery

Compulsory Modules (dark orange blocks 20 credits each), Optional Modules (pale orange blocks 20 credits each)

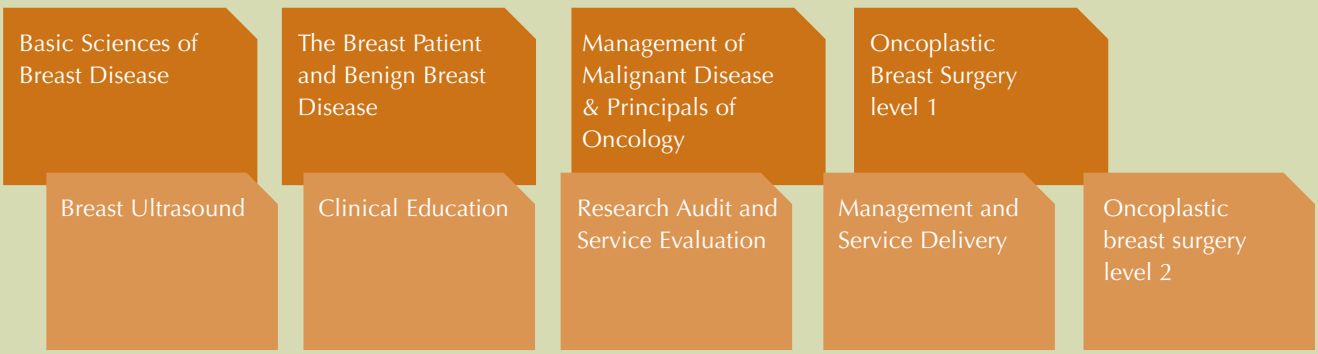


Table 3 ~ MS in Coloproctology

Compulsory Modules (dark green blocks 20 credits each), Optional Modules (pale green blocks 20 credits each)

The programme is strongly supported by an expert faculty from UEA, RCSEng, ABS/BAPRAS and BASO ~ACS. Each trainee on the course will have access to a large specialist faculty of link surgeons in oncoplastic breast, plastics and coloproctology to augment their operative experience. The combination of such a strong faculty and peer support creates exciting learning opportunities via the on-line learning community.

Certification and Modules:

The course allows the candidates to decide whether they wish to undertake a post graduate diploma or a Mastership (Table 1). The compulsory and optional modules for MS Oncoplastic Breast Surgery and MS Coloproctology are outlined (Tables 2 and 3).

Assessments:

Assessment is a key element of the course. This will take place throughout each module with formative and summative methods, both online and by a local surgical tutor. The summative assessments are carried out at the Royal College of Surgeons with MCQ's/EMQ script concordance testing of clinical reasoning, at the end of each module. Assessment of clinical and communication skills and patient mark up will take place in an end of year OSCE. Student examinations include critical analysis of portfolios and reflective diaries. Operative skills are assessed using photograph albums and trainees are expected to pass procedure-based assessments (PBA's) for all ISCP recommended index operations.

Study Time:

The student is expected to spend around 165 hours of study per 16-week module. There will be 35 hours per module of e-tutor support, in the format of mediated discussions of case presentations. We use a problem based learning approach in two-weekly blocks, with follow-up online formative assessments to enable trainees to assess their learning throughout the programme. Direct links from the case study to the library of reading material is made available, either through materials for download or links to external resources. Students would be required to attend training days at the Royal College of Surgeons every 16-weeks.

Trainee Evaluation/Feedback of the first MS Oncoplastic Breast Surgery Programme:

Questionnaire based surveys are conducted at the end of each module aimed at receiving detailed (80 questions) feedback on module content, course delivery, quality of virtual learning environment, standard of e-tutoring, and finally meeting of learning objectives for each module. The results show approximately 80% - 85% good or excellent rating of quality of education provided across all domains evaluated.

In-conclusion:

The level of support from professional bodies for this initiative demonstrates the level of commitment of surgical oncologists to improving standards of surgical training, in the light of challenges faced by EWTD. Clinical educationalists need to embrace new strategies and methodologies to improve the intensity and quality of training, to make up for the shortfall in current training opportunities. BASO ~ ACS are to be congratulated on setting up SOTA, aimed at improving training standards and encouraging the development of future leaders in the field of surgical oncology.

Feedback from faculty and trainees for the e-learning Masterships have been very encouraging. Surveys from senior surgical trainees indicate that there is a great need for new initiatives. This e-learning and practical/operative skills course has strong support from an eminent faculty of tutors recommended by the University of East Anglia, Royal College of Surgeons of England, Association of Breast Surgery, British Association of Plastic Reconstructive and Aesthetic Surgeons and Association of Cancer Surgeons at BASO ~ ACS.

The education programme is very much in line with the future direction of education and training strategy of the key stakeholders. This model of training has caught the imagination of clinical educationalists in other specialities and currently Mastership programmes are being developed in Regional Anaesthesia, Orthopaedics, ENT and Urology. In addition, this UK initiative has captured the attention of European and International institutions leading to invitations to develop collaborative e-learning speciality programmes in a number of specialities.

Masters in Oncoplastic Breast Surgery – Masterships in Coloproctology - visit
www.uea.ac.uk/med/course/PGT/obs/howtoapply

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BASO ~ ACS Prizes and Scholarships

Every year, BASO ~ ACS is proud to award its prestigious Prizes and Fellowships to some of our brightest and most gifted young surgeons. The aim of these awards is to encourage excellence in surgical research, both by rewarding surgeon scientists for their achievements following presentation at the BASO ~ ACS Annual Scientific Conference (Raven Prize, Alan Edwards Prize and the British Journal of Surgery Prize) but also to support new research and clinical and scientific collaborations (Research Fellowships, Travelling Fellowships).

Interim Results of the Sentinel European Node Trial (SENT)

Ms Claire Shilling
ST4 Oral and Maxillo Facial Surgery, London Deanery
Research Undertaken in the Department of Oral and Maxillofacial Surgery, Guys Hospital, London

Oral cancer is the eighth most common cancer worldwide in males and is increasing significantly amongst females. The incidence is highest in the developing world, especially in south-central Asia where it affects 12.6 per 100,000 populations and many countries within the developed world such as Denmark, France, UK, Germany and regions within Central and Eastern Europe have also reported substantial increases in the incidence of oral tumours.

The presence of cervical lymph node metastasis reduces the likelihood of cure by 50% but there is still controversy over the management of the clinically and radiologically N0 neck. Studies show there is a 21-33% rate of occult cervical lymph node metastasis even in the radiologically cleared neck. It is for this reason that elective neck dissection (END) is the standard of care for early stage disease.

Neck dissection is not without risk and is often implicated in reduced quality of life post surgery.

Sentinel node biopsy (SNB) is well established in the management of breast cancer and melanoma and its application to many other types of cancer such as urological and gynaecological tumours is being realised. Oral cancer is particularly suitable for SNB as there is a predictable pattern of drainage throughout the cervical lymph nodes and an accurately identified sentinel node should reflect the nodal status of the neck.

Oral cancer does have a high propensity for recurrence and SNB has not been widely embraced in head and neck surgery because of a fear of seeding disease during lymph node sampling, possibly reducing the chances of containing the tumour.

The European Sentinel Node Trial (SENT) was set up in 2006 to address if SNB is a safe and reliable method of staging the neck in early oral cancer. EORTC as well as local ethical approval was given to 14 centres across Europe to participate in this prospective observational study. Patients were eligible to enter the study if they had early stage oral squamous cell carcinmona with N0 necks on pre-operative CT, MRI and/or PET or ultrasound guided aspiration cytology. 431 consecutive patients were entered over a 4 year recruitment period. Seventy percent were T1 tumours, 28% T2 tumours and 2% T3 tumours. Sentinel nodes were retrieved using a combination of preoperative lymphoscintigraphy and intraoperative blue dye. Sentinel nodes were examined using a strict protocol of serial step sectioning and immunohistochemical analysis. In total twenty-seven percent of patients had occult cervical disease, 104 (24%) were detected by sentinel node biopsy and a further 15(3%) had false negative biopsies (20% of T1 tumours were positive, 39% of T2 tumours and 44% of T3 tumours). This gives SNB a sensitivity of

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88% and a negative predictive value of 96%. At an average follow up of 47 months (minimum 16 months) 87% of patients are alive and disease free and 6% have died from other causes. Overall there were 59 recurrences (13%), of which 2/3 were in the negative group. Most (75%) of the recurrences in the negative SNB group were in the neck and of all recurrences in the negative SNB group 63% were successfully salvaged. In the positive group only one third were successfully treated for recurrence.

The major benefit of SNB is that 73% of patients have avoided neck dissection; with a reduction in operating time, inpatient stay, complications, and cost. We have also been able to detect aberrant drainage with positive contralateral nodes in 12 patients that would have been missed by conventional treatment of unilateral END.

SENT is the largest study of its kind in oral cancer and has accrued large amounts of information about the biological behaviour of oral squamous cell carcinoma. There are exciting plans for the future with the integration of intraoperative 3d imaging and on-table lymphoscintigraphy to improve the ease and accuracy of identifying the sentinel node.

I am currently in and have been involved in the SENT trial under the supervision of Professor Mark McGurk at Guys hospital since 2006. My interest in medical research began whilst I was studying for a medical degree at Imperial College, where I undertook an intercalated BSc. in Cardiovascular medicine. After graduating, I developed an interest in surgery, specifically OMFS which I first gained experience of during my basic surgical training. I found the unique mix of hard and soft tissue diseases as well as the surgical challenges of the intricate anatomy and function of the head and neck region fascinating. I entered a graduate programme dental degree at Kings College London and it was at this time that I started to work on the SENT trial. Over the last 6 years I have had the privilege of co-ordinating collection of data, analysis and presentation of the results of this multicentre trial, providing regular updates to our trial group of over 50 surgeons, pathologists, and nuclear medicine physicians across Europe; as well as at national and international meetings. I have had huge satisfaction at seeing the hard work of all the collaborators produce highly clinically relevant results and I am now confident that these data will have a lasting influence on the management of oral cancer.

The Ronald Raven Prize: The Ronald Raven Prize is awarded annually to the best presenting author in the Ronald Raven Prize Session of the BASO ~ ACS Scientific Conference.

Previous winners of the Ronald Raven Prize:

2007	Mr S Somasundaram
2008	Mr Daniel Marsh
2009	Dr Gillian McColl
2010	Mr Sijie Heng
2011	Jointly awarded to – Mrs Clare Schilling and Mr Paul Farrelly

Does " Aggressive Surgical Resection" Improve Survival for Advanced Stage III and IV Neuroblastoma? - A Systematic Review and Meta-analysis

Mr Paul Farrelly
Specialist Registrar in Paediatric Surgery

Neuroblastoma is the most common extracranial solid tumour in childhood and results in approximately 15% of paediatric oncology deaths. It is often described as enigmatic because of the broad spectrum of clinical behaviour ranging from life-threatening progression despite intensive treatment to complete spontaneous regression. Unfortunately, the outcomes for children with advanced disease have not improved significantly over recent decades with survival around 40% at five years.

Neuroblastoma is a biologically heterogenous malignancy that can be stratified into low, intermediate and high-risk groups. Stratification depends on age, INSS stage, MYCN status, international neuroblastoma histology pathology classification and DNA ploidy. For tumours with favourable biology recent trends in treatment regimes have been aimed at a reduction in the intensity of therapy. However, for tumours with poor prognostic indicators chemotherapy regimes have become more intense.

Managing children with advanced disease is one of the greatest challenges to paediatric oncologists and paediatric oncology surgeons. More than half of all children who present with neuroblastoma have initially unresectable or metastatic disease.

Most centres that treat children with neuroblastoma follow treatment protocols that include surgical resection for stage III and IV disease. Surgery for advanced neuroblastoma is challenging and not without significant risks of morbidity and mortality. Aggressive surgery can cause complications ranging from haemorrhage to neurovascular injury resulting in gut and kidney ischaemia. Sub-adventitial resection of tumour where vascular structures are involved can result in chronic diarrhoea due to intestinal sympathetic denervation.

We conducted a systematic review and meta-analysis to analyse the role of surgery for advanced disease, particularly in those children with stage IV metastatic disease. There have been conflicting results published in the literature as to whether aggressive gross total resection provides any survival benefit over partial resection in stage III and IV tumours. Our results show that performing less aggressive surgery in the presence of metastatic disease does not adversely affect survival. Paediatric oncology surgeons do not need to attempt gross total resection in every case of advanced neuroblastoma. By limiting the surgical resection many of the unpleasant and adverse consequences of aggressive surgery could be prevented whilst maintaining survival.

I am currently a registrar in paediatric surgery at Alder Hey Children's Hospital NHS Foundation Trust in Liverpool. I started at Alder Hey in 2007 and have experienced first hand the challenging yet rewarding role of a paediatric oncology surgeon. I believe that conducting high quality research is often necessary to answer the most difficult clinical problems that we encounter as doctors. Research has the potential to improve treatment strategies for our patients and have a direct impact on their quality of life and prospects of long term survival. Ms Dhanya Mullassery and I have had the benefit of mentorship and guidance from Professor Paul Losty. His passion for research in paediatric surgical oncology has provided the driving force behind this and many other important pieces of work.

Ronald Raven Travelling Fellowship 2010

Mr Robert Jones
Hepatobiliary Research Fellow,
University of Liverpool

Anyone interested in the management of hepatopancreaticobiliary disease will be familiar with the name of Memorial Sloan Kettering Cancer Centre in New York. In 2011 I was lucky enough to spend 2 weeks as part of the Hepatopancreaticobiliary Unit, working alongside Dr. Bill Jarnagin & Dr. Mike D'Angelica.

Few of the patients I met during my visit were from within New York, but many were young (a striking proportion of whom were doctors) with aggressive disease and a grim prognosis. Many US patients are geographically isolated but economically mobile and so it was interesting to compare the patient cohort at MSKCC to our standard UK population. They tended to be well informed and understood the quality of healthcare available at a centre of excellence, and were willing to incur significant hardship to receive this.

Although the surgical management of patients was similar to the UK, the oncological approach was very different. Alongside mainstream systemic chemotherapies, almost all patients were recruited into clinical trials of novel agents. The unit is an advocate of liver-directed therapies, with extensive use of hepatic arterial infusion (HAI) pumps for patients with resectable and irresectable hepatic disease. Patients are identified at the weekly tumour board by Professor Nancy Kemeny, a medical oncologist and world lead on HAI. The team is now starting to implant these pumps using a Da Vinci robot, a procedure I was lucky enough to see. Over 700 patients have been treated to date, and recently published work from this group suggests that adjuvant HAI alongside systemic chemotherapy offers superior survival to systemic therapy alone following hepatectomy for colorectal liver metastases. In an era of increasingly personalised treatments based on predictive biomarkers of response, it was interesting to see a different approach based on maximisation of local exposure to chemoactive agent alongside targeted treatments.

Non-clinical support was unparalleled. Patients and relatives were spoken to every day in special family rooms, where well-informed members of the nursing, clinical and support teams were able to answer their questions. During surgery, a designated nurse would provide updates to the family every 1-2 hours, and the operating surgeon would go and meet the family to discuss the findings of surgery as soon as the case had finished.

