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**Cervical Cancer Prevention in
Low-Resource Countries**
An Outreach Programme by the
Division of Gynaecologic Oncology



CANCER CAREGIVERS

A Research Study on
Their Quality of Life

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Happy New Year!

Time flies and SPARK, a biannual magazine by the National University Cancer Institute, Singapore (NCIS) is one year old! In our third issue, we introduce a new section on education featuring the residency training programmes at the NCIS and our trainees. As an academic institution, training our next generation of young specialists is pivotal in nurturing leaders of the discipline. We also see the growth of our palliative care service into the Division of Palliative Care, helmed by Senior Consultant, Dr Noreen Chan.

Our clinical breakthrough section highlights our Ophthalmic Oncology team in the management of retinoblastoma, a previously lethal malignancy in children and the use of Raman Spectroscopy in surveillance for nasopharyngeal carcinoma by our Ear, Nose & Throat (ENT) surgeons. We will also learn about the regional outreach programme led by our Division of Gynaecologic Oncology in the screening and prevention of cervical cancer.

We had many exciting events in 2016 and we look forward to welcoming the year ahead with more advances in clinical care, discoveries in cancer research and collaborations with our community and institutional partners.

Here's wishing you a happy and healthy 2017!

Dr Chee Cheng Ean

Consultant
Chief Medical Editor



CANCER CAREGIVERS

A Research Study on Their Quality of Life

A caregiver is defined as someone who is 'responsible for attending to the needs of a child or dependent adult' and may be a family member, friend or another person providing support such as physical, psychological and/or other help. Caregiving is not necessarily unique to cancer but is seen in any illness where an individual or a group of people will help another person through an illness.

The demands of caregiving for individuals with cancer has grown as cancer treatment becomes more intensive, complicated and frequently delivered in ambulatory settings. Additionally, as cancer survivorship grows, that burden may become cumulative and unrelenting in certain situations for some caregivers. Caregiver adaptation is a continuous process that goes through many phases as the cancer journey and treatment progresses. One study found that caregivers on average provide care for 8.3 hours a day for 13.7 months.

Two of our studies at the National University Cancer Institute, Singapore (NCIS) have provided us with information about caregivers of local cancer patients: (1) The Relationship between Hope, Resilience, Optimism and Psychiatric Comorbidities in Cancer Patients (HOPE Study), and (2) Investigating the Effects of a Psycho-educational Support Group Therapy on Cancer Caregivers' Burden and Quality of Life (COPE Study).

As there is a paucity of research on the quality of life (QoL) of family caregivers of cancer patients in Singapore, we first validated an international scale called the Caregivers Quality of Life Index – Cancer (CQoL-C) Scale, for use locally. We found that there were cultural differences with other countries for factors used in this scale. Factors such as spiritual well-being and financial concerns in the Mandarin version from Taiwan for instance, were not central to caregivers' QoL in Singapore. We developed a shorter version (CQoLC-S25) which is more relevant in Singapore and has five domains of importance to our caregivers: burden, physical/practical concerns, emotional reactivity, self-needs and social support.

We then compared the QoL of local caregivers with published data from overseas centres expecting that the quality of life of Singapore caregivers to be similar to that of caregivers in other countries. However, the 258 local family caregivers who responded were found to have significantly impaired quality of life compared to caregivers in the West (the United Kingdom, the United States and Canada). Amongst Asian countries, family caregivers in Singapore had similar QoL to caregivers in Turkey and Taiwan and significantly better QoL than caregivers in Iran and South Korea.

Amongst our ambulatory cancer patients, early-stage and lower level of illness severity contribute to low levels of caregiver burden. However, as in other Asian populations, greater burden was associated

One study found that caregivers on average provide care for



for 13.7 months



As healthcare staff focus on the patient's needs and care, the impact of caregiving and the caregivers' own needs are often overlooked and not as extensively supported.

with caregivers' lower educational levels and monthly household incomes.

Furthermore, male caregivers in our study population had significantly lower scores than female caregivers in the areas of physical or practical concerns and self-needs. Those providing care for parents (as compared to those caring for spouses) and caregivers caring for advanced-stage cancer patients (compared to those caring for early-stage cancer patients) had significantly lower QoL.

As healthcare staff focus on the patient's needs and care, the impact of caregiving and the caregivers' own needs are often overlooked and not as extensively supported. Caregiving challenges can range from attending to the patient's physical needs, addressing practical issues such as financial resources and insurance to social issues such as family obligations and relationships, spiritual needs and even supporting the patient's self-esteem and emotions. The challenges to caregivers are also determined by the type of cancer and stage, and the patient's own inner resources and coping ability.

When we studied 65 cancer patient-caregiver pairs, we found that patients who are emotionally distressed may increase caregiver burden by requiring more emotional support in addition to physical care. Amongst 81 patient-caregiver pairs, caregivers of patients who were more spiritual and

had specifically made meaning from their cancer diagnosis, were better adapted to their role primarily through their care recipient's resilience.

There is evidence that caregivers' psychosocial needs should be identified and met. At times, caregivers can themselves become more distressed than the patient. While some studies have reported rates of anxiety and depression in caregivers that are comparable to their care recipients, others have shown that those rates may even surpass that of the patient. Some of the most common concerns identified amongst caregivers are similar to patients, and include fears about illness deterioration, the risks of illness recurrence and about death and dying.

However, we should not view caregiving as entirely a burdensome experience. In our qualitative interviews with family caregivers, many highlighted the experience as rewarding and meaningful. We found that caregivers' motivations could be grouped into three categories: personal value and fulfillment, giving care because of societal expectations such as filial piety, and lastly, practical need.

Caregivers faced greater difficulties in dealing with the challenges of caregiving when caregiving was driven by societal expectations and practical need. They adapted better to the challenges of caregiving when caregiving was driven by intrinsic motivations and personal values such as love, religious teachings, universal concern for humans and filial piety.

Overall, these findings reflect the need for greater recognition of caregiving and support for caregivers, although admittedly not everyone will require help. Caregivers should be willing to seek assistance when required. Another of our studies found that caregivers who received home hospice support through visits by multidisciplinary healthcare professional teams, not only improved patient end-of-life care but simultaneously improved caregiver quality of life.

Caregivers have related different ways in which they help themselves adapt and cope with caregiving. These include taking time for themselves and creating distractions through activities outside of caregiving. This could range from activities such as puzzles and computer games, listening to music or doing anything that one finds soothing. Creating a support system to talk and discuss matters helps and this includes joining a support group for encouragement, using positive self-talk and keeping a journal.

Caregiver Support @ NCIS

At the NCIS, we understand that patients and their families may find it difficult to cope with the disease and with life during and after treatment. Many of our programmes and activities are open to both cancer patients and their caregivers. The past two years have also seen the launch of several programmes specifically developed for the cancer caregiver.

Resources available include:

- Talks on caregiver welfare and caregiving tips
- Classroom and home-based workshops
- Comprehensive Caregiver Infokits on the NCIS website

For more information on the Caregiver Infokits or the latest updates on programmes for cancer patients, survivors and their caregivers, visit bit.ly/caregiverinfokits

Steps for Caregiver Self-Care



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A/Prof Rathi Mahendran graduated from the University of Singapore in 1980 and completed the Specialist Training in Psychiatry in 1986. She subsequently trained in the UK and the US under the Health Manpower Development Plan Programmes in 1989 and 1996. She is a senior consultant psychiatrist with the Department of Psychological Medicine and provides psychiatric care for ambulatory patients at the National University Cancer Institute, Singapore (NCIS).

THEY LIVE & THEY SEE



Retinoblastoma 'A Success Story'



Cancer... the process of
creation gone wild, I thought.

- Philip K. Dick, Radio Free Albemuth



- Imagine parents who are blind and have a newborn child with cancer in both eyes.
- Imagine parents who have lost a child from advanced eye cancer, had a second child with one eye removed and now have a newborn with eye cancer.
- Imagine a precious child, whose only cancer treatment offered is to remove an eye.

Such are the heartrending stories that we frequently face in Ophthalmic Oncology. However, when successfully managed, the satisfaction gained by treating the child, the parents, the extended family as well as the entire community, outweighs all the efforts put in.

Retinoblastoma, the most common primary intraocular malignancy in children, is mostly sporadic but not infrequently hereditary (autosomal dominant-germline mutation of the RB1 gene). It was indeed the first malignancy where a mutation in the tumour suppressor gene (RB1) was identified, and this has served as a prototype for the genetic basis of other cancers. It is one of the very few cancers in the

human body which is diagnosed clinically, mostly by visual inspection, where a diagnostic biopsy is contraindicated.

With an incidence of one in 15-20,000 live births, although we see only two to three Retinoblastoma patients from Singapore each year, our institutions see five to ten times more from the region and beyond.

