Can tamoxifen relieve motion sickness?

Motion sickness (MS) is an unpleasant and sometimes disabling condition in response to the perception of certain kinds of motions. Its pathogenesis is incompletely understood: interactions between endocrine mechanisms and the vestibular apparatus are likely, as suggested by a higher incidence and severity of MS in females and pregnancy, the reported changes in MS susceptibility during the menstrual cycle, and an affinity with migraine [1, 2].

We recently heard about two sisters, both breast cancer patients who were followed-up at the European Institute of Oncology in Milan (Table 1), who had experienced a striking reduction of their intense sea sickness after receiving tamoxifen (TAM). We evaluated the patients by means of a standardized MS susceptibility questionnaire (MSSQ-short) [3]. MSSQ-short evaluates the experience of sickness following nine types of transport or motion before the age of 12 and ‘over the last 10 years’, and three different scores are calculated to express MS susceptibility: a childhood score (MSA), an adulthood score (MSB) and a MSSQ-short raw score (MSA + MSB). To evaluate the changes in MS after TAM therapy, the patients were asked to fill in, retrospectively, MSSQ-short questionnaires for periods preceding and following the start of TAM. Two MSSQ raw scores, one for the pre-TAM period and one for the post-TAM period, could be obtained and compared. As MSSQ-short was not originally intended to be used for the assessment of MS modification following any kind of intervention, our modification should only be regarded as an explorative attempt to look at

Table 1. Characteristics of two patients and results of MSSQ-short

<table>
<thead>
<tr>
<th>Patients</th>
<th>Age</th>
<th>Menopausal status</th>
<th>Histology/ stage</th>
<th>Surgery</th>
<th>Adjuvant therapy</th>
<th>MSSQ-short (pre-TAM)</th>
<th>MSSQ-short (post-TAM)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MSA</td>
<td>MSB</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MSSQ raw scores (percentile scores)</td>
<td>MSSQ raw scores (percentile scores)</td>
</tr>
<tr>
<td>1</td>
<td>42</td>
<td>Pre</td>
<td>LIC pT1cN0 M0</td>
<td>Bilateral mastectomy (left prophylactic)</td>
<td>TAM Goserelin → bilateral prophylactic oophorectomy</td>
<td>21.4</td>
<td>18.0</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>Pre</td>
<td>DCIS</td>
<td>Left quadrantectomy and SNB</td>
<td>TAM</td>
<td>9.0</td>
<td>13.6</td>
</tr>
</tbody>
</table>

Pre, premenopausal; SNB, sentinel node biopsy; LIC, lobular infiltrating carcinoma; DCIS, ductal in situ carcinoma; MSA, motion sickness score for childhood; MSB, motion sickness score for adulthood; MSSQ, motion sickness susceptibility questionnaire.

MSSQ raw scores = MSA + MSB.
the patients’ stories with more objectivity. The evaluation of the questionnaires showed that, after TAM, both patients felt sick less frequently after different kinds of transport or motion. This observation is clearly evident looking at modifications of MS scores after TAM (Table 1). If this observation is real, how can it be explained?

TAM could simply decrease MS susceptibility by interfering with the menstrual cycle, although disturbances in postural balance are common in postmenopausal women and TAM itself may cause vertigo. MS is associated with gastric dysrhythmias: estrogens may also disrupt normal gastric slow-wave rhythm, which could be prevented by TAM. We know that a number of neurotransmitters, neuromodulators, hormones and others pharmacological agents influence the activity of vestibular system and potentially affect the occurrence of MS. Of particular interest is the evidence of steroid modulation of GABA and glutamate receptors in the brain and central vestibular pathways. Estrogens and TAM can interfere with gene expression and two studies seem particularly intriguing: (1) animal studies looking at gene expression after vestibular stimulation or gravity modifications have shown Fos induction with subsequent reduction of Fos expression after adaptation to motion [4]; and (2) estrogens and TAM could interact with GABAergic neurotransmission and c-Fos induction/inhibition could be important in these pathways [5].

Our strange clinical observation obviously needs confirmation and further investigation. However, it seems to us that even 40 years after the introduction of TAM in clinics, when new drugs are establishing themselves as first-line choice in breast cancer treatment, TAM appears to retain interest and surprise.

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References


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