

Hyperbaric Oxygen Therapy (HBOT) in Problem Wound Management

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Hyperbaric and Diving Medicine Centre

Introduction

Hyperbaric Oxygen Therapy (HBOT) is not a new treatment modality and has been around for more than half a century. In Singapore, the first hyperbaric chamber can be traced back to the Singapore General Hospital, in the 70's, where it was used by the Orthopaedic Department. However, this was transferred to the Singapore Navy where the bulk of hyperbaric medical work was carried out by the Republic of Singapore Navy until recently. Whilst the application of HBOT in the management of decompression illness is well established, its application for other clinical conditions is less well known. Currently, there are 13 accepted indications for Hyperbaric Oxygen Therapy supported by good evidence.

Indications for Hyperbaric Oxygen Therapy

Approved uses as recommended by the Undersea and Hyperbaric Medical Society. (Hyperbaric Oxygen 2003, Indications and Results. The Hyperbaric Oxygen Therapy Committee Report)

- 1) Air or gas embolism
- 2) Carbon monoxide poisoning
- 3) Clostridial myositis and myonecrosis (Gas gangrene)
- 4) Crush injury, compartment syndrome and other acute ischaemias
- 5) Decompression sickness
- 6) Enhancement of healing in selected problem wounds
- 7) Exceptional anaemia
- 8) Intracranial abscess
- 9) Necrotising soft tissue infections
- 10) Osteomyelitis (Refractory)
- 11) Delayed radiation injury (soft tissue and bony necrosis)
- 12) Skin grafts and flaps
- 13) Thermal burns

One of the most common indications in clinical practice is enhancement of wound healing in selected problem wounds.

Effective problem wound management requires an integrated multidisciplinary team approach. Hyperbaric Medicine is one important component of this team. When used

... Hyperbaric Oxygen Therapy can be an effective adjunctive therapy for problem wounds.

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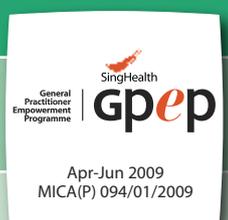
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appropriately, Hyperbaric Oxygen Therapy can be an effective adjunctive therapy for problem wounds.

What is Hyperbaric Oxygen Therapy?

It is a form of therapy where patients breathe 100% oxygen intermittently at pressures greater than sea level. In order to receive oxygen at these pressures, patients will need to be pressurized in a specially designed and built vessel. These vessels can accommodate one or more patients. The vessel is usually compressed with air and the patient breathes 100% oxygen via a transparent hood or mask. Some one-man chambers are compressed with 100% oxygen. By breathing oxygen at high pressures, a large amount of oxygen is carried dissolved in the plasma.

Topical Hyperbaric Oxygen Therapy where oxygen is delivered directly to a wound is not considered Hyperbaric Oxygen Therapy.

How Does Hyperbaric Oxygen Help in Wound Healing?

Wounds without adequate tissue oxygen levels will not heal. Hyperbaric Oxygen Therapy when used appropriately can reverse tissue hypoxia so that wound healing can proceed.

Hyperbaric oxygen therapy has been shown to have the following effects:

- Stimulation of angiogenesis
- Enhancement of fibroblast replication and collagen synthesis
- Enhancement of epithelialization
- Reduction of local oedema
- Improved leukocyte killing
- Direct toxic effects on anaerobic bacteria
- Suppression of bacterial toxin production
- Synergism with certain antibiotics
- Prevention of leukocyte mediated post-ischaemic reperfusion injury

For Hyperbaric Oxygen Therapy to be effective there must be adequate blood flow to the wound. Without adequate blood flow, the oxygen carried in the blood and plasma will not be able to reach the site where it is needed most and in some cases revascularization procedures may be required first.

Who Can Benefit From Hyperbaric Oxygen Therapy?

Patients with the following types of wounds may benefit from Hyperbaric Oxygen Therapy:

- 1) Diabetic lower extremity wounds - failure to heal or improve with conventional management.
- 2) Venous stasis ulcers – failure to heal or improve with adequate control of oedema.
- 3) Late radiation injury – wounds that fail to heal or improve with conventional management.



Hyperbaric Oxygen Therapy



49 year old lady with a history of Diabetes Mellitus. Presented with poor healing wound (Right big toe). Received 30 sessions of HBOT.



- 4) Arterial insufficiency ulcers – failure to heal or improve despite maximum revascularisation.
- 5) Any wound that has failed to heal with conventional management where hypoxia is a contributing factor.

Patients with problem wounds will undergo a non-invasive test called Transcutaneous Oximetry. This test measures the transcutaneous oxygen tension at the level of the skin and is an indirect measurement of microcirculatory blood flow. A baseline measurement is taken on room air and another while breathing 100% oxygen at sea level.

Patients who have reversible periwound hypoxia are suitable candidates for HBOT. If perfusion is too poor, referral to vascular team is warranted. Patients can be reassessed after vascular intervention if any.

Before a patient is selected for Hyperbaric Oxygen Therapy, an assessment is made to determine the patient’s fitness for exposure to high ambient pressure and high oxygen concentration.

Malignant ulcers are generally not accepted for Hyperbaric Oxygen Therapy.

When skin grafts and flaps are used to cover problem wounds, Hyperbaric Oxygen Therapy can be beneficial in support of compromised skin grafts and flaps.

What is Treatment Like?

Problem wounds usually require 20 to 30 treatment sessions or more depending on response. Each treatment session lasts about 2 hours and the treatment pressure is between 2 to 3 ATA (equivalent to 10 to 20 metres underwater).

The actual treatment can be divided into 3 phases – compression, maintenance of pressure and decompression.

Compression

During this phase, the pressure in the chamber is increased slowly to the treatment depth. There will be a sensation of fullness in the ears similar to that felt during take off and landing in an airplane. Equalization techniques are taught. Patients will feel warm during this phase.

Maintenance of pressure

Once the depth is reached, patients can relax and read a book, or watch a program on the in chamber entertainment system, while breathing oxygen in a transparent hood or mask.