The level of teaching was very impressive, with weekly grand rounds consisting of two fellows being asked to present on a contentious oncology topic in an adversarial setting. Both oncology and surgical fellows presented, reinforcing the multidisciplinary approach of the centre. In what could be described as a "hostile" environment, fellows often found themselves arguing not only with their opponent but also an international authority on their subject who was in the audience!

The unit's reputation as a world lead in the management of HPB disease owes a lot to the endeavor of Professor Lesley Blumgart in the 1980s and 1990's. At the age of eighty, Professor Blumgart still visits to give weekly afternoon teaching to all surgical fellows, and it was a privilege to be able to meet him, receive some career advice and discuss the future direction of HPB surgery.

Following my visit to New York, I travelled to Chicago to attend the American Society for Clinical Oncology (ASCO) Annual Meeting. Attended by over 30 000 delegates, ASCO is one of the premier oncology meetings in the world. It was incredibly exciting to see the absolute cutting edge of clinical oncology first hand. One noticeable theme was the design of clinical trials targeting agents against a specific tumour phenotype or genotype, ensuring maximal yield by treating only the group of patients likely to benefit from a particular agent. These techniques are no longer restricted to experimental research; one unit now performs full tumour genotyping within 20 days of tissue biopsy, allowing multidisciplinary teams to tailor treatment to tumour subtype.

Immediately following ASCO, I travelled to the MD Anderson Cancer Centre in Houston, to work with Professor Nic Vauthey, Dr. Tom Aloia, and Dr. Jason Fleming. I'd been told "everything is bigger in Texas", and I realised that was true when I had to take a ride on a golf buggy through the hospital to find the

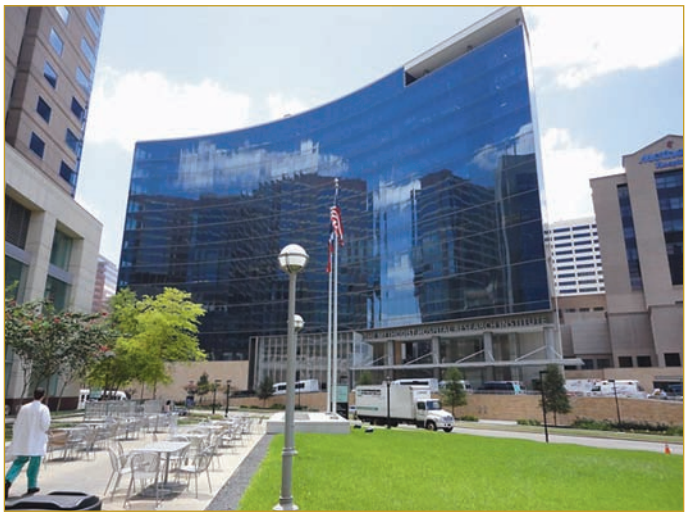
surgical department in the delightfully named T. Boone Pickens Tower.

MD Anderson has established a phenomenal reputation in cancer care and research, and visiting the hospital it was not difficult to see why. A series of enormous glass and steel buildings in the Texas Medical Centre, MD Anderson treats research and clinical care as equally important. Incredibly well resourced, clinicians have two full days each week to focus purely on research activities. With world class support from basic scientists working within the centre, a willing body of research fellows and trainees, excellent data collection and prospective biobanking of a huge quantity of clinical samples, it was incredible to see what could be achieved when time and money become seemingly limitless.

Operating on a similar patient group to MSKCC, it is obvious that not every patient would benefit from surgery. The integration between medical and surgical oncologists was seamless, with patients always aware that the whole team was focused on delivering the best care for them. Job titles seemed almost arbitrary, with oncologists advising on radiology and surgeons recommending chemotherapeutic regimen. It was not uncommon for patients to be reviewed by a medical oncologist, a surgical oncologist, undergo an MRI scan which was reported live, then re-reviewed by both oncologists during the same morning clinic.

All patients undergoing hepatic resection for colorectal liver metastases received neoadjuvant and adjuvant systemic therapy, and it was fascinating to see the group's excellent survival data for what seemed to be a self-selecting biologically poor group of patients. The team continues to research novel ways of assessing tumour response to treatment using biological and radiological markers, and it was interesting to see the varied methods they have developed for doing this.

Again, the quality of education for surgical fellows was exemplary. Daily teaching conferences were the norm, with a particular highlight being grand rounds delivered by Professor Charles Balch, Professor of Surgery at Johns Hopkins on the



subject of "professional burnout". US fellows are currently limited to 80 hours a week, but often work in excess of 100. My mention of the 48-hour week triggered incredulous gasps!

Receiving the BASO ~ ACS Ronald Raven fellowship was an incredible honour. I am indebted to the BASO ~ ACS council for their generous support. I also owe a huge amount of thanks to Mr. Graeme Poston for his support during the planning of this trip, as well as the teams at MSKCC and MD Anderson for their fantastic hospitality.

Previous Ronal Raven Travelling Fellowship award holders have included:

2006	**Mr G Morris-Stiff**
2007	**Mrs K Hogben**
2008	**IASO Conference; Mr S Balasubramanian, Mr A Goyal, Mr S Menakuru, Mr H Ramesh, Mr A Subramanian, Mr V Upasani**
2009	**Ms P Roy**
2010	**Mr R Jones & Mr I Whitaker**
2011	**Mr Declan Dunne**

Ronald Raven Travelling Fellowship 2010

Mr Iain S Whitaker

Honorary Professor in Plastic Surgery, Swansea University College of Medicine & Specialist Registrar in Plastic and Reconstructive Surgery, Welsh Centre for Burns and Plastic Surgery

Raven Fellowship 2010 awarded to Mr Iain Whitaker to support a visit to Professor Mark Ashton, Head of Plastic and Reconstructive Surgery at the Royal Melbourne Hospital and Director of Research at the Taylor Laboratory, Department of Anatomy and cell Biology, University of Melbourne, Australia.

As I have a keen interest in oncoplastic microsurgical reconstruction, and a strong research background, I was very keen to visit an international centre of excellence to develop these interests. I am very grateful to the BASO ~ The Association for Cancer Surgery for this prestigious award, as The Ronald Raven Travelling Scholarship helped fund a visit which gave two major benefits:

1) To see a wide variety of high volume microsurgical reconstructions;
2) To get further involved in related research activities.

The Royal Melbourne Hospital is one of Melbourne's pre-eminent hospitals, providing world-leading clinical care, extensive surgical and medical expertise and outstanding research, built on its foundation as a university teaching hospital. The Royal Melbourne Hospital was Melbourne's first hospital, established in 1848. It has two campuses in the renowned Parkville Precinct, just north of the Melbourne Central Business District.

During the year at the Royal Melbourne Hospital and affiliated institutions, I was involved in over one hundred microsurgical reconstructions following resection of head and neck, breast, extremity and trunk tumours. I was lucky enough to spend the majority of my time with world class microsurgeons such as Mark Ashton, Damien Grinsell and Scott Ferris, however I also learned a great deal from my time with other senior team members such as Kirsty MacGill, Anand Ramakrishnan, Dean Trotter, Eldon Mah and Simon Overstall.

There was exposure to deep inferior epigastic artery perforator flaps (DIEPS) for breast reconstruction, anterolateral thigh flaps

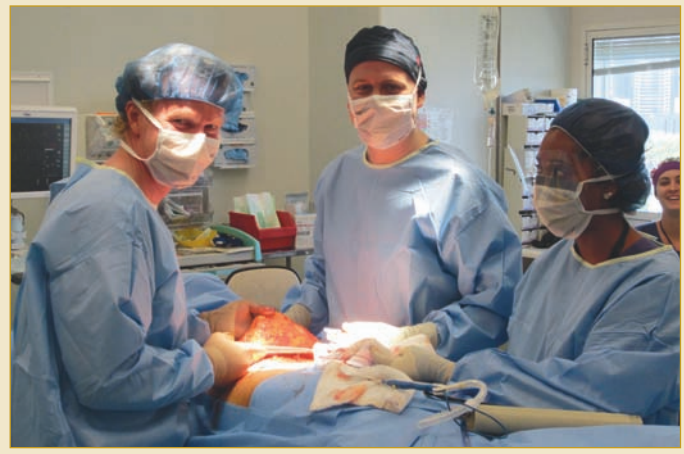


Photo of Professor Mark Ashton and Mr Iain Whitaker operating in Melbourne

(ALT), radial forearm (RFF), deep circumflex iliac artery (DCIA) and fibula flaps for head and neck reconstruction, innervated gracilis, rectus abdominis flaps and the workhorse latissimus dorsi flap for upper and lower extremity reconstruction.

In Australia, there is a greater influence of the private sector than in the UK, and a reasonable amount of my time was spent in that setting. In both the public and the private setting, microsurgery is very much a two consultant surgeon approach, and this seems to work very well. The registrars are heavily involved in the public operating, and the teaching and experience they receive is top class. I believe the UK will work towards a two consultant operating team in the future and it will be interesting to see the effect of this approach on patient reported outcome measures (PROMS) and other service delivery variables.

The Royal Melbourne Hospital, and the Taylor Laboratory have always focused on Translational research, and the world's very first free flap was researched and developed by the unit in the early 1970s. To Professor Taylor's credit, although his early efforts somewhat defined the times, he then moved with them, and research has steadily progressed through the issues

confronting current medical science. For the last few years efforts developed and expanded to investigate the lymphatics and in particular the need to study the variability in sentinel node biopsies in melanoma and the onset and development of lymphoedema following mastectomy for breast cancer or the aetiology behind the ways in which sarcomas and cancers spread.

I was lucky to get involved in recent efforts guided by the current Director Mark Ashton and post doctoral researcher Warren Rozen, to image the blood vessel anatomy prior to free flap raising using computed tomographic angiography and more recently dynamic infrared thermography (Figures 1 and 2). One of the research highlights was supervising a pre-med student (Maria Karavias) to develop one of Mark Ashton's ideas regarding the blood supply of the gracilis muscle. Her hard work and dedication, with some help from a computer program designed by Ramin Shayan and co-workers, and the technical expertise of Michelle Le Roux, helped me write an elegant paper delineating the two or three territory nature of the gracilis fasciocutanoues free flap and the blood supply of both the muscle and the skin. Mark Ashton and team members accompanied me to the Annual British Association of Plastic, Reconstructive and Aesthetic Surgeons winter meeting in London where this work was potentially rolled out as a clinical trial (Figures 1-4).

In addition to a brilliant clinical and research experience, my hosts were very welcoming on the social front. Thanks must go to Ramin Shayan and Tara Karnezis for their support towards the end of my stay – I wish we had met earlier but look forward to a lifelong friendship. Thanks must also go to Felix Behan for passing on his tips regarding the wonderful keystone island perforator island flap, and allowing me to increase my clinical experience working at Western Health for a short time. I would also like to thank Damien Grinsell, who, although famous for his microsurgical skills, failed at getting me interested in Aussie rules football and resorted to the safe option of kindly taking me to see the Melbourne Rebels Rugby union team in action.

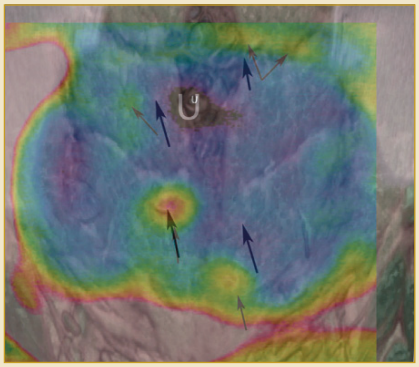


Figure 1. Preoperative thermal image overlying the preoperative computed tomographic angiogram (CTA), showing the correlation between the findings of the two modalities (black arrows) in a patient about to undergo a DIEP flap.

Special thanks are reserved for Mark Ashton and Linda Ferguson for their unfailing support throughout the year in every arena. Without them, this year would not have been possible.

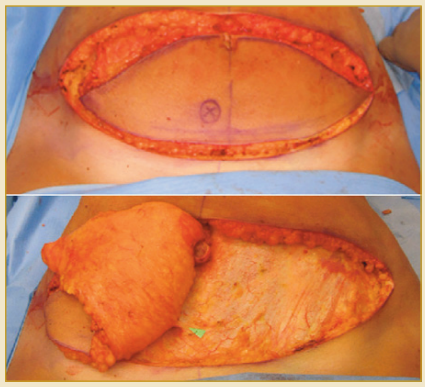


Figure 2. Intra-operative photographs showing the raised DIEP flap, with the marked perforator of choice on the right hemiabdomen. The left hemiabdomen had no perforators of note

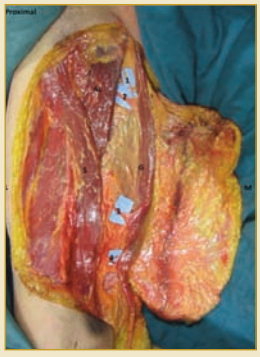


Figure 3. Cadaveric dissection showing the positions of the nerve to gracilis and the three vascular pedicles

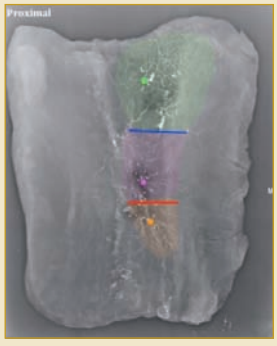


Figure 4. A lead oxide radiographic study (coloured using photoshop) showing three vascular territories of the gracilis pedicles with intervening choke zones

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Selected original articles produced as a result of this fellowship:

1. Murray AC, Rozen WM, Alonso-Burgos A, Ashton MW, Garcia-Tutor E, Whitaker IS. The anatomy and variations of the internal thoracic (internal mammary) artery and implications in autologous breast reconstruction: clinical anatomical study and literature review. *Surg Radiol Anat.* 2012 Mar;34(2):159-65.
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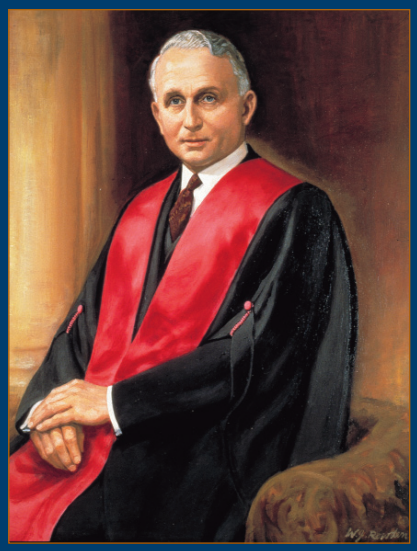
THE 2012 RONALD RAVEN TRAVELLING SCHOLARSHIPS



Submissions are invited for the BASO ~ ACS Ronald Raven Travelling Scholarship Award for 2012. The funds for this award are provided by the Ronald Raven Trustees in memory of Ronald Raven, founder of the Association. The award this year is a maximum of £2,000 and can be awarded to one or several individuals as considered appropriate by the BASO ~ ACS National Committee when considering the merits of the applications.

The scholarship is open to trainees or recently appointed consultants, who have gained the Fellowship of one of the British or Irish Colleges.

Applicants need not be members of BASO ~ The Association for Cancer Surgery, but applications must relate to the aims and objectives of the Association.

