

(31%) had moderate (0.1-0.2 ml/min) and 10 patients (53%) had severe xerostomia (salivary flow less than 0.1 ml/min). For the creamy and gratin food items, no difference in mean NRS score was seen after the use of oral gel. In contrast, a difference was observed for the soft and solid/unmodified food items, such as bread and meat - especially for the large bites of the solid food items (see table 1). No patients experienced food aspiration.

Food item	Without gel	With gel	1 wk with gel	p-value
White bread w/liver pâté				
Is it difficult to swallow?	6.69	8.50	9.88	<0.0001
The food gets stuck in my throat when I swallow	6.69	8.17	9.67	0.002
I have to swallow multiple times for the food to clear my throat.	4.44	7.42	8.87	<0.0001
Rye bread w/cold meat				
Is it difficult to swallow?	4.23	7.07	9.81	<0.0001
The food gets stuck in my throat when I swallow	4.77	6.64	9.43	<0.0001
I have to swallow multiple times for the food to clear my throat.	3.77	6.50	7.79	<0.0001
Crisp bread				
Is it difficult to swallow?	5.44	6.21	9.71	<0.0001
The food gets stuck in my throat when I swallow	6.44	6.00	8.71	0.005
I have to swallow multiple times for the food to clear my throat.	4.44	5.79	6.93	0.06
Solid meat				
Is it difficult to swallow?	4.55	9.38	8.94	<0.0001
The food gets stuck in my throat when I swallow	5.18	8.17	8.62	0.03
I have to swallow multiple times for the food to clear my throat.	4.18	6.83	6.54	0.1

Conclusion

This feasibility study concluded that the tasteless and edible oral gel could be tested using ranked food items according to their consistency. A significant trend was seen towards decreasing late dysphagia after use of the oral gel and could be promising for improving situations involving social eating.

EP-1151 Pattern of failure in head and neck cancer patients after RT-CT based on pre-treatment 18F-FDG PET/CT uptake.

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Purpose or Objective

To analyse the pattern of failure in relation to pre-treatment 18F-FDG PET/CT uptake in head and neck squamous cell carcinoma (HNSCC) patients treated with definitive radiochemotherapy (RT-CT).

Material and Methods

From 2012 to 2016, 87 head and neck cancer patients treated with definitive CT-RT with IMRT-SIB underwent pre-treatment 18F-FDG PET/CT (PETpre), and MRI/CT for RT planning purposes in our department. We focused on patients who experienced a recurrence at the site of primary tumour. All of them did an 18F-FDG PET/CT (PETrec) at the time of failure.

In recurrent patients, the GTV-PETpre and the GTV-PETpost were contoured by means of an adaptive thresholding algorithm implemented on the dedicated iTaRT workstation (Tecnologie Avanzate, Italy). Both GTV-PETpre and the GTV-PETrec were transferred on the original planning CT scans by means of deformable co-registration of PETrec on PETpre in the Ray-Station treatment planning system.

The overlapping volume of the pre-treatment volume and failure volume was generated: "GTV-PETpre \cap GTV-PETrec". The dose delivered to the 99% of a volume (D99) was measured within GTV-PREpre \cap GTV-PETrec and GTV-PETrec. The recurrent volume was defined as: "In-Field (IF)", "Extending Outside the Field (EF)" or "Out-of-Field (OF)" if it had received >95%, 20-95% or <20% of the prescribed dose, respectively.

Results

We found 10/87 (11.5%) recurrences at primary site (2 oral cavity, 2 nasopharynx, 2 oropharynx, 3 hypopharynx and 1 larynx).

The mean GTV-PETpre was 13.1 cc (4.6-37.4), while the mean GTV-PETrec was 4.3 cc (1.1-12.7).

Mean D99 of GTV-PETpre \cap GTV-PETrec was 68.1Gy, [66.5-69.2], considering a prescription dose of 70 Gy to the PTV. Two recurrences were 100% inside GTV-PETpre, 4 recurrences were mostly inside (61-91%) and 4 recurrences were marginal to GTV-PETpre (33-1%). Six recurrences (60%) were defined as IF, 3 (30%) as EF and one (10%) as OF.

