

locoregional control similar to those reported for radical surgery followed by radiotherapy, offering to the vast majority of the patients functional organ preservation.

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POSTER

#### Intensity modulated radiotherapy for oropharyngeal and hypopharyngeal cancers: a short-term result

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**Background:** To assess a short-term treatment result and toxicities of intensity modulated radiotherapy (IMRT) for oropharyngeal and hypopharyngeal cancers.

**Materials and Methods:** Between 2002 and 2006, we treated a total of 44 patients with squamous cell carcinomas of the oropharynx (19) and the hypopharynx (25) by IMRT. *Patient characteristics:* Gender: M/F = 40/4. Median age: 64 years (34–81), Performance status: 0/1/2 = 31/13/0. For oropharyngeal cancer (OPC), T1/2/3/4 = 5/9/3/2, N0/1/2a/2b/2c = 7/2/1/8/1, and clinical stage (UICC 2002) I/II/III/IVa/IVb = 1/5/3/9/1. For hypopharyngeal cancer (HPC), T1/2/3/4 = 10/11/3/1, N0/1/2a/2b/2c = 9/3/1/8/4, and I/II/III/IVa/IVc = 5/3/3/13/1. In totals, 24 of 44 patients (54%) had stage IV diseases. A planned neck dissection was also done in 64%. IMRT was performed with 4–6 MV X rays of 7 coplanar beam arrangements using a dynamic MLC technique. All patients were initially treated with a whole-neck IMRT of 44–54 Gy/22–27 fractions. At 40 Gy, CT scans were obtained again to make a boost IMRT plan targeting to the primary lesions and high-risk nodal regions to the total dose of 66–70 Gy/33–35 fractions. Twenty-eight patients (63%) received concurrent chemotherapy, such as weekly infusions of docetaxel (15 mg/m<sup>2</sup>) or 2–3 courses of cisplatin (80 mg/m<sup>2</sup>). Local tumor responses were assessed by fiberoptic and radiological examinations. Survival results were analyzed by the Kaplan-Meier method. Treatment-related toxicities were evaluated according to the Common Toxicity Criteria, version 3.0.

**Results:** Complete responses were achieved in 40 of 44 patients (91%). The 2-year local relapse-free survival rates were 89% and 46% for OPC and HPC, respectively. Salvage surgery was required in 4 cases of local recurrence and a neck dissection was done in a case of nodal recurrence. The corresponding 2-year overall survival rates were 83% for stage I-III and 90% for stage IV of OPC, and 85% for stage I-III and 27% for IV of HPC. The maximum acute dermatitis was G3: 6 cases (14%), Acute mucositis was G3: 22 (50%) and G4: 1 (2%). Higher mucosal reactions were observed with docetaxel significantly than with cisplatin. Xerostomia was observed G2: 14 (33%) at 3 months and 7 (21%) at >12 months after the initiation of IMRT.

**Conclusions:** The IMRT with concurrent chemotherapy produces promising local control and survival results for OPC and HPC with acceptable toxicities. Parotid gland sparing is also achievable with IMRT.

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POSTER

#### The potential for sparing the parotid glands with helical radiotherapy

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**Purpose:** Radiotherapy for head and neck cancer patients causes distressing complications of which xerostomia – due to irradiation of the salivary glands – has the highest adverse effect on the quality of life. The aim of the current study is to investigate the potential of helical tomotherapy to preserve the parotid glands function.

**Methods and Materials:** The study includes patients with a head and neck cancer treated with helical tomotherapy (Hi-art Tomotherapy®) at the UZ Brussel. During planning, the highest priority is given to a satisfying PTV coverage: at least 95% of the prescribed dose must be delivered to at least 95% of the target. A dose of 70.5 Gy (2.35 Gy/fraction) is prescribed to the primary tumor and the pathological lymph nodes. The elective node regions receive 54 Gy (1.8 Gy/fraction): a simultaneous integrated boost scheme is used. If possible the mean dose to the parotid gland is kept below 26 Gy. Seven patients with a follow up of 12 months are evaluated. To assess the function of both parotids a salivary gland scintigraphy was performed before (baseline) and every 4 months after radiotherapy.

