

Int Poster J Dent Oral Med 2011, Vol 13 No 2, Poster 532

## Changes of parotid gland function due to simultaneous radiochemotherapy

**Language:** English

### Authors:

Dr. Jeremias Hey, Dr. Arne Boeckler, Prof. Dr. Jürgen Setz,  
 Universitätspoliklinik für Zahnärztliche Prothetik, Martin-Luther-Universität Halle-Wittenberg, Germany  
 Dr. Reinhard Gerlach,  
 Universitätsklinik für Strahlentherapie, Universitätsklinikum Halle, Germany  
 PD Dr. Christian Gernhardt,  
 Universitätspoliklinik für Zahnerhaltung, Martin-Luther-Universität Halle-Wittenberg, Germany  
 PD Dr. Thomas Kuhnt,  
 Universitätsklinik für Strahlentherapie, Universitätsklinikum Rostock, Germany

### Date/Event/Venue:

July 14 - 17, 2010  
 88th General Session & Exhibition of the IADR Barcelona  
 Barcelona

### Objectives

To investigate complication probability on parotid gland tissue due to simultaneous radiochemotherapy [XRCT] with cisplatin.

### Material and Methods

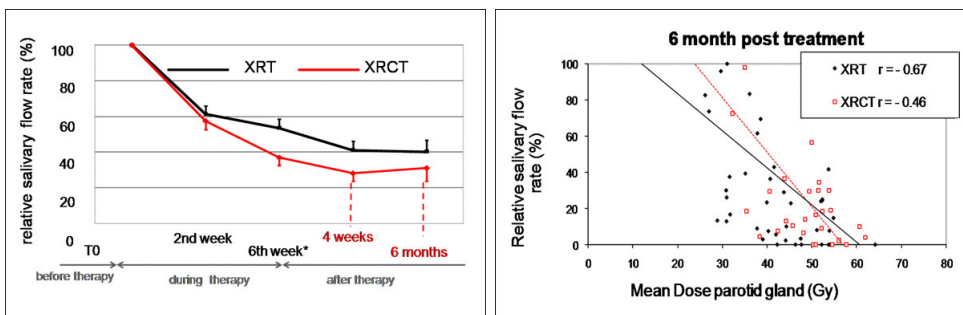
Patients treated either with radiotherapy [XRT] ( $n = 61$ ) or XRCT with cisplatin ( $n = 36$ ) for head and neck cancer were prospectively evaluated. Dose and volume distributions of the parotid glands were recorded in dose-volume histograms. Stimulated salivary flow rates were measured before, at the 2nd and 6th week during and at 4 weeks and 6 months after the treatment. The data were calculated based on the normal tissue complication probability [NTCP] model of Lyman. Complication was defined as a reduction of the salivary flow rate  $>75\%$  of the pre-treatment flow rate.



Abbreviations: EUD = Equivalent Uniform Dose Homogeneous dose distribution with equivalent damage likelihood

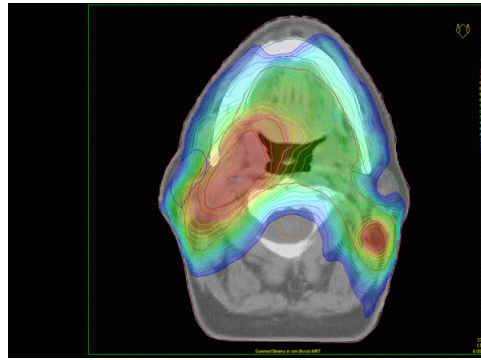
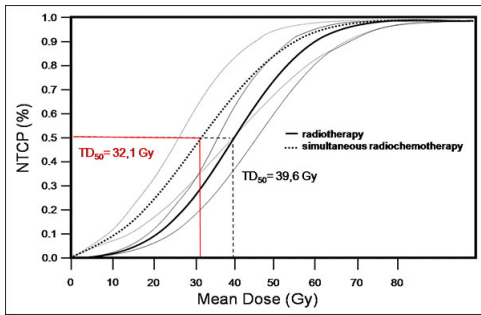
### Results

In both groups the salivary flow rate already dropped considerably during the radiation therapy. The salivary flow rates for simultaneous radiochemotherapy decreases further than for radiotherapy. Data of relative salivary flow rate differ significantly at the 6th week of treatment ( $p = 0.02$ ). The dose leading to a complication probability of 50% [TD50] was found to be 32.2Gy/4 weeks and 32.1Gy/6 months for XRCT and 41.1Gy/4weeks and 39.6Gy/6 months for XRT. The tolerated dose for XRCT was at least 7-8Gy lower than for XRT alone at TD50.



Course of relative salivary flow at repeated assessment for radiotherapy and simultaneous radiochemotherapy  
Abbreviations: XRT = radiotherapy; XRCT = radiochemo-therapy

Correlation between mean dose of the parotid glands and the relative salivary flow rate. Abbreviations: XRT = radiotherapy  
XRCT = radiochemo-therapy  $r$  = Pearson's correlation coefficient



NTCP curves 6 months post treatment with their 95% intervals of confidence: radiotherapy and simultaneous radiochemotherapy

Parotid gland sparing with IMRT Mean dose right parotid gland 35 Gy. Mean dose left parotid gland 19 Gy.

