

AbstractID: 12895 Title: Comparison of inter- and intra-observer variability in prostate definition with tissue harmonic (H) and brightness (B) mode imaging

Purpose: To compare the image quality of tissue harmonic (H) with brightness (B) mode transrectal ultrasound (TRUS) images of the prostate gland, by studying the interobserver and intraobserver variation in prostate delineation. **Method and Materials:** Transrectal ultrasound images of the prostates of 10 patients were acquired using both B and H ultrasound imaging modes. The prostates on all image sets were contoured by an experienced radiation oncologist (RO) and five equally trained observers. The volumes of the prostate glands were calculated and compared among the observers, and against the RO. Prostate contours for one of the patients were drawn five times by four observers in order to evaluate the intraobserver variability. The prostate volumes were also compared to observe the inter mode (B vs H) variation. **Results:** A one sample student t-test showed that the volumes outlined by the five observers are in close ($p>0.05$) agreement with that of the RO in both imaging modes. Based on a paired student t-test it was found the prostate volumes with H mode were significantly smaller ($p=0.008$) than that of B mode. Inter- and intraobserver consistency was estimated based on standard deviations as percentages of mean volumes and concordance indices (CIs). It was found that for smaller prostate glands (≤ 35 cc) H mode provides more consistency amongst observers (higher CI) compared to B mode; however for larger glands (≥ 35 cc) B mode provides more consistent results. Intraobserver consistency was also higher for H mode compared to B mode. **Conclusion:** Prostate volumes defined with H mode are significantly smaller compared to B mode. H mode improves inter- and intraobserver consistency in volume differentiation for smaller to medium prostate glands. In larger glands, H mode does not show any advantage over the B mode.