

AbstractID: 11669 Title: Testing for Optimal Grid Choice in Automated Bedside Imaging

Purpose: The BRAGA (Bedside Radiography Automatic Grid Alignment) mobile x-ray unit utilizes automated positioning of the x-ray focal spot and grid to allow the use of grids in bedside imaging without compromising image quality. Because of the imprecision of manually aligning the grid and focal spot, it was previously difficult to characterize the grid that would produce optimal results. We used the BRAGA unit to investigate a variety of grids at different techniques to identify superior grids for mobile chest imaging, as determined by the greatest image contrast to noise ratio (CNR). **Method and Materials:** The grids tested in this experiment were the Matiya 15:1, the Matiya 12:1, the Smit-Röntgen 10:1, the Smit-Röntgen 13:1, and the Smit-Röntgen 15:1. A BRAGA mobile unit was used with its grid tunnel anchored to hold the grid and CR plate in place during measurements. The phantom used for imaging was the standard AAPM chest phantom (two 12"x12" blocks of 1" Lucite - 2 mm Al - 1" Lucite, separated by a 2" air gap), which was modified by the insertion into the air gap of a 4"x12"x2" Lucite block (simulating the mediastinum) with holes drilled for positive contrast and three aluminum disks placed over the mediastinum and lungs for negative contrast. Exposures were taken for each grid using the same techniques, chosen to be useful for bedside chest imaging. **Results:** The CNR was greatest for the Smit-Röntgen 13:1 grid using the standard chest phantom. Typical CNR variability between grids was 5-10%, while the standard deviation in the CNR was on the order of 1%. **Conclusion:** Implementation of the BRAGA mobile unit will allow the use of grids in an effective way, to improve CNR and diagnosis. The Smit-Röntgen 13:1 grid produced the highest CNR for positive and negative contrast objects in the chest phantom.