AbstractID: 5809 Title: Breathing characteristics of patients undergoing long treatment sessions

Purpose:
To quantify the constancy of patient respiratory motion over the long treatment times required for high dose stereotactic body radiation therapy (SBRT) and to assess feasibility of the use of respiratory gating for SBRT
Method and Materials:
The respiratory motion of 26 patients undergoing SBRT to spinal sites was tracked for periods between one and two hours. A stereoscopic infra-red camera tracked reflectors attached to the patient's abdomen, chest and bony areas such as over clavicles, sternum or hips in three dimensions. Variations in the amplitude, period, the mean position of each reflector averaged over several breathing cycles, and phase differences between chest and abdominal reflectors, were examined to monitor for departures from regular diaphragmatic breathing. The fraction of time patients were breathing irregularly between the first and second half of treatment was compared to assess patient tolerance of long treatment times.
Results:
In general, patients showed similar variability in both amplitude and period. Averaged over patients, the percent standard deviations were 30.6% and 29.4% respectively. Changes in relative amplitudes between the abdominal and chest markers, an indicator of a change from diaphragmatic to chest breathing, were infrequent. No increase in the frequency of chest breathing was observed with time. The standard deviation of the amplitudes and periods in the first half of the data was not significantly different from those in the second half, indicating no overall changes in breathing patterns.
Conclusion:
In spite of the long treatment times, no significant changes in respiratory patterns, nor increases in irregular breathing, were observed. This indicates that the long treatment time is not a factor in deciding whether or not gating can be used for patients treated to sites affected by respiratory motion.