Decompression

Once treatment is completed, patients will be decompressed back to sea level. Again, there will be a sensation of fullness in the ears. It is a normal sensation which will resolve spontaneously. Patients will feel cold during this phase.



Contraindications

The only true absolute contraindication to HBOT is an untreated pneumothorax. Once treated, the patient can proceed with HBOT. Prior exposure to Bleomycin is not compatible with HBOT.

Complications associated with HBOT

- Barotrauma
 - Middle ear
 - Tooth
 - Sinus
 - Pulmonary
- Oxygen toxicity
- Temporary worsening of myopia

Serious complications are extremely rare. The most common complaint is ear pain which can easily be managed with no serious consequences.

For more information, please visit our website:

<http://www.sgh.com.sg/MedicalSpecialtiesnServices/SpecialistCentres/HDM/>

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58 year old gentleman with a history of Diabetes Mellitus. Presented with poor healing wound (Left leg). Received 30 sessions of HBOT.



Problem wounds usually require 20 to 30 treatment sessions or more depending on response. Each treatment session lasts about 2 hours and the treatment pressure is between 2 to 3 ATA (equivalent to 10 to 20 metres underwater).

Updates on Retinal Disease

By Dr Chan Choi Mun, Associate Consultant, Vitreo-Retinal Service, Singapore National Eye Centre

In Ophthalmology, the subspecialty managing vitreo-retinal diseases has classically been divided into Surgical Retina and Medical Retina. Surgical retinal cases include retinal detachments, trauma and intraocular foreign bodies. The field of Medical Retina is increasingly gaining importance as it encompasses several significant eye diseases, all of which can have a devastating impact on one's vision. Age-related macular degeneration, which includes choroidal neovascularisation and polypoidal choroidal vasculopathy, is one of these conditions. Also falling within the purview of Medical Retina are the conditions of diabetic retinopathy, retinal vein occlusions, central serous retinopathy and hereditary retinal diseases.

Age-related Macular Degeneration

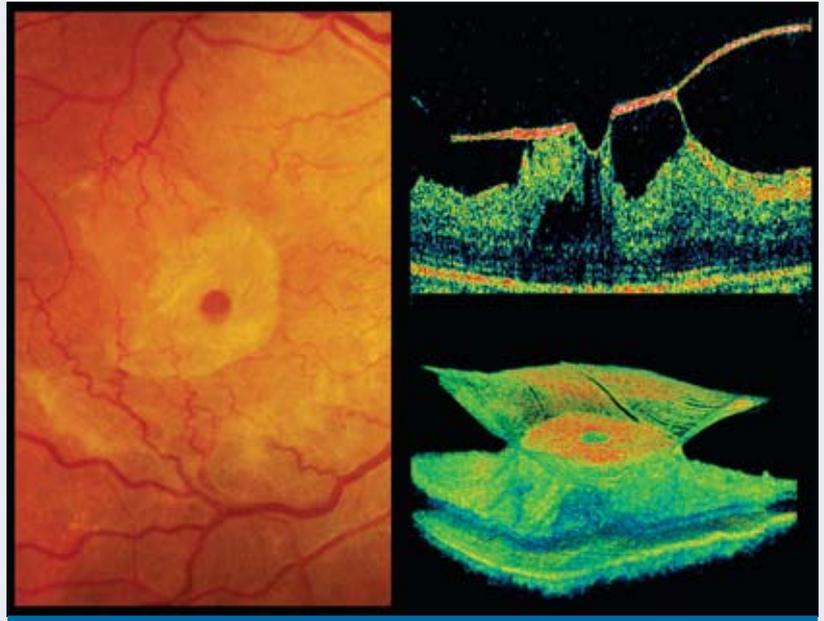
Age-related macular degeneration (AMD) is the leading cause of irreversible vision loss in the industrialised world. With Singapore's ageing population, we are already noticing an increase in age-related macular degeneration. As its name implies, it is a condition of older adults which affects the macula - the centre of the retina, and the area responsible for clear central vision. In the wet, or exudative, form of AMD, pathological choroidal neovascular membranes (CNV) develop under the macula, leading to leakage and accumulation of fluid and blood over the macula. Ultimately, a central disciform scar develops over the macula if AMD is left untreated. As such, a patient with AMD notices blurred central vision, disturbances of colour vision or metamorphopsia (where straight lines appear wavy). This translates to problems with recognising faces, reading, driving and all activities requiring good central vision.

Investigations

Before treatment can be instituted, specialised investigations need to be carried out. These tests are employed not just for AMD, but also for all retinal pathologies. Colour fundus photography, optical coherence tomography (OCT), rapid sequence fundal fluorescein angiography (FFA) and indocyanine green angiography (ICG) are essential.

Latest Developments

SNEC now has the latest 3D OCT, which provides a highly detailed three-dimensional view of the macula. There is also the Heidelberg Reina Angiograph (HRA) confocal laser scanning system which delivers crisp, minutely detailed, high-speed real-time digital angiographic images of the retinal vasculature. These greatly contribute to accurate and precise diagnoses.



The colour fundus photograph shows an epiretinal membrane over the macula. The high resolution 3D Optical Coherence Tomograph (OCT) illustrates the pathology beautifully.

Management of AMD

The traditional treatment of AMD has been to employ thermal laser to destroy the CNV. However, laser photocoagulation of juxta or subfoveal CNV, that is CNV which lies within 200 micrometers of the fovea, induces an immediate iatrogenic central scotoma. It was only recently that antiangiogenic agents, injected directly into the vitreous humour of the eye, were employed in the arsenal to treat AMD. The rationale for this is that animal and clinical studies have established vascular endothelial growth factor or VEGF as a key mediator in ocular angiogenesis.

Anti-VEGF agents can cause regression of the abnormal blood vessels and improvement of vision when injected directly into the vitreous humor of the eye. Examples of these anti-VEGF agents include Ranibizumab (Lucentis, Genentech) and Bevacizumab (Avastin, Genentech), and they are usually injected on a monthly basis for the initial 3 months after diagnosis. Studies have demonstrated that treatment with these agents improves or stabilises vision.