Conclusion

In all 10 patients an overlap existed between the planning 18F-FDG PET and the recurrence scan, which indicates a high probability of the recurrence to originate from the GTV-PETpre volume.

Furthermore 60% of recurrences were IF while 10% were OF. Our study indicates, even though not conclusive, that the recurrence may come from the strongest FDG-signal. These results support the hypothesis of an intensification of the dose on these volumes.

EP-1152 Prospective evaluation of relationships between radiotherapy dose to masticatory apparatus and trismus

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Purpose or Objective

This study aimed to identify relationships between radiation doses to the muscles of mastication as individual subunits or as a combined block with changes in trismus following radiotherapy.

Material and Methods

Twenty patients from a single centre were recruited prospectively as part of a randomised trial comparing proactive exercises in the management of trismus. Patients with stage III/IV oral cavity or oropharyngeal squamous cell cancers received Intensity Modulated Radiotherapy (IMRT) with concurrent systemic therapy between February 2013 and January 2015. All patients had trismus defined as patient-reported jaw tightening prior to the start of radiotherapy. Maximal inter-incisor distance (MID) was measured pre and 6 months from the start of radiotherapy. Bilateral muscles of mastication were contoured on CT axial images guided by an in-house contouring atlas: medial and lateral pterygoids (MP, LP), masseters (M), temporalis (T) and temporomandibular joint (TMJ). The block comprised all muscles excluding the TMJ below the orbital floor. Mean dose, equivalent uniform dose (EUD) and V35-60 Gy were calculated for each muscle and block and compared with change in MID.

Results

6/20 (30%) patients had a reduction in MID 6 months from the start of radiotherapy compared with 14/20 (70%) whose MID improved. No significant association was observed between age, gender, smoking, alcohol use, exercise compliance, cisplatin, tumour site or stage with change in MID. There was a significant association between mean dose and change in MID at 6 months for the ipsilateral MP ($p \leq 0.01$), LP ($p \leq 0.01$) and block ($p \leq 0.02$). All patients with a deterioration in trismus at 6

months received doses >40 Gy to the block. There was no correlation between change in MID and V35-60 Gy or EUD.

Conclusion

Higher mean radiation doses to the ipsilateral MP, LP and block were significantly associated with a deterioration in trismus. Limiting dose to these structures to ≤ 40 Gy for tumours not invading the masticatory muscles may improve treatment related sequelae. The block structure may be used as an alternative to the individual muscles as an avoidance structure in treatment planning.

EP-1153 Impact of pre-treatment imaging on outcomes of organ conservation in laryngopharyngeal cancers

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Purpose or Objective

To prospectively correlate pre-treatment CECT scan findings with local control (LC), overall survival (OS) and functional outcomes after non-surgical treatments in laryngo-pharyngeal cancers.

Material and Methods

147 consecutive patients treated with radical RT/CTRT were analysed. Baseline CT scans were reviewed by a head and neck radiologist for the following: TN stage, tumour volume, pre-epiglottic space and para-glottic space invasion, thyroid cartilage involvement, soft tissue infiltration /exo-laryngeal disease, involvement of other cartilages (arytenoids/ cricoids/ crico-arytenoid unit-CAU) and extra nodal extension (ENE). Functionality was assessed by speech and swallowing therapist and subjectively by the patients. Patients were treated with radical radiotherapy with or without concurrent chemotherapy as per Institutional protocol. Response was assessed 3 months after completion of treatment with clinical evaluation, CECT scan/ PET-CT and functional assessment. The study was approved by the Institutional Ethics Committee.

Results

68 (46%) patients had laryngeal and 79 (54%) had hypopharyngeal cancers. 98 (67%) patients had T3/T4 tumors and 53 (36%) had N2/N3 disease. 127 patients were treated with radical CTCT and 20 with radical RT. The median follow up was 17 months (range: 6-70 months). At last follow-up 90 (61%) patients were alive with no evidence of disease. The predominant failure was local 14.2% (21/147). The 2-year LC was 78.3%. 16 of those patients who failed locally underwent salvage laryngectomy.

