Trends in the Abscopal Effect After Radiation to Spinal Metastases: A Systematic Review

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Abscopal Effect

- In 1953, RH Mole first described the abscopal effect as regression of tumor remote from the irradiated tissue.
- In the *New England Journal of Medicine* publication of 2012, Postow et al. popularized the abscopal effect by describing a case of metastatic melanoma resistant to standard cisplatin, vinblastine, and temozolomide.
Methods

- A systematic review identified relevant studies via a computer-aided search of MEDLINE (1946 – October 18, 2018) and Embase (1947 – October 18, 2018)

- Inclusion Criteria
  1. cases with metastatic and/or hematological cancer to the spine
  2. “abscopal” in the title, abstract, and/or keywords.
PRISMA 2009 Flow Diagram

Identification

Records identified through database searching (n = 247)

Records after duplicates removed (n = 173)

Screening

Insufficient information in the abstract/ Full articles not available (n = 12)

Records screened (n = 171)

Records excluded because non-human studies (n = 58)

Review articles/ Non-cohort studies (n = 40)

Eligibility

Full-text articles assessed for eligibility (n = 101)

Studies included in qualitative synthesis of abscopal effect (n = 61)

-Studies included in quantitative synthesis (n = 10)

-Studies included in qualitative synthesis of abscopal effect (n = 61)

-Records excluded because non-human studies (n = 58)

-Review articles/ Non-cohort studies (n = 40)

-Included

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Results

- All 10 articles included radiation therapy to spine


- Three authors failed to observe an abscopal effect
Radiation Therapy

- Mice treated w/ high-dose, hypofractionated irradiation enhances anti-tumoral immunity measured by “tumor microenvironment” and “tumor draining lymph nodes” in T-lymphocytes

- Gy in a select few fractions, just enough to induce interferon (IFN)-related genes, such as activators of transcription and, thus, signal transducers
Immunomodulators

- Only 46 reported cases of the abscopal effect were published within the 31 articles of a systematic review by Abuodeh et al in 2014.

- The subsequent years in this study saw a rise in case reports and case series on abscopal observations with the dawn of immunomodulators.
Immunomodulators
Conclusions

(1) abscopal effect more commonly observed when systemic therapy includes immunomodulators

(2) abscopal effect has a higher likelihood of success when immunomodulators are administered in conjunction with or after RT to the spine

(3) ↑ Radiation in a smaller number of fractions likely increase the abscopal success

(4) ionizing radiation to the bone marrow of the spinal column may increase circulating lymphocytes that attack cancerous lesions elsewhere in the body.