Purpose: Comparing fixed-field intensity-modulated radiotherapy (f-IMRT) with intensity-modulated arc therapy (IMAT) treatment plans in dosimetry and practical application for cervical esophageal carcinoma.

Methods: For ten cervical esophageal carcinoma cases, f-IMRT plan (7 fixed-fields) and two IMAT plans, namely RA (co-planar 360° arcs) and RAx (co-planar 360° arcs without sectors from 80° to 110°, and 250° to 280°). DVHs were adopted for the statistics of above parameters, as well as conformal index (CI), homogeneity index (HI), dose-volumetric parameters of normal tissues, total accelerator output MUs, and total treatment time.

Results: There were differences between RAx and f-IMRT as well as RA in PTV parameters such as HI, V95% and V110%, but not in CI. RAx reduced lung V5 from (50.9±9.8)% in f-IMRT and (51.4±10.8)% in RA to (49.3±10.4)% in RAx (P<0.05). However, lung V30, V40, V50 and MLD increased in RAx. There was no difference in the mean heart dose in three plans. Total MU was reduced from 1174.8±144.6 in f-IMRT to 803.8±122.2 in RA and 736.2±186.9 in RAx (P<0.05).

Conclusions: Compared with fIMRT, IMAT reduced low dose volumes of lung and total MU on the basis of meeting clinical requirements.