Historically, mortality was 100 per cent without appropriate early care. However, great strides in the knowledge, understanding, and application of multi-modality multidisciplinary management have turned the tables with mortality reduced to less than five per cent in developed nations. Treatment options for this potentially life-threatening and until recently, globe-threatening condition has evolved from crude ocular enucleation or even exenteration to salvage external beam radiotherapy (with associated disfiguration and second malignant neoplasms in the field of radiation) to local measures such as laser photocoagulation and cryotherapy. A chance observation in the 90's, of palliative chemotherapy resulting in tumour size reduction, resulted in the introduction of routine systemic chemoreduction with local tumour consolidation techniques (Figure 1).

Even when such treatments failed, tumour/disease free survival with enucleation followed by customised prosthesis fitting could be easily attained albeit with 'organ' sacrifice (Figure 2).

Subsequently, with the awareness of significant side-effects from systemic chemotherapy (neutropenia, sepsis, etc.) especially with inadequately trained paediatricians and oncologists in developing nations and the remote possibility of second cancers like leukaemia, selective intraophthalmic artery chemotherapy (IAC) along with intravitreal chemotherapy (IVIc) was introduced, where the latter was once considered taboo for fear of systemic tumour dissemination. This has not only revolutionised treatment outcomes by avoiding all systemic complications from conventional management but has also raised globe salvage rates of even advanced intraocular tumours previously considered unsalvageable. In select cases, it has even helped restore near normal vision. Thus, the ultimate goal of preservation of LIFE, GLOBE and VISION is now achievable in most patients with retinoblastoma, provided early appropriate multi-modality management is offered to the child (Figure 3, 4).

The National University Hospital (NUH) is the only institution in Singapore and the region to offer Selective Intraarterial Chemotherapy for Retinoblastoma, performed by our neurointerventional radiologist.



Figure 1 a, b - Group D retinoblastoma: presentation & post chemoreduction, transpupillary thermotherapy (TTT)



Figure 2 - Advanced retinoblastoma in the right eye. Pre & post-enucleation with customised ocular prosthesis

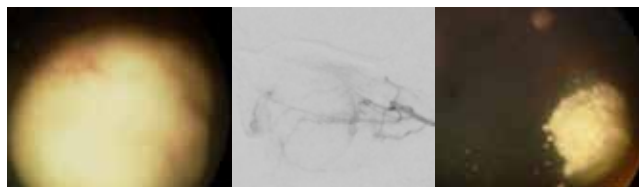


Figure 3 a, b, c - Group D retinoblastoma, intraophthalmic artery chemotherapy, post treatment (IAC, IViC, TTT, Cryotherapy).

Evolution of Retinoblastoma Management

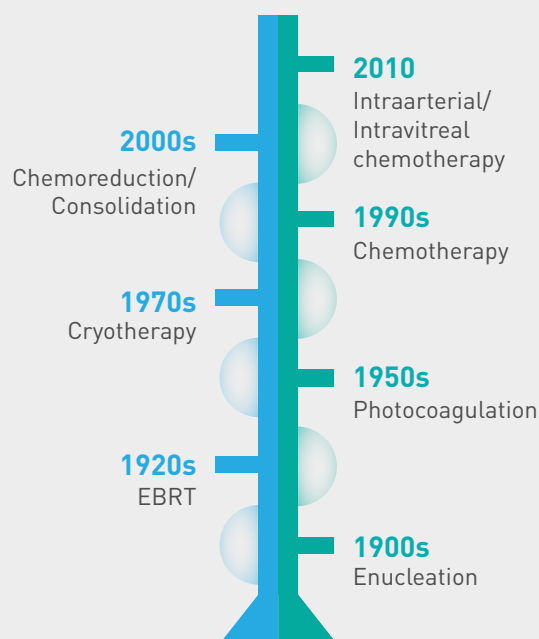


Figure 4 - Evolution of retinoblastoma treatment

This, complemented with intraocular laser therapy, cryotherapy, intravitreal chemotherapy performed by the ophthalmologists and systemic chemoreduction offered by our paediatric oncologists makes multi-modality multidisciplinary management of Retinoblastoma possible. In children who are not suitable or have failed conservative treatment, when the eye has to be removed, the ophthalmic pathologist looking for 'high-risk pathological factors' helps guide neoadjuvant chemotherapy to prevent metastatic disease. Our NUH ocularists build customised prosthesis which negates the disfiguration after socket reconstruction of the enucleated eyes. Genetic testing of the tumour or blood sample also helps with the identification of mutation which facilitates genetic counselling for the parents and the child (Figure 5).

The Ophthalmic Oncology Service, Department of Ophthalmology, NUH and the Division of Paediatric Haematology-Oncology, National University Cancer Institute, Singapore (NCIS) through the Khoo Teck Puat Foundation and the St Jude-VIVA foundation

BREAKTHROUGHS



Figure 5 - Multi-modality multidisciplinary approach to ocular tumours

have been instrumental in supporting clinical and educational activities for Retinoblastoma and other paediatric cancers. They have not only helped fund equipment and training of experts from the region but also helped in the partnership of the NUH with Paediatric Oncology services in the Southern Philippines Medical Centre, Davao and the Philippine General Hospital, Manila for knowledge exchange and transfer of expertise with other Southeast Asian and Asian Pacific countries, focusing on not only Retinoblastoma but also other childhood cancers.

However, the greatest challenge is not in managing the children who arrive at our doorstep, but to educate primary care practitioners and paediatricians to recognise this potentially life-threatening condition at its initial presentation, and refer them to a well-equipped centre with trained manpower. Each of these referral centres have to be armed with appropriately trained professionals, modalities of treatment (surgery, lasers, cryotherapy, etc.) and expertise of neurointerventionalists. The greatest barrier is not just the affordability of the costs of these various forms of treatment but the human factor of developing and building these multidisciplinary teams of professional experts.

In summary, today, we can proudly state that at least as far as Retinoblastoma is concerned, we have achieved a major milestone that was once a blinding, disfiguring and life-threatening disease. A battle has been won.

Acknowledgements:

A/Prof Quah Thuan Chong, Dr Miriam Kimpo, Division of Paediatric Haematology-Oncology, NCIS & NUH Dr Anil Gopinathan, Neurointerventional Radiology, NUH

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Ms Suriya Abu Waled, Ms Rosemarie Clemens, Ocularists, NUH

“ The cure of even one solid cancer... would singularly revolutionise oncology. It would provide the most concrete proof that this was a winnable war. ”

- The Emperor of all Maladies, Siddhartha Mukherjee.

Ophthalmology & Oncology – A Brief Note

The spectrum of oncologic conditions encountered by ophthalmologists include primary intraocular tumours like retinoblastoma, uveal melanoma and lymphomas to ocular adnexal tumours like rhabdomyosarcoma, lymphoma and lacrimal gland carcinoma, the rare metastatic disease to the eye and orbit and finally children and adults who are survivors of systemic malignancies who have undergone various forms of bone marrow/stem cell transplants with debilitating Ocular Graft vs. Host Disease.



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Dr Gangadhara's areas of training and expertise include functional and reconstructive ophthalmic plastic surgery, aesthetic oculo-facial surgery and ocular oncology. He is also certified by the American Board of Ophthalmology. He is active in furthering the cause of the subspecialty in the South and East-Asian region and is actively involved in undergraduate and postgraduate education in Singapore and the region. Common surgeries performed by him include blepharoplasty, ptosis correction, epiblepharon correction, minimally invasive surgery for tearing disorders, management of complex orbital tumours, orbital reconstruction, etc. Dr Ganga was the recipient of the Rustom Ranji Oration Award, Andhra Pradesh Ophthalmological Society 2010 and the Asia Pacific Academy of Ophthalmology Achievement Award in 2011.

RAMAN SPECTROSCOPY

for improving diagnosis and detection of nasopharyngeal cancer

Raman Spectroscopy (RS) is an optical analytic technique which uses the principle of inelastic scattering of light that allows characterisation of biochemical molecules such as proteins, lipids and amino acids in the tissue. Therefore, the technology may potentially be exploited for real-time tissue analysis which is invaluable for screening and surveillance of cancer. This system has been miniaturised and developed for clinical applications by Associate Professor Huang Zhiwei from the Department of Engineering, National University of Singapore. In the last few years, clinicians from the National University Cancer Institute, Singapore (NCIS) have investigated the utility of this system in cancer surveillance. Unsurprisingly, this system appears to bridge the gap in the surveillance of nasopharyngeal cancer (NPC), which is the most common head and neck cancer seen locally. Due to its deep anatomical location, detecting early recurrence of NPC can be challenging; and more often than not, local recurrences are detected late, precluding surgical salvage due to the close proximity of the tumour to critical neurovascular structures in the skull base.

Through an Institutional Review Board (IRB) approved protocol, our team at the Department of Otolaryngology (Head and Neck Surgery) has sought to investigate the

utility of near infra-red Raman Spectroscopy in the surveillance of nasopharyngeal cancer patients. Our system comprises the following equipment which is summarised in Table 1.