Applications should be submitted to Mr Zenon Rayter by Friday 28th September 2012 and should be submitted in the following format:

(i) A personal statement outlining the details of the use to which you wish to put the scholarship and also the benefits you wish to obtain from the visit. Please also include details of any other sponsorship/ scholarships obtained and whether you are applying for the full scholarship or part of it.

(ii) Curriculum Vitae (brief version – 3 pages maximum)

(iii) A letter of support from an independent referee/ supervisor in the UK as to your suitability for this scholarship.

(iv) A letter of invitation from the Unit/ Institution to be visited, showing that approval has been given for the intended programme.

Please send applications as detailed above to arrive no later than 28th September to:

Mr Zenon Rayter, Honorary Secretary, BASO ~ ACS, at the Royal College of Surgeons of England,
35 – 43 Lincoln's Inn Fields, London, WC2A 3PE.

For further information please contact Rebecca Murchie at the above address or by e-mail to: rebeccamurchie@baso.org.uk

The Joint RCS / BASO~ACS Research Fellowship

Mr Mark Ferguson
Specialty Registrar in ENT,
London Deanery

My earliest experience of research was during my intercalated BSc(hons) in Molecular Biology at Imperial College, London. Apart from taking the obligatory taught modules the highlight of the year was my research project investigating attenuating mutations in Coxsackie B3 virus and the development of an immunisation strategy. It engendered in me a lasting aspiration to return to translational research in the future.

After qualifying as a doctor I pursued a career in Otolaryngology and I am now a Specialty Registrar in ENT in London. Since my first Otolaryngology post in a busy Head & Neck Cancer unit at Barts, I have been fascinated by this complex and challenging surgery. Accordingly, I have devoted a significant proportion of my training to this sub-speciality so far and in this time I have come to appreciate that many of our patients with more advanced disease fared poorly despite our best efforts. This raised the question in my mind about the best way to treat this cohort of patients. Clearly established treatment modalities are not sufficient alone and I wanted to be involved in the development of alternative treatment strategies. This aim became realty when I won one of The Royal College of Surgeons of England Research Fellowships. My particular fellowship was supported jointly by The Rosetrees Trust and BASO ~ ACS. This funding allowed me to undertake a significant full-time laboratory based research project in virotherapy for solid tumours, enabling me to pursue a PhD and develop greater experience in scientific methodology.

My project

Head and neck cancer is fifth most common cancer worldwide and despite advances in surgical care and chemoradiotherapy in recent years the prognosis for advanced cancer has remained dismal. This has precipitated the search for novel treatment strategies. One of the most promising novel therapies are oncolytic viruses. These are viruses that either have a natural tropism for cancer cells or have been engineered to have one. They infect, replicate and then destroy the cancer cells whilst sparing neighbouring normal tissue. These agents have now been further modified to improve their selectively whilst also "arming" them with transgenes which are produced in the tumour microenvironment. Many of these transgenes encode immune-modulating proteins the aim of which is to shift the balance in the tumour microenvironment from immune tolerance of the tumour to tumour clearance and ideally the development of tumour specific immunity.

Our laboratory uses Vaccinia virus (VV) which has a wide tropism for cancer cells partly due to the fact that, unlike other oncolytic viruses, it is not dependent on a specific cell membrane protein for cellular entry and is able to thrive in a broader range of cellular conditions[1]. Furthermore Vaccinia virus has an excellent safety record having been used in the immunisation program against smallpox.

Vaccinia virus can be delivered by both intra-tumoural (IT) and systemic routes successfully[2]. Systemic delivery offers significant advantages over IT delivery as it enables treatment of both the primary tumour as well as any metastatic deposits at the same time. This is crucial as death from cancer is often due to metastatic disease. Treatment of multiple metastases or inaccessible tumours requires the delivery of therapeutic agents that are able to persist in the circulation without depletion or degradation while selectively infecting tumour cells. The ability of most oncolytic viruses to infect tumours after systemic delivery is limited by host defences such as tissue resident macrophages[3], complement, antibodies and antiviral cytokines[4]. Oncolytic VV has the potential to overcome these barriers since it produces a form of itself called the Extracellular Enveloped Virus (EEV) which shrouds itself in a host cell derived envelope and thus can evade both complement and neutralising antibodies[5,6]. Indeed, strains of Vaccinia viruses that have high levels of EEV have been shown to spread more effectively within and between tumours[7]. However it is the intracellular mature virion (IMV) form of the virus that will potentially be injected either intra-tumourally or systemically in the clinical

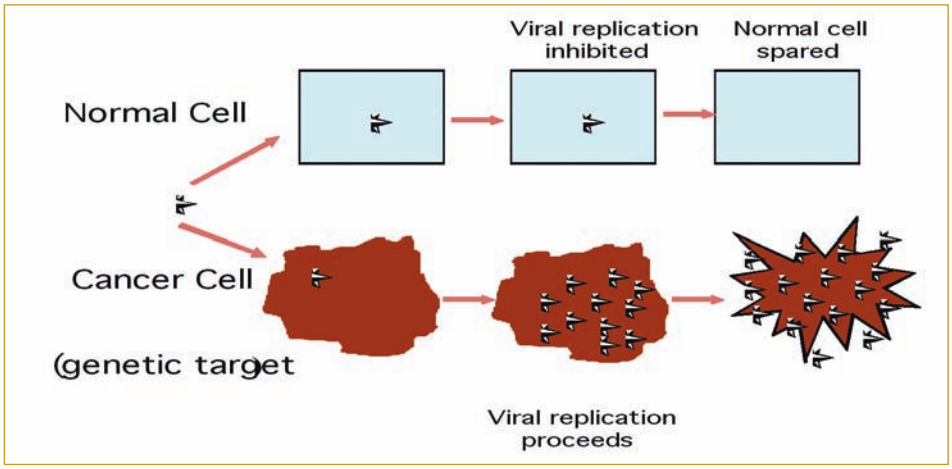


Figure 1: Thymidinekinasegene deletion in the virus enhances tumour selectivity and thymidineknase is required for virus regulation in normal cells but in the dysregulated cancer cells it is not

setting and it's this form that must successfully reach the target tissue before any EEV form can be produced. IMV unlike EEV is highly immunogenic.

Studies examining systemic VV delivery so far have used IMV and the majority of studies have been performed in human xenograft models in nude mice. Clearly though there is a need to assess systemic delivery in an immune competent model as host immune response is a major barrier. To date there have been many systemically delivered oncolytic virus clinical trials published but none of these have shown efficacy. They have demonstrated that there is limited toxicity and latency and there are phase IIb and phase III trials pending but they have not reported. At present the available data suggests systemically delivered oncolytic viruses offer only modest improvements, if at all, over conventional second line treatment.

My research project has been to investigate the factors that influence the systemic deliver of our oncolytic virus, Vaccinia, and to ultimate develop a strategy that can overcome these factors and improve the systemic delivery in our preclinical models.

Our results have demonstrated that while VV can effectively infect tumour cells in nude mice after systemic delivery, effective infection of tumour cells cannot be achieved in the immunocompetent model. Concurrently, work in our group revealed that depletion of macrophages by clodronate liposomes dramatically enhanced VV infection of tumours in immunocompetent mice after systemic delivery (unpublished data by James Tysome et al). This almost completely restored the anti-tumour potency to the level seen in nude mice. However, clodronate liposomes non-selectively deplete macrophages and therefore potentially diminish any beneficial activity in the tumour microenvironment unrelated to viral clearance. Consequently, this necessitates a search for a novel, more selective agent for enhancement of systemic delivery of VV.

Macrophages recognise and ingest pathogenic microorganisms through opsonin-dependent and independent (scavenger receptor) phagocytosis, a process for which several lines of evidence have highlighted an important role for phosphatidylinositol 3-kinases (PI3K)[8]. These observations imply that PI3K inhibitors may be potential therapeutic agents for enhancement of systemic delivery of VV. One caveat to this is that therapeutic interference in the PI3K pathway may have to be targeted at individual, or groups of, PI3K isoforms[9]. It is known that mammals have eight isoforms of PI3K, but the specific isoforms of PI3K involved in macrophage phagocytosis and VV uptake have yet to be elucidated. Accordingly, in my preliminary investigations I have evaluated the effect of selective PI3K inhibitors on macrophage phagocytosis in vitro using both chemical inhibitors and transgenic models. I have also investigated whether or not these inhibitors have any toxic off target effects. To date this work has been very encouraging and there is a very real hope that a strategy for enhanced systemic delivery of VV in humans can be developed soon and potentially rolled out as a clinical trial.

These results formed the basis of a successful CRUK Clinical Research Fellowship application and this funding has allowed me to continue my research full time after the RCS / BASO~ACS funding finished. Shortly I hope to complete my PhD and then it will be back to clinical training but now that I have had this experience I think that ultimately I will aspire to include translational research into my future career plans.

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The Alan Edwards Prize

Ms Jagdeep K. Singh
General Surgery Registrar (ST3) in the West Midlands Deanery

It was an honour to be awarded the Alan Edwards Prize at last year's BASO~ACS conference for my research. To gain a greater understanding of breast cancer biology and how this knowledge can be used to develop targeted therapies, I took time out of training to study for an MD at the Paterson Institute for Cancer Research, Manchester.

Despite major advancements in breast cancer management, approximately 12,000 patients will die from the disease each year in the UK. Increasing evidence indicates that a small subpopulation of cells, known as breast cancer stem-like cells (CSCs), are responsible for tumour initiation, maintenance and metastases. Moreover, by virtue of their intrinsic resistance to conventional therapies, these cells are proposed to be the cause of disease recurrence[1-3]. Consequently, in order to improve survival there is a need to develop CSC-targeted therapies.

Up to 25% of breast cancers over express human epidermal growth factor receptor-2 (HER2). HER2 positive tumours are associated with poor prognosis and recent studies indicate that this may be a consequence of increased breast CSC activity[4, 5]. Trastuzumab (Herceptin), a monoclonal antibody against HER2, has improved the survival of HER2 positive patients and this is postulated to be due to inhibition of HER2 positive CSC activity[5]. However, trastuzumab in most cases is insufficient to eradicate the disease, indicating that other factors are important in driving the activity of HER2 positive breast CSCs.

Inflammation is a hallmark of cancer and interleukin-8 (IL-8), an inflammatory cytokine, is upregulated in breast cancer and associated with poor prognosis[6, 7]. Recent studies indicate that IL-8 via its cognate receptors, CXCR1 and CXCR2, can promote breast CSC activity and therefore represents a rational therapeutic target[8, 9]. However, these studies were conducted in cell lines, which have many inherent limitations. The aims of my MD were firstly, to explore the role of IL-8/CXCR1/2 signalling in the regulation of breast CSC activity in patient-derived breast cancers and secondly, to determine the potential benefit of combining CXCR1/2 inhibition with HER2-targeted therapy.

By measuring IL-8 levels in ascites and pleural effusions of patients with metastatic breast cancer, I found a direct correlation between IL-8 level and CSC activity when cells from these fluids were cultured ex vivo. This demonstrates that patients with higher IL-8 levels have cancers with greater CSC activity. Using recombinant IL-8, I demonstrated that activation of CXCR1/2 promoted CSC activity and blockade of these receptors and inhibit this effect. Furthermore, by knocking down HER2 I discovered that the biological effects of IL-8 are mediated via a novel pathway involving HER2 transactivation. Given the importance of HER2 in regulating breast CSC activity[5], a pathway driving the activation of this receptor via CXCR1/2 could have important biological consequences. This may be very relevant in oestrogen receptor negative and HER2 positive breast cancers which are reported to have higher levels of IL-8[10, 11] and this may contribute to their aggressive phenotype. In addition, I demonstrated that inhibition of CXCR1/2 added to

> *"Overall, my research experience has provided me with unparalleled opportunities to develop as a researcher, and as a surgeon in training, these skills will enable me to contribute to future studies, which hopefully will improve patient outcomes."*

the efficacy of inhibiting HER2 in HER2-positive cancers. These studies establish a role for IL-8 in the regulation of breast CSC activity and suggest that combining CXCR1/2 inhibitors with current HER2-targeted therapies has the potential to deliver a more effective therapeutic strategy to eliminate CSCs and improve the survival of HER2-positive patients. Trials are underway to determine the efficacy of CXCR1/2 inhibitors in advanced breast cancer.

My time out of programme has been a challenging, yet immensely rewarding experience. It has been a unique opportunity to acquire a multitude of research skills, and develop skills in communicating my findings to scientific, clinical and lay audiences. I give thanks to my supervisors, Dr Robert Clarke and Professor Nigel Bundred, who have supported me throughout my studies and helped me develop my ability to analyse and critique scientific data. Their passion for research has been a constant source of inspiration. As a recipient of the Margaret Roberts Royal College Surgical Research Fellowship, I am incredibly grateful for the support I have received from the College, which helped to get my project started. The funding I received from the fellowship also enabled me to present my findings at the San Antonio Breast Cancer Symposium, Texas in December 2011. Furthermore, it has been a privilege to speak on behalf of the College at several fundraising events and in doing so I hope I have helped generate funds for future research fellows. I was awarded the Royal College Stefan Galeski Travelling Fellowship for my project, which gave me the chance to leave the laboratory work behind for a week and assist in surgical skills workshops in Brunei and Borneo in March 2011. This was extremely rewarding as well as great fun! Overall, my research experience has provided me with unparalleled opportunities to develop as a researcher, and as a surgeon in training, these skills will enable me to contribute to future studies, which hopefully will improve patient outcomes.

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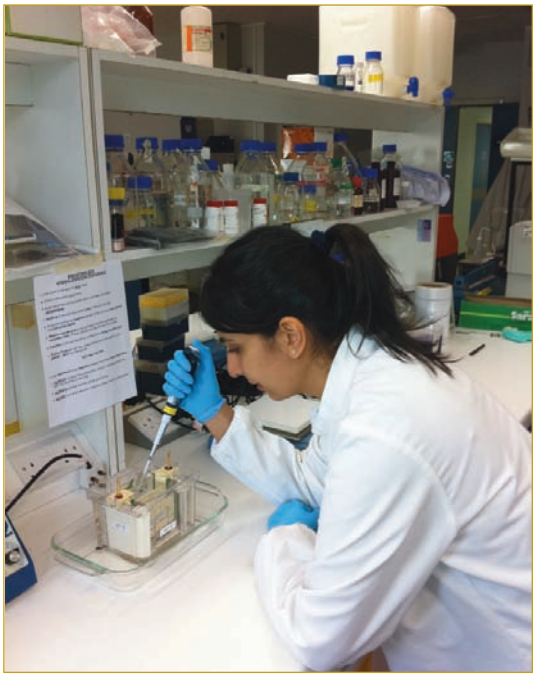


The British Journal of Surgery Prize

Mr Samer-ul Haque
ST3 Speciality Registrar in General Surgery, London Deanery and PhD Surgical Research Fellow at UCL

Colorectal cancer (CRC) is one of the most common cancers worldwide and is the third commonest cancer in the UK, with approximately 36,000 new cases per year. Although surgical removal is curative for early stage disease, approximately 50% of all patients will go on to develop metastases, usually to the liver. Adjuvant chemotherapeutic regimens typically comprise 5-Fluorouracil, which incorporates into DNA to inhibit synthesis, plus folinic acid. This is combined with either: the alkylating-like agent Oxaliplatin which interferes with DNA repair (FOLFOX); or the topoisomerase inhibitor Irinotecan (FOLFIRI).

