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Stereotactic body radiotherapy versus conventional radiotherapy for painful bone metastases: a systematic review and meta-analysis of randomised controlled trials

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Abstract

Background: Stereotactic body radiotherapy (SBRT) is a promising approach in treating painful bone metastases. However, the superiority of SBRT over conventional external beam radiotherapy (cEBRT) remains controversial. Therefore, this systematic review and meta-analysis of randomised controlled trials was conducted to compare SBRT and cEBRT for the treatment of bone metastases.

Methods: A search was conducted using PubMed on January 22, 2022, with the following inclusion criteria: (i) randomised controlled trials comparing SBRT with cEBRT for bone metastases and (ii) endpoint including pain response. Effect sizes across studies were pooled using random-effects models in a meta-analysis of risk ratios.

Results: A total of 1246 articles were screened, with 7 articles comprising 964 patients (522 and 442 patients in the SBRT and cEBRT arms, respectively) meeting the inclusion criteria. The overall pain response (OR) rates of bone metastases at 3 months were 45% and 36% in the SBRT and cEBRT arms, respectively. The present analyses showed no significant difference between the two groups. In four studies included for the calculation of OR rates of spinal metastases at three months, the OR rates were 40% and 35% in the SBRT and cEBRT arms, respectively, with no significant difference between the two groups. The incidence of severe adverse effects and health-related quality of life outcomes were comparable between the two arms.

Conclusions: The superiority of SBRT over cEBRT for pain palliation in bone metastases was not confirmed in this meta-analysis. Although SBRT is a standard of care for bone metastases, patients receiving SBRT should be selected appropriately.

Keywords: Meta-analysis; Metastasis; Quality of life; Randomised controlled trial; Stereotactic body radiotherapy; Systematic review.

Figures

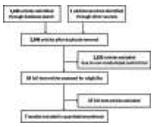

Fig. 1 Flow diagram of search strategy

Fig. 2 Forest plot for bone metastases....

Fig. 3 Forest plot for spinal metastases....

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