

Purpose: On-board imager (OBI) has been implemented to improve the in-room patient positioning. It is therefore important to establish quality assurance (QA) procedure to ensure proper functionality and operational accuracy. This report presents monthly OBI QA procedure, which includes checking collision interlocks, isocenter, digital measurements, and image qualities.

Method and materials: OBI system consists of mega-voltage detector (MVD), kilo-voltage x-ray source (KVS) and detector (KVD), which are linked to the workstation. The workstation provides a platform for acquisition/analysis of images and auto-couch motion for repositioning. For collision interlock test, possible collisions are made to check sound alarm and motion interlocks of the system itself, radiation machine (LINAC), treatment couch and OBI console. The isocenters of MVD, KVS and KVD should coincide with the isocenter of the LINAC. The vertical distance from the isocenter to each device and longitudinal/lateral shift of the isocenter should be measured. The isocenter reproducibility is tested after vertical movement of each device. The digital measurement tool accuracy should be tested as a part of mechanical tests. This digital measurement test confirms magnification and accuracy of digital read for MVD and KVD. For image quality tests, the Las Vegas phantom and the Leeds TOR 18FG phantom are used for MVD and KVD respectively. The visible disks in raw and column in the Vegas image determines the contrast and resolution of MVD. The number of disks visible in the Leeds image determines the contrast and the visible line-pair per mm determines the resolution of KVD.

Result: The procedure has been performed for monthly OBI QA. Only small variations within the acceptable range have been found.

Conclusion: The suggested QA tests assure reliable portal images for verification of daily patient positioning using OBI. It is very important to set up a standard procedure to provide acceptable clinical service.