Conclusion: new parameters were found as predictors of moderate-severe mucositis.

EP-1036

Glottic carcinoma stage T1 radiotherapy

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Purpose or Objective: Retrospective review of results of radiotherapy for stage T1 glottic carcinoma.

Material and Methods: A retrospective review was done of all patients with squamous cell carcinoma of the glottis stage T1 treated with radiotherapy between 1960 and 2012 inclusive. There were 995 patients identified. All patients were treated with wedged lateral or angled anterior oblique technique. The main site of relapse was local and hence the main end point for anaysis was local control at 5 years. Survival curves were calculated using Kaplan Meier method and log rank test used to comparer differences.

Results: Overall the 5 year freedom from relapse was 88%. The only factor which influenced outcome was time period of radiotherapy with those between 1960 and 1980 had a 84% relapse free rate, significantly worse than the latter time period. Other factors examined included sex, age, substage T1a and T1b, grade, radiation dose, radiation field size and duration of radiation, and none of those factors had a significant effect on outcome. There were 121 relapses, most in the primary alone and most within the first two years.

Conclusion: The overall 5 year freedom from relapse was 88%.

EP-1037

Dysphagia and irradiation of constrictor pharyngeal muscles: a clinical-dosimetric correlation

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Purpose or Objective: To correlate clinical late dysphagia with the dose received by the constrictor pharyngeal muscles in patients receiving induction chemotherapy (ICT) and radiochemotherapy (RT-CT) with SIB-VMAT technique.

Material and Methods: Between July 2010 and January 2015, 51 patients with locally advanced head and neck cancer underwent ICT and subsequent RT-CT with concurrent weekly Cisplatin. The superior, middle, and inferior (S, M, and I) pharyngeal constrictors muscles (CM) were delineated and the correlation between dosimetric parameters and late pharyngeal toxicity was analyzed.

Results: 51 patients [M/F: 41/10, median age 56, range 30-77, stage III: 10 (20%), stage IV: 41 (80 %)] were included in this analysis. The tumor site was: oropharynx in 21 (40%) patients, epipharynx in 10 (20%), oral cavity in 9 (18%), larynx in 5 (10%), and hypopharynx in 6 (12%). ICT in the majority of cases (74%), was based on Cisplatin - 5 -Fluorouracil, with the addition of Docetaxel in 26% of cases. The dose delivered to the primary tumor was 67.5 Gy (in 8 patients, 16 %) and 70.5 Gy (in 43 patients, 84 %); 60 Gy and 55.5 Gy were delivered on high and low risk lymph node levels, in 30 fractions with SIB-VMAT (2 arcs) technique, respectively. With a median follow-up of 11 months (range 3-44), late G1 dysphagia was recorded in 6 patients (12%) and late G2 dysphagia was observed in 2 patients (4%) (CTC-AE v. 4.3). Other late toxicities are reported in the Table 1. G3-4 toxicities were not recorded. In DVH analysis, the median dose received by CM was 66.2 Gy (S: 67.4 Gy, M and I: 67.2 Gy), with V50 being 96.9 % (S: 97.4%, M: 98.3%, and I: 95.9 %), and V60 being 82.4% (S: 86.8%, M: 90.1 %, and I: 73.8%). The median dose received by the larynx was 63.5 Gy (V50: 94.1 %, and V60: 66.2 %). No statistically significant difference between the group of patients with and without late dysphagia was observed.

Table 1: Late toxicity (CTC - AE v. 4.3)

	G0	G1	G2	G3	G4
Hyperpigmentation (%)	0 (0)	9 (18)	1 (2)	0 (0)	0 (0)
Xerostomia (%)	0 (0)	16 (31)	5 (10)	0 (0)	0 (0)
Subcutaneous fibrosis (%)	0 (0)	8 (16)	1 (2)	0 (0)	0 (0)

Conclusion: No statistically significant correlation between dose delivered to the constrictors muscles and late dysphagia was observed in this patients cohort. This result may depend on tolerability of the treatment and then by the small number of recorded adverse events.