In some situations, photodynamic therapy (PDT) is used in tandem with anti-VEGF agents. Also available at SNEC, PDT first involves the intravenous injection of verteporfin before directing a "cold laser", which activates the verteporfin, at the affected area. Verteporfin is a photosensitizing dye, which reacts with water to create oxygen and hydroxyl free radicals. These radicals

induce occlusion of the pathologic vasculature by means of massive platelet activation and thrombosis while preserving the normal choroidal vasculature and nonvascular tissue. The advantage conferred by PDT is that it avoids creating a central blinding scotoma when treating subfoveal CNV.

Diabetic Retinopathy

This is a condition very familiar to us. The hallmark of treatment for severe non-proliferative of proliferative diabetic retinopathy is panretinal photocoagulation laser treatment. That is unchanged. However, there is now the additional option of employing intravitreal injections of antiVEGF agents, similar to that employed in the management of AMD, for the treatment of vitreous haemorrhage secondary to proliferative diabetic retinopathy or for persistent macula oedema which is resistant to focal laser treatment.

Central Retinal Vein Occlusion

Akin to a stroke in the eye, the ischaemic form or central retinal vein occlusion (CRVO) can lead to a severe loss of vision. While panretinal photocoagulation laser can prevent neovascularisation within the eye, and its associated complication of painful neovascular glaucoma, it does not help reduce any incident macula oedema. Focal laser is the mainstay of treatment. However in cases with persistent unresolving macula oedema, anti-VEGF treatments are now being used at SNEC with some success.

Hereditary Retinal Diseases

Although rare, when they do strike, these conditions can be visually debilitating. They include retinitis pigmentosa, cone-rod dystrophies, retinal pigment epithelial dystrophies and the hereditary vitreoretinal degenerations.

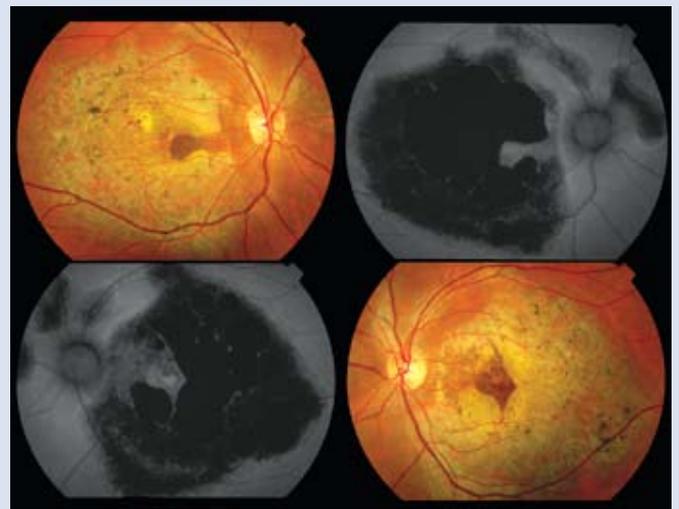
SNEC has both the diagnostic and therapeutic capabilities to manage these patients well. These patients would require specialised electrophysiological testing, which includes the electroretinogram (ERG) and visual evoked potentials (VEP), to clinch the diagnosis. They would also need Goldmann visual fields to monitor their condition over the long term. These diagnostic tests are all available at SNEC in a special laboratory. These patients need to be followed up long term to exclude associated conditions such as cataracts and glaucoma. We are also performing ongoing research, in collaboration with the Singapore Eye Research Institute, looking at genetic testing for these patients.

Low Vision Clinic

Sometimes, in spite of the best treatment, or due to the inherent nature of the eye disease, some patients end up with permanent poor vision. These patients can be reviewed at the Low Vision Clinic at SNEC. This is a special service where patients are counseled on how to optimise their vision; are given certain optical aids, such as magnifiers, to facilitate their reading vision; and are refracted by an optometrist familiar with dealing with low vision patients. Hope and optimism, which is so important for patients with low vision, is upheld.



This frame of a high resolution Fundus Fluorescein Angiogram (FFA) shows clearly the capillary non-fusion and dilated arterioles in a central retinal vein occlusion.



This is a case of a bilateral macular retinal dystrophy. The autofluorescein fundal photographs demonstrate that the patients maculae are in jeopardy with only an island of viable nerve cells bilaterally.

The Management of Head and Neck Cancers

By Dr Tan Hiang Khoon, Consultant, Surgical Oncology, National Cancer Centre Singapore

Head and neck cancers including both nasopharyngeal carcinoma (NPC) and Head and Neck Squamous Cell Carcinoma (HNSCC) is one of the most common cancers in Singapore with about 500 cases per year, of which nearly eighty percent are treated at the National Cancer Centre Singapore (NCCS). Although the term head and neck cancer comprises cancers of different etiology and from different subsites, they do share a common anatomical region, which is characterised by a plenitude of crucial structures with vital physiological function (e.g. swallowing, breathing, facial expression) packaged into a very small confined space that is aesthetically important. This unique relation between space, function and aesthetics accounts for the gravity of symptomatology caused by the tumour, as well as, the possible deleterious effects of the prescribed treatment. As such, the management of Head and Neck Cancers demands careful consideration of the extent of tumour involvement, the best treatment option and its oncological outcome, possible functional impairment and aesthetic effect. This complex task is best undertaken by a team of experts comprising surgical oncologists, medical oncologists, radiation oncologists, radiologists, plastic surgeons, maxillofacial prosthodontists, dentists, physical therapists, speech therapists, nurses, dietitians and social workers. This multi-disciplinary approach underpins the management philosophy of every head and neck cancer managed in NCCS.

What is New?

Radiotherapy

Improvement in computer technology and innovation has contributed to many of the recent advances in the field of radiotherapy. For instance, the availability of faster computers has made intensity-modulated radiotherapy (IMRT) possible. With multiple fields IMRT, radiation oncologists can now manipulate radiation beams that can contour around the tumour providing precise targeted therapy with minimal collateral damage to important organs and tissues such as spinal cord and orbit.

