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Purpose or Objective
Regional failure in nasopharyngeal carcinoma (NPC) is managed by salvage treatment in the form of neck dissection. Radical neck dissection (RND) is preferred over modified radical neck dissection (MRND), since it is traditionally believed to offer better long term disease control. However, with the advent of more advanced imaging modalities like high-resolution Magnetic Resonance Imaging, Computed Tomography and Positron Emission Tomography-CT scans, earlier detection is achieved. Additionally, concurrent chemotherapy also contributes to reduced tumour burden. Hence, there may be a lesser need for a RND and a greater role for MRND. With this retrospective study, the primary aim is to ascertain whether MRND, as opposed to RND, has similar outcomes and hence, whether there would be more grounds to offer a less aggressive procedure to achieve lower patient morbidity.
Material and Methods
This is a retrospective study of 66 NPC patients treated at Singapore General Hospital between 1994 to 2016 for histologically proven regional recurrence, of which 41 patients underwent RND and 25 who underwent MRND, based on surgeon preference. The type of ND performed, primary treatment mode, adjuvant treatment and pattern of recurrence was reviewed. Overall survival (OS) was calculated using Kaplan-Meier estimate and compared.
Results
Overall, the disease parameters such as nodal involvement and extranodal extension were comparable between the two groups. Comparing MRND and RND, the median (IQR) OS is 1.76 (0.58 to 3.49) and 2.41 (0.78 to 4.11) respectively. However, the p-value found is 0.5301 and hence not statistically significant.
Conclusion
RND is more aggressive and has been associated with greater morbidity. Hence, with similar outcomes, MRND could be an alternative salvage procedure for regional failure in selected NPC patients, allowing similar salvage rates with lesser mortality and morbidity.

EP-1136 Management SCC unknown primary with contemporary diagnostic and radiotherapy techniques

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Purpose or Objective
No randomised evidence exists to guide treatment of squamous cell carcinoma of unknown primary (SCCUP) of the head and neck. Two main approaches with RT exist – treating involved neck only (INO) or the addition of an elective dose to potential primary sites and contralateral neck (MUC). The rationale for this is to reduce the likelihood of the primary tumour emerging in the future but results in increased toxicity. If the frequency of mucosal primary emergence remains low without elective irradiation, we may be able to spare our patients toxicity. As SCCUP in the head and neck has a much better prognosis than unknown primary cancers presenting below the clavicles, the avoidance of late and permanent toxicity is highly relevant.
The purpose of our study was to evaluate disease related outcomes and doses to organs at risk in a contemporary cohort of patients investigated, diagnosed and treated for SCCUP.
Material and Methods
This was a retrospective cohort study; patients with histologically confirmed SCCUP with unilateral neck disease staged with FDG PET-CT scan were eligible. Patients were identified from the radiotherapy database and electronic case records reviewed.
Results
26 patients with unilateral neck disease from SCCUP were treated between August 2012 and April 2016. All patients underwent investigation with FDG PET-CT and EUA.
All patients underwent radiotherapy with volumetric modulated arc therapy (VMAT). Patients receiving radiotherapy as primary treatment received 65Gy/30# to areas of gross disease and entirety of that involved nodal level and 54Gy/30# to areas considered at risk of harbouring microscopic disease. Patients who received adjuvant RT following neck dissection received either 65Gy/30# (if ECS) or 60Gy/30# to involved nodal levels (if no ECS) and 54Gy/30# to areas at risk of microscopic disease.
16 patients received INO RT, 10 patients received MUC RT. 37.5% patients receiving INO RT had HPV/p16 positive disease. 50% patients receiving MUC RT had HPV/p16 positive disease. 56.3% patients in INO group received concurrent cisplatin, 50% in the MUC cohort.
Median follow up is 35 months (range 30-46mths). No mucosal primaries in either group have emerged. 1 patient in the MUC group relapsed in contralateral neck in the elective dose volume. 2 year OS is 81.3% in INO group, 80% in MUC group.
Dose to organs at risk are shown in table below.

	INO RT (n=16)	MUC RT (n=10)	
Mean dose contralateral parotid	1217cGy	3336cGy	p<0.01
Maximum dose brain stem	3270cGy	4191cGy	p<0.01
Maximum dose spinal cord (	3686cGy	4023cGy	p=0.056
Mean dose midline mucosa (hyoid-cricoid)	4040cGy	5068cGy	p<0.01
Mean dose midline mucosa (cricoid – sternum)	2658cGy	3324cGy	p=0.07

Conclusion
This is the only contemporary series of SCCUP head and neck where all patients have undergone a PET-CT as part of their diagnostic work up and the first series to compare outcomes from unilateral neck radiotherapy with VMAT to irradiating potential mucosal primary sites with VMAT.
RT to INO does not result in more frequent emergence of mucosal primary or contralateral recurrence in SCCUP.
The observed reduction in dose to OARs with INO approach may represent an opportunity to spare patients toxicity and would support further research to confirm the benefits of RT to INO.