More recently, monoclonal antibodies against the epidermal growth factor receptor (EGFR) and vascular endothelial growth factor A (VEGF-A) have been developed, such as Cetuximab and Bevacizumab respectively. The latter agents are combined with classical chemotherapeutic drugs as adjuvant therapy. Treatment efficacy has improved survival rates, however, colorectal cancer still remains a common cause of cancer death within the UK. Despite advances in both surgery and chemotherapy regimens, it remains the second most common cause of death within the UK from cancer. We therefore need to focus on developing novel targeted therapies. One emerging potential target is the Endothelin-1 (ET-1) system.

ET-1, initially described as a vasoconstrictive substance, is now known to be involved in the pathophysiology of many solid malignancies including colorectal, ovarian, breast, stomach and prostate carcinomas, melanomas and glioblastomas. ET-1 has various actions which contribute to tumourigenesis: it modulates mitogenesis, apoptosis, angiogenesis, invasiveness and metastatic development. ET-1 is significantly up-regulated in 80% of primary CRCs. Our group showed that plasma levels of ET-1 were increased in patients with both primary CRCs with or without liver metastasis.

ET-1 acts via two receptors, ET_A and ET_B. ET_A receptors are up-regulated predominately in colorectal, ovarian, renal and prostate cancers, whilst ET_B receptors are down-regulated. Specifically within CRCs, we demonstrated that pharmacologically functional ET_A receptors were over-expressed in all CRC tissues from patients, compared to normal. Several in vivo models have been used to assess the role of endothelin antagonism in tumorigenesis. Work originating from our department using intraportally injected syngeneic MC28 cells in rats demonstrated that ET_A antagonism with BQ123 significantly reduced hepatic tumour load compared to controls.

Gene	Name	Role/Effect
MT1X	Metallothioneins	Pro-proliferation/ migration/invasion, angiogenic
MMP7	Metalloproteinase	Pro-invasion/migration
PPP2R5D	Protein Phosphatase 2 Reg5 Delta	Pro-proliferation/ division/migration
CTGF	Connective Tissue Growth Factor	Pro -proliferation/ adhesion/ migration/angiogenesis
ADM	Adrenomedullin	Pro-proliferation/ angiogenesis & inhibits apoptosis
STC1	Stanniocalcin 1	Pro-survival/ mitogenic

Table 1. Significantly altered genes were confirmed in both CRC cell lines and fibroblasts using RT-PCR, real time qRT-PCR and at the protein level with Western blotting (genes in CRC cell lines: MT1X, MMP7 & PPP2R5D; fibroblasts: CTGF, ADM & STC-1).

> *I believe the future of new therapeutic strategies in cancer will be driven by better delineation of molecular mechanisms of tumourigenesis combined with advancements in biotechnology, and identifying receptors, molecules or biomarkers specific to tumour subtypes or even individuals.*

My research within the Department of Surgery at UCL under Dr Marilena Loizidou was aimed at carrying forward this work. Initially we used CRC cell lines and fibroblasts (isolated from CRC specimens of patients who had undergone surgical resection) to demonstrate inhibition of proliferation, migration and contraction with the use of ET_A and/or ET_B receptor antagonists. To systematically identify potential tumourigenic genes that were altered by ET-1, induction assays with ET-1 were performed and gene array analysis carried out on extracted RNA. Significantly altered genes were confirmed in both CRC cell lines and fibroblasts using RT-PCR, real time qRT-PCR and at the protein level with Western blotting (Table 1).

Importantly, these same techniques were used to show that the ET-1 effects were inhibited by ET_A and/or ET_B receptor antagonists; and results confirmed by siRNA for the two receptors. Within patient tissue samples we used immunohistochemistry and autoradiography to demonstrate ET-1 binding to ET receptors (primarily ET_A) which were localised mainly to tumour stroma around blood vessels and fibroblasts. We now know that tumour stroma plays a pivotal role in tumourogenesis. With the ultimate aim of entering phase 1 clinical trials, we evaluated the pharmaco-kinetics, pharmaco-dynamics and IC50 of zibotentan (an orally active specific ET_A receptor antagonist licensed for use in prostate cancer) in CRC cell lines and fibroblasts, with early promising results. Much of this work could not have been carried out without the expertise of Dr Mick Dashwood, a leader in the field of autoradiography and endothelin receptor binding, and Dr Hazel Welch, an expert in molecular biology. Excitingly, new areas of research within the department are looking at 3D tumour modelling, nano-technologies for cancer targeting and bioengineering.

This makes my continued work with the department ever more fascinating, and highly recommended to other surgeons in training.

I believe the future of new therapeutic strategies in cancer will be driven by better delineation of molecular mechanisms of tumourigenesis combined with advancements in biotechnology, and identifying receptors, molecules or biomarkers specific to tumour subtypes or even individuals. Conventional chemotherapy with the disadvantages of attacking all dividing cells may well be replaced by personalised therapy directed at specific biomarkers, aimed at enhanced treatment response rates and reducing toxicity. As herceptin receptors affect adjuvant therapy in breast cancer, and EGF receptors are influencing the use of cetuximab in CRC, ET receptors may well prove to be another important targetable biomarker. With clinical trial data suggesting that combination therapy may prove to be more efficacious than monotherapy, genetic and biomarker screening at the time of diagnosis will need to become the norm for all cancer diagnosis in-order to determine customised treatment regimens.

The British Journal of Surgery Prize

The British Journal of Surgery Prize is awarded annually to the best presenting author in the British Journal of Surgery session of the BASO ~ ACS Scientific Conference.

Previous winners of the British Journal of Surgery Prize:

2007 Mr L Maraqa

2008 Ms Rachael Johnson

2009 Mr Brian Hogan

2010 Mr Rosin Dolan

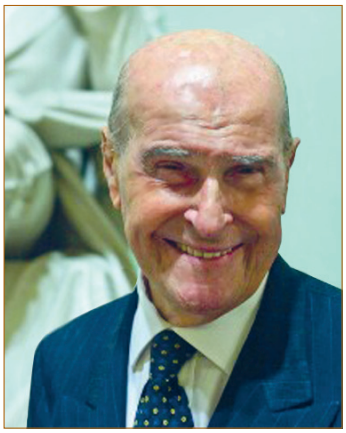
2011 Mr Samer-ul Haque

Management of the Axilla in Breast Cancer: The Debate Continues

Complete surgical clearance of the axilla was the standard of care for all women with breast cancer until 30 years ago, with many hundreds of thousands of women across the world suffering lymphoedema and other complications, despite 60% having no nodal disease. Led by the dedicated work of Professor Veronesi and others, research demonstrated that we were overtreating the axilla in the majority of women. Many hundreds of thousands of women have now benefitted from more conservative approaches such as sentinel node biopsy (SLNB) with clearance only if positive. Todays pioneers are continuing to challenge dogma with new techniques which may avoid even SLNB, and reduce the need for second operations in women with positive nodes by use of intra-operative nodal assessments. Here we present an article by one of the Giants of Breast Cancer Research, Professor Umberto Veronesi, outlining his ground breaking research on the axilla over the years and showcase two novel techniques to enhance axillary management.

2012 YEARBOOK

Sentinel Lymph Node: A New Course



Professor Umberto Veronesi

Scientific Director, European Institute of Oncology

Thirty years ago we inaugurated a new trend in breast cancer surgery introducing the concept of the "lobectomy", i.e. that the excision of a mammary lobe, constituted by a ductal tree, might be the correct surgical treatment of breast cancer of limited size. This principle was based on the assumption that the intraductal spread of breast cancer is a common event and that the ductal tree from where the cancer originated is often extensively involved.

The original definition of lobectomy was for practical reasons modified into the term "quadrantectomy" to give the surgeons a clear anatomical description of the operation. A randomised trial, published 31 years ago, showed absolutely identical survival rates between patients treated with quadrantectomy, axillary dissection and radiotherapy and patients treated with a Halsted mastectomy[1]. The Milan results were confirmed by other studies and breast conservation is now an accepted method of treatment of breast carcinoma. Hundreds of thousands of women with breast cancer have their breasts saved every year worldwide.

In the last two decades our interest was directed to the possible avoidance of axillary dissection in early breast carcinoma. In fact, following the development of imaging techniques that detect small, early stage primary carcinomas, it is increasingly noted that axillary dissection finds only healthy lymphatic nodes. Furthermore, it has been suggested that axillary dissection should not be viewed as a curative procedure but mainly as a staging procedure for obtaining as much prognostic information as possible. We demonstrated, in a number of studies, that the spread of breast cancer cells in the axillary nodes follows an orderly pattern and that the first level is first involved, skip metastases being present only in 1.5% of the cases[2,3].

These results were the premises to our approach to sentinel node biopsy, a procedure which was first used in melanoma with good results[5]. The sentinel node technique showed encouraging results in early studies on breast carcinomas[6,7,8]. We designed a number of studies to address the need for axillary dissection in early breast carcinoma. First we showed in a study on 436 patients with small carcinomas (<1.2 cm in diameter) that axillary dissection may be avoided without significant risks, with 5-year survival rates of 98% in this series of patients[4].

> *Encouraging results have been achieved in early studies on breast carcinomas. We designed a number of studies to address the need for axillary dissection in early breast carcinoma.*

Subsequently, we designed a study of 376 cases of breast carcinoma, which were treated with sentinel node biopsy with a radio-tracer (Tc99) which was immediately followed by a complete axillary dissection. The study showed an overall accuracy of 96.8%, a sensitivity of 93.3% and a specificity of 100%. There were a total of 12 false negative cases which represented 3.2% of all cases in the series and 6.7% of the cases with positive axillary metastases[8]. An important multicentre study was conducted in the United States by Krag and others on 443 cases with similar results[9].

After these encouraging results we designed a randomised trial which was carried out in the years 1998 and 1999. We recruited 516 patients, who were randomised between routine total axillary dissection and elective axillary dissection, only in case of a positive sentinel node biopsy. The results showed that the sentinel node policy is able to detect the cases of positive

axillary nodes in a percentage similar to that obtained with the routine axillary dissection[10]. But more importantly, long term follow-up showed that overall survival was superior in patients submitted to sentinel node biopsy compared to the patients who were treated with immediate dissection of the axillary tissue at primary breast surgery[11].

We concluded that probe-guided biopsy of the sentinel node is easy to apply, does not require special surgical training and the whole procedure is associated to a low risk of false negatives.

More recently an important step forward resulted from the randomised trial that Giuliano recently published[12]. He showed that patients with positive sentinel nodes had a similar five years survival either if they received the axillary dissection or if they have simple follow-up without any axillary surgery.

Following this publication from Dr Giuliano it appears that sentinel node biopsy may be unnecessary. At the Milan European Institute of Oncology we have started a new trial comparing patients without clinical or ultra sound suspicion of axillary involvement to be submitted either to sentinel node biopsy or to simple strict follow-up. If the trial demonstrates results similar to those of Dr Giuliano, the sentinel node biopsy may disappear from clinical practice, replaced by pre-operative imaging and biopsy techniques.

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Identification of Sentinel Lymph Nodes Using Microbubbles and Contrast Enhanced Ultrasound in Preoperative Breast Cancer Patients

Miss Karina Cox

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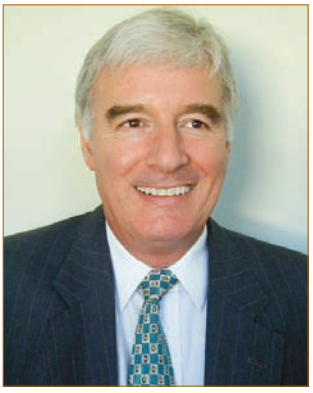

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Sentinel lymph node (SLN) biopsy is a safe and accurate first line technique for staging the axilla in breast cancer patients who have normal axillary lymph nodes (LN) on pre-operative ultrasonography, with or without fine needle aspiration cytology (FNAC)[1,2]. However, as many as 35% of patients who have a SLN biopsy are found to have nodal metastasis requiring further surgery in the form of a completion axillary node clearance[1]. Until now, SLN could only be reliably identified at operation following injection of radioactive isotope and blue dye.

In 2004, Goldberg et al described a technique to identify superficial lymphatic channels and LN using microbubble contrast agent and ultrasound in a swine melanoma model. The ultrasound contrast agent was injected around the tumours and microbubbles were seen to readily enter superficial lymphatic channels. Swine SLN were accurately identified by ultrasound in 90% of cases.[3].

The results of the Goldberg study raised the possibility that microbubble contrast agent could also enter human lymphatic vessels. In the treatment of early breast cancer, the intra-operative SLN biopsy depends upon injected radioactive colloid and blue-dye gaining access to breast lymphatics and draining SLN. It therefore seemed reasonable to assume that microbubble contrast agent could substitute for radioactive colloid to identify SLN in pre-operative breast cancer patients.

In Maidstone Hospital, Kent, Ali Sever (Consultant Radiologist) together with Peter and Sue Jones (Consultant Breast Surgeons) decided to initiate an investigation to determine whether microbubble contrast agent could enter breast lymphatic channels and traffic to SLN in patients with early breast cancer.

Following the approval of the Medicines and Healthcare products Regulatory Agency (MHRA) and the local Ethics committee, 5 consecutive consenting patients with early breast cancer and a normal ipsilateral axillary ultrasound were initially recruited to the study. The microbubble contrast agent was injected intradermally in the peri-areolar, upper outer quadrant of the affected breast. Breast lymphatics were visualised and followed to identify putative SLN.

The Ultrasound examination was performed in real time Cadence Pulse Sequencing (CPS) mode with an ultrasound machine that also provided conventional grey-scale, pulse-inversion harmonic grey scale and contrast specific sonographic imaging with live dual images of tissue only. A high frequency 14-MHz linear-array probe was used. In order to reduce microbubble destruction, low mechanical index (MI) values were applied (0.2-0.4).

These first 5 patients demonstrated that the technique was safe and importantly, microbubbles were observed to readily enter breast lymphatic vessels and drain into putative SLN. Enhancing LN were seen approximately 30-90 seconds following injection[4]. Buoyed by these preliminary results, the study was extended and a further 54 patients were recruited.

To ensure that SLN identified by microbubbles and CEUS corresponded with surgically excised SLN, guide-wires were inserted into putative SLN by the radiologist performing the study. The next day, patients underwent standard breast tumour excision and conventional SLN biopsy after administration of radioactive isotope and blue dye. Sentinel lymph nodes were correctly identified and localised preoperatively using microbubbles and CEUS in 48 patients (89%). In 18 of the 48 patients, SLN were only recognised after microbubble enhancement and were invisible on grey-scale imaging[5]. Again the safety of the technique was confirmed.

The success rate of identifying axillary SLN using microbubbles and CEUS and the relative ease of deploying guidewires indicated that SLN could be readily biopsied in the breast clinic. The methodology of the study was therefore modified to form a new trial to fully validate the technique in a large group of patients the results of which are currently being analysed.

The evolution of the technique using microbubbles and CEUS to identify SLN in pre-operative breast cancer patients is likely to advance our ability to identify patients with nodal disease. Standard axillary grey-scale ultrasonography and FNAC biopsy has limited value, with a sensitivity of between 31% and 63% in detecting metastatic LN[6]. In patients with breast cancer, this novel technique allows the SLN to be identified and biopsied in the pre-operative period and will reduce the numbers of patients requiring a second axillary surgical procedure.

