# Proton Therapy of Paranasal Sinus Tumors: An Update of the UFPTI Experience

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## Introduction:

Twenty one patients with tumors in the paranasal sinus region with skull-base extension have received high-dose proton therapy at UFPTI since January of 2007. The disease characteristics, treatment planning and delivery techniques, and initial follow-up results are presented.

## Methods:

Of the twenty one patients, eighteen had prior surgery, ten with positive margins. Three patients had biopsy only. Histology included poorly differentiated carcinomas, sino-nasal undifferentiated carcinoma, adenocarcinoma, mucosal melanoma, and adenoid cystic carcinoma. Proton treatment targets and critical structures were delineated from co-registered simulation CT images and diagnostic MR images. The geometric relations between target volumes and critical structures were examined to select optimal proton beam parameters. Proton-specific through- and patch-fields, as well as match-fields were used for these patients to achieve target-conforming and critical organ-sparing concave dose distributions. Prescribed dose ranges from 69.6 CGE to 74.4 CGE, delivered at 1.2 CGE per fraction, two fractions per day. Treatments were delivered with orthogonal kV x-ray imaging guidance, to achieve 1 mm patient setup accuracy, for each fraction.

## Results:

Patient follow-ups ranged from 1 to 21 months, with mean of 10.4 months. All patients tolerated treatments well. Patients had brisk skin reactions that resolved within 4 weeks after completion of treatments. Follow-up CT and MR scans revealed in-field recurrent disease in one patient at 9 months, and progressive meningeal seeding in one patient within two months after completion of treatment. Medial retinopathy occurred within the treated volume in one patient at 11 months after completion of treatment without negative impact in visual acuity.

## Conclusion:

Our experience suggests that patients with tumors involving the skull base will benefit from high-dose conformal proton therapy treatments.