At the NCCS, nasopharyngeal cancer (NPC) patients are treated using IMRT as a standard radiotherapy treatment. In addition, patients in the advanced stage and who are fit also have concurrent chemotherapy to further improve disease control as has been demonstrated in a randomised trial that we have recently conducted and published in *Journal of Clinical Oncology* (fig. 1)^[1]. We have also established ourselves as one of the main treatment centres in the world contributing to good trial data on NPC.

Recently, image-guided radiotherapy (IGRT) has added an additional dimension to the already impressive 3-D nature of IMRT, that of the dimension of 'time'. Before treatment, the exact

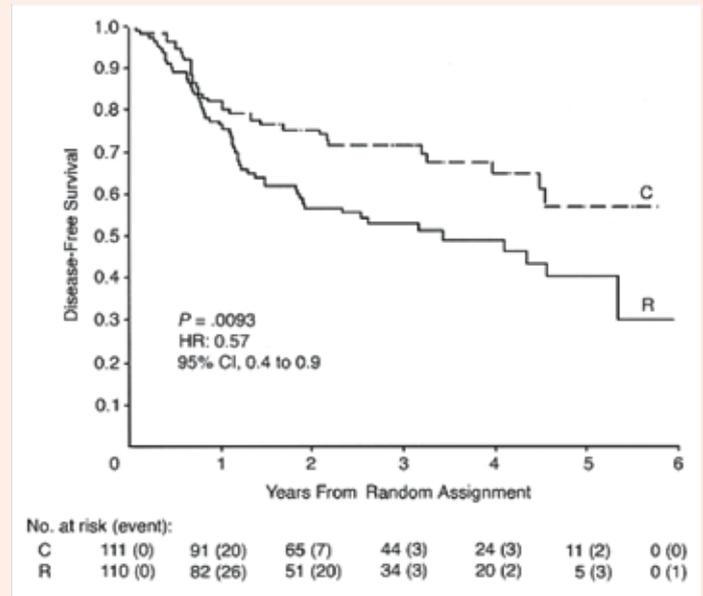


Figure 1

location of the tumour is ascertained by imaging (by X-rays or with CT). Instead of only a single snap shot in time, with IGRT, the patient is imaged continuously at all points in a complete respiratory cycle so that the full extent of all body and organ movements are captured for planning in the computer. Using sophisticated techniques like respiratory gating and fiducial markers, these machines will shoot only when the tumour moves into the parameter coordinates within the treatment field. This allows consistent delivery of radiation to the targeted area taking into consideration minute movement of tissue during respiratory cycle. This enables the radiation oncologist to minimise toxicity, and increase precision without sacrificing tumour control.

Looking into the future, NCCS is looking into building a proton therapy facility. The use of particle therapy (in this case proton) has the advantage that it has a very narrow Bragg peak, which minimises damage to surrounding normal tissue and thus for the reasons mentioned above, is particularly useful in the treatment of head and neck cancer.

Molecular Targeted Therapy

The increased understanding of the molecular biology of Head and Neck Cancer has led to efforts to develop compounds that target these molecular pathways. The epidermal growth factor receptor (EGFR) and its ligands (epidermal growth factor (EGF) and tumour growth factor (TGF- α)) are fundamental for cell proliferation, motility, adhesion, invasion and angiogenesis.

Interestingly, these receptors are over-expressed up to 90% of HNSCC. One of the EGFR antibodies, cetuximab, has shown great promise in the treatment of recurrent or metastatic HNSCC in combination with cisplatin and 5-FU [2]. Equally, it has been shown to increase overall survival of advanced HNSCC when used in combination with radiotherapy compared to radiotherapy alone

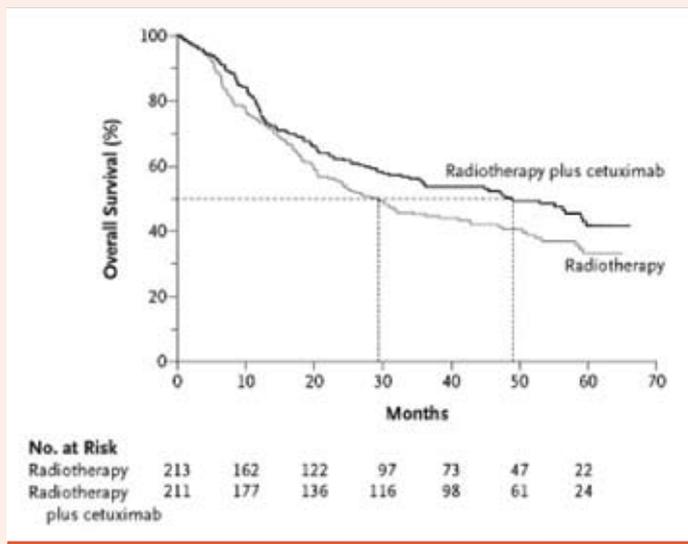


Figure 2

(Fig 2) [3]. In other words, there is level I evidence that cetuximab has the ability to potentiate the effect of both chemotherapy and radiotherapy. Importantly, this was achieved without significantly increasing the treatment toxicity. It will be therefore be most interesting to see if EGFR antibody can enhance the efficacy of concomitant chemoradiation. To specifically address this question, NCCS has initiated an international multi-center Phase III, double-blind, placebo-controlled trial to compare post-operative adjuvant concurrent chemoradiotherapy with or without nimotuzumab (a new generation EGFR receptor antibody) for stage III/IV head and neck squamous cell cancer. This NMRC sponsored trial has 22 participating centers from 12 different countries to accrue 710 patients and will interrogate the role of EGFR antibody in the setting of post-operative adjuvant therapy. We envisage that the trial will open towards the end of 2009. The successful execution of a trial of this magnitude will further cement NCCS role as an important trial centre for head and neck cancer globally.

Imaging – The Evolving Role of PET

PET imaging exploits the glucose metabolic pathway, through the use of the most commonly used PET radio-tracer [F-18]

fluoro-deoxyglucose (FDG). Various molecular derangements in malignant cells, including increased glycolytic rates and upregulated glucose transporters, result in increased cellular uptake of FDG. A FDG-PET scan can detect and localise such abnormal concentrations of FDG.