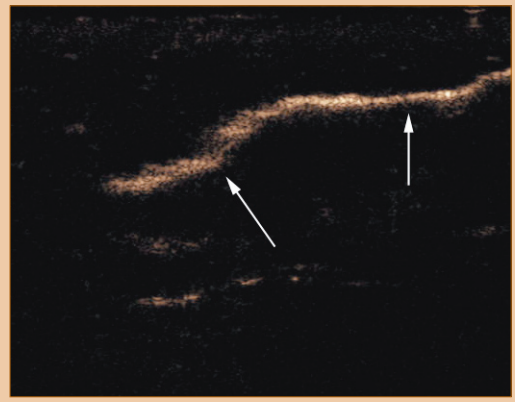

Figure 1: contrast pulse sequencing image of an afferent lymphatic vessel

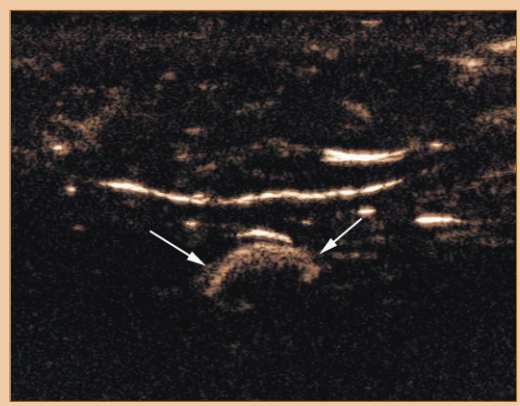

Figure 2: Contrast pulse sequencing image of an enhancing sentinel lymph node. This picture demonstrates the typical accumulation of contrast agent the LN structure

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Intraoperative Assessment of Sentinel Lymph Nodes in Breast Cancer

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Sentinel lymph node surgery using the dual localisation technique is established as the gold standard for staging the axilla in invasive breast cancer in patients who are clinically node negative.

Over the last 3 years, most breast units have moved to performing preoperative an ultrasound of the axilla biopsy of any abnormal lymph nodes. Despite this, the identification of lymph node positive disease is still elusive in up to 60% of patients who eventually are found to have positive lymph nodes. One reason for this is that biopsy will inevitably miss micrometastases or small macrometastatic deposits in the lymph nodes due to sample error.

Traditionally, the recommendation for patients who have positive sentinel lymph nodes has been that patients should then undergo a completion axillary dissection. A reliable and rapid form of intraoperative assessment of the sentinel node(s) would be very attractive. This would allow definitive surgery to the axilla at the same time as the breast procedure, abolish repeat surgery and reduce delays to adjuvant therapy.

A variety of methods have been used to immediately assess the sentinel lymph node. These include imprint cytology, frozen section and intraoperative molecular pathology testing. Imprint cytology sensitivity varies between 37-67% but is cheap and rapid. It has a specificity of over 80% but requires the services of an experienced cytopathologist and this is not routinely available in many units. Frozen section has a much higher sensitivity (in some cases approaching 95%) but again requires the presence of a pathologist. It is reasonably quick and accurate but many units may not have enough pathologists to be able to offer this to all patients in an equitable fashion.

The OSNA system (One Step Nucleic Acid Amplification) uses reverse transcription loop mediated isothermal amplification (RT-LAMP) to detect cytokeratin 19 which is specific and accurate. Recently, a study using OSNA evaluating it against immuno-histochemistry has been published and found to be very accurate, sensitive and specific, giving sensitivities and specificities of over 95%[1]. At a recent meeting of OSNA users, data on over 1200 patients from 3 centres was presented and showed remarkable consistency in terms of specificity, sensitivity and lymph node positivity rate between the centres which underlines that the technology is transferable between units with only a moderate amount of training for the technicians who perform the assay, thereby dispensing with the services of a Consultant Pathologist. Lymph node positivity rates varies from 27-33%, of which half are patients whose sentinel nodes harbour only micrometastases and half with macrometastses. These 3 units had completely abolished repeat surgery to the axilla and reported that patients appreciated the immediate knowledge of the result even if the node was positive.

There has been much debate in the literature that intraoperative testing is unnecessary because in the modern era, patients with 1 or 2 positive sentinel nodes who have post breast conservation radiotherapy do not require completion axillary dissection in any case due to very low axillary recurrence rates [2]. However, this approach requires careful selection of patients and is not applicable to all patients with a clinically negative axilla and it has not been validated in patients undergoing mastectomy. It therefore appears that intraoperative molecular pathology testing using OSNA is sensitive, highly specific, cost saving and timely. Because OSNA is semi-quantitative, it can categorise the lymph node into being negative, have isolated tumour cells (no further surgery performed), contain micrometastases (the jury is still out whether these patients should have any further surgery) and have macrometastases, in which case a completion axillary dissection is still performed by most if not all users of this technique. It may have the potential to identify patients who are more likely to have more than 2 positive nodes and therefore are not suitable for a non-operative (or at least non-therapeutic) approach to the axilla and opens up the possibility of further study in the management of the axilla in this contentious area.

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Metastatic Disease: New Ways of Managing

In addition to playing a major part in the significant advances in the treatment of primary cancers, surgeons have increasingly been contributing to improved outcomes in metastatic patients. The 2011 yearbook highlighted the surgical advances in the treatment of liver metastases. This year we look at the other two major metastatic disease areas: lung and bone. Professor Tom Treasure critically reviews the role of pulmonary metastasectomy and the new research study which will hopefully inform the profession of its value. Mr Robert Ashford gives a detailed overview of the role of the orthopaedic oncologist and how they can help patients with metastatic bone disease.

2012 YEARBOOK

PulMiCC: A Trial of Pulmonary Metastasectomy in Colorectal Cancer in the Context of Current Practice in the Surgery of Lung Metastases

Professor Tom Treasure

Professor at the Clinical Operational Research Unit at University College London and Past President of the European Association of Cardio-thoracic Surgery

Pulmonary metastasectomy is frequently performed and for many thoracic surgeons is a routine part of practice.[1] There are three main groups of cancers for which this surgery is undertaken: germ cell tumours, sarcoma and carcinoma.

For germ cell tumours, the mainstay of treatment is chemotherapy which is highly effective. The thoracic surgeon is sometimes asked to remove residual nodules, which the pathologists often find to be completely necrotic. The surgery is believed by some to be effective in completing cure[2] although its main role is generally regarded as guiding treatment. Repeated biopsies are considered by some oncologists to be the way of the future to help "personalise" anti-cancer treatments. Pulmonary metastasectomy in germ cell tumours is perhaps an example but this quotation from the New England Journal of Medicine early in 2012 may be a salutary warning: "Intratumor heterogeneity can lead to underestimation of the tumor genomics landscape portrayed from single tumor-biopsy samples and may present major challenges to personalised-medicine and biomarker development."[3]

Sarcoma metastasises predominately to the lung and may be the only site of metastasis in a half to two thirds of patients.[4;5] A practice of repeated metastasectomy is the norm in this disease. However there is "limited information on how the recurrences were treated" but clinical

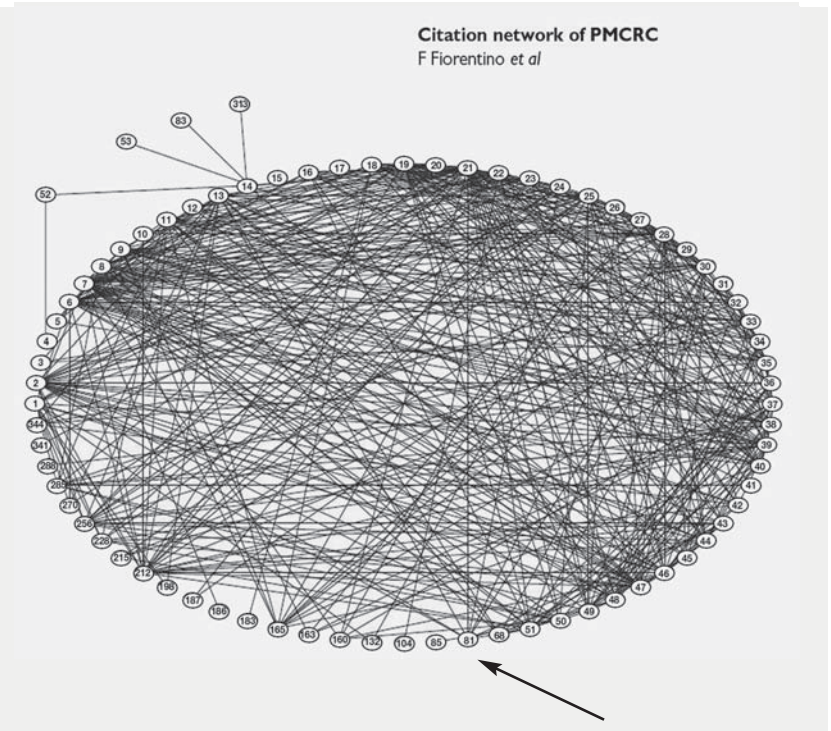

Figure 1

The 51 papers in the systematic review[10] and 21 other surgical follow-up studies shows the frequency of citation amongst them. Aberg's challenging paper[13] identified as 52 in this citation network and other challenging papers are less cited. Also used in British Journal of Cancer.[11]

management includes “surgical treatment of all distant recurrences in case of resectable disease”.[5] These quotations come from a paper combining results from three European Osteosarcoma Intergroup studies which provides no details on pulmonary metastasectomy other than to state “all patients were treated in experienced sarcoma centres and it is likely that all patients received the best available treatment for their recurrence”.[5] This illustrates a problem in unraveling the true effectiveness of pulmonary metastasectomy in sarcoma.

Some years ago care of sarcoma was quite rightly gathered in to designated centres but as far as pulmonary metastasectomy is concerned there has been a “presumption of efficacy”[6] rather than critical evaluation of any benefit attributable to performing up to ten or more thoracotomies. Most of these patients die of recurrence and there is no way of being knowing whether this is sooner or later than would otherwise have been the case.[7] Of the big three common solid tumours, colorectal cancer is the one for which pulmonary metastasectomy is most frequently performed. For metastatic breast cancer, which is generally regarded as widely disseminated, most agree that pulmonary metastasectomy should not be undertaken. Nevertheless one enthusiast reported removing up to 124.[8] There is no realistic place for pulmonary metastasectomy in primary lung cancer.

Pulmonary metastasectomy in colorectal cancer is the subject of a currently recruiting randomised trial (PulMiCC).[9] Although a special case may be made for pulmonary metastasectomy in selected patients with thyroid and renal carcinoma, the background and rationale for the trial apply in general to carcinoma of other primary sites. For systematic review we found 51 surgical follow-up studies, published up to 2007, including 3,504 patients with data amenable to quantitative synthesis.[10] These 51 reports provided the material for a citation network analysis of 344 publications[11] which illustrated a very high degree of mutual citation, and of similar reports of pulmonary metastasectomy. Little heed was paid to papers challenging what appears to be a presumption of efficacy, for there are no randomised trials or any other form of comparative study.[6] [Fig.1] There are many multivariable analyses with a consistent theme. A number of features are associated with the length of survival after pulmonary metastasectomy and the favourable ones are fewer metastases, longer interval between primary resection and metastasectomy, and lower levels of carcinoma embryonic antigen (CEA).[12] An entry criterion to these studies was no evidence of disease at the primary site or elsewhere, with the exception, increasingly in more recent papers, of liver metastases, present or already removed.

It is not difficult to appreciate that the favourable factors listed are general prognostic factors for colorectal cancer. In fact the 3,504 patients are highly unrepresentative of patients with advanced colorectal cancer. At the time of the pulmonary metastasectomy, in round figures, 60% of them had a solitary metastasis, 60% had low CEA, and the average interval since primary resection was 36 months. Despite these unusually favourable features, 60% of them died within five years of metastasectomy. It is therefore concerning that the five year survival of about 40% has been used in justification of extending the practice to patients well outside the characteristics of the patients in whom those survival rates were reported.[1]

Over thirty years ago Aberg provided some evidence to suggest that long term survival was a result of the selection, not the surgery, and posed the question "The effect of metastasectomy: fact or fiction?"[13]. He has largely been ignored. [Fig.1] To get an idea of how effective selection is consider Figure 2. We know from Thames Cancer Registry data that more than 5% of patients with metastatic cancer at the time of registration are alive at five years[14] and we know that only 2-3% of patients with pulmonary metastases have them removed.[15] It is not difficult to see how selection of patients with favourable prognostic features such as CEA, the number of metastases, and the interval over which they have appeared, results in a group of operated patients who already had the best outlook before the surgeon picked up his knife. Clinicians do not base decisions on a staging snap shot. They observe the progression of disease over some weeks or months as they consider the clinical options. And they are smart. They may inadvertently select for surgery likely survivors and erroneously attribute their survival to surgery rather than the selection for surgery. The association is real enough but it is not proof of causation.[6]

Figure 2. A thought experiment in which we consider 300 people with metatstatic CRC amongst whom there are 15 (5%) destined to survive for five years. If they are sorted by two commonly used prognostic factors such as the number of metastases, the interval between primary surgery and metastasectomy, or carcinoma antigen levels this would have the effect of clustering the natural survivors in one corner. If the same factors are used to select patients for surgery (here 25/300 which at >8% is less selective than present practice) the natural five year survivors will be over represented amongst the operative patients. The claimed survival attributable to surgery (10/25 = 40%) might be no more than might occur by being candidates for surgery but not actually having it, as in Aberg's study.[13] This illustration is reproduced from Journal of Thoracic Oncology with permission.[24]

There is no evidence or reason to believe that pulmonary metastasectomy has a palliative role in this cancer. The metastases are generally asymptomatic and the terminal symptoms are not usually pulmonary. There is no published evidence on alteration in symptoms and scant mention of pulmonary function before or after surgery. The question is one of survival advantage.

We took the view that there was considerable room for doubt about the effect of pulmonary metastasectomy for colorectal cancer.[16] Analysis of as much as we could find on the subject[10;11] only increased our uncertainty and we began to beat the drum for a trial.[17] This gained the support of both lung and advanced colorectal Clinical Studies Groups of the National Cancer Research Institute. The PulMiCC trial is run from the Royal Brompton Hospital's Clinical Trials and Evaluation Unit. The design allows teams to offer metastasectomy or not according to existing clinical practice but is based on the belief, indeed the knowledge from repeated observation in multidisciplinary team meetings, that there is a grey zone where the decision is debatable. This often ends with someone asking "what does the patient want?" While this is a reasonable question from the outset, arising at this point in the debate, it confirms clinical uncertainty about what advice to give. In fact there is uncertainty about the benefit of metastasectomy for all patients who undergo this surgery because the fair test[18] of a randomised trial has never been done. A trial will be difficult we know. To help, the PulMiCC trial includes a two stage consenting process, which proved successful in the MARS trial of radical surgery for mesothelioma.[19] PulMiCC also incorporates minimisation in the randomisation process to ensure balance between arms in what is a very variable clinical practice. [20;21]

What about hepatic resection in this disease? Where does PulMiCC sit with respect to that now entrenched practice?[22] The question must have occurred to many readers who are aware of what is going on in oncology. One view is that "At present, the state of the art on metastasectomy in thoracic surgery is a decade behind that in liver surgery"[23] but the liver is a different organ with the capacity for regeneration. It is a preferred site for colorectal metastases, perhaps at an earlier stage in the disease, while pulmonary metastases are clear evidence of dissemination in the systemic blood flow. The absence of evidence from randomised trials for hepatic resection is not helpful in establishing the effectiveness of pulmonary metastasectomy. As far as the PulMiCC trial is concerned, patients who have already had R0 liver resections are eligible for PulMiCC.

