Purpose:
To evaluate and compare five different ionization chamber - phantom combinations for verification in routine patient specific quality assurance of RapidArc treatments.

Methods:
Fifteen different RapidArc plans conforming to the clinical standards were selected for the study. Verification plan was subsequently created for each treatment plans with different chamber-phantom combinations CT scanned. This includes Medtec- IMRT phantom with micro ionization chamber (0.007cm³) and pinpoint chamber (0.015cm³), PTW-Octavius phantom with semiflex chamber (0.125cm³) and 2D array (0.125cm³) and indigenously made Circular wax phantom with 0.6 cm³ chamber. The measured isocentre absolute dose was compared with the TPS planned.

Results:
Micro ionization chamber shows more deviations when compared to semiflex and 0.6 cm³ with a maximum variation of -4.76%, -1.49% and 2.23% for micro ionization, semiflex and farmer chambers respectively. The positive variations indicate that the chamber with larger volume slightly overestimates. Farmer chamber shows higher deviation when compared to 0.125cm³. In general the deviation was found to be less than 1% with semiflex and farmer chamber. A maximum variation of 2% between the plans was observed for 0.007cm³ ionization chamber, except for few cases. Pinpoint chamber underestimates the calculated isocentre dose by maximum 4%.

Conclusions:
Absolute dose measurements using semiflex ionization chamber with intermediate volume (0.125cm³) shows good agreement with the TPS calculated among the detectors used in this study. Positioning is very important when using smaller volume chambers as they are more sensitive to geometrical errors within the treatment fields. Also it is suggested to average the dose over the sensitive volume for larger volume chambers. The ionization chamber-phantom combinations used in this study can be used interchangeably for routine RapidArc patient specific quality assurance with a satisfactory accuracy for clinical practices.