In NCCS, we perform many oncologic PET/CT imaging which combines PET with CT within a single scanner. PET/CT has been used to 1) attain diagnosis, 2) evaluate staging, 3) assess response to chemotherapy/radiotherapy in head and neck cancer and 4) detect disease recurrence. In terms of attaining diagnosis, PET/CT is particularly useful in the clinical setting of cervical lymph node metastases with 'unknown' primary. This functional imaging technique can detect small volume or submucosal lesions that may be missed in pan-endoscopy and structural imaging technique such as CT and MRI. To accurately determine the tumour staging is important not only to prognosticate but also helps decide on the type of treatment prescribed. As a whole body imaging technique, PET/CT is invaluable in the detection of distant metastases. It is also very useful to help determine the nature of cervical lymph nodes that are of borderline significance by size criteria in structural imaging. In the setting of post-chemo/radiotherapy, PET/CT is normally performed 8-12 weeks after the completion of treatment and has been shown to have very high negative predictive value. In other words, if PET/CT post-treatment showed no SUV uptake in the primary tumour site or cervical lymph nodes, the patient is likely to have complete response even if clinical examination and structural imaging may suggest remnant unresolved mass. Similarly, PET/CT can be useful in detecting recurrences post-treatment particularly in patients with post-radiation fibrosis that render clinical examination difficult or where the interpretation of structural imaging are difficult due to altered anatomy.

Role of Surgery

Surgery remains the treatment of choice for cancer of the oral cavity. It is also the first line treatment in advanced tumours of the larynx or hypopharynx where organ preservation is no longer an option. In oropharyngeal cancer that has invaded the mandible, surgery is again the best treatment option for attaining local control. Over the last two decades, the progress made in microvascular techniques and the evolution of free flaps, have 'liberated' the hands of surgical oncologists who can now attempt more extensive resections with wide surgical margins that were previously difficult to close.

Laryngeal Conservation Surgery:

The advent of transoral endoscopic laryngeal surgery has opened up debates in the management of early laryngeal

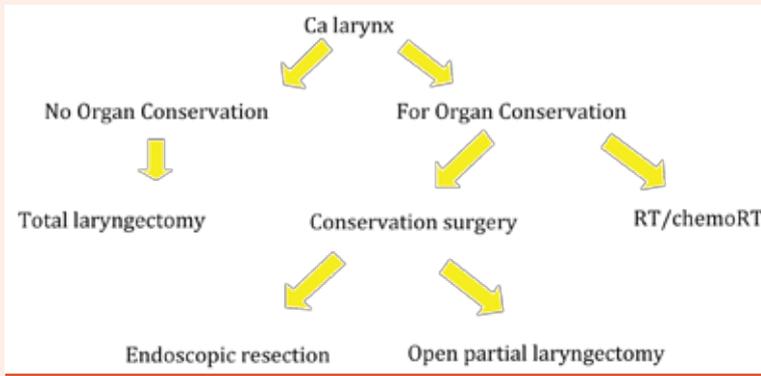


Figure 3

carcinomas, an entity that was conventionally treated with radiotherapy. Recent reports from large series of early laryngeal carcinomas that underwent endoscopic laser resection showed local control in the region of 90% [4]. This is comparable with outcome of treatment by radiotherapy from historical data. Furthermore, in the event of local recurrence after initial resection, there is an option for re-excision either by endoscopic laser surgery or open partial laryngectomy. Alternatively, it is still possible to attempt radiotherapy to achieve tumour eradication without sacrificing the larynx. In contrast, in patients previously treated by radiotherapy upfront, salvage organ preservation surgery could be difficult. This is partly because post-radiation recurrences in HNSCCs, tend to be multi-focal and sometimes sub-mucosal and thus mandate a wider margin of excision, which would make organ preservation difficult [5]. However, radiotherapy confers better voice quality post-treatment whilst the voice quality can be unpredictable after organ preservation surgery. As such, both radiotherapy and surgery clearly have their place in the organ preservation protocol of early ca larynx. Figure 3 outlined the treatment paradigm schematically.

Salvage Surgery:

As concomitant chemoradiation becomes the standard of care in the non-surgical management of advanced Head and Neck Cancer, the role of salvage surgery after failed chemoradiation will be increasingly important. Total laryngectomy for laryngeal carcinoma that recurs after chemoradiation is probably the most commonly performed salvage surgery and, in most studies, has shown good loco-regional control. Salvage surgery for other head and neck cancers (particularly Ca hypopharynx) are less common and the benefit of extensive surgery (e.g. total pharyngolaryngectomy) in a heavily treated field, with tissues at the edge of tolerable toxicity, remains controversial. However, recent report suggested that in highly selected cases,

salvage surgery after failed chemoradiation in non-laryngeal carcinomas could provide long term survival (40% at 5 year) with acceptable morbidity [6]. A clear and pragmatic criterion for selecting patients who are most likely to benefit from salvage surgery is the key to reduce unnecessary morbidity and mortality. This should be the theme for future study.

Robotic Surgery:

Another recent development is the application of robotic surgery in head and neck cancer. The precision and the dexterity of the robotic arms make transoral excision of hard-to-reach sites (e.g. nasopharynx, larynx, hypopharynx, and oropharynx) technically feasible. However, this surgical modality remains experimental in most centres and detail study of cost vs. efficacy is required before it can become more widely accepted.

Tumour Biology – The New Frontier

It is hard to fully grasp the impact that advances in molecular biology will have on the management of head and neck cancer. The discovery of new molecular targets provides new possibilities of treatment. As mentioned above, EGFR targeted therapy is one such example. Other molecular targets such as vascular endothelial growth factor (VEGF) and ErbB2 are also undergoing further evaluation for the treatment of head and neck cancer.

A clear and pragmatic criterion for selecting patients who are most likely to benefit from salvage surgery is the key to reduce unnecessary morbidity and mortality. This should be the theme for future study.