Since the initiation of this study in 2015, we have collected the Raman Spectroscopy information for 135 data-points on 79 patients with either newly diagnosed NPC (N=12) (Figure 1), post-irradiated nasopharynx (N=37) and healthy normal nasopharynx (N=30) (Figure 2). In this surveillance system, a near infra-red laser of 758 nm is emitted from the 1.8 mm fiberoptic probe. As the laser is emitted onto the nasopharyngeal tissue, the differential light waves which are scattered back to the device is collected and filtered to remove the auto-fluorescent background. This final filtered signal (Raman signal) is then funnelled through the air cooled CCD (Charged Coupled Device) camera which differentiates and displays the different wavelengths' spectral peaks. Each of these spectral peaks represents a specific tissue composition which can be compared to specific amino acids/lipids or proteins based on previously published databases. Therefore, depending on the tissue composition among healthy nasopharyngeal tissue, post-irradiated tissue and nasopharyngeal cancer tissue, differential expression of these spectral peaks will be obtained.

MATERIALS	DESCRIPTION
Near Infra-Red Laser Source	Fixed wavelength of 758nm
Fibre Optic Probe	1.8mm probe with optic fibres for transmitting laser for excitation and collection of scattered light
Thermo-Electrically Cooled Charged-Coupled Device (CCD) Camera	Filtering and differentiation of collected scattered light intensity into wave peaks according to biomolecules
Computer	Data acquiring and analysis using Matlab software for diagnostic prediction

Table 1: Summary of equipment used in surveillance of NPC

BREAKTHROUGHS

Figure 1



Figure 2



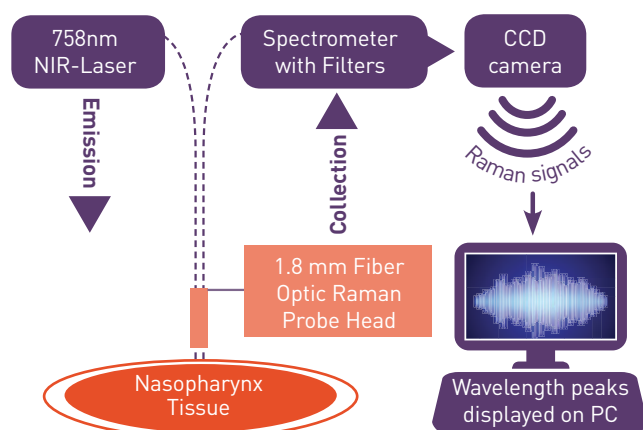
Figures 1 and 2 : Cancerous nasopharynx versus healthy nasopharynx

Data processing

Data processing of this dataset will largely be based on using existing mathematical algorithm in the analysis. A multivariate statistical analysis will be performed by constructing a PCA-LDA (Principal Component Analysis-Linear Discrimination Analysis) model. The PCA is carried out to retain the information which is significant for classification of the tissue by reducing the dimensionality of the Raman data obtained. This significant information is then used as input for constructing the LDA algorithm for predicting and classifying the tissues between Normal versus Cancer, Cancer versus Post-treatment and Post-treatment versus Normal. To differentiate the “correct” and “incorrect” classification of tissue, the Receiver Operating Characteristic (ROC) curve is generated for analysis.

Using this model, we have shown that there was good specificity of differentiating nasopharyngeal cancer from either post-irradiated nasopharyngeal tissue or healthy normal nasopharyngeal tissue. Therefore, we believe that this preliminary result can be expanded to validate the utility of near infra-red Raman Spectroscopy in the surveillance of nasopharyngeal cancer. Hopefully, in the near future, when the clinician encounters a normal looking nasopharynx during the follow-up of a nasopharyngeal cancer patient, a “benign” Raman Spectroscopy signal will increase confidence of post-irradiated tissue; and a “malignant” Raman Spectroscopy signal should be pursued with Raman-directed biopsy to exclude a local cancer recurrence.

Fiber Optic Near-Infra Red Auto-Flourescence Raman Spectrascopy



Quick Facts about NPC

- NPC is a form of nose cancer that begins at the junction of the back of the nose and the top of the throat, an area called the nasopharynx.
- Risk factors of NPC include strong family history, consumption of salted food, and an individual’s response to the Epstein-Barr Virus (EBV) infection.
- Signs and symptoms of NPC include:
 - Painless lump in the neck
 - Blocked nose
 - Nosebleed
 - Ear blockage
 - Ringing sound in the ear
 - Hearing loss
 - Blood in saliva
- If NPC is suspected, a nasal endoscopy is performed. This involves inserting a thin flexible tube (with a mounted camera) into the nasopharynx through the nose.



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Currently a consultant with the NCIS and the Department of Otolaryngology - Head & Neck Surgery at NUH, Dr Lim is also a member of the multidisciplinary Head & Neck tumour group which discusses complex cases involving NPC patients. During his two-year Fellowship at the University of Pittsburgh Medical Center, Dr Lim did translational benchwork research in immunotherapy in head and neck cancer, focusing on immunological mechanisms in monoclonal antibody based therapy in cancer and identifying novel immune modifiers in cancer therapy. In his clinical training, he was trained in transoral robotic surgery (TORS), minimally invasive video assisted thyroidectomy (MIVAT) and minimally invasive approaches in head and neck surgery, in addition to the major head and neck resections. In the area of research in robotic surgery, Dr Lim is actively collaborating with the academic staff from the Faculty of Engineering, National University of Singapore, and was the co-PI evaluating the key technologies for minimally invasive robotics surgery and navigation.

CAN INTRAPERITONEAL CHEMOTHERAPY IMPROVE SURVIVAL OUTCOMES OF GASTRIC CANCER PATIENTS?

Intraperitoneal chemotherapy appears to be a promising strategy in gastric cancer patients with peritoneal disease. The results of a phase 2 clinical trial on this form of chemotherapy was presented during the Digestive Disease Week in San Diego, United States last year.

In Singapore, gastric cancer is the seventh most common cancer in men and ninth most common cancer in women. It is also one of the leading causes of cancer-related deaths in the world. The survival rate of stage four gastric cancer patients on conventional treatment is typically between 10 – 14 months, while survival for those with peritoneal metastasis is less than 10 months.

About Gastric Cancer

The abdominal cavity is lined by a thin layer of membrane that covers and supports abdominal organs. This membrane is called the peritoneum. When gastric cancer grows through the stomach wall, it can spread to other locations within the abdominal cavity. This can lead to devastating consequences such as bowel obstruction and perforation.

Peritoneal metastases can be a challenge to treat because it is difficult to attain adequate drug concentration due to poor drug penetration in the abdominal cavity. Patients with peritoneal metastases usually fare less well as compared to those with metastases in lymph nodes or other organs. Historically, the one-year survival rate of gastric cancer patients with peritoneal metastases is typical not more than 40 per cent.



Stage four gastric cancer patients on conventional treatment typically live for between between

10 – 14 months,

while those with peritoneal metastasis live for

less than 10 months.

About Intraperitoneal Chemotherapy

One strategy to overcome the issue of poor drug penetration in the abdominal cavity is to administer liquid chemotherapy directly into the abdominal cavity, also known as intraperitoneal chemotherapy. Intraperitoneal chemotherapy delivers high concentrations of the drug directly into the cancer cells in the peritoneal lining, destroying them in the process. This novel procedure also minimises the systemic absorption of the drug into the blood or lymphatic system, thereby reducing systemic toxicity such as marrow suppression. At the end of the hour-long procedure, the liquid is drained off.

Paclitaxel is a form of chemotherapy approved for the treatment of gastric cancer. The drug is usually administered directly into the blood vessel. Its large molecular size and low risk of inducing

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local reaction makes it an ideal candidate to be administered intraperitoneally.

At the 2016 American Society of Clinical Oncology (ASCO) annual meeting, results of a phase 3 study from Japan examining the role of intraperitoneal paclitaxel was shared. Though the report showed a difference in the median overall survival of patients receiving intraperitoneal chemotherapy (17.7 months) versus patients receiving standard chemotherapy (15.2 months), the results did not show statistical significance.

In the study performed at the National University Cancer Institute, Singapore (NCIS), it was found that the one-year survival rate of newly diagnosed gastric cancer patients with peritoneal-limited metastases who received standard chemotherapy and additional intraperitoneal paclitaxel was 72 per cent. The results also showed that intraperitoneal chemotherapy led to the complete resolution of peritoneal metastases in one-quarter of these patients and gave them the opportunity to undergo resection of the primary gastric cancer. Through this study, it appears that this subset of patients achieved the best survival outcome.

The role of intraperitoneal chemotherapy is still evolving. However, further study is needed to improve the outcome of gastric patients with peritoneal metastases.

Conventional Treatment of Gastric Cancer

A gastric cancer patient's conventional treatment routine comprises chemotherapy which is delivered over eight cycles, each lasting three weeks. In the current clinical trial at the NCIS, intraperitoneal chemotherapy is added on to each cycle of conventional chemotherapy on the 1st and 8th day of treatment.