**Results:** There was a significant dose-response relationship between the mean dose (Gy) given to the parotid gland and the functional recuperation. If the mean dose is kept below 33 Gy a recuperation at least 12 months of 80% can be expected ( $p = 0.0001$ ).

There is also a significant correlation between the salivary excretion (SE) and the percentage of parotid gland that received a dose <26 Gy (V26%).

To have a SE of 80%, 49% of the parotid volume should receive a dose less than 26 Gy ( $p = 0.002$ ).

**Conclusion:** Not only the delivered mean dose but also the volume percentage that receives a dose <26 Gy is important. By using helical tomotherapy the parotid gland function can be preserved in many cases.

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POSTER

#### Stage III-IV sinonasal and nasal cavity carcinoma treated with 3D-conformal radiotherapy

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**Purpose:** To report the dosimetric data and clinical outcomes of patients with advanced neoplasm of the paranasal sinuses and nasal cavity, treated by three-dimensional conformal radiotherapy (3D-CRT).

**Methods and Materials:** Between 2000 and 2005, 31 consecutive patients were treated for locally advanced tumors of paranasal sinuses and nasal cavity. All patients underwent conformal radiotherapy, with or without surgery and chemotherapy.

**Results:** The median follow-up was 42 months. 5-year local tumor control, disease-free survival, overall survival and disease-specific survival actuarial rates were 60%, 48%, 56% and 70% respectively. 5-years local control and overall survival rates for patients treated with RT +/- CT were 30% and 25%. Local recurrence was the most common site of failure. Dosimetric data are reported.

**Conclusion:** The local control rate for these tumors remains low. The prognosis depends on localization, tumor stage and treatment modality. 3D-CRT reduces the risk on optical pathways but doesn't modify outcomes.

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POSTER

#### Video-assisted thyroidectomy with sentinel lymph node biopsy

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**Introduction:** The study was aimed to assess the feasibility of minimally invasive surgery for thyroid tumours.

**Materials and Methods:** In our centre 129 patients with benign and malignant thyroid tumours underwent video-assisted surgery. There were 111 women and 18 men (median age 41 years). Preoperative pathological findings: papillary/follicular adenoma – 75, high-grade differentiated early (T1–T3N0M0) – 34. The extent of surgical procedure was hemithyroidectomy + isthmusectomy in 116 patients, thyroidectomy with sentinel lymph node biopsy after preliminary lymphography in 13 patients. Micrometastases of papillary thyroid cancer in sentinel nodes were found in 7 cases. In all cases thyroidectomy was done extracapsularly. Surgical incision (length 2–2.5 cm) was made ipsilaterally and parallel to the posterior of sternocleidomastoid muscle in the medium third of the neck.

**Results:** The incision described above ensured sufficient operation space, making it possible to perform either type of surgery. We observed no intraoperative complications. Immediate complications included mild hoarseness of the voice in 3 (3.87%) patients and hematoma in 1 (1.29%) patient. Hoarseness disappeared within 7 days after surgery, hematoma was handled conservatively. In all cases surgical margins were negative on pathological examination. The median operation time was 45–60 minutes, median hospital stay was 3 days.

**Conclusions:** Minimally invasive surgery with sentinel lymph node biopsy used for treatment of thyroid cancer does not compromise oncological radicality and ensures good cosmetic outcome.

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POSTER

#### Follicular carcinoma thyroid with bone metastasis – a dismal look but a call towards more drug research

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**Background:** In carcinoma thyroid with bone metastasis, follicular carcinoma thyroid is the commonest and females are most commonly affected.

**Aim:** To review bone metastasis among follicular carcinoma thyroid patients and the role of Iodine 131 ablation.

**Patients and Methods:** We have gone through the inpatient and outpatient records of patients who have bone metastases among follicular carcinoma thyroid for the past 15 years. The diagnosis was made either by I-131 scans or x-rays. All of them had total thyroidectomy except one. There were 684

carcinoma thyroid patients and follicular thyroid were 87[12.7%]. Out of 20 males who had follicular carcinoma thyroid 11 [55%], majority of them were in the third and fourth decades. Out of 67 females who had follicular carcinoma thyroid 16[23%] had bone metastases, majority of them were in the fifth and sixth decade.