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Surgical Management of Skeletal Metastases in the 21st Century

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Introduction

Bone metastases are the final common pathway of many malignancies. Untreated they can result in pain, pathological fracture and spinal cord compression. Appropriate expeditious management of skeletal metastases can result in the maintenance of quality of life.

The orthopaedic surgeon has four possible roles in the management of metastatic malignancy:

- Diagnostic – biopsying of suspicious lesions
- Reactive – the fixation of pathological fractures / surgical treatment of spinal cord compression
- Proactive – prevention of pathological fractures / surgical treatment of impending spinal cord compression
- Oncologic – potentially curative excisions of isolated metastases

Demographics

The five year world prevalence of breast cancer is 4.4 million and prostate cancer is 2.4 million. These two pathologies constitute 65-75% of all bone metastases and median survival for both is in excess of two years, with many patients surviving longer than five years. Oncological advances have resulted in continued prolongation of survival. The longer the survival, the longer that any surgical reconstruction needs to last.

Diagnosis

The majority of cases of skeletal metastases are easily diagnosed. There is a recent history of malignancy and there are multiple skeletal lesions. In this scenario a confirmatory biopsy is unnecessary. There are six situations where a biopsy is mandatory. These are;

1. A patient with a known primary malignancy who develops a new (and first) bone lesion.
2. A patient with a stable, long history of malignancy (considered cured) with a new bone lesion.
3. A patient with a known malignancy presenting with a pathological fracture.
4. Multiple bone lesions in the previously healthy patient (a staging CT may reveal the primary tumour).
5. A healthy patient with pathological fracture (again a CT may be helpful in diagnosing the primary).
6. A healthy patient with solitary bone lesion – This should be assumed to be a primary bone sarcoma until proven otherwise. Referral should be made to a supra-regional bone sarcoma service.

"Bone metastases are the final common pathway of many malignancies. Untreated they can result in pain, pathological fracture and spinal cord compression. Appropriate expeditious management of skeletal metastases can result in the maintenance of quality of life."

When a patient presents with a bone lesion, a staging CT is the investigation of choice to evaluate for a primary malignancy. It will also usually reveal additional skeletal metastases. If the bone lesion is apparently isolated, then an isotope bone scan is useful to clarify this, because an isolated metastasis may be amenable to curative resection.

Bone pain, back pain or neurology in a cancer patient should alert the managing clinician to the possibility of skeletal metastases. The minimum acceptable investigation is a plain radiograph of the affected area. If the plain radiograph is normal then either an MRI or a bone scan should be undertaken.

Surgical Management of Skeletal Metastases

As with all cancers management should be through a multi-disciplinary team (MDT). Prognostic information is necessary for treatment planning. All orthopaedic units should have a lead clinician for skeletal metastases. Some units have specialist bone metastases multi-disciplinary clinics or MDTs and this should be regarded as the gold standard of care. Surgery for skeletal metastases is in most cases palliative. There are a number of goals in palliative metastatic surgery. These include

- Maximising the Quality of Life
- Restoration or maintenance of neurologic function
- A rapid return to weight-bearing
- Enabling functional rehabilitation of the upper limb
- Alleviation of pain

The orthopaedic surgeon has a number of tools in his armamentarium for treating metastatic deposits or fractures. These include ablation (amputation), cement, metal and prosthetic replacement.

Amputation has a limited but occasionally valuable role in metastatic disease. Indications include intractable pain, fungating tumours, infected internal fixation, tumour progression and neurovascular involvement.

There are a number of advantages of amputation including the fact that it alleviates pain in a predictable manner, it is a single operation that gains rapid local tumour control and reconstructively there is a reasonable amount of spare tissue if you need it. Fillet-of-arm or fillet-of-leg flaps can be created, as can the limb be used as a skin graft donor site.

The disadvantages of amputation are a minimal chance of rehabilitation and the development of phantom limb pain. Local recurrence can be difficult to manage, especially with more proximal amputations.

Cement has had a role in the management of skeletal metastases for many years. This can be as an isolated treatment for focal metastases most commonly in the vertebral body (vertebroplasty) but also increasingly in other sites for example the bones of the mid and hindfoot and the acetabulum. Cement can also be used to augment internal

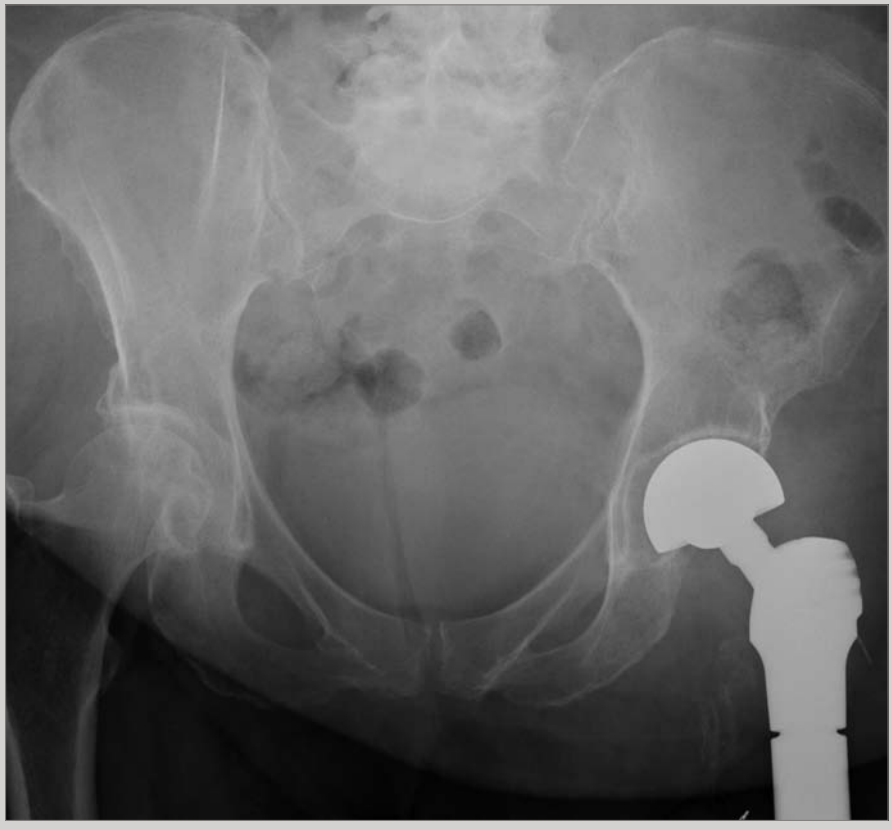

Figure 1: Post-operative radiograph of a proximal femoral replacement following resection of a renal cell metastasis

fixation. There are also case reports of more extensive use of cement for metastatic disease of bones.

The workhorse of the orthopaedic surgeon is metal. This can take the form of intra-medullary nails, plates and screws, joint replacement and endoprosthetic replacement. Intramedullary nails, locked proximally and distally, function well for diaphyseal metastases. For the femur, these should include screws up the femoral neck (cephallo-medullary nails) to stabilise the whole bone, as adjuvant radiotherapy may put the femoral neck at risk of fracture. Plates and screws are of more use for metaphyseal metastatic lesions. Extensive bone destruction or femoral neck lesions are best served by arthroplasty or endoprosthetic replacement (figure 1).

Surgical Management of Metastatic Disease of Long Bones

Most pathological fractures occur in the femur or humerus. The proximal femur is considered later in this article.

Diaphyseal lesions are best treated by locked intramedullary nails. If the lesion is solitary then an intercalary endoprosthetic replacement may be appropriate.

Juxta-articular lesions can be treated by intralesional curettage, cementation and locking plate fixation or alternatively endoprosthetic replacement.

Where the bone has been reamed, the whole bone is deemed contaminated and should therefore be irradiated postoperatively to prevent metastatic seeding at the tip of the implant and to reduce the potential for the development of a periprosthetic pathological fracture. If the metastasis has been excised en bloc with clear margins then adjuvant radiotherapy may be unnecessary.

"The workhorse of the orthopaedic surgeon is metal. This can take the form of intra-medullary nails, plates and screws, joint replacement and endoprosthetic replacement."

Surgical Management of Metastatic Disease of the Acetabulum

The acetabulum can be a challenge for reconstruction. Solitary lesions that are contained can be treated by cementoplasty, either under radiological guidance or surgically.

If the lesion is more extensive then total hip arthroplasty with curettage of the lesion and cementation will work as long as the defect is contained. As lesions get more extensive, cages and Harrington pins may be necessary. Specialist implants for acetabular reconstruction "The Ice Cream Cone Hemipelvic Replacement" (Stanmore Implants, Elstree, UK) have been designed and utilised for metastases. There are however some cases where the bone destruction is so extensive that no reconstruction is possible (Figure 2).

Surgical Management of Metastatic Disease of the Proximal Femur

The most common pathological fracture is the proximal femur. Internal fixation devices such as sliding hip screws are widely used in the non-metastatic situation. These have no place in metastatic disease.

Where the femoral head is involved, the lesion is best treated by arthroplasty. If the acetabulum is uninvolved then this can be a cemented hemiarthroplasty. If the acetabulum is involved then total hip replacement is preferable. Arthroplasty for metastatic disease should always be cemented as post-operative radiotherapy will adversely effect biological fixation of implants.

If the lesion is peri-trochanteric the choice is between a long-stem arthroplasty with the same criteria as above regarding the acetabulum and a long cephallo-medullary nail.

If bone destruction is extensive or the lesion is isolated then an endoprosthetic proximal femoral replacement is versatile and effective is restoring anatomy, and enabling early mobilisation.

Spinal Metastatic Disease

A detailed review of the management of spinal metastatic disease is outside the remit of this article. The National Institute of Health and Clinical Excellence published clinical guidelines in 2011 on the management of metastatic spinal cord compression and the reader is referred to these[1].

Non-Surgical Oncology for Skeletal Metastases

There have been numerous advances over the past decade in the oncological management of solid tumours resulting in increased length of survival. It is now not uncommon to see patients with skeletal metastases from breast cancer still alive five years after the diagnosis of skeletal metastases.

All patients presenting to the orthopaedic surgeon with metastatic disease should have an up to date oncological opinion and orthopaedic management should not be an isolated entity.

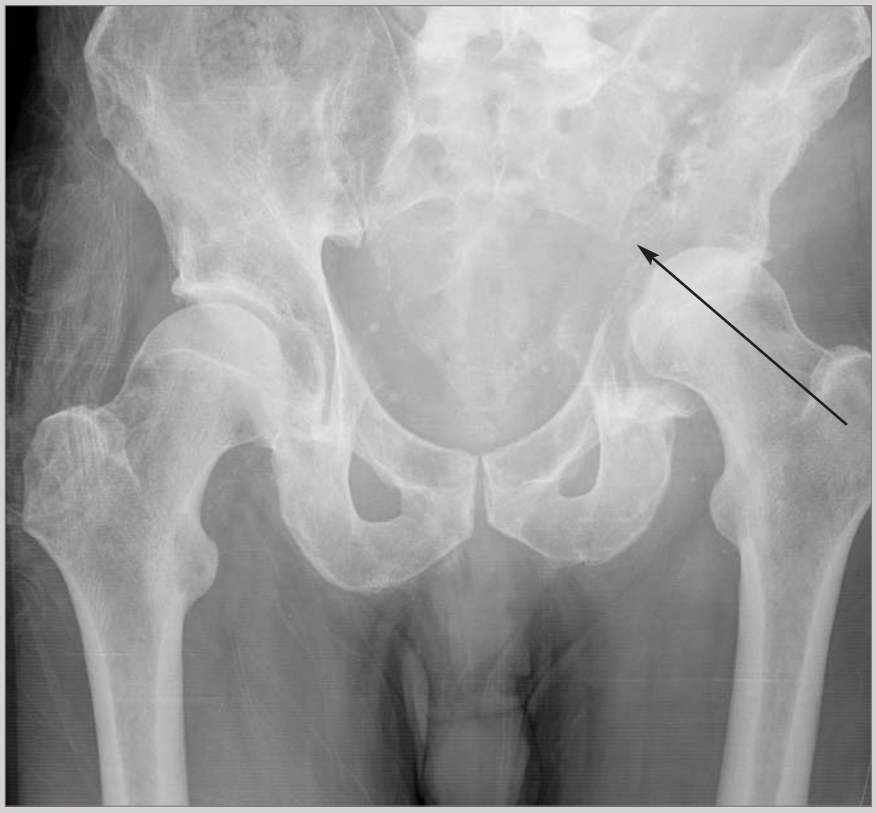

Figure 2: Image of a grossly destructive acetabular metastasis from renal cell cancer, deemed unreconstructable.

Conclusions

Skeletal metastases are common and represent the final common pathway of many malignancies. Bone or back pain in the cancer patient should be taken seriously and investigated further. The orthopaedic surgeon has a number of tools in his armamentarium to alleviate pain and enable maintenance or restoration of mobility. An early orthopaedic opinion is recommended.

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Improving the Quality of Colorectal Cancer Care

Colorectal cancer outcomes are progressively improving across Europe. The 2011 yearbook highlighted the improvements made in reducing local recurrence rates in rectal cancer by the collaboration between surgeons and pathologists in ensuring the adequacy of total mesorectal excision. This year we focus on the role of medical imaging in the multidisciplinary management of rectal cancer in ensuring optimal local control and how improved outcomes can be facilitated by a pan European audit which will ensure that best practice is identified and standardised across national borders.

2012 YEARBOOK

The EURECCA-Project: Improving Quality of Cancer Care Through Audit

Prof. Cornelis van de Velde

Professor of Surgery, President of ECCO, the European CanCer Organisation

In recent years there have been significant improvements in cancer treatment. Besides (neo) adjuvant treatment regimes, new surgical techniques have made a big contribution to these improvements. Standardised and quality controlled techniques seem to have a positive effect that reaches further than the patients and doctors that participated in the studies.

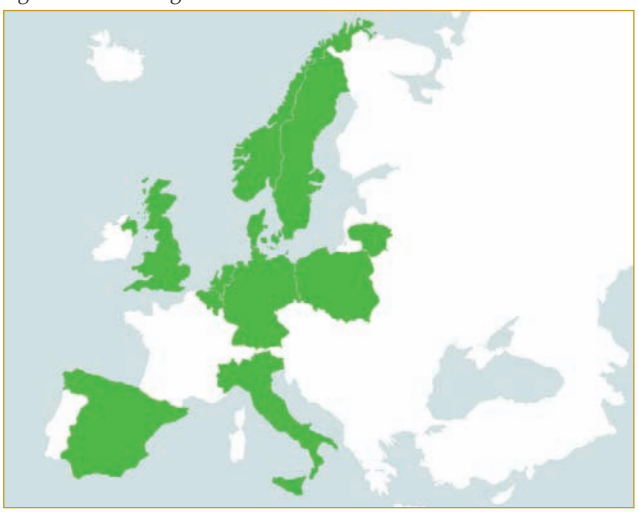
Good examples are the Dutch TME trial and the Dutch D1-D2 Gastric Cancer Trial. In both trials standardisation and quality of surgical treatment was continuously emphasised by means of master classes, supervision, and visitation with lasting positive effects.

