

Skin Radiation Oncology

10 High-Yield Board-Style Practice Questions

Original board-style practice questions for radiation oncology residents, written in ABR single-best-answer format with detailed rationales. These are original questions created for educational review and are not reproductions of actual ABR examination content.

Question 1

A 78-year-old man on chronic immunosuppression after renal transplant has a 2.2 cm cutaneous squamous cell carcinoma (cSCC) of the helix with perineural invasion on biopsy but no palpable adenopathy. Which combination of features most strongly supports considering this clinically high-risk disease requiring more aggressive management?

- A. Tumor diameter alone
- B. Patient age
- C. Location on non-sun-exposed skin
- D. Perineural invasion and immunosuppression
- E. Absence of ulceration

Answer: D. Perineural invasion and immunosuppression

Rationale: Perineural invasion and chronic immunosuppression, particularly in solid-organ transplant recipients, are important high-risk features associated with increased risks of local recurrence, nodal metastasis, and disease-specific mortality in cSCC. The ear is also a high-risk anatomic location.

References:

Stratigos AJ, Garbe C, Dessinioti C, et al. European consensus-based interdisciplinary guideline for invasive cutaneous squamous cell carcinoma. Part 1: Diagnostics and prevention—Update 2023. *Eur J Cancer*. 2023;193:113251.

de Jong E, Genders R, Harwood CA, et al. Cumulative incidence and risk factors for cutaneous squamous cell carcinoma metastases in organ transplant recipients: the Skin Care in Organ Transplant Patients in Europe—International Transplant Skin Cancer Collaborative metastases study. *J Am Acad Dermatol*. 2024;90(6):1200-1209.

Question 2

Perineural invasion involving a named nerve on imaging in cutaneous SCC of the head most directly increases the risk for which pattern of failure?

- A. No change in management is warranted
- B. Retrograde spread along the nerve toward the skull base and potential intracranial extension
- C. Distant metastasis to bone only
- D. Isolated regional nodal disease without local implications
- E. Increased risk of a second primary melanoma

Answer: B. Retrograde spread along the nerve toward the skull base and potential intracranial extension

Rationale: Gross perineural spread can track proximally along named nerves toward the skull base. MRI is particularly useful for defining the extent of perineural disease and can influence radiation target design, including coverage of the involved nerve pathway toward the skull base.

References:

Lin CY, Ladwa R, Sommerville R. Perineural spread and base of skull involvement in cutaneous squamous cell carcinoma—a critical review from an endemic region. *Curr Oncol*. 2026;33(5):250.

Stambuk HE. Perineural tumor spread involving the central skull base region. *Semin Ultrasound CT MR*. 2013;34(5):445-458.

Question 3

A patient with cutaneous SCC of the scalp has clinically positive ipsilateral parotid and cervical lymph nodes. Which nodal basins are relevant to the radiation treatment volume?

- A. Both parotid and cervical nodal basins
- B. Mediastinal nodes
- C. Parotid nodes only
- D. Cervical nodes only
- E. Inguinal nodes

Answer: A. Both parotid and cervical nodal basins

Rationale: Because metastatic disease is clinically established in both the ipsilateral parotid/periparotid and cervical nodal basins, both regions are relevant to radiation treatment-volume design. The specific extent of treatment should be individualized according to the distribution and burden of nodal disease and other clinical and pathologic risk factors.

Reference:

Veness MJ, Porceddu S, Palme CE, Morgan GJ. Cutaneous head and neck squamous cell carcinoma metastatic to parotid and cervical lymph nodes. *Head Neck*. 2007;29(7):621-631.

Question 4

A patient has a 2.1 mm-thick melanoma of the trunk with ulceration and no palpable nodes. Which features determine the AJCC 8th edition T category of the primary tumor?