EP-1038

IMRT/VMAT-SIB technique chemoradiation in locally advanced head and neck cancer: toxicity results

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Purpose or Objective: To evaluate the toxicity of intensity modulated radio-chemotherapy with simultaneous integrated boost technique (SIB) after induction chemotherapy in patients with locally advanced head and neck (H&N) cancer.

Material and Methods: The IRMA studies are described in the table. Patients with stage III-IV H&N cancer, without progressive disease after induction chemotherapy (IC), underwent radio-chemotherapy with weekly Cisplatin 30

mg/m2 (IRMA 1, 2, 3, 5) or Cetuximab 400 mg/m2 (IRMA 4). A dose of 67.5 Gy in 30 fractions (IRMA 1, 2, and 4) or 70.5 Gy in 30 fractions (IRMA 3, 4, and 5) was delivered to primary tumor and involved nodes, 60 Gy were delivered to high risk and 55.5 Gy to low risk lymph node areas. Static (IMRT) or volumetric (VMAT) intensity modulated technique with simultaneous integrated boost was used.

Results: 107 patients (median age 56 years, range 30-78, UICC stage III: n = 18, IV: n = 89) were included in this analysis. IC was performed with Cisplatin + 5-Fluorouracil in 65 (61%) patients and with Docetaxel + Cisplatin + 5-Fluorouracil in 42 (39%) cases. Concomitant Cisplatin and Cetuximab were administered in 84% and in 16% of patients, respectively. 51% (n = 55) of cases were irradiated with step & shoot IMRT-SIB technique (7 beams), while 49% (n = 52) of patients were irradiated with VMAT-SIB (two arcs) technique. During radio-chemotherapy, 23 (21%) patients developed mucositis, 12 (11%) G3 dysphagia and 10 (9.3%) G3 hematological toxicity. Even 1 (0.9%) G4 leukopenia and 3 (2.8%) G5 (2 neutropenia and one fatal myocardial infarction) adverse events were observed. The overall response rate after radio-chemotherapy was 82.2%. Two-year local control and survival were 64.2% and 64.6% (IRMA 1), respectively, 57.8% and 56.2% (IRMA 2), 66.4% and 75.5% (IRMA 3), 70.1% and 66.7% (IRMA 4), and 76.5% and 82.4% (IRMA 5), respectively.

Table IRMA and studies related toxicity

IRMA* 1	IRMA* 2	IRMA* 3	IRMA* 4	IRMA* 5
3 CF → C+IMRT/VMAT (67,5-60-55,5 Gy/30 fx)	3 DCF → C+IMRT/VMAT (67,5-60-55,5 Gy/30 fx)	3 DCF → C+IMRT/VMAT (70,5-60-55,5 Gy/30 fx)	3 CF → Cetuximab+IMRT/VMAT (67,5/70,5 -60-55,5 Gy/30 fx)	3 CF → C+IMRT/VMAT (70,5-60-55,5 Gy/30 fx)
n° pts = 28	n° pts = 16	n° pts = 26	n° pts = 17	n° pts = 20
Mucositis: G3: 29% G4: 0% Disfagia: G3: 11% G4: 0% Haematological toxicity G3: 25% G4: 0% G5: 3% Myocardial infarction G5: 3%	Mucositis: G3: 19% G4: 0% Disfagia: G3: 12% G4: 0% Haematological toxicity G3: 37% G4: 12% G5: 0%	Mucositis: G3: 15% G4: 0% Disfagia: G3: 7% G4: 0% Haematological toxicity G3: 4% G4: 0% G5: 4%	Mucositis: G3: 29% G4: 0% Disfagia: G3: 18% G4: 0% Haematological toxicity G3: 6% G4: 6% G5: 0%	Mucositis: G3: 15% G4. 0% Disfagia: G3: 10% G4: 0% Haematological toxicity G3: 5% G4: 0 G5: 0%)
OR**: 86%	OR: 75%	OR: 92%	OR: 65%	OR: 85%
2-year LC***: 64.2% 2-year OS****:64.6%	2-year LC: 57.8% 2-year OS: 56.2%	2-year LC: 66.4% 2-year OS: 75.5%	2-year LC: 70.1% 2-year OS: 66.7%	2-year LC: 76.5% 2-year OS: 82.4%%

* IRMA : Intensified Radiotherapy by multimodality Association in H&N cancer
CF: Cisplatin + 5Fluoruracile ; C: Cisplatin (30 mg / m2) ; DCF: Docetaxel + Cisplatin + 5Fluoruracile; Cetuximab (400 mg / m2): ** OR: Overall response; ***LC: Local control; ****OS : Overall survival.