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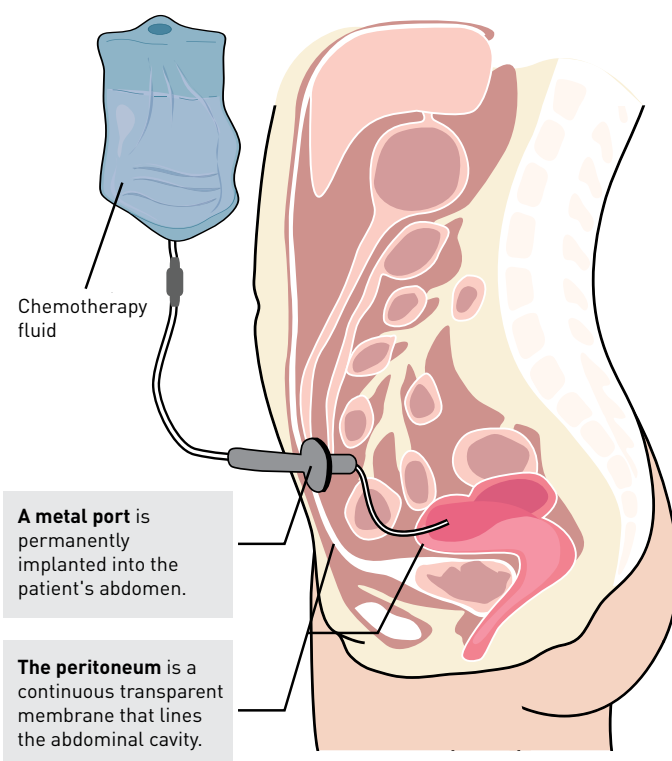
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The Procedure

A metal port the size of a bottle cap is permanently implanted into the patient's abdomen. During treatment, approximately one litre of liquid chemotherapy is inserted into the peritoneum, through the metal port. The patient returns home after the fluid is drained about an hour later.



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Dr Yong Wei Peng obtained his medical degree and postgraduate training in University of Aberdeen, Scotland. After completing an oncology fellowship at the National University Hospital, he was awarded the A*Star international clinical pharmacology fellowship at the University of Chicago. Upon his return to Singapore, he was awarded a three-year Investigatorship Award under the Clinician Scientist Award to further his research into personalised therapy. Dr Yong leads the therapeutic arm (NUH module) of the Singapore Gastric Cancer Consortium. The consortium received the prestigious five-year Translational Clinical Research grant in 2007. He is also the Chairman of the National Healthcare Group Domain-Specific Ethics Review Board. His clinical interest is in gastrointestinal cancers and his research interests are pharmacogenetics and epigenetics in cancer.

MEDICAL ONCOLOGY SENIOR RESIDENCY PROGRAMME

at the National University Health System (NUHS)

The professional education of the next generation of medical oncologists is valued as one of the most important missions at the National University Cancer Institute, Singapore (NCIS), with the NUHS Medical Oncology Senior Residency Programme offered as one of the 12 Senior Residency programmes at the NUHS.

Our main goal during subspecialty training is to hone our Senior Residents' skills to a standard that is beyond the minimal requirement for subspecialty medical oncology accreditation, and we do so by developing each cohort of oncologists for careers in academic medicine, research and education. At the NCIS, we want to groom a generation of leading researchers and clinicians who will eventually assume leadership roles in our department and further the development of academic medicine.

The Medical Oncology Fellowship Training Programme at the NCIS is typically three years long. During the first two years, Senior Residents will be clinically rotated across the different tumour types, with the opportunity to attend multidisciplinary tumour board meetings for each particular rotation, as well as see patients during their outpatient clinic attachments to the "tumour specific clinics", two to three times a month. Their third and final year comprises research activities and selected rotations to related disciplines such as radiation oncology and palliative medicine. The first two years of the programme are accredited by the Accreditation Council of Graduate Medical Education-International (ACGME-I).

Senior Residents will be empowered through supervised independence under the Medical Oncology Senior Residency Programme. They will be mentored by rotation supervisors, core faculty supervisors, and the programme director, and receive feedback from the Clinical Competency Committee every six months.

During their Senior Residency, our Senior Residents will acquire cognitive knowledge, clinical experience, procedural skills, and professional tools that will shape

them into effective oncologists and researchers. They will also be nurtured to develop necessary humanistic qualities, which are an integral part of oncology patient management.

As an academic institution, research training at the NCIS is an integral part of the Medical Oncology Fellowship Training Programme. Senior Residents complete the Good Clinical Practice (GCP) course and the Collaborative Institutional Training Initiative (CITI) course during their first year of training as part of formal research training and during their fellowship, they will be given the opportunity to formulate and complete a research project under close supervision and mentoring.

We are proud to announce that the inaugural batch of six residents who joined the programme three years ago successfully graduated in July 2016! A new intake of Senior Residents will commence on the 1st of July every year, following the nationwide Senior Residency matching exercise, and we look forward to moulding the next generation of leaders in oncology medicine!

Interested to find out more? Please visit our website at www.ncis.com.sg or email ncis@nuhs.edu.sg.



Article by
**Dr Nesaretnam Barr
Kumarakulasinghe**
Associate Consultant
Department of Haematology-
Oncology, NCIS

Dr Nesaretnam Barr Kumarakulasinghe graduated from the Yong Loo Lin School of Medicine, National University of Singapore in 2008. He was trained in Internal Medicine and completed his Senior Residency in Medical Oncology at the National University Cancer Institute, Singapore (NCIS) in 2015. As a clinician, his present focus is on general oncology with a special interest in genitourinary and head & neck cancers.

DAY IN THE LIFE OF A SENIOR RESIDENT DR YVONNE ANG



| Can you describe a typical day at work?

A typical day starts with ward rounds from 7 to 11am, and together with the consultant and medical officers, we review the patients admitted to the wards and make plans for their treatment that day. I then spend an hour or two talking to these patients and their family members. Lunchtime is usually set aside for tumour board meetings and educational activities, where the Senior Residents take turns giving presentations on various topics or interesting cases. In the afternoon, patients are seen in our outpatient specialist clinics, including those on active treatment or surveillance, before our team meets up again in the evening to discuss the warded patients and their progress during the day.

| What are some skills that you have acquired as a Senior Resident that you find most useful during your day to day work of seeing patients?

Communicating with our patients is central to our job as oncologists – from explaining the diagnosis, through treatment choices and complications, up to the end of a patient’s cancer journey. In particular, I have learnt from seniors and patients that communication is a two-way street – as important as it is to be clear and concise in laying out what your ideas and plans are, it is even more vital to listen to what patients have to say and to actively seek their opinions. Two people receiving an identical diagnosis may perceive it in very different ways, which affects how much they want to know and their decisions about treatment. Another skill that I have developed through our training is adaptability. On a patient level, that involves tailoring treatment and information to each individual, on an academic level, that means keeping up-to-date with new developments in the field and continually adjusting our mindsets on what is “standard”, and on a systemic level it helps us manage our time and prioritise the most important tasks.

| Was there any specific experience or patient that really affirmed your decision to work with cancer patients?

I did not really have a Eureka moment when I decided to work with cancer patients. It was more a gradual realisation while I was doing my Oncology rotation as a medical officer that this was closest to what I was looking for in medicine – not only making treatment decisions specific to cancer, but taking an involved role in coordinating patients’ care with other disciplines and helping them to process and accept their illness.

| What are some personal goals and dreams that you hope to achieve?

In 10 years’ time, I would like to be able to say that I have cared for my patients to the best of my ability and made their walk with cancer easier.

| Any words of advice for medical students who are thinking of joining the Haematology - Oncology Residency Programme?

I have found it to be a very challenging yet rewarding juggling act – we continue to strive to stay at and even contribute to the forefront of medical science, and at the same time, treat each individual patient with understanding and compassion. I would say that it is not a job you can leave at the office, which may not be everyone’s cup of tea. That being said, there is never a boring day – frustrating, exciting, depressing, satisfying, but never boring.

Dr Yvonne Ang
Senior Resident
Department of Haematology-Oncology
National University Cancer Institute, Singapore (NCIS)

CERVICAL CANCER PREVENTION IN LOW-RESOURCE COUNTRIES

An Outreach Programme by the Division of Gynaecologic Oncology

Cervical cancer is one of the leading causes of death in women worldwide. The highest incidence and mortality from cervical cancer are still found in the developing countries (Table 1), which are burdened with financial and resource challenges. Singapore is unique in its location as it is a developed and high-income country surrounded by developing countries. This puts Singapore in an ideal position to take the lead in cervical cancer screening, prevention and management for ASEAN countries. The Gynaecologic Oncology team at the National University Cancer Institute, Singapore (NCIS) located within the National University Hospital (NUH) recognised this immense potential and designed an outreach programme to train local doctors in ASEAN countries to be competent in cervical cancer screening and prevention.

The final outcome of this programme that the team hopes to achieve is to establish a group of local ASEAN trainers that are able to continue training their local doctors and allied healthcare workers independently in the diagnosis, basic management and treatment of pre-invasive cervical disease leading to effective cervical cancer prevention in their community.