An exciting prospect that molecular biology can offer would be the stratification of patients that would permit prognostication of disease and tailoring of treatment. Kian Ang et al. has demonstrated tumours with EGFR expression above the median level, in a cohort of patients enrolled in a randomised trial, had significantly worse overall survival and disease free survival (Fig 4) [7].

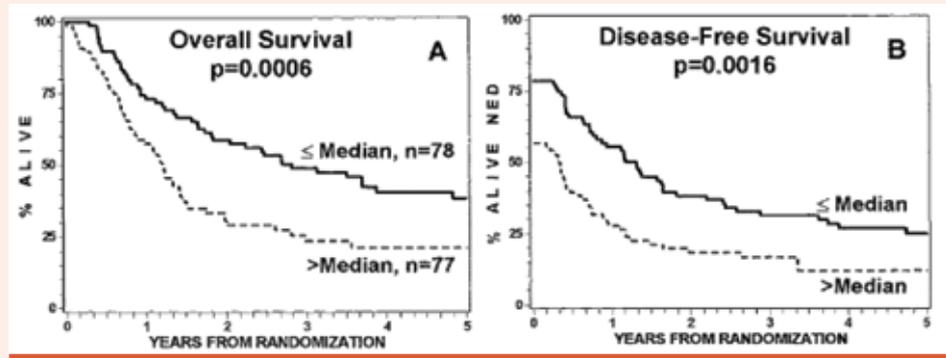


Figure 4

The causal effect between Human papilloma virus and oropharyngeal squamous cell carcinomas has only recently been established [8]. This is an important finding for the following reasons: 1) HPV positive oropharyngeal SCCs tend to be associated with younger patients; with a rising incidence in developed countries and now comprise about 40% of all oropharyngeal SCCs in United States, 2) they are more radiosensitive and carry a better prognosis compared to HPV negative oropharyngeal SCCs and 3) potentially, like

HPV associated cervical cancers, they may be prevented by vaccination against the cancer causing strains of HPV.

These are a few examples of how tumour biology can impact on the current paradigm of cancer management. The onus is now on the clinicians to harness the potential benefit that this explosion of new knowledge can provide. This will be the greatest challenge facing head and neck oncologists, or for that matter, any oncologists in the coming decades.

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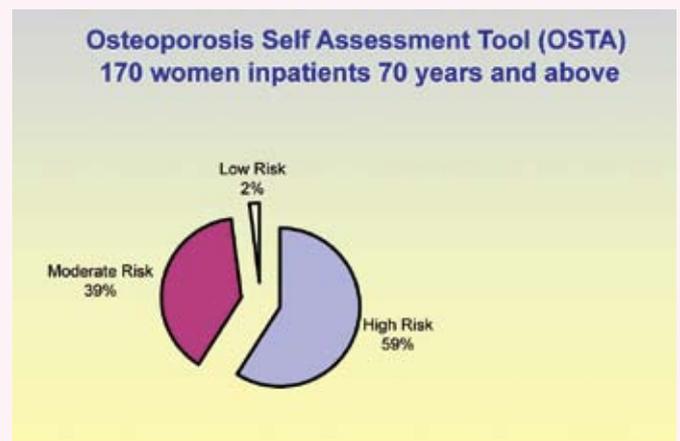
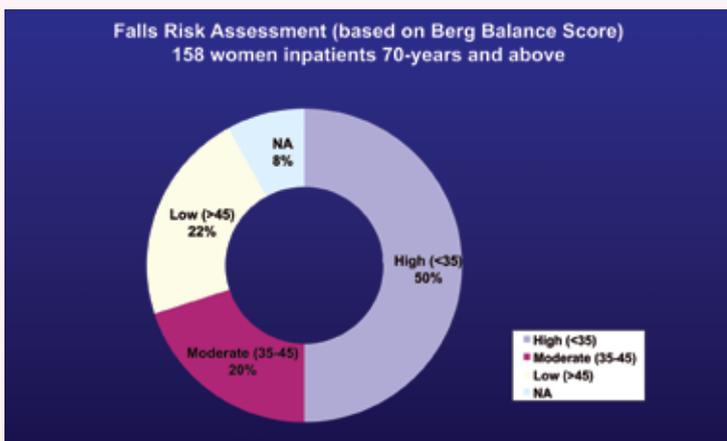
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KKH Inpatient Screening Highlights Poor Osteoporosis Awareness

A proactive screening of inpatients over 70 years old by KK Women's and Children's Hospital brought to light significant findings about the health and wellness of elderly women in Singapore. Conducted since July 2008, the study highlighted in particular the poor knowledge and awareness of osteoporosis and falls risk.

The screening found that out of 244 women over 70, just 4% were aware or diagnosed with osteoporosis. Yet a geriatric nursing assessment at the hospital found more than half to be at high risk of the condition.

A falls-risk assessment of the same group of women revealed that nearly 70% were at high or moderate risk of falls, which increases the risk of osteoporotic fractures, and related complications. An estimated 800 to 900 hip fractures occur every year due to osteoporosis in Singapore. According to statistics by the International Osteoporosis Foundation, about 1 in 5 out of these died within a year of sustaining an osteoporotic hip fracture and 1 in 3 became wheelchair-bound or bedridden.



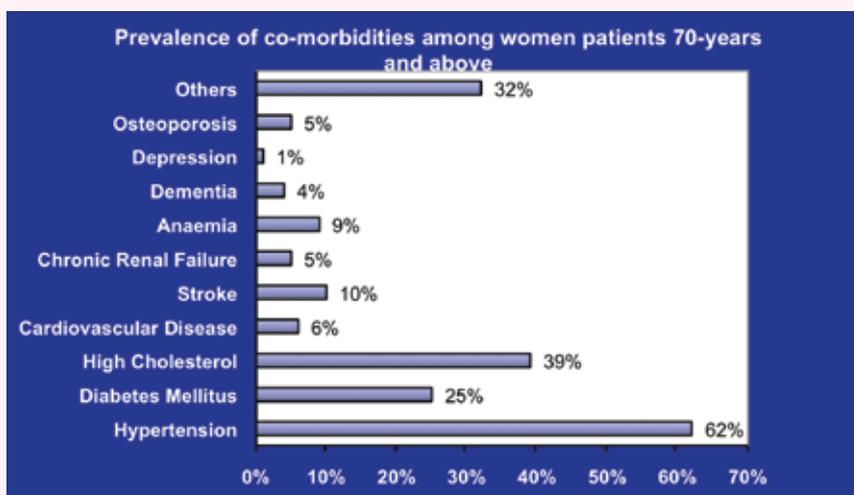
Berg Balance Scale: A test used to measure the balance of this group of elderly women by assessing their performance of functional tasks such as 'sit-to-stand' and picking up an object from the floor. It is a 14-item scale, scored out of 56 points.

