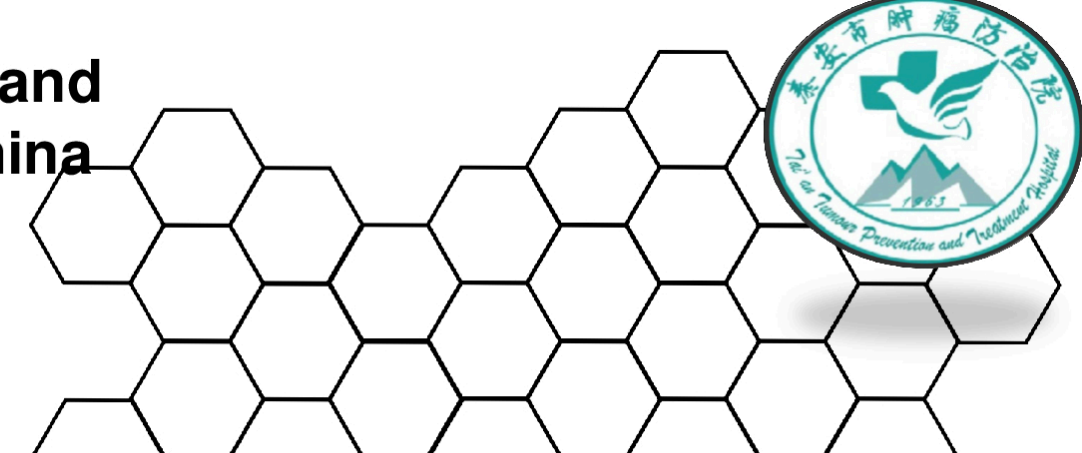


Dosimetric comparison between static intensity modulated radiotherapy and volumetric intensity modulated radiotherapy for esophageal cancer in China

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INTRODUCTION

Radiotherapy is a method for the treatment of esophageal cancer. The technique has changed from the ordinary two-dimensional irradiation to the current IMRT, IMAT and Tomotherapy Etc. At present, with volumetric modulated arc therapy (Volumetric modulated arc Therapy, VMAT) technology gradually improves, More and more hospitals are concerned about the development of VAMT, which also has many advantages in the treatment of esophageal cancer. Sixty-five patients with esophageal cancer were selected to design VMAT and sIMRT (static intensity-modulate radio-therapy, sIMRT) plans to understand their characteristics through comparative analysis.

AIM

To study the planned dosimetric differences between static intensity modulated radiotherapy (sIMRT) and Volume-modulated arc therapy (VAMT) in patients with esophageal cancer.

METHOD

65 patients with esophageal cancer treated with radiotherapy alone were assigned sIMRT and VAMT, and the dosimetric parameters of the two groups were compared.

RESULTS

Compared with sIMRT, the doses of D99, D95 and Dmean of GTV under VMRT plan were lower ($P < 0.05$). The coverage and maximum dose of 99% and 95% of PTV were high ($P < 0.05$). The coverage of 105% of PTV was low ($P < 0.05$). The conformal index and non-uniform index were similar ($P > 0.05$).

In the comparison of crisis organs, the average dose of V20 and V30 of VAMT in both lungs were 19.8% and 12.1%, the average dose of V20 and V30 of sIMRT were 22.4% and 12.95%, the dose of VMAT treatment plan in lung tissue was significantly lower than sIMRT ($p < 0.05$), can help clinicians in reducing radiation pneumonia.

Studies on cardiac dose showed that Spinal cord and heart exposures were similar in the two groups ($p > 0.05$), There was no statistically significant difference between the two, which may be related to the selected cases. In practical work, VMAT has advantages for elderly patients with poor heart function.

The ray Numbers of sIMRT and VAMT were 572.33 ± 97.9 and 754.95 ± 177.6 . sIMRT was 24% lower than VAMT ($p < 0.05$). Compared to sIMRT, The main characteristics of VMAT technology are to ensure the dose distribution in the target area, shorten the time and ray number, and improve the biological effect and treatment efficiency in the target area.

CONCLUSIONS

Compared with sIMRT, VAMT technology is characterized by ensuring dose distribution in the target area, shortening time and number of rays, improving biological effect and therapeutic efficiency in the target area, and theoretically reducing the probability of 2-carcinogenesis. In conclusion, compared with sIMRT, VAMT can improve the dose in the target area, reduce the irradiation time, and may have a better effect in the treatment of esophageal cancer.

REFERENCES

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