Countries	Incidence of cervical cancer (age adjusted per 100 000 women annually)	Mortality from cervical cancer (per 100 000 women annually)
Europe*	4.5 – 9.4	1.2 – 2.7
UK	7.2	2
Singapore	6.9	2.3
USA	5.7	1.7
Australia	4.9	1.4
Cambodia	27.4	16.2
Myanmar	26.4	15
Thailand	24.5	12.8
Laos	22.1	13.3
Malaysia	17.9	5.6
Brunei	16.9	6
Indonesia	12.7	7
Philippines	11.7	5.3
Vietnam	11.5	5.7

* Finland, Sweden, Norway, Germany, France, Spain, Belgium

Table 1: Incidence and mortality of cervical cancer in developed and developing countries.



Training in cryotherapy



Training in colposcopy

The Gynaecologic Oncology team on the other hand, will continue to support medical referrals and expert advice in all aspects of advance training in cervical cancer prevention which include advance colposcopy training, cancer care and management for all ASEAN countries.

Establishing an outreach programme

Through the NUH International office, a doctor from Cambodia was identified as a candidate for sponsorship as an initial part of this programme.

Dr Sovannara Thay is a women's health specialist and currently, she is also the Women's Health Clinic manager at the Sihanouk Hospital Centre of HOPE (SHCH) in Cambodia where she runs the colposcopy clinic and performs treatment for pre-cervical cancer in the hospital she works in. As part of the sponsorship, Dr Sovannara spent one week with the division to gain experience in all aspects of pre-invasive cervical cancer practice. This included attending the Gynaecologic Oncology advanced colposcopy course on October 3, 2015. She was able to report her experience gained to the Cambodia Ministry of Health that led to her successful application for funding to run a basic colposcopy course in Cambodia for the local doctors. Cambodia's first basic colposcopy workshop was held on April 29 and 30, 2016 with support from the Cambodian Ministry of Health.

The NUH & NCIS team consisted of:

- Dr Ida Ismail-Pratt, Consultant in Obstetrics and Gynaecology, Lead in NUH Gynaecologic Cancer Screening and Prevention Programme
- Dr Ng Kai Lyn, Senior Resident in Obstetrics and Gynaecology
- Ms Joyce Er, Advanced Practice Nurse in Gynaecologic Oncology
- Ms Blyss Kwong, Assistant Manager for Gynaecologic Oncology and Course Coordinator

32 participants from various parts of central and provincial areas of Cambodia attended the workshop which consisted of theory and practical sessions on basic colposcopy, visual inspection with acid (VIA) procedure and treatment for pre-cancer (Loop excision electrosurgical procedure (LEEP) and cryotherapy).

Lessons learnt

The workshop ran successfully for the two days and the team not only established new colleagues but gained valuable experience and lessons from this important workshop.

Cater training to the local needs

Research and establishing local needs for the workshop is crucial to be able to deliver and reach our aim. The majority of the doctors perform VIA and cryotherapy with colposcopy while LEEP is only performed by a small group of doctors in Phnom Penh's city hospitals. It was vital that the training programme concentrated on VIA and cryotherapy as concentrating on colposcopy and LEEP alone would not have been beneficial for the Cambodian doctors as majority did not have the facilities to perform these procedures.

Always be ready to improvise

However well-planned a programme is, always be ready to improvise. The team encountered various challenges during the workshop from defective equipment to non-ideal facilities for training. However, the team managed to improvise, allowing the two-day programme to run smoothly.

Language is a barrier

It was established that language would be a barrier thus interpreters were available at the workshop. However, the team realised that the best way to deliver any training was to communicate via the local language. This is one of the main reasons the team was keen to identify local doctors with training potential who could be groomed to be effective local trainers in future workshops with support from the Gynaecologic Oncology team.

Bring the right equipment (as many as you can)

The Division of Gynaecologic Oncology had earlier collaborated with the National University of Singapore's School of Design to develop a portable, easy-to-use colposcopy training simulator to assist in the training of colposcopy treatment and examination. The colposcopy simulator played a crucial role in training doctors in cryotherapy and colposcopy procedures in Cambodia as doctors experienced a more realistic situation with the simulator.

References:

Ferlay J., Soerjomataram I., Dikshit R., Eser S., Mathers C., Rebelo M. et al. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. *Int J Cancer* ;136:E359-E386;2015

Ferlay J., Shin H.R., Bray F., Forman D., Mathers C., Parkin D.M. Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. *Int J Cancer*; 127:2893-917;2010

New opportunities for the division

Following the workshop, further opportunities for the team were created such as the interest in the establishment of a training programme and the continuation of the current basic colposcopy workshop annually in Cambodia. The team has also been approached by other hospitals and non-government organisations (NGOs) in Cambodia for future collaborations. Within the region, there is also interest in a collaboration with the Association Medicale Franco Asiatique (AMFA) in Myanmar.

Conclusion

Singapore is in a unique situation where it can be positioned as the leader in cervical cancer screening and prevention for ASEAN countries. The establishment of an outreach programme in Cambodia by the Gynaecologic Oncology team in the NCIS at the NUH has opened up opportunities and collaborations for the team to establish this goal.



Article by
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Consultant
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Dr Ida Ismail-Pratt is a consultant at the Division of Gynaecologic Oncology, NCIS. She is currently the lead for the Gynaecology cervical cancer screening and prevention programme in NUH/NCIS. Apart from being a specialist in obstetrics and gynaecology, she is also a United Kingdom accredited colposcopist. She is also the Programme director for the Gynaecology Oncology Outreach program and a faculty of the Singapore Colposcopy and Cervical Pathology Society (SCCPS). She leads the SCCPS education division and has organised various basic and advanced colposcopy courses for local and international doctors especially in ASEAN. She is also on the advisory committee for the Singapore Cancer Society and has worked closely with the Health Promotion Board to organise the national Pap smear training program for nurses for the last three years. Her interests are pre-invasive diseases, human papillomavirus, cancer screening and prevention, including a multidisciplinary approach to care of women with pre-invasive diseases.

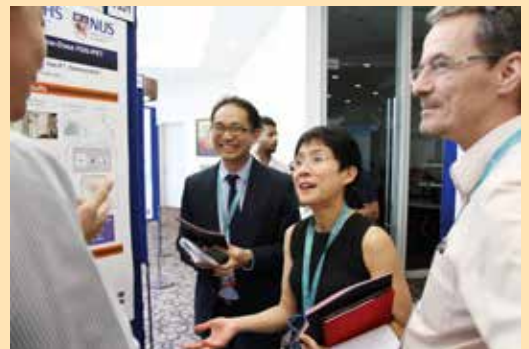
1ST NUH SINGAPORE COLORECTAL CANCER SYMPOSIUM



Jointly organised by the National University Hospital (NUH), the National University of Singapore and the National University Cancer Institute, Singapore (NCIS), the 1st NUH Singapore Colorectal Cancer Symposium was held on the June 3 and 4. The theme was “Multidisciplinary Approach to Rectal Cancer” and 25 colorectal experts (both local and foreign) were invited to discuss and deliver lectures over a diverse range of topics spanning oligometastatic disease, inthersphincteric dissection, robotic rectal cancer surgery, pelvic exenteration and neoadjuvant chemoradiation therapy. Over 150 participants from Singapore and the region attended this two-day symposium, and many gave feedback that the quality of the lectures and case discussions was excellent.

NCIS ANNUAL RESEARCH MEETING

Into its 3rd year, the NCIS Annual Research Meeting (NCAM) was held on July 1 with the theme “Biomarkers to Personalise Cancer Treatment”. Over 250 participants comprising clinicians, clinician-researchers and basic researchers from the NCIS, NUH, Cancer Science Institute (CSI), Agency for Science Technology and Research (A*STAR) and other research institutions attended the conference which served as a valuable platform to promote research culture, nurture junior clinician investigators, foster interactions between clinicians and researchers, and showcase cancer research within the NCIS campus. 20 awards were given out to outstanding poster submissions and presentations across four categories – basic science, translational science, clinical science and nursing/paramedical/supportive care.



WINNING AGAINST CANCER SYMPOSIUM



The annual Winning Against Cancer Symposium was held on August 20 at the NUHS Tower Block. Organised by the NCIS, this year’s focus was on Singapore’s top two cancers – Colorectal and Lung Cancer. An expert panel of speakers covered a diverse range of topics including screening, surgery, chemotherapy, nutrition and more. Participants were able to interact with our multidisciplinary team of experts during our question and answer sessions. A new feature in this year’s programme, a rehabilitation workshop led by therapists from the NUH was also conducted for cancer survivors and caregivers.



3RD INTERNATIONAL SBRT SYMPOSIUM & WORKSHOP

The 3rd International SBRT (Stereotactic Body Radiation Therapy) Symposium and Workshop was held from June 21 to 25, with invited faculty comprising of both local and foreign SBRT experts. The five-day event organised by the NCIS attracted practitioners from Singapore and the region. The focus of this year's symposium was on lung and spine SBRT, and intracranial SRS (Stereotactic Radiosurgery). For the first time, a special 1.5 day SBRT workshop was organised to provide participants with an opportunity to have hands-on training in all aspects of SBRT.