/// An estimated 800 to 900 hip fractures occur every year due to osteoporosis in Singapore. *///*

At KKH, patients found to be at high risk for osteoporosis are advised to go for a bone mineral density (BMD) measurement. A vast majority of the patients who took this test were found to need medication, while other patients who were borderline cases were advised to increase calcium and vitamin D intake and exercise regularly.

The study also highlighted that 47% of women patients above 70 years have 1 or 2 co-morbid conditions, and up to 20% of them have more than 5. Hypertension, High Cholesterol and Diabetes Mellitus constituted the most prevalent co-morbidities.

Emphasising the need to address and prevent osteoporosis, Dr Ang Seng Bin, Senior Resident Physician, Ambulatory Geriatric Service said: "The correlation between osteoporosis and fracture is as strong if not stronger than the correlation between hypertension and stroke or hyperlipidemia and heart attack."



- Others refers to Thyroid Disease, Rheumato & Immuno Disease, Respiratory Disease, and Osteoarthritis



The KKH Inpatient Screening Programme

The inpatient screening programme at KKH assesses patients for various age-related conditions, including blood pressure, cholesterol, diabetes, dementia, osteoporosis and falls risk. The 45-minute assessment also draws attention to specific health and care issues a patient faces, enabling appropriate follow-up for diagnosis, treatment, discharge-planning or care-planning. With effect from February 2009, the screening has been extended to include all inpatients above 65 years.

New Brace Offers Better Treatment Option For Sciolosis

KKH First Accredited Treatment Centre in Asia to Offer SpineCor

A new corrective brace for the abnormal curvature of the spine, idiopathic scoliosis, offers patients greater flexibility and comfort leading to better outcomes.

The SpineCor brace comprises a series of straps and elastic bands that can be custom-fitted for each patient and worn discreetly under clothing. Patients wearing the SpineCor can also participate in sports including gymnastics and ballet. The protocol dictates that the brace is worn for a minimum of 18 months.

Prior to SpineCor, patients had to wear a rigid, custom-made Thoracolumbosacral Orthosis (TLSO), which was worn under clothing, for 22 hours a day, until the child reaches skeletal maturity.

The comfort level of SpineCor and that fact that it is more discreet under clothing makes it easier for the patients to follow the protocol for treatment thus preventing their condition from worsening.

"The poor compliance with the TLSO forced us to look for an alternative," said Dr Kevin Lim, Consultant Orthopaedic Surgeon at KKH. "Many of our patients are visibly upset at the prospect

of having to wear the TLSO. This is not surprising as the brace is warm and uncomfortable".

Patients who opt for the SpineCor brace attend a weekly clinic for patients to reinforce the corrective movements. Patients are also taught how to keep the flexibility and strength of the spine and trunk, which is essential for maintaining a good posture after the brace is removed. Since its introduction in mid-January 2009, 8 patients have chosen the SpineCor brace over the TLSO.

/// The poor compliance with the TLSO forced us to look for an alternative... Many of our patients are visibly upset at the prospect of having to wear the TLSO. This is not surprising as the brace is warm and uncomfortable. ///

KKH is the first accredited treatment centre in Asia to introduce SpineCor. KKH's Rehabilitation Department is also the first in Asia to be accredited as a SpineCor Physiotherapy Centre.

KKH Sleep Disorders Centre 1st in Asia to be Accredited by Regional Bodies

As a recognition of the quality of its programme, the Sleep Disorders Centre of KK Women's and Children's Hospital (KKH) has become the first sleep service in Asia to achieve accreditation by the Thoracic Society of Australia and New Zealand (TSANZ) and the Australasian Sleep Association (ASA).

The accreditation not only endorses the international standards and practices followed by KKH's Sleep Disorders Service, but also sets the benchmark for the management of paediatric sleep disorders in Singapore.

The accreditation of the centre follows a rigorous audit of the organisation and administration, staffing and direction, policies and procedures, staff development and education, facilities and equipment, and quality assurance programmes of the Sleep Disorders Service.

The KKH Sleep Disorders Centre

KKH's Sleep Disorders Centre sees newborns to 16-year-olds. The 3-room facility runs over 500 studies a year and is managed by sleep technologists, specifically trained in paediatrics.

The Service cares for over 1000 outpatients annually for disorders including obstructive sleep apnea hypopnea syndrome, central and alveolar hypoventilation syndromes, parasomnias, behavioural sleep disorders, periodic limb movement disorders, narcolepsy, insomnia, and other non-respiratory related sleep disorders.

It offers a wide range of tests commonly required and includes overnight attended video Polysomnography (PSG), Video EEG PSG, Mean sleep latency testing (MSLT), CPAP/BiPAP/Oxygen Titration studies and overnight Oximetry. The TcCO₂, EEG studies integrated with current PSG software are also available.

In line with its multidisciplinary approach, the Service involves specialists from multiple disciplines. Specialists from Neurology, Psychology and Otolaryngology support the Respiratory Medicine Service.

