Gadoxetic Acid-induced Acute Transient Dyspnea: 
The Perspective of Japanese Radiologists

Utaroh MOTOSUGI1,2*

1Department of Radiology, University of Wisconsin, Madison, WI, USA
2Department of Radiology, University of Yamanashi, Yamanashi, Japan

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Acute transient dyspnea after intravenous administration of gadoxetic acid is a newly recognized side effect reported from the United States in 2013.1 Although it is self-limited and not harmful, it can deteriorate the quality of images obtained during the arterial phase. According to the Davenport et al.,1 14% (14/99) of patients who received gadoxetic acid complained of transient dyspnea. Severe motion-related artifacts during the arterial phase were observed in approximately 18%2 or 10%3 of patients in whom gadoxetic acid was injected. However, even after 2 years passed from the first report, this phenomenon has been only reported from United States.1–3 At least, it was not observed in the recent study from Japan which is about gadolinium-based contrast agents-related adverse events in large cohort.4 I also met some radiologists who even doubted the occurrence of dyspnea, because they had not encountered such cases. In facts, Japan is the largest consumer of gadoxetic acid in the world, probably because of increased interest in the early detection of hepatocellular carcinoma in cirrhotic livers.5,6 About a half of gadoxetic acid is marketed in Japan (based on personal communication with Bayer Healthcare); this makes me wonder why this side effect has not been reported very often in Japan.

To reveal what Japanese radiologists think of this phenomenon, I administered personal questionnaires to 10 experienced Japanese radiologists who are committing both clinical magnetic resonance imaging and research using gadoxetic acid. The questionnaire asked their opinion about dyspnea after gadoxetic acid injection and the frequency of image deterioration during arterial phase imaging. The results are summarized in the table. Interestingly, more than half of them (6/10, 60%) have never encountered patients who complained of dyspnea after gadoxetic acid administration. However, most of them also feel that image quality in arterial phase is deteriorated when using gadoxetic acid.

Before these reports, artifacts on gadoxetic acid-enhanced arterial phase images were discussed from the view point of truncation artifacts or ringing artifacts (mostly from Japan), which may be caused by rapid injection or a small volume and/or strong T1-shortening effect of gadoxetic acid.7 Pietryga et al. used multiple arterial phase acquisitions and showed more severe artifacts in the later arterial phase, suggesting that at least the artifacts reported in their paper is respiration-related rather than truncation artifacts.3 However, it would be worth to reconsider if the artifacts discussed in papers about transient dyspnea and truncation are completely different from one another. I am also curious to see if there is some race difference for this new side effect. Additionally, a larger physical built of patients in the United State might increase the scan time and cause a higher rate of breath hold failure. In any case, it is important to continue the monitoring and research of this new side effect.

**Table**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answers</th>
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<tbody>
<tr>
<td>Q1: Have you ever experienced patients who complained dyspnea after gadoxetic acid injection?</td>
<td>Yes (4), No (6)</td>
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<tr>
<td>Q2: Do you think it’s true that arterial phase with gadoxetic acid has more artifacts compared with other Gd contrast agents?</td>
<td>Yes (6), No (4)</td>
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<td>Q3: What is the rate of degradation of image quality during arterial phase when using gadoxetic acid?</td>
<td>&lt;1% (0), 1–5% (2), 5–10% (2), 10–20% (6), &gt;20% (0)</td>
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<tr>
<td>Q4: What is the dose of gadoxetic acid?</td>
<td>0.025 mmol/kg (10), others (0)</td>
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</table>

Note: All questions were answered by 10 radiologists. Numbers in the parentheses are the number of response.
case, I believe further investigation is warranted to clarify the occurrence of this effect outside the United States. Large cohorts belonging to countries other than the United States would provide further knowledge on this issue.

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References