However, most patients are treated without being enrolled in clinical trials. Furthermore, elderly patients or those with multiple co morbidities are often excluded from trials, leaving little evidence for the treatment of these categories of patients. Therefore, to improve quality of care for the entire patient population, a comprehensive audit could be a more effective instrument. In Europe several national colorectal cancer audit registries have been established of which all showed positive and very economic effects on the outcome of care. Even though there are numerous national projects, international initiatives are limited. Besides, despite these laudable efforts, there is still a wide variation in treatment outcomes between countries, regions, and institutions, which calls for a European audit on cancer treatment outcomes.

"The best care for every cancer patient" is one of the major topics of the European CanCer Organisation (ECCO), and "Surgical outcomes: can we do better?" is a goal of the European Society of Surgical Oncology (ESSO). Urged by the differences in cancer survival outcomes through Europe the ESSO initiated an international, multidisciplinary, outcome-based quality improvement program, which is fully embraced by the ECCO.

To generate the best care for colorectal cancer in the whole of Europe and to meet political and public demands for transparency, a deep and broad insight into treatment outcomes is needed union wide. A European audit registration, funded by EURECCA (European Registration of Cancer Care), will provide transparency, benchmarking, and feedback across national borders.[1] This can rapidly lead to treatment improvements and a decreased variation in the quality of care around the continent. It also provides opportunities to treat elderly and co morbid patients in an evidence based manner while it offers a unique insight in social-economical healthcare matters such as the consequences of commercialisation, treatment availability, and screening initiatives. Initially, the focus will be on colorectal cancer, later other solid tumors, such as breast and upper gastrointestinal cancer will follow. Currently, nine audit registries in eleven countries are participating in the EURECCA-project (Table 1, overleaf). This covers over 120 million EU citizens (Figure 1). By mid 2011, all audit registries included over 400,000 patients with colorectal cancer.

Figure 1: Coverage of EURECCA



Name	Country	Year of establishment	Number of included patients (mid 2011)
Dutch Surgical Colorectal Audit (DSCA)	The Netherlands	2009	25,000
International Quality Assurance in Colorectal Carcinoma	Germany, Poland Italy (Naples) Lithuania	2000	76,000
Norwegian Colorectal Cancer Project	Norway	1993	26,500
Swedish Colorectal Cancer Registry	Sweden	1995	41,000
Danish Colorectal Cancer Database	Denmark	1994	36,500
National Bowel Cancer Audit Program (NBOCAP)	United Kingdom	2001	200,000
Project on cancer of the Rectum (PROCARE)	Belgium	2005	4,500
Spanish TME project	Spain	2006	7,500
Study group for Therapies Of Rectal Malignancies (STORM)	Italy	1999	1,500
EURECCA			418,500

Table 1: Participating audit registries

Recently, datasets were harmonised to facilitate future analyses with respect to national privacy legislation. Forty-five shared data items have been identified which are collected by at least eight out of the nine participating registries. Among the 45 variables were patient data, data about preoperative staging, surgical treatment, pre- or postoperative radio- and/or chemotherapy, and follow-up.[2]

Currently, the first international comparison is being analysed. With these analyses, more insight in the differences in using (neo) adjuvant therapy for rectal cancer throughout the countries is gained. In December 2012, a multidisciplinary consensus meeting will be organised in Perugia, Italy. The objective is to present extensive results at the 2013 ECCO-17 conference in Amsterdam, The Netherlands. As such, ECCO and ESSO have established the basis for a strong, multidisciplinary audit structure with the commitment to improve cancer care for every European cancer patient. All information about EURECCA can be found on the webpage: www.canceraudit.eu

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Advances in MRI for Rectal Cancer: Improving Surgical Outcomes

Dr Gina Brown
Consultant Radiologist and Imaging Research Lead,
Royal Marsden Hospital, London

The establishment of the colorectal multidisciplinary team and the practice of an MRI based preoperative discussion for all newly diagnosed rectal cancer patients prior to treatment decisions and surgical planning has had a critical impact on local recurrence rates and outcomes in patients with rectal cancer[1].

It is now possible, using high-resolution MRI analysis of the images, to determine the specific predictors for local recurrence and distant failure. Equally, MRI can be used to identify patients who will have a good outcome with primary total mesorectal excision surgery alone.

Understanding and predicting local recurrence

In 2001, The Dutch TME trial published the results from over 1800 patients who were randomised between total mesorectal excision surgery with or without pre-operative short course radiotherapy. The aim of this trial was to determine whether the addition of radiotherapy, in the context of patients undergoing total mesorectal excision surgery, could prevent or reduce the incidence of local recurrence. This was in a group of patients with clinically assessed mobile or early stage tumours identified on clinical examination, CT or ultrasound[2].

One of the pertinent findings in this trial was the audit of the surgical specimens being produced from "total mesorectal excision surgery". This revealed that 24% of these resections were graded incomplete with large defects in the mesorectum[3]. Therefore, mesorectal tissue retained within the pelvis led to the observed high rates pelvic recurrence and high positive margin rates for clinically staged mobile tumours. In addition local node status in partially removed TME specimens predicted strongly for local recurrence. Similarly in the CR07 trial a 13% rate of incomplete resections was observed in a similar population of patients. What is clear from the MERCURY study experience over the last few years has been the importance of auditing the quality of surgery and ensuring that the proportion of patients undergoing total mesorectal excision with incomplete removal of the mesorectum can be reduced by histopathological audit and documentation of specimen quality.

The MERCURY trial was a prospective observational study recruiting consecutive patients with biopsy proven rectal cancer, of all stages, conducted in 11 European centres. A significant observation in this study was that incomplete specimen rates was only 5% reflecting a significant improvement in the quality of surgery compared with the Dutch TME and CR07 trials[4]. In this series more than a third of patients underwent primary surgery and the local recurrence rate for this series of patients predicted to have a good prognosis tumor on MRI was only 3%. Analysis of TME surgery data has shown that nodal status no longer predicted for pelvic recurrence in tumours staged with MRI as early stage, good prognosis primary rectal cancers and this group of patients formed a substantial proportion of the primary rectal cancers presenting with less than 5 mm of extramural spread.

The only independent predictors for pelvic recurrence based on pathology assessment of the specimens were involvement of the resection margin (tumour within 1 mm of the surgical excised margin) or patients undergoing abdominoperineal excision surgery. Similarly the finding of potential margin involvement on preoperative MRI or a tumour height of <5 cm from the anal verge were both predictors for local recurrence regardless of tumour stage and other clinical factors. The finding of a potentially involved CRM on MRI was associated with a 20% rate of local recurrence compared with only 7% for MRI predicted negative margins[5].

Therefore, provided that no other adverse features are identified on imaging, such as encroachment of the tumour upon the mesorectal fascia or intersphincteric plane or spread of tumour into extramural vessels primary, surgery results in local cure in 97% of such patients (figure 1). For many centres treating rectal cancer with good quality audited total mesorectal excision

surgery, this means that it is now possible to avoid excess toxicity and morbidity associated with the routine use of preoperative radiotherapy or chemoradiotherapy for MRI identified low risk patients.

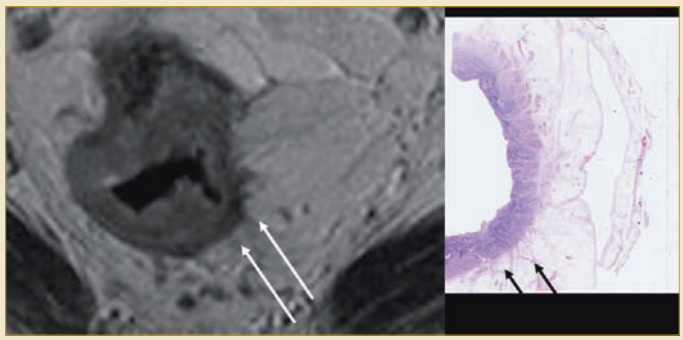

Figure 1: MRI and Histopathology

Patient with an early stage, good prognosis T3 tumour undergoing primary TME surgery

Low Rectal Cancers

Patients presenting with low rectal cancers arising at a height of 6 cm or less from the anal verge have been identified as being most at risk of developing local recurrence[6-7]. This has been attributed to the very high rates of radial margin involvement. Audit of rectal cancer specimens revealed that the areas of margin involvement relate to the surgical waist produced by the abdominoperineal excision operation at the distal portion of the dissection[8]. In a prospective study, examining the site of the waist, surgical specimens were scanned using MRI and the slices were mapped to the in vivo images. For patients undergoing abdominoperineal excision this study found significant variation in the amount of tissue removed. In all cases undergoing TME surgery with excision of the sphincter, specimen scans showed coning or waisting of the distal portion of the specimen. The area where the least tissue was removed was noted between 30 and 42 mm from the anal verge. In addition significantly greater tissue was noted to be excised in the poster quadrants compared with the anterior quadrants. This area of narrowing corresponded to the distal insertion of the levator muscle at the level of the puborectalis sling. Thus, tumours arising at this site were at the greatest risk of a potentially involved surgical margins. Specimen MRI scans showed that, for the distal portion of the specimen, the radial margins were formed by the distal muscle tube of the anorectal junction. When mapped to the in vivo images, the narrowest portion of the dissection was consistently demonstrated to lie just above the level of the distal levator insertion at the puborectalis sling. It was therefore proposed that tumours extending to the muscle tube surface or beyond at the level of the puborectalis sling or below would be at greatest risk of radial margin involvement from TME dissection. This formed the basis for a different nomenclature for staging and assessing cancers that arise in the lower third of the rectum (Table 1):

Using these criteria, just over 50% of patients with low rectal cancers were found to have tumours that were either confined to the muscularis propria or bordering but not infiltrating into the intersphincteric plane. The incidence of positive radial margins for those patients was only 6%. In contrast, 47% of patients with low rectal cancers had tumours extending into or beyond the intersphincteric plane and the rate of circumferential resection margin involvement for those patients was significantly greater 51% (or 17.7), indicating a group of patients with a significantly higher risk of involved radial margins if the TME plane was followed.

As a consequence, it was proposed that MRI could be used to determine which patients can undergo TME plane surgery with little risk of radial margin involvement and which patients required more radical extralevator abdominoperineal surgery in order to reduce the risk of tumour perforation, positive radial margins and consequent pelvic recurrence[9-11]. The safety and validity of such an approach is being tested prospectively in the low rectal cancer trial which will also examine the impact on quality of life from the different treatment approaches.

Patients at risk of distant failure

As early as the 1950's Dukes and colleagues observed the strong positive relationship between the increasing depth of spread of tumour beyond the muscularis propria and the prevalence of adverse features such as: nodal metastases and distant metastases[12]. In subsequent published series, including the

MRI Low Rectal Stage	MRI criteria
1: TME plane safe	Tumour on MRI images appears confined to bowel wall but not through full thickness (intact muscularis propria of the internal sphincter)
2: TME plane safe	Tumour on MRI replaces the muscle coat of the internal sphincter but does not extend into the intersphincteric plane. Above the level of the sphincter it is confined to the mesorectum - distance to mesorectal fascia and intersphincteric plane >1mm
3: TME plane at risk of CRM involvement	Tumour on MRI invading into the intersphincteric plane or lying within 1mm of levator muscle above the level of the sphincter complex
4: TME plane at risk of CRM involvement	Tumour invading into the external anal sphincter and infiltrating/ extending beyond the levators +/- invading adjacent organ. Above thesphincter tumour invades the levator muscles

Table 1: Classification of low rectal stage and risk of CRM involvement from TME plane surgery

Erlangen Registry, a clear drop in survival was demonstrated for T3 tumours showing more than 5 mm of spread beyond muscularis propria[13]. As a consequence, Hermanek and colleagues proposed a better classification for T3 tumours, which comprises the majority of rectal cancers and yet is very prognostically heterogenous with a range of disease free survival from 25% to 80%. By sub classifying patients according to depth of extramural spread the patients' risk of distant metastatic disease could be stratified much more precisely:

T3a: tumours with extramural spread measuring less than 1 mm beyond the muscularis propria. These patients have an excellent prognosis and survival outcomes. When tumour spread is measured at less than 1 mm, this has been shown to be identical to tumours with no spread beyond the muscularis propria. This means that the prognostic distinction between T2 and T3 tumour with minimal spread is clinically irrelevant, as both categories would be defined as good prognosis.

T3b: tumours with extramural spread that measures between 1 mm and 5 mm beyond the muscularis propria. Such tumours are also associated with a good prognosis and have a low rate of metastatic disease.

T3c: tumours with extramural spread that measures more than 5 mm but less than 15 mm beyond the muscularis propria. Such patients have a significantly worse prognosis than T3a or T3b tumours and this prognosis worsens with each millimetre of tumour spread.

T3d: extensive extramural spread greater than 15 mm beyond muscularis propria. This finding carries the worst prognosis with only a 25% 5 year disease free survival.

It is therefore far more clinically relevant to be able to categorise patients into high or low risk categories by measuring the depth of tumour spread than simply to differentiate between T2 and T3 tumours. The MERCURY study group tested the precision of measurement of the depth of extramural spread in a prospective study that incorporated the measurements of 295 patients undergoing primary surgery. The ability to accurately measure the depth of spread in millimeters was shown to be equivalent to the corresponding histopathology measurements and therefore supported the use of MRI in staging tumours by measuring the depth of spread rather than simple T and N measurements[14]. Follow-up of patients in the MERCURY study has shown that distant metastatic disease was a predominant cause of failure and this was associated with increasing depth of tumour spread. Therefore the early identification of such patients and the initiation of a treatment strategy aimed at eliminating the risk of distant metastases is a goal currently being pursued by several clinical trials. The first of these trials was the EXPERT study conducted by investigators at the Royal Marsden Hospital. Patients with tumours that had tumour spread of greater than 5 mm (T3c and T3d tumours) were offered systemic chemotherapy prior to receiving chemoradiotherapy. Long-term follow-up of patients treated in the EXPERT trial has shown overall survival rates of >80% in a group of patients whose expected survival would be little more than 50%[15]. This approach of offering systemic chemotherapy as an initial treatment of patients with high-risk disease is being pursued in several clinical studies as a precursor to a future phase III trial[16-17].

MRI detected extramural venous invasion.

The detection of tumour signal intensity on MRI extending into the extramural vessels is associated with synchronous metastatic disease and is an independent prognostic predictor for poor disease-free survival[18-19]. It is clear from outcome data analysis of the current treatment strategies of chemoradiotherapy followed by adjuvant chemotherapy that these regimes are insufficient to improve survival in this group of patients. Clinical trials are underway to evaluate the impact of neoadjuvant chemotherapy in this high-risk group of patients as well as surveillance strategies for synchronous and metachronous metastatic disease.