LIVING WITH LOSS, LIVING WITH HOPE PALLIATIVE WORKSHOP 2016



The inaugural Living with Loss, Living with Hope Palliative Workshop was held over two weekends in August. The workshop, targeted at healthcare professionals, was conducted by experienced palliative care trainer, Ms Liese Groot-Alberts, who is also a grief therapist, clinical supervisor and workshop presenter. Over 75 participants from diverse healthcare backgrounds attended the two-day workshop. Using experiential and personal reflection approaches, participants explored themes of loss, suffering, healing and hope, both individually and in small groups.

ASIA PACIFIC CENTRE OF EXCELLENCE (CoE) IN HAEMATOLOGICAL MALIGNANCIES CONFERENCE

Jointly organised by the NCIS and the Singapore General Hospital, the 3rd Asia-Pacific CoE in Haematological Malignancies Conference was held between on July 29 and 30. The two-day programme included a series of insightful talks by experts specialising in blood cancers, interactive case study discussions as well as facility tours of the NCIS. Participants came from across Southeast Asia and the conference served as a good platform for cross-institutional discussions and networking.



SINGAPORE - CHINA BREAST CANCER DIAGNOSIS PROGRESS CONFERENCE

The second edition of the Singapore-China Breast Cancer Diagnosis Progress Conference was held on 2nd and 3rd July at Kunming, China. Organised by the Yunnan Provincial Hospital of Oncology, the theme for the forum was "Reinforcing common goals, improving communication". Associate Professor Philip Iau (Senior Consultant, Division of Surgical Oncology) and Dr Johann Tang (Senior Consultant, Department of Radiation Oncology) from the NCIS were invited to speak on key topics such as surgical techniques, radiation therapy and neoadjuvant therapy for breast cancer. The forum served as an interactive platform for breast cancer professionals both in China as well as the Southeast Asian countries, fostering multidisciplinary partnerships and instilling a philosophy of holistic patient management amongst participants.

AWARDS

Congratulations to all our award winners! Thank you for lifting the standards of healthcare and going above and beyond for our patients at the National University Cancer Institute, Singapore (NCIS)!



PROFESSOR CHNG WEE JOO

Director and
Senior Consultant

Professor Chng Wee Joo, Director of the NCIS, was awarded the prestigious **National Outstanding Clinician Scientist Award** at the National Medical Excellence Awards (NMEA) in August. Launched in 2008, the NMEA is a national-level award to recognise outstanding clinicians and healthcare professionals who made outstanding contributions in the advancement of healthcare.

“ I think the award provides some peer confirmation of my contributions to my field but importantly, the work and glory should not be on me only. There is a large team of people working with me, who has contributed significantly, as well as my mentors and seniors who have inspired me and supported me. I hope this recognition will provide inspiration to other clinician scientists. Research and translating discoveries into the clinics are very meaningful work that have important impact on patients, and we must continue this work.

Dr Lee Yee Mei, Head of the Division of Oncology Nursing at the NCIS was awarded the **Innovation Champion Silver Award** at the recent PS21 ExCEL Convention in November 2016. The PS21 ExCEL Convention is an annual event that showcases, recognises and celebrates innovation by individuals or teams that have created value (through innovative ideas, policies and projects) within the Public Service.

“ Getting the award is an honour and it validates what I strongly believe in, and that is using innovation to improve care delivery and encouraging inter-professional collaboration. Winning this award would not have been possible without the inspiration I have received from my peers and colleagues, with whom I have the privilege to work with and draw strength from to challenge the status quo and be the best that we can be. This award does not reflect my success, but it is the mark of the NCIS team’s achievement, which is based on teamwork invested in the pursuit of excellence and dedication to patient care.



DR LEE YEE MEI

Head, Division of Oncology
Nursing



**ASSISTANT PROFESSOR
CHOO BOK AI**
Senior Consultant

Assistant Professor Choo Bok Ai has done the NCIS proud by winning the **Singapore Patient Advocate Award** at the second installment of the Singapore Patient Action Awards (SPAA), held in October 2016. The SPAA is a platform to honour individuals and groups who have demonstrated exemplary qualities of care, making significant and notable contributions in enhancing the healing journey of their patients.

“**Winning the award is a humbling experience. It represents the group effort of the Nasopharyngeal and Sarcoma Cancer Support Groups’ volunteers. In 2011, I started the Befriender’s programme. It is a one-to-one sharing platform between cancer survivors and caregivers, as well as newly diagnosed cancer patients and caregivers. Despite my best efforts to tell a patient about the side-effects of radiation, it is different coming from a cancer survivor or caregiver with personal experience. With proper treatment, a positive mindset and a healthier lifestyle, many of my cancer survivors are healthier than ever.**

Winning this award is an excellent recognition of the work that the support groups have done. I accept this award on behalf of all those cancer survivors and caregivers who are now also my friends. We do this patient advocacy work as a team.

We are proud to share that APN Jedidah Lieow was awarded the Ministry of Health (MOH) **Nurses’ Merit Award** in July! Presented by the MOH, a total of 100 nurses received the award this year. The Nurses’ Merit Award was first given out in 1976, to nurses who have demonstrated consistent and outstanding performance and dedication to the nursing profession.

“**Oncology nursing to me is beyond profession or calling; it is my daily dose of inspiration about what life (and death) has to give. In nursing, there will be countless life-touching moments – either I touch one or someone touches mine.**

I am actually feeling very humbled by the award! I am deeply grateful to those who have groomed me to who I am today. This award is the result of their hard work for I would not have come this far if it was not for their constant support and guidance.



MS JEDIDAH LIEOW
Advanced Practice Nurse
(APN)



MS LIM CHI CHING

Advanced Practice Nurse
(APN) Intern

Congratulations to APN Intern Lim Chi Ching from Ward 58 for achieving her Master of Nursing from the National University of Singapore! APN Intern Lim was also awarded **Best Graduating Student** of her batch and has impressively clinched three additional awards - the **Wee Kim Wee Medal**, **Libby Tin Peh Medal** and the **Lee Foundation Medal in Nursing**.

“As oncology nurses, we pride ourselves in providing good quality nursing care to alleviate our patients’ sufferings, and ensure a dignified end of life for them. Such experiences have inadvertently made me grow as a person throughout these six years as a nurse, as we learn to treasure our lives and our loved ones through the life experiences of our patients.

I am immensely honoured to be conferred the awards. Each award is donated by respectable organisations and individuals, and as a recipient, they remind me that the Master of Nursing is just a beginning to my journey as an APN. It inspires me to give my best, and also spurs me to translate my learning to improve the standards of my care.

DOCTORS' PROMOTIONS

Congratulations to our newly promoted doctors!



- 1 **DR TIMOTHY CHEO**
Consultant
Department of
Radiation Oncology
- 2 **DR ANAND D JEYASEKHARAN**
Associate Consultant
Department of
Haematology-Oncology
- 3 **DR JOANNE LEE**
Associate Consultant
Department of
Haematology-Oncology
- 4 **DR SOON YU YANG**
Associate Consultant
Department of
Radiation Oncology

DIVISION OF PALLIATIVE CARE



From left: Dr Yong Woon Chai, Dr Jamie Zhou and Dr Noreen Chan

The Palliative Care service started at the National University Hospital (NUH) eight years ago with one doctor and one nurse. Although sited within cancer care, the Palliative Care service has always served the entire hospital, including Paediatrics, so the NUH is able to offer the full range of Palliative and Supportive care, regardless of age or diagnosis.

The “core business” of hospital-based Palliative Care (PC) usually starts as a consultative service, i.e. a ward discipline requests a consult for a patient and the PC service makes an assessment, and works with the primary team to provide the necessary interventions and support. These vary according to the individual situation, but could include:

- ➔ Pain and symptom control
- ➔ Psychosocial support
- ➔ Assistance with communication, clarification of goals and preferences for care and treatment
- ➔ Advice in ethically complex situations
- ➔ Patient/family liaison with hospice services locally or overseas
- ➔ End of life care for actively dying patients

In the past eight years, many changes have occurred within the NUH – The Cancer Institute (TCI) became the National University Cancer Institute, Singapore (NCIS); the National University Health System (NUHS) as a regional health service was formed, incorporating the Yong Loo Lin School of Medicine; the Kent Ridge facilities expanded and upgraded to meet evolving needs. The PC service has also grown into the **Division of Palliative Care**, as part of the natural evolution of its increased scope of work.

A large part of this work is **capacity-building**, which is to teach non-PC specialists to do some basic Palliative Care. This has been happening within the NCIS for many

years, so that oncology doctors, nurses, and allied health professionals (medical social workers, pharmacists, dietitians, physiotherapists, etc.) can develop confidence in caring for patients and families facing the end of life.

Other departments then started to request for help – for example, the PC service helped the NUH Emergency Medicine Department (EMD) to become the first EMD in Singapore to provide a customised approach in providing care and comfort for dying patients. Currently, an initiative known as PEACE (Palliative Approach and ACP Conversation Enhancement) is being piloted in two medical wards.