**Results:** Out of 87 patients with bone mets, 27 (31.03%) presented with bone metastases, the commonest being skull and pelvis. 4 patients (14.81%), had metastasis in more than one site. 10 (37.03%) patients presented primarily as bone metastases. 3 (11.11%) patients had external radiotherapy to the bone for palliative pain relief. 7 patients (29.92%) lost follow up. 9 (33.33%) had two year follow up with an average ablation dose of 190MCIU and the disease remains static. 3 (11.11%) patients with an average 400MCIU as ablation dose had progressive disease. 8 (29.62%) patients had regression of the lesion with an average dose of 270MCIU and they were followed up for an average of 6 years. All the patient had residual disease in the neck for which I131 ablation was done with an average dose as 90 mci. The commonest site of regression were spine and long bones. All patients with static or progressive disease had initial high thyroglobulin value of more than 300.

**Conclusion:** Bone metastases more common in males in third and fourth decades and they have more chance of having bone Mets with follicular carcinoma thyroid. 30% of the patients can have regression of their bone metastases with repeated I-131 ablation up to 1000MCIU and initial high thyroglobulin is an indicator of poor prognosis. External radiotherapy can be given to alleviate bone pain.

## Haematological Malignancies

Oral presentations (Wed, 26 Sep, 09.00–11.00)

### Leukaemia, lymphomas, transplantation (adults)

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ORAL

**Quality assessment of FDG PET imaging in clinical trials: definition of standard indicators and longitudinal assessment in patients treated for lymphoma**

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**Introduction:** F-18 FDG PET is widely applied in clinical oncology. It remains a heterogeneous process. A recent consensus was unable to provide a solution for quality assessment (Juweid et al, 2007). We developed a method for quality control (QC) and validated it longitudinally in a cohort of patients treated for lymphoma.

**Material and Methods:** PET scan was performed in 79 subjects using a PET/CT Biograph 16. Careful and reproducible protocols of acquisition and analysis were applied. QC method was based on data of 30 normal subjects and further validated using longitudinal data of 153 PET scans/49 patients under treatment for lymphoma and followed for up to 32 months. Mean standardized uptake values (SUVm) were obtained for normal tissues (lung, liver, and trabecular bone of L4 vertebral body). Two observers performed blind analyses in order to calculate %CV and least significant changes for a 95% level of confidence (LSC-95%). QC corresponded to lower/upper limits of acceptance (mean SUV  $\pm$  2SD). These limits were compared to LSC-95% values. Longitudinal QC was performed by identifying SUV changes larger than LSC-95% between exams.

**Results:** Tissue specific SUVm of PET averaged (1SD) was 0.43 (0.10), 2.21 (0.44) and 1.72 (0.48) for liver, lung and bone in normal subjects while, for patients with lymphoma, it was 0.41 (0.11), 2.03 (0.45) and 1.94 (0.72). For normal subjects, LSC-95% was 0.3, 1.3 and 1.2, enabling to calculate the lower/upper limits: 0.90/3.52, 0.12/0.74 and 0.28/3.16. Among the 153 PET exams analyzed, only 2 exams with pulmonary SUVm and 12 exams with bone SUVm values were above the defined upper limit. All hepatic SUVm were within normal range. Simultaneous changes in the 3 parameters were never found. Intra-subject longitudinal QC identifies 12 patients with transient significant changes of normal bone SUVm and only 1 patient with transient significant change of normal pulmonary tissue SUVm. For bone reference, transient increase was correlated to administration of GCSF while for lung tissue, it was related to occurrence of pulmonary infectious disease. Chemotherapy never altered SUVm of hepatic tissue.