## Conclusions

It seems that XRCT cause a higher probability of parotid gland tissue damage. Radiotherapy planning approaches such as Intensity-Modulated Radiation Therapy may be particularly important for parotid sparing in radiochemotherapy due to cisplatin-related increased radiosensitivity of glands.

*This Poster was submitted by Dr. Jeremias Hey.*

## Correspondence address:

Dr. Jeremias Hey  
Martin-Luther-University Halle-Wittenberg  
Department of Prosthodontics, Centre for Dentistry and Oral Medicine  
Poliklinik für Prothetik  
Grosse Steinstrasse 19  
06108 Halle /Saale  
Germany



Hey J<sup>1</sup>, Boeckler AF<sup>1</sup>, Setz JM<sup>1</sup>, Gerlach R<sup>3</sup>, Gemhardt Ch<sup>2</sup>, Kuhn Th<sup>4</sup>

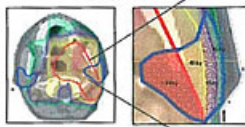
<sup>1</sup>Department of Prosthodontics, <sup>2</sup>Department of Operative Dentistry and Periodontology, <sup>3</sup>Department of Radiotherapy, University Clinic Martin-Luther-University, Halle, Germany, <sup>4</sup>Department of Radiotherapy, University Clinic, University Rostock, Germany

## Changes of parotid gland function due to simultaneous radiochemotherapy

**Objectives:** To investigate complication probability on parotid gland tissue due to simultaneous radiochemotherapy [XRCT] with cisplatin.

**Material and Methods:** Patients treated either with radiotherapy [XRT] (n = 61) or XRCT with cisplatin (n = 36) for head and neck cancer were prospectively evaluated.

1. Dose and volume distributions of the parotid glands were recorded in dose-volume histograms.



EUD = Equivalent Uniform Dose  
 EUD 32Gy  
 Homogeneous dose distribution with equivalent damage likelihood

2. Stimulated salivary flow rates were measured before, at the 2nd and 6th week during and at 4 weeks and 6 months after the treatment.



3. The data were calculated based on the normal tissue complication probability [NTCP] model of Lyman. Complication was defined as a reduction of the salivary flow rate >75% of the pre-treatment flow rate.

**Results:** In both groups the salivary flow rate already dropped considerably during the radiation therapy. The salivary flow rates for simultaneous radiochemotherapy decreases further than for radiotherapy. Data of relative salivary flow rate differ significantly at the 6th week of treatment (\*, p = 0.02).

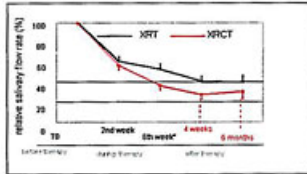


Figure 1 Course of relative salivary flow at repeated assessment for radiotherapy and simultaneous radiochemotherapy  
 Abbreviations:  
 XRT = radiotherapy  
 XRCT = radiochemotherapy

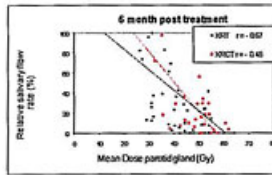


Figure 2 Correlation between mean dose of the parotid glands and the relative salivary flow rate.  
 Abbreviations:  
 XRT = radiotherapy  
 XRCT = radiochemotherapy  
 r = Pearson's correlation coefficient

The dose leading to a complication probability of 50% [TD<sub>50</sub>] was found to be 32.2Gy/4 weeks and 32.1Gy/6 months for XRCT and 41.1Gy/4weeks and 39.6Gy/6months for XRT. The tolerated dose for XRCT was at least 7-8Gy lower than for XRT alone at TD<sub>50</sub>.

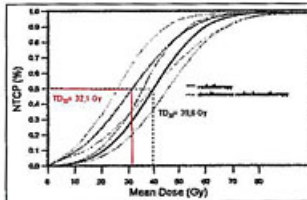


Figure 3 NTCP curves 6 months post treatment with their 95% intervals of confidence: radiotherapy and simultaneous radiochemotherapy

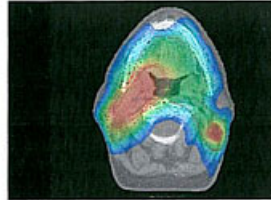


Figure 4 Parotid gland sparing with IMRT Mean dose right parotid gland 35 Gy, Mean dose left parotid gland 19 Gy.

**Conclusion:** It seems that XRCT cause a higher probability of parotid gland tissue damage. Radiotherapy planning approaches such as Intensity-Modulated Radiation Therapy may be particularly important for parotid sparing in radiochemotherapy due to cisplatin-related increased radiosensitivity of glands.



Jürgen Setz, MD, PhD  
 Department of Prosthodontics,  
 Martin-Luther-University Halle-Wittenberg, Germany  
 Große Steinstrasse 12, D-06107 Halle, Germany  
 E-mail: juergen.setz@medizin.uni-halle.de