Conclusion: In our experience moderately hypofractionated and accelerated radio-chemotherapy after induction chemotherapy was feasible. Intensive patient monitoring and supportive strategies during chemoradiation are necessary to manage of side effects.

EP-1039

H&N IMRT: correlation of dysphagia/xerostomia to dose/volume parameters of involved OARs

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Purpose or Objective: To analyse the frequency and severity of dysphagia and xerostomia in patients affected by nasopharyngeal and oropharyngeal cancers treated by intensity-modulated radiotherapy (IMRT) and the correlation with volumetric variations and dosimetric data of pharyngeal constrictor muscles and parotid glands.

Material and Methods: Fifty patients, who underwent adaptive IMRT for nasopharyngeal and oropharyngeal cancers, were included in the present study. Eighty-four percent of patients (42/50) received concurrent radio-chemotherapy and 92% (44/50) were in locally advanced stage. Dose-volume parameters related to constrictor muscles (superior constrictor muscle, SCM; middle constrictor muscle, MCM; inferior constrictor muscle, ICM and whole pharyngeal constrictor muscle, CM), and parotid glands were analyzed using dose-volume histograms (DVHs). All patients underwent replanning CT scan after 5 weeks of radiation therapy and the target and OARs were re-contoured on fusion images after co-registration. The volumetric variations of pharyngeal constrictor muscles and parotid glands were measured. Volumetric variations and dose-volume parameters were associated to acute and late dysphagia and xerostomia according to RTOG score, quality of life questionnaires (PSS-H&N e QLQ-H&N35), and oesophageal transit .

Results: Volumetric variations and dose-volume parameters of pharyngeal constrictor muscles and parotid glands are reported in Table 1. Adaptive IMRT achieved a good sparing of parotid glands (mean dose 24.9 Gy) and constrictor muscles (mean dose 51.2 Gy). Acute dysphagia, was scored as grade 0-1 in 18/50 patients (36%) and as grade 2-3 in 32/50 (64%). Acute xerostomia, was scored as grade 0-1 in 21/50 patients (42%) and as grade 2-3 in 29/50 (58%). Volumetric variations and dose-volume parameters of the constrictor muscles and parotid glands did not correlate with acute toxicity ($p>0.05$). At 2 years median follow-up (range 6-67 months), late dysphagia was scored as grade 0-1 in 40/50 of patients (80%) and as grade 2-3 in 10/50 (20%). Late xerostomia was scored as grade 0-1 in 42/50 of patients (84%) and as grade 2-3 in 8/50 (16%). The analysis of the correlation of volumetric variations and dose-volume parameters with clinical data (RTOG score for late toxicity, quality of life questionnaires and oesophageal transit) is ongoing.

OAR	Median Volume (cc)	Replanning median Volume (cc)	Δ volume (%)	Median maximum dose (Gy)	Median mean dose (Gy)
SCM	6.9	8.5	+20	71.9	62.7
MCM	2.1	2.6	+17	65.2	51.5
ICM	3.1	3.7	+11	60.1	42.9
CM	12.0	14.7	+17	71.9	51.2
Right parotid gland	25.0	17.8	-24		24.9
Left parotid gland	22.6	16.2	-32		24.9

Conclusion: During radiotherapy, pharyngeal constrictor muscles and salivary glands underwent volumetric variations. Volumetric variations and dosimetric findings did not correlate with acute toxicity, probably because of the complexity and multifactorial pathogenesis of acute dysphagia and xerostomia. The ongoing analysis on the correlation of late toxicity data with volumetric variations and dose-volume parameters may help in the optimization of IMRT treatment planning.

EP-1040

Development of a CT-based prognostic model for regional control in head and neck cancer after RT

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