**Conclusion:** Quality assessment of FDG PET imaging is feasible using SUVm of reference tissues (lung, liver and bone). Applying the calculated

lower/upper limits of references, QC enables to identify inappropriate PET scans. When applying LSC-95%, discrimination between effect of treatment and non-specific technical effect can be performed.

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ORAL

**Immunosuppressive TLI-based reconditioning regimens enable engraftment after graft rejection or graft failure in patients treated with allogeneic hematopoietic stem cell transplantation**

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**Background:** Primary non-engraftment/ early graft rejection after allogeneic hematopoietic stem cell transplantation (HSCT) is a rare but life-threatening complication after allogeneic HSCT. Standardized treatment protocols addressing the type of the reconditioning regimen are lacking. As total lymphoid irradiation (=TLI) confers substantial immunosuppression with relatively little toxicity we speculated that a TLI-based approach could be useful for reconditioning prior to a second allogeneic HSCT.

**Materials and Methods:** We identified a cohort of 14 patients (7 adults –  $\geq$ 18 years, median age 48 years, range 27–53 years – and 7 children –  $<$ 18 years, median age 9 years, range 4–16 years) with primary non-engraftment (n=7) or early graft rejection (n=7) after conventional myeloablative allogeneic HSCT for different hematologic diseases. Patients were treated with a TLI-based reconditioning regimen with 7 Gy single dose application (median dose rate 1.18 Gy/min, range, 0.55–2.13 Gy/min) plus anti-T lymphocyte antibody OKT3 (n=11) and/or antithymocyte globulin (n=7)/fludarabine (n=9), and/or thiopeta (n=5), followed by an infusion of peripheral blood stem cells (n=13) or bone marrow stem cells (n=1) from related/unrelated donors.

**Results:** The median interval between initial transplantation and retransplantation was 38 days (range, 23–173 days) for the overall group, 36 days (range, 23–173 days) for adults and 41 days (range, 31–61 days) for children. All patients were transplanted in aplasia. 11/14 recipients were evaluable for engraftment following TLI-based reconditioning as three adults died early (day 2/5/15) after second transplantation due to infectious complications. Engraftment in four adults was seen after a median of 12 (range 10–18) days. In seven children engraftment occurred after a median of 10 (range 9–32) days. TLI-based reconditioning was well-tolerated with no severe organ toxicity. Median overall survival/ disease-free survival for the whole cohort was 140 days (range 5–1268 days). After a median follow-up of 681 days, in children disease-free/ overall survival are 85.7%/ 85.7%, respectively. Despite engraftment in 4 adults none of them survived due to fatal GVHD (n=1), infection (n=1), disease relapse (n=1) and acute respiratory distressed syndrome (n=1).

**Conclusion:** In patients with graft failure or graft rejection after allogeneic HSCT, TLI-based reconditioning regimens allow sustained engraftment paralleled by favourable toxicity profile potentially leading to long-term survival.

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ORAL

**Involved-field radiotherapy (IFRT) and involved-nodal radiotherapy (INRT) as a component of combination therapy for limited stage Hodgkin lymphoma: a question of field size**

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**Background:** Combination therapy is the standard of care for limited stage Hodgkin lymphoma (HL). The radiotherapy component has evolved from extended-field (EFRT) to involved-field radiotherapy (IFRT), lowering radiation-induced toxicity whilst maintaining high cure rates. Recent publications suggest a further reduction of field size to involved-nodal radiotherapy (INRT). Although guidelines have been published, there is no uniform consensus on the optimal definition for radiotherapy field size. Furthermore, there is no published evidence to demonstrate that field size can be reduced from IFRT to INRT while maintaining treatment efficacy. The aim of this study is to determine the influence of field size on patterns of relapse in limited stage HL treated with combination therapy. Is INRT associated with increased marginal recurrences?

**Materials and Methods:** Using the BC Cancer Agency Lymphoid Cancer Database, 325 eligible patients were identified: limited stage HL diagnosed between 5/1/89 and 4/1/05, and treated with combined chemo/radiotherapy. According to prospective protocols, patients were treated with EFRT until