The severity of extramural venous invasion can be graded according to the type of vessel that has been infiltrated by tumour and it is likely that the degree of vascular invasion dictates the risk and rates of distant metastatic disease. In a recent observational study evaluating patients undergoing staging PET-CT for biopsy proven rectal cancer, the finding of high-risk features, such as depth of extramural spread of >5 mm or extramural venous invasion was associated with a significantly higher odds ratio for metastatic disease being found on either the PET CT or CT examinations. The rate of synchronous distant metastatic disease was 21% but only 5%, in MR detected low-risk tumours[20]. Therefore future strategies in patients with MRI detected extramural venous invasion would include the early use of systemic therapy and closer surveillance at diagnosis and follow up for the development of metastatic disease.

Assessment of tumours after chemoradiotherapy

Reassessment of MRI scans after preoperative therapy has implications for surgical planning, the timing of surgery, sphincter preservation, deferral of surgery for good responders and development of further preoperative treatments for radiologically identified poor responders. Until recently, the precise role, importance and validity of staging rectal cancers after preoperative therapy has been uncertain[21].

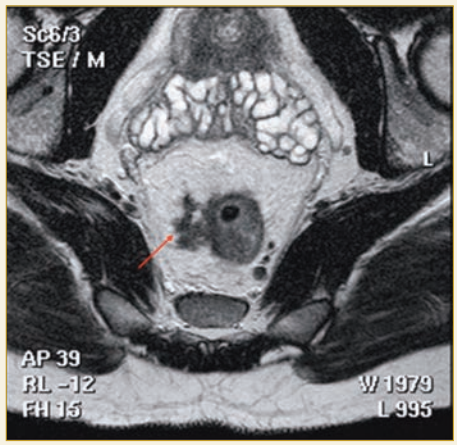

Figure 2: MRI detected extramural venous invasion

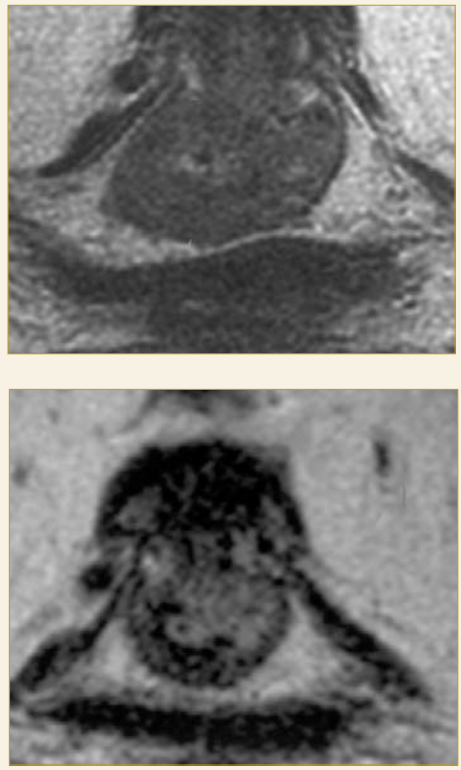

Figure 3: Pre-treatment and post treatment scans showing a complete response following chemoradiotherapy for a low rectal cancer.

The MERCURY study evaluated consecutive patients undergoing both primary surgery and preoperative therapy with histopathological correlation and analysis of survival outcomes[22]. This study showed that post chemoradiation, MRI assessment of tumour regression grade (mrTRG) correlated with disease free survival and overall survival, and thus patient prognosis, before definitive surgery. Furthermore, post-treatment MRI prediction of circumferential resection margin involvement (mrCRM) also gave prognostic information regarding the risk of local recurrence.

In this study both MRI T staging (ymrT) and TRG (mrTRG) showed statistical correlation with pathological T stage (ypT) which was strongly associated with overall and disease free survival as well as local recurrence[22]. The ability to identify good and poor response after preoperative therapy enables further tailoring of treatment[23]. For example, a patient with a poor MRI response or persistently potentially involved CRM could be offered systemic non-cross-resistant chemotherapy, or to consider a radical surgical exenterative procedure and future trials could evaluate this. On the other hand, for patients with a good MRI response, the permanent deferral of surgical resection by serial monitoring of scans is being tested in a prospective trial[24-25].

Pre-operative radiotherapy is crucial to improving outcomes for rectal cancers with MRI detected threatened circumferential resection margins (CRM). The aim is to operate when tumor shrinkage is maximal, to prevent a histologically involved CRM and thereby reduce local recurrence rates. There is, however, little published evidence regarding the optimum time from completion of radiotherapy to surgery. In a prospective randomised study, the Lyon R90-01 trial 4 compared surgery at 2 versus 6 weeks after completion of radiotherapy and found that the longer interval group (6 weeks) had better tumour response and pathological down-staging. As a consequence, surgery at 6 weeks after completion of radiotherapy became the standard of care. Recent audits, however, suggest that a delay of longer than 8 weeks could result in greater down-staging and better surgical outcomes. In a retrospective analysis Habr-gama et al showed that there was no difference in overall survival and disease free survival in 250 patients who underwent surgery before 12 weeks and after 12 weeks, suggesting that deferral of surgery may be safe. We have recently shown that patients undergoing surgery with a delay of at least 8 weeks after completion of radiotherapy were three times more likely to undergo T down-staging, (OR: 3.79, 1.10-12.99, $p<0.03$) than patients undergoing surgery at less than 8 weeks. In addition there appeared to be a trend towards increased rates of pathological CR in patients who underwent surgery delayed beyond 8 weeks, 17.8% pathological complete response in the delayed group versus 5.5% of patients undergoing surgery at <6 weeks. However, these studies have all been conducted as retrospective analyses and there is therefore insufficient evidence to enable a delay in surgery beyond 8 weeks to become the standard of care. Thus, there is a need to establish whether this approach is safe and whether it provides any additional long term benefit in terms of disease free survival. A major concern is the possibility that such delays cause delays in commencing adjuvant systemic chemotherapy, and create the risk of inadvertent progression of systemic disease. Therefore, having shown that there is likely to be increased local down-staging and local control in patients undergoing a greater delay to surgery, a prospective randomised controlled multicentre study (the 6 vs. 12 trial) is now underway to determine the safety of such an approach. This trial is supported by funding from the Royal College of Surgeons and is recruiting nationally.

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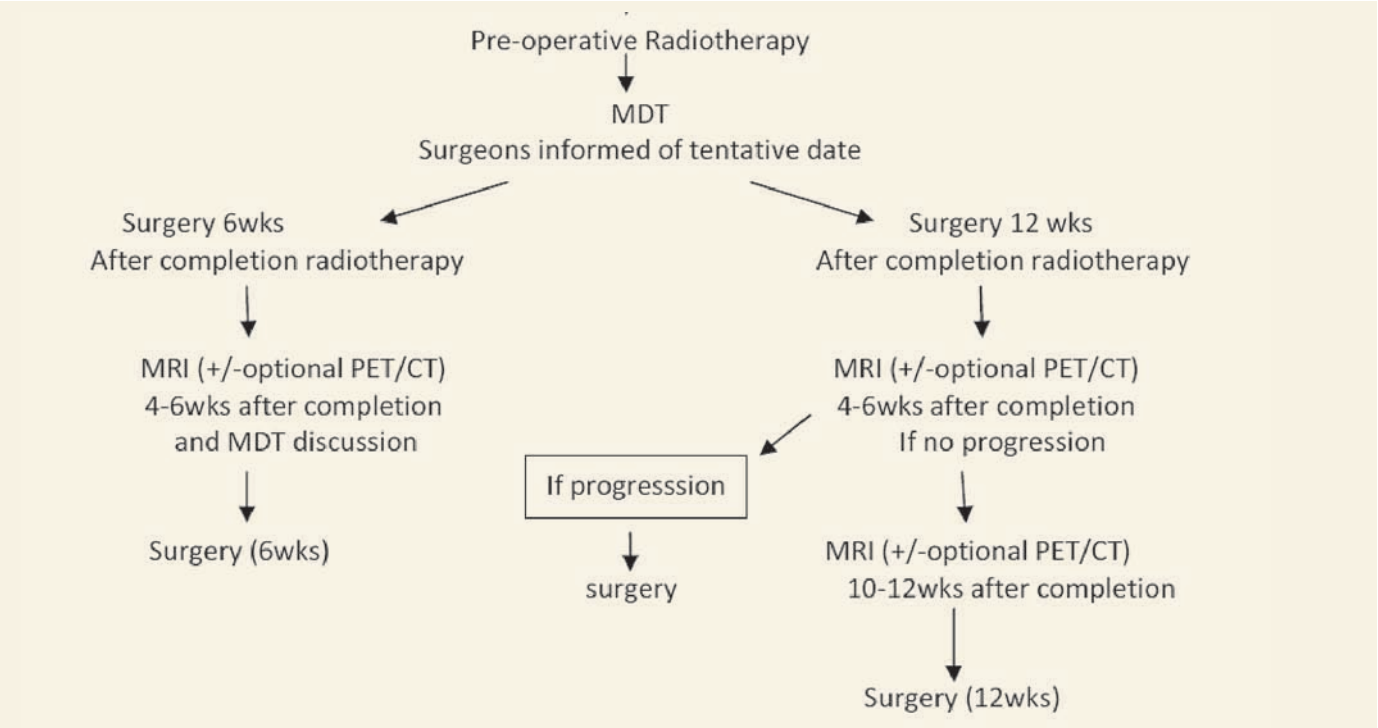

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A Thought Provoking Alternative Perspective

In recent decades, surgery has increasingly striven to eradicate dogma and non-evidence based practice and replace it with evidence based scientific certainty. There has been a massive proliferation of guidelines and protocols within the NHS and whilst this has undoubtedly led to massive quality improvements in patient care, the practice of surgery needs more than just rigid adherence to protocol. Surgeons need to take a more holistic view of each decision, taking into account often complex facets of each case, which may mean that the protocol is sometimes wrong or needs to be modified. Dr Iain McGilchrist explains how the human brain functions both in the narrow, protocol driven and wider, holistic domains.

The Role of Intuition and Holistic Perception in the Art and Science of Surgery

Dr Iain McGilchrist

Former Consultant Psychiatrist and Clinical Director
at the Bethlem and Maudsley Hospital London

He thought he saw an Argument
That proved he was the Pope:
He looked again, and found it was
A Bar of Mottled Soap.
'A fact so dread,' he faintly said,
'Extinguishes all hope!'

Lewis Carroll's Mad Gardener's Song contains surprising sanity. What we find the world to be depends to a large extent on what we think will be there, and when we change how we attend to things – 'I looked again' – we find a different reality. But this does not need to extinguish all hope. With due respect to Lewis Carroll, it may even be the grounds for hope, provided we understand what is going on.

Why is the brain, an organ whose entire purpose is to make connections, and which, according to the prevailing orthodoxy, actually brings consciousness into being by the sheer multiplicity of its interconnections, profoundly divided? Over evolution it has become more divided, not less, and the purpose of much of the interhemispheric transmission is to inhibit the contralateral hemisphere. 20 years of research have led me to the conclusion that the evolutionary basis for this separation of the cerebral hemispheres lies in the fact that they attend to the world in different ways. Each, therefore, gives access to a differing reality. The neuroscience, and the cultural consequences, are spelt out in my book *The Master and his Emissary: the Divided Brain and the Making of the Western World*, published by Yale in 2010.

> *"The purpose of this divide, I believe, is to permit two kinds of consciousness in one mind at the same time."*

The purpose of this divide, I believe, is to permit two kinds of consciousness in one mind at the same time. Birds and animals, like humans have divided brains. They need to be able to pay detailed attention to the parts – for a bird, being able accurately to pick up that seed from the background of grit or gravel on which it lies – with a view to manipulating the world. But they also need to have the broadest possible picture of the whole, of everything else going on and how it interrelates – to watch out for predators or for mates – at the same time. One gives a partial vision of parts: just the bits that are needed to allow us to manipulate our environment effectively. This is for birds, mammals and humans, the left hemisphere: and it is the left hemisphere that controls our grasping right hands, and the parts of language with which we say we have 'grasped' something. The other sees the whole and helps us not to manipulate, but to understand, the world. Each contributes to everything, of course, but this is the nub of the difference.

The consequence is that to our left hemisphere the world appears to be a complex system that works according to rules we think we understand. To it, there are discrete, static entities that are certain, and knowledge depends on putting more and more of these together to make a whole. To the right, however, no one apparent 'thing' is separate from its context, which radically alters it. We need to see the whole before we can understand the parts to which it belongs. It is like the famous Dalmatian dog, sniffing the ground in the shade of a tree:

It can't be put together in our minds by seeing one splodge of black, and saying 'Now I know that is part of a dog (or a tree)'. We have to see the whole first. This is in fact how we get to see and understand everything in the world, though when we think about the process piecemeal afterwards, and reflect on it using our conscious verbal, analysing left hemisphere, we imagine it is put together from bits.

Because the left hemisphere has no inkling of what it is that it doesn't know, it thinks it knows everything. The right hemisphere, given to scepticism and at ease with uncertainty, lacks even a voice. This means that, over time, the left hemisphere's 'take' on the world seems more and more certain, and seems to drive out the intuition that the right hemisphere has that there is more to this than is currently meeting the eye. The right hemisphere seems aware that it needs the valuable contribution of the left, but that awareness is not reciprocated.

Three times in the history of the West – in 6th Century BC Athens, in Augustan Rome, and in our own Renaissance – one can track the emergence of a flourishing civilisation where the best perceptions of both hemispheres are taken together to produce enormous richness. Three times one can see this fall away into the rigid, bureaucratic systematising, where theory is more important than practice, and a civilisation fails.

I think we are in such a time. The evidence is all around us. The managerial culture that has no way of understanding or respecting embodied skills and the fruits of experience, no way of knowing what it is that it all too clearly doesn't know, substitutes a reality that is on that sheet of paper, where you tick the box, not in your hands. Don't be fooled. What brain science tells us is that we should stick to what we know from our vision of the whole picture, which we all have, but are learning frighteningly fast to disregard, not what the myopic view of utility here and now dictates. Or there may not be a here and now, and, all hope extinguished, we will be left with – just a bar of mottled soap.

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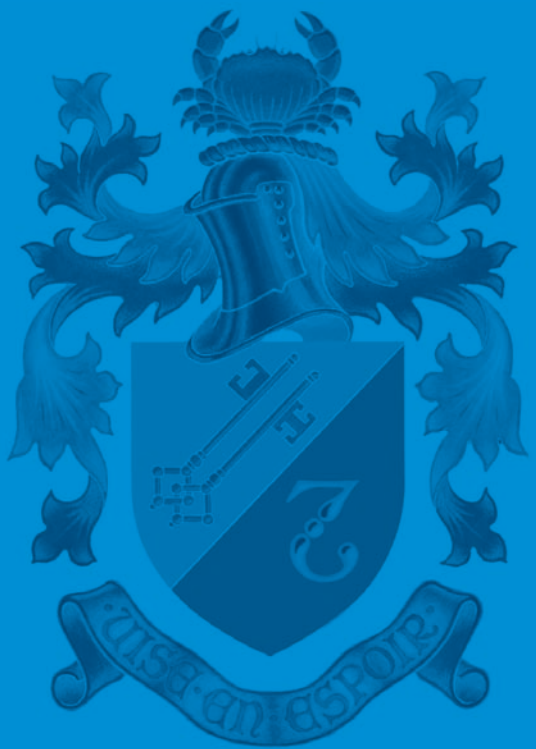

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