Writing Multiple Choice Questions for *AJR Integrative Imaging*

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The purpose of multiple choice questions in *AJR Integrative Imaging* is to provide readers an opportunity for self-assessment. Feedback to the reader is essential, so an explanation of each of the correct and incorrect options should be prepared. The content of the questions should correspond to the learning objectives of the educational activity. We are not attempting to quantify performance or establish benchmarks for passing. All of our multiple choice questions should have a stem and several answer options, exactly one of which will be correct. The stem is the part of the question that asks for a response. The incorrect answer options are called distracters. Here are hints and guidelines for writing multiple choice questions for *AJR Integrative Imaging*.

1. Questions should focus on important, relevant concepts.
2. Questions should ask the student to perform a single task, such as:
   a. Recall information
   b. Apply knowledge
   c. Solve a problem
   d. Interpret a diagnostic image
3. Questions may include diagnostic images or other graphic material in the stem.
4. Questions may include a case presentation in the stem.
5. Each question should focus specifically on a single concept that the writer wishes to test. It is best to ask the question directly. For example, if the writer wants the reader to recall the definition of the silhouette sign, the stem might be "What is the definition of the silhouette sign?" followed by several possible definitions as answer options.
6. Avoid controversy, unless the existence of controversy is the important concept being tested.
7. Stems that ask a question are better than stems that require the reader to complete a sentence. For example, "What is the silhouette sign?" is preferred to "The silhouette sign is _____?"
8. Avoid using fill-in-the-blank stems, such as "The ____ sign is defined as…"
9. One successful technique for constructing stems is to use a linear path: background + situation + request for response. For example, "In children with cardiomegaly, what is the most common tumor of the heart?"

10. Do not attempt to "trick" the test taker by using convoluted language, reverse logic or double negatives.
11. Try to compose stems that pose a question that is answerable without consulting the list of options. A question such as "What is the definition of the silhouette sign?" is preferred to a question such as "Which of the following is correct regarding the silhouette sign?"
12. Include any required assumptions in the stem.
13. Writing plausible but clearly incorrect distracters may be challenging. One way to construct distracters is to imagine common misconceptions about the subject and write responses based on that incorrect knowledge.
14. The best distracters are those that are mutually exclusive from each other and from the correct answer.
15. If using numerical values as distracters, the values should be arranged logically (generally smallest to largest); if using ranges, the ranges should be non-overlapping and logically chosen.
16. Do not use "All of the above" or "None of the above" as options.
17. Do not use the terms "always" and "never" in the distracters.
18. All of the options, correct answer as well as distracters, should be of similar length on the page. There is a tendency for the correct answer to have more words than the distracters.
19. All of the options, correct answer as well as distracters, should have similar grammatical construction. There is a tendency for the correct answer to be grammatically different from the distracters.
20. Multiple choice questions for *AJR Integrative Imaging* should have four or five answer options, one correct answer, and three or four distracters.
21. It is better to have a long stem with short responses than to have a short stem with long responses.
22. Each question should have at least one reference to the medical literature other than the article that the question accompanies. The reference(s) should be numbered and indicated in brackets like other references in the article, and should appear in the explanation of the correct answer. References for distracters may also be included at the option of the author.
23. Edit the question until it is clear and concise. Ask a resident or colleague to try the question to make sure that it is clear and understandable.

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