As the Division continues to build Palliative Care capacity within the NUH and the NCIS, it is also involved in undergraduate and postgraduate education, and in the development plans for the new NUHS campus, where a Palliative Care unit is planned. It is our vision that patients approaching the end of life are able to access good care wherever they are.

For more information on the Division of Palliative Care, visit bit.ly/ncis-palliativecare.



Article by
Dr Noreen Chan
Head and Senior Consultant
Division of Palliative Care, NCIS

Dr Noreen Chan obtained her medical degrees from the University of London and Royal College of Physicians UK, and completed advanced specialty training with the Sydney Institute of Palliative Medicine, Australia. She was Medical Director and CEO of Dover Park Hospice before joining the National University Cancer Institute, Singapore (NCIS).

SPECIALIST AND TUMOUR GROUP LISTING

BLOOD CANCERS AND BLOOD DISORDERS

Bone Marrow and Stem Cell

Transplant Programme

Haematology-Oncology

A/Prof Koh Liang Piu (Leader)

Dr Michelle Poon Li Mei

Dr Tan Lip Kun

Radiation Oncology

Asst Prof Bala Vellayappan

Asst Prof Wong Lea Choung

Diagnostic Imaging

Dr Khor Lih Kin

Dr Loi Hoi Yin

Coagulation

Haematology-Oncology

Dr Liu Te Chih (Leader)

Dr Chee Yen Lin

Dr Lee Shir Ying

Dr Yap Eng Soo

General Haematology

Haematology-Oncology

Dr Liu Te Chih (Leader)

Dr Lee Shir Ying

Dr Ng Chin Hin

Dr Tung Moon Ley

Dr Yap Eng Soo

Leukaemia, Myelodysplastic and Myeloproliferative Neoplasms (MDS/MPN)

Haematology-Oncology

Dr Ng Chin Hin (Leader)

A/Prof Koh Liang Piu

Adj Asst Prof Melissa Ooi Gaik Ming

Dr Esther Chan Hian Li

Dr Tan Lip Kun

Dr Tung Moon Ley

Radiation Oncology

Asst Prof Bala Vellayappan

Asst Prof Wong Lea Choung

Diagnostic Imaging

Dr Khor Lih Kin

Dr Loi Hoi Yin

Pathology

A/Prof Ng Siok Bian

A/Prof Tan Soo Yong

Dr Wang Shi

Lymphoma

Haematology-Oncology

Dr Michelle Poon Li Mei (Leader)

Dr Esther Chan Hian Li

Dr Chee Yen Lin

Dr Anand D Jayasekharan

Dr Joanne Lee

Dr Tan Lip Kun

Radiation Oncology

Asst Prof Bala Vellayappan

Asst Prof Wong Lea Choung

Diagnostic Imaging

Asst Prof Arvind Kumar Sinha

Dr Khor Lih Kin

Dr Loi Hoi Yin

Pathology

A/Prof Ng Siok Bian

A/Prof Tan Soo Yong

Dr Wang Shi

Multiple Myeloma

Haematology-Oncology

Prof Chng Wee Joo (Leader)

Adj Asst Prof Melissa Ooi Gaik Ming

Radiation Oncology

Asst Prof Bala Vellayappan

Asst Prof Wong Lea Choung

Diagnostic Imaging

Asst Prof Arvind Kumar Sinha

Dr Khor Lih Kin

Dr Loi Hoi Yin

Pathology

A/Prof Ng Siok Bian

A/Prof Tan Soo Yong

Dr Wang Shi

BREAST CANCER

Surgical Oncology

Asst Prof Chan Ching Wan (Leader)

A/Prof Philip Iau Tsau Choong

Asst Prof Mikael Bo Anders Hartman

Dr Shaik Ahmad Bin Syed Buhari

Dr Tang Siau-Wei

Diagnostic Imaging

A/Prof Quek Swee Tian

Dr Eide Sterling Ellis

Dr Pooja Jagmohan

Dr Jeevesh Kapur

Dr Premilla Pillay

Dr Felicity Pool

Pathology

A/Prof Thomas Choudary Putti

Haematology-Oncology

Prof John Wong Eu-Li

A/Prof Lee Soo Chin

Dr Joline Lim Si Jing

Dr Lim Siew Eng

Dr Lim Yi Wan

Dr Samuel Ow

Dr Andrea Wong Li Ann

Radiation Oncology

Asst Prof Choo Bok Ai

Asst Prof Koh Wee Yao

Asst Prof Vicky Koh Yaling

Asst Prof Johann Tang I-Hsiung

Plastic, Reconstructive & Aesthetic

Surgery

Dr Jane Lim

Dr Ong Wei Chen

Dr Yap Yan Lin

COLORECTAL CANCER

Surgical Oncology

Dr Cheong Wai Kit (Leader)

Asst Prof Chong Choon Seng

Asst Prof Tan Ker Kan

Dr Ridzuan Farouk

Dr Sharon Koh Zhiling

Dr Lee Kuok Chung

Dr Bettina Lieske

Dr Frances Lim Sheau Huei

Haematology-Oncology

Dr Chee Cheng Ean

Dr Angela Pang

Dr Ho Jing Shan

Dr Raghav Sundar

Dr Yong Wei Peng

Radiation Oncology

Asst Prof Francis Ho

Asst Prof Leong Cheng Nang

Asst Prof Jeremy Tey Chee Seong

Asst Prof Bala Vellayappan

Diagnostic Imaging

Dr Bertrand Ang Wei Leng

Dr Calvin Koh

Dr Thian Yee Liang

Dr Lynette Teo Li San

Pathology

Prof Teh Ming

Dr Brendan Pang Nghee Kheem

GYNAECOLOGIC CANCER

Gynaecologic Oncology

A/Prof Jeffrey Low Jen Hui (Leader)

A/Prof Arunachalam Ilancheran

Dr Ida Ismail-Pratt

Dr Joseph Ng Soon Yau

Dr Pearl Tong

Diagnostic Imaging

Prof Joseph Lee King-Tat

Dr Bertrand Ang Wei Leng

Dr Thian Yee Liang

Pathology

A/Prof Raju Gangaraju Changal

Dr Qasim Ahmed

Dr Diana Lim Gkeok Stzuan

Haematology-Oncology

Dr Lim Siew Eng

Dr Lim Yi Wan

Dr David Tan Shao Peng

Radiation Oncology

Asst Prof Vicky Koh

Asst Prof Johann Tang I-Hsiung

Dr Leong Yiat Horng

HEAD & NECK CANCER

Surgical Oncology

A/Prof Thomas Loh Kwok Seng (Leader)

Dr Jane Lim

Dr Lim Chwee Ming

Diagnostic Imaging

Prof Vincent Chong Fook Hin

Asst Prof Eric Ting

Dr Choong Chih Ching

Dr Tan Ai Peng

Dr Jocelyn Wong Yen Ling

Pathology

A/Prof Fredrik Bengt Petersson

Dr Qasim Ahmed

Haematology-Oncology

Adj Prof Goh Boon Cher

Dr Tan Chee Seng

Dr Nesaretnam Barr

Kumarakulasinghe

Radiation Oncology

Asst Prof Francis Ho

Asst Prof Ivan Tham Weng Keong

Asst Prof Wong Lea Choung

Dr Timothy Cheo

THYROID CANCER

Surgical Oncology

A/Prof Thomas Loh Kwok Seng (Leader)

Asst Prof Rajeev Parameswaran

Dr Lim Chwee Ming

Dr Ngiam Kee Yuan

Dr Tan Wee Boon

Endocrinology

E/Prof Lim Pin

Asst Prof Samantha Yang

Dr Chionh Siok Bee

Dr Kao Shih Ling

Dr Eric Khoo Yin Hao

Dr Soh Lip Min

Diagnostic Imaging

Asst Prof Arvind Kumar Sinha

SUPPLEMENTS

Dr Khor Lih Kin
Pathology
A/Prof Nga Min En
A/Prof Fredrik Bengt Petersson
Dr Qasim Ahmed
Haematology-Oncology
Adj Prof Goh Boon Cher

LIVER, PANCREATIC AND BILARY (HPB) CANCER

Surgical Oncology

Dr Iyer Shridhar Ganpathi (Leader)
Prof Krishnakumar Madhavan
Dr Glenn Bonney
Dr Alfred Kow Wei Chieh

Gastroenterology & Hepatology

Prof Lawrence Ho Khek Yu
Prof Lim Seng Gee
A/Prof Dan Yock Young
Asst Prof Lee Keat Hong
Dr Bhavesh Kishor Doshi
Dr Michelle Angela Gowans