General Practitioners Seminar On Laser Vision Correction

General Practitioners Seminar On Laser Vision Correction	
Audience/Level	Family Physicians
Date	Saturday, 15 August 2009
Venue	SNEC Auditorium, Level 4, Tower Block
Registration	Ms Cassandra Ang / Ivy Law Mail to: The Organising Secretariat, GENERAL PRACTITIONERS SEMINAR ON LASER VISION CORRECTION Singapore National Eye Centre, 11 Third Hospital Avenue, Singapore 168751 Tel: (65) 6322 8315 Fax: (65) 6220 7807 Email: registration@sneec.com.sg
Closing Date	1 August 2009
Course Outline	To update family practitioners on the latest techniques and developments in laser vision correction for myopia, astigmatism, presbyopia and hyperopia. Aspheric LASIK, presbyopic LASIK, Intralase LASIK, AcuFocus corneal inlay and other new technologies will be discussed.
Course Faculty	<p>Prof Donald Tan Medical Director, SNEC Head and Senior Consultant, Corneal and External Eye Disease Service, SNEC Head, Department of Ophthalmology, Yong Loo Lin School of Medicine, NUS</p> <p>Dr Cordelia Chan Senior Consultant, Corneal and External Eye Disease Service, SNEC</p> <p>Dr Chan Tat Keong Senior Consultant, Cataract and Comprehensive Ophthalmology Service, SNEC</p> <p>Dr Lim Li Senior Consultant, Corneal and External Eye Disease Service, SNEC Deputy Director, Singapore Eye Bank</p> <p>Dr Ti Seng Ei, Senior Consultant, Corneal and External Eye Disease Service, SNEC</p> <p>Dr Peter Tseng Head and Senior Consultant, Cataract and Comprehensive Ophthalmology Service, SNEC</p> <p>Dr Wee Tze Lin Senior Consultant (Part-time), Refractive Surgery Service, SNEC</p> <p>Assoc Prof Leonard Ang Visiting Consultant, Corneal and External Eye Disease Service, SNEC Assoc Professor, Department of Ophthalmology, Yong Loo Lin School of Medicine, NUS</p> <p>Dr Chua Wei Han Consultant, Refractive Surgery Service, SNEC</p> <p>Dr Jodhbir S Mehta Consultant, Corneal and External Eye Disease Service, SNEC</p>

Continued ...

Contact Lens Update For Family Physicians

... Continued

	<p>Dr Raymond Loh Consultant, SNEC-CGH Eye Service, SNEC</p> <p>Dr Chan Choi Mun Associate Consultant, Vitreo-Retinal Service, SNEC</p> <p>Dr Chng Nai Wee Associate Consultant, Cataract and Comprehensive Ophthalmology Service, SNEC</p> <p>Dr Mohamad Rosman Othman Associate Consultant, Refractive Surgery Service, SNEC</p> <p>Dr Chan Wing Kwong Visiting Senior Consultant, Refractive Surgery Service, SNEC</p>
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Contact Lens Update For Family Physicians	
Audience/Level	Family Physicians
Date	Saturday, 12 September 2009
Venue	SNEC Auditorium, Level 4, Tower Block
Registration	Ms Cassandra Ang / Ivy Law Mail to: The Organising Secretariat, CONTACT LENS UPDATE FOR FAMILY PHYSICIANS Singapore National Eye Centre, 11 Third Hospital Avenue, Singapore 168751 Tel: (65) 6322 8315 Fax: (65) 6220 7807 Email: registration@sneec.com.sg
Closing Date	29 August 2009
Course Director	Dr Lim Li Senior Consultant, Corneal and External Eye Disease Service, SNEC Deputy Director, Singapore Eye Bank
Course Outline	This is a 2 hours course that will provide participants with updates and practical information on contact lenses. Topics such as types of contact lenses, contact lens complications and managements will be covered.
Course Faculty	<p>Dr Lim Li Senior Consultant, Corneal and External Eye Disease Service, SNEC Deputy Director, Singapore Eye Bank</p> <p>Dr Cordelia Chan Senior Consultant, Corneal and External Eye Disease Service, SNEC</p> <p>Dr Ti Seng Ei, Senior Consultant, Corneal and External Eye Disease Service, SNEC</p> <p>Assoc Prof Leonard Ang Consultant, Corneal and External Eye Disease Service, SNEC Assoc Professor, Department of Ophthalmology, Yong Loo Lin School of Medicine, NUS</p>

1st SGH Obesity & Metabolic Unit Symposium



Time	Programme
13:00 – 13:50	Registration & Lunch
13:55 – 14:00	Welcome Address
14:00 – 14:25	Medical Treatment of the Obese Diabetic
14:25 – 14:50	Exercises for Metabolic Disease
14:50 – 15:15	Food for Thought: Metabolic Syndrome

Time	Programme
15:15 – 15:30	Question & Answer
15:30 – 15:45	Tea Break
15:45 – 16:10	Tackling Diabetic Dyslipidemia 2009
16:10 – 16:35	Bariatric Surgery: A Cure for the Obese Diabetic?
16:35 – 17:00	Tour of LIFE Centre

Date : 11 July 2009, Saturday
Time : 1 pm - 5 pm (inclusive of lunch)
Venue : SGH Postgraduate Medical Institute
CME Points : To be confirmed

Registration is by invitation only. Email your name, MCR no., clinic name and contact no. to pgmi.gpcme@sgh.com.sg or call 6326 6267. To download flyer or registration form, please visit www.pgmi.com.sg.



HOTLINE NUMBERS

GPEP HOTLINE : 6557 2233

SOC FAST TRACK APPOINTMENT CONTACT NUMBERS

SGH Singapore General Hospital	6321 4402	NHC National Heart Centre Singapore	6436 7848
KKH KK Women's and Children's Hospital	6294 4050	NNI National Neuroscience Institute @ SGH	6321 4402
CGH Changi General Hospital	6788 3003	NNI National Neuroscience Institute @ TTSH	9637 9718
NCCS National Cancer Centre Singapore	6436 8288	SNEC Singapore National Eye Centre	6322 9399
NDCS National Dental Centre Singapore	6324 8798		

DIRECT WARD REFERRAL CONTACT NUMBERS

SGH Singapore General Hospital	6321 4822	CGH Changi General Hospital	6850 1648
KKH KK Women's and Children's Hospital	6394 1183		

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