- A. Mitotic rate
- B. Breslow thickness and ulceration status
- C. Tumor diameter
- D. Color of the lesion
- E. Presence of a nevus precursor

Answer: B. Breslow thickness and ulceration status

Rationale: The melanoma T category is determined principally by Breslow thickness and ulceration status. Mitotic rate was removed as a formal T-category criterion in AJCC 8th edition, making it an important potential distractor in staging questions. A 2.1 mm ulcerated melanoma is categorized as T3b.

Reference:

Gershenwald JE, Scolyer RA, Hess KR, et al. Melanoma staging: evidence-based changes in the American Joint Committee on Cancer eighth edition cancer staging manual. *CA Cancer J Clin*. 2017;67(6):472-492.

Question 5

Which of the following represents an established role for adjuvant radiation therapy in melanoma?

- A. First-line treatment replacing wide local excision for all primary melanomas
- B. Adjuvant treatment of a dissected nodal basin in selected patients with high-risk features such as extranodal extension or substantial nodal burden
- C. Radiation has no role in melanoma
- D. Radiation is indicated only for ocular melanoma
- E. Routine adjuvant radiation for all resected stage I melanoma

Answer: B. Adjuvant treatment of a dissected nodal basin in selected patients with high-risk features such as extranodal extension or substantial nodal burden

Rationale: Adjuvant RT to a dissected nodal basin can improve regional control in selected patients at particularly high risk for nodal-field recurrence, including those with extranodal extension or substantial nodal disease burden. Its

use is individualized in the modern era of effective adjuvant systemic therapy. Radiation also remains important for selected primary-site indications and for palliation or stereotactic treatment of metastatic disease.

Reference:

Henderson MA, Burmeister BH, Ainslie J, et al. Adjuvant lymph-node field radiotherapy versus observation only in patients with melanoma at high risk of further lymph-node field relapse after lymphadenectomy (ANZMTG 01.02/TROG 02.01): 6-year follow-up of a phase 3, randomised controlled trial. *Lancet Oncol.* 2015;16(9):1049-1060.

Question 6

Desmoplastic melanoma is notable for which clinical behavior relevant to radiation treatment planning?

- A. Relatively lower nodal metastatic risk but greater propensity for local recurrence and perineural invasion, sometimes prompting consideration of adjuvant radiation
- B. Complete radioresistance
- C. Very high rates of early nodal metastasis compared with other melanoma subtypes
- D. Exclusive occurrence on mucosal surfaces
- E. No association with sun exposure

Answer: A. Relatively lower nodal metastatic risk but greater propensity for local recurrence and perineural invasion, sometimes prompting consideration of adjuvant radiation

Rationale: Desmoplastic melanoma generally has a lower propensity for nodal metastasis than conventional melanoma but an increased tendency toward local recurrence and perineural invasion. These characteristics can support consideration of adjuvant RT to the primary site in selected high-risk patients rather than its routine use in all patients with desmoplastic melanoma.

Reference:

Sharafi CS, Guadagnolo BA, Nelson KC, Mitra D. Adjuvant radiation therapy in desmoplastic melanoma: a scoping review. *Cancers (Basel).* 2024;16(22):3874.

Question 7

When treating a superficial skin cancer with electrons, why is bolus commonly applied over the target?

- A. To reduce the electron energy required
- B. To increase the depth of the 90% isodose line
- C. To increase surface dose and shift the electron depth-dose distribution toward the skin
- D. To reduce lateral scatter beyond the field edge

Answer: C. To increase surface dose and shift the electron depth-dose distribution toward the skin

Rationale: Electron beams have a dose maximum beneath the skin surface. Tissue-equivalent bolus increases surface dose and shifts the electron depth-dose distribution toward the skin, helping ensure adequate coverage of a superficial target.

Reference:

Vyas V, Palmer L, Mudge R, et al. On bolus for megavoltage photon and electron radiation therapy. *Med Dosim.* 2013;38(3):268-273.

Question 8

In the phase III C-POST trial, patients with high-risk cutaneous SCC who had completed surgery and postoperative radiation therapy were randomized to adjuvant cemiplimab or placebo. What was the key finding?

