

Purpose To evaluate the interfraction and intrafraction reproducibility of intrahepatic tumor position using an active breathing control (ABC) and on-line CBCT for direct tumor targeting in patients with unresectable liver cancer after transarterial chemoembolization (TACE) .

Methods Thirteen patients with liver cancer were treated with RT on study. Prior to radiotherapy, all patients underwent TACE which was performed with infusion of a mixture of iodized oil contrast medium and chemotherapeutic agents. K_v fluoroscopy was used to measure lipiodol spots position potential motion during ABC breath holds. ABC was used for planning CT scans and radiation delivery with the breath held at the same phase of the respiratory cycle (near end-exhale). CBCT were taken using Varian IGRT system . They were compared online to previously computed CT using a 3D-3D matching tool .Analysis relied on lipiodol spots on planning CT and CBCT by mannul. The treatment table was moved to produce acceptable setup,and began treatement delivery. Repeat CBCT images and another analysis were obtained after irradiation.

Results No motion of the intrahepatic tumor was observed on fluoroscopy during ABC breath holds macroscopicly. From analyses of 130 sets of CBCT after RT , the average intrafraction craniocaudal(CC) , anterior posterior(AP),and mediolateral (ML) reproducibility (σ) of the hepatic tumor position using ABC breath holds was 3.2 mm ,2.2mm and 1.8mm,respectively. However, based on 130 sets of CBCT prior to RT,

AbstractID: 6749 Title: The primary study of image guided radiotherapy in liver tumor

the average interfraction CC,AP,and ML reproducibility (σ) of the hepatic tumor was 6.8 mm , 4.4 mm and 3.3mm, respectively.

Conclusion Daily direct tumor targeting of liver cancers relying on lipiodol spots using CBCT and ABC is feasible . Our preliminary data demonstrate good intrafraction reproducibility of intrahepatic tumor position using ABC. However, the interfraction inhepatic tumor position is worse, suggesting the need for daily on-line image guidance.