On univariate analysis, involvement of para-glottic space, thyroid cartilage involvement, volume of primary ≥ 10 cc and exo-laryngeal disease had significant impact on LC. Volume of primary ≥ 10 cc (73.2% vs 85.3%, $p=0.04$), presence of exo-laryngeal disease (68% vs 80%, $p=0.02$) and involvement of para-glottic space (70.3% vs 80.4%, $p=0.05$) were significant for OS. 18 patients (14%) had dysfunctional larynx at last follow-up. Involvement of CAU (21.4% vs 67%, $p=0.003$), thyroid cartilage involvement (47.2% vs 67%, $p=0.04$), para-glottic space invasion (56% vs 70%, $p=0.01$) and volume of primary ≥ 10 cc (53.1% vs 73.2%, $p=0.04$) had significant impact on functional larynx preservation. On multivariate analysis, involvement of CAU was significant (HR=0.45, 95% CI 0.22 to 0.9, $p=0.02$) for functional larynx preservation.

Conclusion

Baseline CECT is an important tool to predict outcomes for non-surgical organ preservation. Besides factors like involvement of para-glottic space and thyroid cartilage other factors like ENE and volume of primary disease ≥ 10 cc predict inferior disease related outcomes with

RT/CTRT. Involvement of CAU is a predictor of inferior functional outcomes.

EP-1154 Sensorineural Hearing Loss In Patients With Head And Neck Cancer Treated With Chemo-Radiotherapy

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Purpose or Objective

Concurrent chemo-radiotherapy remains the standard of care for patients with locally advanced, high-risk head and neck squamous cell carcinoma (HNSCC). Sensorineural hearing loss (SNHL) is a common adverse event after radiotherapy (RT), with higher incidence when cisplatin-based chemotherapy (CHT) is used. The aim of this study was to evaluate the SNHL in patients with locally advanced, high-risk HNSCC treated with concurrent RT and cisplatin-based CHT.

Material and Methods

In a retrospective cohort study, we selected 19 consecutive patients (15 male, 4 female; median age 58 years) affected by HNSCC (12 patients with diagnosis of oropharynx carcinoma, and 7 patients with nasopharynx carcinoma). Median follow-up was 15 months (average follow-up, 16.3 months). All patients were treated between July 2014 and March 2016. All patients underwent Intensity Modulated Radiotherapy technique (IMRT) and 11 patients were treated with Simultaneous Integrated Boost IMRT (SIB-IMRT) with a dose ranging from 50 to 54 Gy on low-risk CTV, 60 Gy on intermediate-risk CTV, and from 67.5 to 70 Gy on GTV and high risk CTV in 30 and 35 fractions, respectively. In addition, all patients received concurrent CHT with cisplatin at 100 mg/m² day 1 and day 21. Dosimetry was performed using the value of mean dose to the cochlea with a constraint of ≤ 45 Gy. Audiometry was performed before and after treatment (up to 24 months). All of the audiometric evaluations used bone conduction (BC) measurements at frequencies of 0.5, 1, 2 and 4 kHz. Pure tone averages (PTA) were calculated at PTA 0.5-1-2. SNHL was defined as an increase in BC threshold >10 dB at frequencies PTA 0.5-1-2 or 4 kHz alone.

Results

Audiograms were conducted in all of the 19 patients (38 ears) before and after treatment. Ten patients (52.6%) showed an increment in BC at high frequency 4 kHz after treatment; 3 of them developed both low frequency (PTA 0.5-1-2 kHz) and high frequency SNHL. In 4 of these patients (8 ears), mean cochlear dose was >45 Gy, while in 15 patients (30 ears) mean cochlear dose was < 45 Gy.

Conclusion

Radio-chemotherapy remains the standard of care in patients with locally advanced, high-risk HNSCC. SNHL is a common adverse event after RT, with higher incidences after concomitant cisplatin-based CHT. Our data suggest that SNHL could be related to concomitant cisplatin-based CHT as the RT hearing damage is still not detectable due to the short follow up. More interesting data about SNHL are expected as long as follow up continues.

EP-1155 Patient-reported long term swallow function following chemoradiotherapy for oropharyngeal carcinoma

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