

## Abstract ID: 9553 Title: A comparative analysis of *in vivo* and *ex vivo* prostate volumes using CT and ultrasound imaging

**Purpose:** Several studies have reported computerized tomography (CT) overestimates prostate volume by 30 to 50% in comparison to ultrasound in prostate radiation therapy. To further elucidate this phenomenon, we compared the differences in prostate volume assessed by ultrasound and CT, specifically with *in vivo* and *ex vivo* ultrasound, and *ex vivo* CT. **Method and materials:** Seven patients with localized prostate cancer treated with radical prostatectomy were enrolled. Each patient was scanned with transrectal ultrasound (TRUS) prior to surgery. Prostate specimens were immediately scanned post-surgery with both ultrasound and CT. 3-D imaging scans were acquired from the base to the apex of the prostate in the axial plane in 2 mm and 1.25 mm slices for ultrasound and CT imaging, respectively. The prostate gland was contoured on each 3-D ultrasound and CT image set by one radiation oncologist and then volume calculations were made based on voxel size. **Results:** The *in vivo* prostate volume acquired with ultrasound was on average 33.2 cc (range 25.7 – 41.3 cc). The *ex vivo* CT and ultrasound volumes of the prostate specimens were 32.8 cc (range 24.7 – 41.1) and 32.7 cc (range 24.9 – 40.3), respectively. The *in vivo* and *ex vivo* ultrasound prostate volume measurements were within 5% of each other. Overall, there was a 1 to 2% reduction between the imaged pre- and post-surgery prostate volumes. For each individual specimen the concordance between the CT and ultrasound volumes was within 5%. **Conclusions:** While several studies have consistently reported larger prostate volumes when using CT as compared to transrectal ultrasound, our study shows no intrinsic difference between ultrasound and CT imaging in terms of prostate volume measurements. Therefore, we propose the difficulty with precise prostate contour delineation encountered with CT imaging results in the frequent overestimation of the prostate gland size seen in prostate radiation therapy.