Dr Leo Hartono Juanda
Dr Calvin Koh

Dr Lee Guan Huei

Dr Lee Yin Mei

Dr Kieron Lim Boon Leng

Dr Loo Wai Mun

Dr Low How Cheng

Dr Mark Muthiah

Dr Tan Poh Seng

Diagnostic Imaging

Dr Stanley Loh Eu Kuang

Dr Kamarjit Singh Mangat

Dr Neo Wee Thong

Dr Prapul Rajendran

Dr Pavel Singh

Dr Bernard Wee

Dr Yeong Kuan Yuen

Pathology

Prof Aileen Wee

Dr Pang Yin Huei

Dr Benjamin Wong Pak Kwong

Haematology-Oncology

Dr Chee Cheng Ean

Dr Ho Jing Shan

Dr Raghav Sundar

Dr Yong Wei Peng

Radiation Oncology

Asst Prof Francis Ho

Asst Prof Leong Cheng Nang

Asst Prof Jeremy Tey Chee Seong

Asst Prof Bala Vellayapan

LUNG/THORACIC CANCER

Haematology-Oncology

Dr Ross Soo (Leader)

Adj Prof Goh Boon Cher

Dr Chin Tan Min

Dr Joline Lim

Dr Tan Chee Seng

Surgical Oncology

A/Prof Thirugnanam Agasthian

A/Prof John Tam Kit Chung

Dr Harish Mithiran Muthiah

Respiratory & Critical Care Medicine

Prof Lim Tow Keang

A/Prof Lee Png

Asst Prof See Kay Choong

Dr Adrian Kee

Dr Khoo Kay Leong

Diagnostic Imaging

Asst Prof Arvind Kumar Sinha

Asst Prof Anil Gopinathan

Dr Khor Lih Kin

Dr Stanley Loh Eu Kuang

Dr Loi Hoi Yin

Dr Lynette Teo Li San

Dr Bernard Wee

Pathology

Dr Seet Ju Ee

Radiation Oncology

Asst Prof Koh Wee Yao

Asst Prof Leong Cheng Nang

Asst Prof Ivan Tham Weng Keong

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Surgical Oncology

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A/Prof Edmund Chiong

Asst Prof Lincoln Tan Guan Lim

Asst Prof Tiong Ho Yee

Dr David Terrence Consigliere

Dr Wu Qing Hui

Diagnostic Imaging

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Dr Wynne Chua Yuru

Dr Khor Lih Kin

Dr Stanley Loh Eu Kuang

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Pathology

Prof Teh Ming

Dr Thomas Paulaj Thamboo

Haematology-Oncology

Prof John Wong Eu-Li

Dr Alvin Wong Seng Cheong

Dr Nesaretnam Barr

Kumarakulasinghe

Radiation Oncology

Asst Prof Keith Lim Hsiu Chin

Asst Prof Jeremy Tey Chee Seong

UPPER GASTROINTESTINAL CANCER

Surgical Oncology

Prof Jimmy So Bok Yan (Leader)

E/Prof Ti Thiow Kong

Dr Asim Shabbir

Gastroenterology & Hepatology

Prof Lawrence Ho Khek Yu

A/Prof Yeoh Khay Guan

Dr Calvin Koh

Dr Lim Li Lin

Dr Low How Cheng

Dr David Ong Eng Hui

Pathology

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Asst Prof Jeremy Tey Chee Seong

Asst Prof Bala Vellayapan

Diagnostic Imaging

Dr Prapul Rajendran

Dr Pavel Singh

Dr Bernard Wee

Dr Yang Cunli

Dr Yeong Kuan Yuen

PAEDIATRIC HAEMATOLOGICAL MALIGNANCIES

Paediatric Haematology - Oncology

A/Prof Quah Thuan Chong (Leader)

Prof Dario Campana

A/Prof Allen Yeoh Eng Juh

Asst Prof Tan Poh Lin

Dr Elaine Coustan-Smith

Dr Chetan Anil Dhamne

Dr Krista Francisco

Dr Miriam Kimpö

Dr Koh Pei Lin

Dr Mariflor Villegas

Dr Frances Yeap

Pathology

A/Prof Tan Soo Yong

Radiation Oncology

Asst Prof Vicky Koh

Asst Prof Johann Tang I-Hsiung

MUSCULOSKELETAL CANCER/SARCOMA

Hand & Reconstructive Microsurgery

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E/Prof Robert Pho Wan Heng

Orthopaedic Surgery

Dr Gurpal Singh

Diagnostic Imaging

A/Prof Quek Swee Tian

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Pathology

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Haematology-Oncology

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Haematology-Oncology

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Prof Chng Wee Joo

A/Prof Lee Soo Chin

Dr Chee Cheng Ean

Dr Ross Soo

Dr David Tan Shao Peng

Dr Andrea Wong Li Ann

Dr Yong Wei Peng

RESEARCH PUBLICATIONS BY THE NCIS (JUN - DEC 2016)

The names of authors from the NCIS are underlined.

- | | | | |
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| 02 | Profile of nivolumab in the treatment of metastatic squamous non-small-cell lung cancer. <i>Onco Targets Ther</i> . 2016 May 30. 9:3187-95. Ang YL, Lim JS, <u>Soo RA</u> . | 17 | Bortezomib-related neuropathy may mask CNS relapse in multiple myeloma: A call for diligence. <i>Cancer Biol Ther</i> . 2016 Jul; 17(7): 723-726. Abid MB, De Mel S, Abid MA, Tan KB, <u>Chng WJ</u> . |
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NCIS EVENTS & PROGRAMMES (JAN - JUL 2017)

JANUARY

- ▶ Caregivers in Cancer - Basic Homecare Skills Training Programme
For NCIS patients / caregivers
- ▶ Chinese New Year Craft Workshop
For NCIS patients / caregivers
- ▶ Chemotherapy Orientation Patient Education (COPE) Programme
For NCIS patients only
- ▶ January Oncology Grand Rounds - Genomic Profiling in Haematologic Malignancies: Translational and Clinical Applications
For Healthcare Professionals
- ▶ January Oncology Grand Rounds - How Culture Affects the Way We Grieve
For Healthcare Professionals
- ▶ Palliative Care Public Forum - Grief and the Quest for Meaning
For the Public
- ▶ Relax Your Mind Yoga Class
NCIS patients / caregivers

FEBRUARY

- ▶ Caregivers in Cancer - Basic Homecare Skills Training Programme
For NCIS patients / caregivers
- ▶ Chemotherapy Orientation Patient Education (COPE) Programme
For NCIS patients only
- ▶ February Oncology Grand Rounds - Genes and Brain
For Healthcare Professionals
- ▶ Look Good Feel Better Workshop
For NCIS patients / caregivers
- ▶ Relax Your Mind Yoga Class
For NCIS patients / caregivers

MARCH

- ▶ Caregivers in Cancer - Basic Homecare Skills Training Programme
For NCIS patients / caregivers
- ▶ Chemotherapy Orientation Patient Education (COPE) Programme
For NCIS patients only
- ▶ March Oncology Grand Rounds - Dental Health Issues for Patients with Head & Neck Cancer Regenerating Salivary Glands
For Healthcare Professionals
- ▶ GP CME Talk
For GPs / Family Physicians
- ▶ Relax Your Mind Yoga Class
For NCIS patients / caregivers

APRIL

- ▶ April Oncology Grand Rounds - Drug Development and Biomedical Research in Singapore
For Healthcare Professionals
- ▶ Caregivers in Cancer - Basic Homecare Skills Training Programme
For NCIS patients / caregivers
- ▶ Chemotherapy Orientation Patient Education (COPE) Programme
For NCIS patients only
- ▶ Look Good Feel Better Workshop
For NCIS patients / caregivers

MAY

- ▶ 2nd NUH Singapore Colorectal Cancer Symposium: A Multidisciplinary Management of Metastatic Colorectal Cancer
For Healthcare Professionals
- ▶ Caregivers in Cancer - Basic Homecare Skills Training Programme
For NCIS patients / caregivers
- ▶ Chemotherapy Orientation Patient Education (COPE) Programme
For NCIS patients only
- ▶ May Oncology Grand Rounds
For Healthcare Professionals

JUNE

- ▶ 4th NCIS Annual Research Meeting (NCAM 2017)
For Healthcare Professionals
- ▶ Caregivers in Cancer - Basic Homecare Skills Training Programme
NCIS patients / caregivers
- ▶ Chemotherapy Orientation Patient Education (COPE) Programme
For NCIS patients only
- ▶ Look Good Feel Better Workshop
NCIS patients / caregivers
- ▶ June Oncology Grand Rounds
For Healthcare Professionals

JULY

- ▶ Caregivers in Cancer - Basic Homecare Skills Training Programme
NCIS patients / caregivers
- ▶ Chemotherapy Orientation Patient Education (COPE) Programme
For NCIS patients only
- ▶ July Oncology Grand Rounds
For Healthcare Professionals
- ▶ Head & Neck Public Forum
For the Public

The events and programmes listed above are subject to change, please check our website at www.ncis.com.sg for the most updated information.


EVERY PERSON MATTERS

With the patient at the heart of all our programmes, we bring professionals across multi-disciplines including doctors, surgeons, nurses, medical professionals, pharmacists and rehabilitative therapists to provide a broad spectrum of cancer care and management, from screening and early diagnosis to treatment and long-term care.



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