EP-1137 DW MRI as biomarker of response during RT for intermed/high risk SCC oropharynx: a feasibility study

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Purpose or Objective
Despite radical chemo-radiotherapy (CRT), many patients with intermediate and high risk SCC oropharynx (OPSCC) relapse. Treatment related toxicity limits further uniform

intensification across the patient group. If a predictive biomarker for outcomes from CRT can be identified during treatment, individualised and adaptive treatment strategies may be employed for the non-responders.
This is the 1st study to use DW MRI for early response assessment in a specific H&N sub-site with sub-type of similar biological behaviour.
The primary aim of this study was to determine the feasibility of:

- Recruiting patients
- Carrying out DW MRI at baseline (MRI 1) and week 3 (MRI 2) of RT
- Measuring apparent diffusion coefficient (ADC) on each scan for each target lesion, as per study protocol (Paterson et al, Clinical and translational radiation oncology, Feb 2017, Vol 2, p 13-18

Material and Methods
Patients with intermediate and high risk, locally advanced OPSCC receiving radical RT/CRT were recruited to this prospective observational imaging study with national REC approval (15/WS/0159);
A feasibility study was carried out to evaluate the viability of this approach in the 1st 20 patients recruited.
Patients underwent DW- MRI immediately prior to #1and #11. 3D target lesions were defined on each MRI by a clinical oncologist and radiologist. ADC measurements were obtained for each target lesion (primary and lymph nodes), and % change in ADC calculated. Disease status for each target lesion is noted at follow up at 6, 12, 18 and 24 months.
Results
71 patients have been recruited to date. The first 20 patients were recruited over a 10 month period, with a high recruitment up-take of approximately 62.5% of those screened.
Of the first 20 patients recruited 16 patients (80%) completed both MRI scans. One patient underwent MRI-1 and declined MRI-2 as they felt unable to tolerate the scan. Three of the patients were unable to undergo the 1st MRI therefore were withdrawn before being scanned (1- poor IV access for contrast, 1- unable to tolerate the scan, 1 - MRI unavailable).
All 16 scanned patients had at least one target lesion that was measureable on DW MRI baseline and repeat image for the purposes of recording ADC.
Conclusion
Feasibility work has demonstrated good patient compliance with scanning requirements and the ability to measure ADC in target lesions suggesting this is a viable approach to identifying the sub-group of non-responders during RT which may ultimately allow individualised and adaptive treatment intensification.
Establishing ADC thresholds that predict for local failure is an essential step towards using DW-MRI to improve the therapeutic ratio. The MeRInO study will help establish these thresholds in OPSCC

EP-1138 Non-invasive imaging of tumour hypoxia using EF5 and PET-CT in head and neck cancer: A pilot study.
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Purpose or Objective
Tumour hypoxia is an important factor in treatment failure following radiation therapy for locally advanced head and neck squamous cell carcinoma (HNSCC). This pilot study was performed to evaluate the feasibility of using [18F]EF5 for clinical PET imaging of tumour hypoxia in HNSCC planned for radical radiotherapy.
Material and Methods
Fourteen patients with Stage III/IV HNSCC undergoing radical radiotherapy were enrolled between 2012 and 2016. Patients were imaged before and 2 weeks into radiation treatment with EF5-PET. All patients had an FDG-PET CT prior to treatment. On the FDG-PET CT, standardized uptake values (SUV) were calculated using a region of interest drawn around the target area images for suspicious primary and nodal disease separately where SUV = (peak activity/mL in region of interest) / (injected activity/g of body weight). These lesions were evaluated for corresponding EF5 uptake on the EF5-PET. After injection of 185 to 370 MBq of [18F]EF5, PET data was obtained in three-dimensional mode. EF5 uptake was evaluated by the tumour-to-muscle activity ratio (TMR) and a ratio of >1.5 was considered EF5 positive. Paired t-test was used to determine whether there is a significant difference between the TMR before and during treatment, based on the 2 EF5-PET scans.
Results
Median follow up was 26 months. All patients except one had 2 EF5-PET and 1 FDG-PET CT scan. One patient declined the second EF5-PET scan. No adverse pharmacological reactions were observed after administration of [18F]EF5. 13 patients had oropharyngeal cancer (all except 1 was p16+) and 1 had nasopharynx cancer. All patients were treated with 70Gy and 12 received concurrent chemotherapy.
38 lesions were identified on pre-treatment FDG-PET CT imaging. EF5 was positive in 22 lesions (8 primary and 14 nodal sites) before treatment. 6 lesions (3 primary and 3 nodal) remained EF5 positive during radiation, although 4 had borderline TMR ranging between 1.5-1.62. Mean TMR difference pre and during treatment was 0.30 for primary (p=0.003) and 0.53 for nodal disease (p=0.001). One patient with p16- oropharynx cancer had EF5+ persistence during treatment and subsequently had local recurrence. Two patients with p16+ oropharynx cancer died of metastatic relapse, one of which was EF5+ pre-treatment which did not persist during treatment.
Conclusion
PET imaging with [18F]EF5 was feasible, and adequate image quality was achieved. The single p16- oropharynx cancer patient who had no resolution of tumour hypoxia in lymph node and primary disease had locoregional recurrence requiring salvage therapy. In this study, EF5+ persistence was not predictive recurrence in p16+ oropharynx cancer, however, larger scale studies to further assess the impact of EF5-PET detected hypoxia prior and during radiation treatment is warranted to evaluate its ability to predict treatment outcomes.

EP-1139 Prognostic impact of hematological profile in oropharyngeal cancer treated with chemoradiotherapy
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