- A. Cemiplimab showed no disease-free survival benefit
- B. Cemiplimab significantly improved disease-free survival, with a hazard ratio of approximately 0.32 and estimated 24-month DFS of approximately 87% versus 64% with placebo
- C. Cemiplimab improved overall survival but not disease-free survival

D. The trial was stopped early for futility

Answer: B. Cemiplimab significantly improved disease-free survival, with a hazard ratio of approximately 0.32 and estimated 24-month DFS of approximately 87% versus 64% with placebo

Rationale: C-POST demonstrated a significant disease-free survival benefit with adjuvant cemiplimab following surgery and postoperative RT in patients with high-risk cSCC. The hazard ratio for disease recurrence or death was 0.32, with estimated 24-month DFS of 87.1% with cemiplimab versus 64.1% with placebo. Overall survival data were immature at the initial analysis.

Reference:

Rischin D, Porceddu S, Day F, et al.; C-POST Trial Investigators. Adjuvant cemiplimab or placebo in high-risk cutaneous squamous-cell carcinoma. *N Engl J Med*. 2025;393(8):774-785.

Question 9

The phase III KEYNOTE-630 trial evaluated adjuvant pembrolizumab versus placebo following surgery and radiation therapy in patients with high-risk locally advanced cutaneous SCC. What was the outcome?

- A. Pembrolizumab significantly improved recurrence-free survival
- B. The trial was not conducted because of lack of equipoise
- C. Pembrolizumab did not meet the prespecified statistical criterion for a significant improvement in recurrence-free survival, and the trial was stopped for futility
- D. Pembrolizumab demonstrated benefit only in PD-L1-positive tumors

Answer: C. Pembrolizumab did not meet the prespecified statistical criterion for a significant improvement in recurrence-free survival, and the trial was stopped for futility

Rationale: Although the numerical results favored pembrolizumab, KEYNOTE-630 did not meet the prespecified statistical criterion for a significant improvement in its primary recurrence-free survival endpoint compared with placebo. The 24-month RFS rates were 78.3% with pembrolizumab versus 68.6% with placebo (HR 0.76; P=0.07243). The study was stopped for futility. This contrasts with the significant DFS benefit demonstrated with cemiplimab in C-POST.

Reference:

Koyfman SA, Lee JHJ, Mortier L, et al. Phase 3 randomized trial (KEYNOTE-630) of adjuvant pembrolizumab versus placebo for high-risk locally advanced cutaneous squamous cell carcinoma following surgery and radiation. *J Clin Oncol*. 2025;43(16_suppl):6000. [Meeting abstract]

Question 10

FLASH radiotherapy is being investigated for localized cutaneous basal cell and squamous cell carcinomas. What is a major rationale for evaluating FLASH-RT?

- A. Conventional-dose-rate RT provides inadequate tumor control
- B. FLASH-RT may reduce radiation-associated normal-tissue toxicity while maintaining tumor control
- C. FLASH-RT increases treatment time and thereby improves tumor control
- D. Conventional electron therapy cannot adequately treat skin cancers

Answer: B. FLASH-RT may reduce radiation-associated normal-tissue toxicity while maintaining tumor control

Rationale: FLASH radiotherapy delivers radiation at ultra-high dose rates. Preclinical studies suggest a potential “FLASH effect,” in which normal-tissue injury may be reduced while antitumor efficacy is maintained. Clinical investigation is evaluating whether this advantage translates to patients, including potential reductions in radiation-associated skin toxicity. FLASH-RT remains investigational and is not currently a standard treatment for skin cancer.

Reference:

Kinj R, Gaide O, Jeanneret-Sozzi W, et al. Randomized phase II selection trial of FLASH and conventional radiotherapy for patients with localized cutaneous squamous cell carcinoma or basal cell carcinoma: a study protocol. *Clin Transl Radiat Oncol*. 2024;45:100743.

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