“Means of Sedation”. A Commentary on “Music does not Alter Anxiety in Patients with Suspected Lung Cancer Undergoing Bronchoscopy: A Randomised Controlled Trial” – European Clinical Respiratory Journal

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Bronchoscopy plays a major role in diagnosing lung cancer. The thought of undergoing a bronchoscopy may provoke fear in patients [1]. In our study, the anxiety level of the patients included varied from no anxiety to high anxiety, with a median anxiety score of 39, measured with STAI (Spielberger’s State-Trait Anxiety Inventory). The inventory has a minimum score of 20 and a maximum score of 80. Higher scores indicate higher levels of anxiety.

There are different practices of sedation for patients undergoing bronchoscopy stretching from topical anesthesia to deep sedation with moderate sedation in between. In the out-patient clinic at Bispebjerg Hospital the most common means of sedation is a combination of midazolam and fentanyl. This is a safe sedation for most patients, but needs to be administered cautiously because of the risk of adverse side effects such as respiratory depression [2–5]. Reduced lung function causes an increased risk of respiratory adverse side effects. Smoking is a common cause of both lung cancer and reduced lung function, and therefore a considerable number of patients undergoing bronchoscopy suffer from reduced lung function. In our study the mean FEV1 was 75.0% (SD 22.3) of the predicted FEV1 for the included patients and 66.4% (SD 21.67) of predicted for the excluded patients. So, even lower for the excluded patients.

Therefore it is interesting to investigate other means of sedation or supplementary ways of sedation to conscious sedation with small to no respiratory side effects. Music could be such a supplement to conscious sedation, with no respiratory side effects, but the question is whether it works as supplement to conscious sedation or whether it is a waste of the staff’s time and effort. This has been investigated before, both with regard to bronchoscopy but also with other endoscopic procedures, but with different outcomes, music, audio devices and with contradictory findings [6–10]. Our study showed that there was no effect of music on patients’ anxiety, when adjusted for gender and baseline anxiety (Table 1), but patients rated their experience of the sound in the operating theatre much more positively when listening to music (MusiCure) in the operating theatre (Figure 1). The result could be confounded by the length of the music intervention, before the questionnaire was administered, which was just 10 minutes, and could also be confounded by the fact that researcher-selected music was used instead of patient-selected music [11,12]. There were no significant differences between the groups in confounders such as duration of the bronchoscopy, physician who performed the bronchoscopy or procedures performed during the bronchoscopy.

In addition to the anxiety questionnaire (STAI), which was the primary outcome, a sample of plasma cortisol was taken from the patient’s peripheral venous catheter for analysis of plasma cortisol 15 and 60 minutes after termination of the bronchoscopy. There was no significant difference between the music and the no-music group in P-cortisol, neither 15 nor 60 minutes after termination of the bronchoscopy. This result could be confounded by the administration of midazolam and fentanyl, which also affects the value of P-cortisol [13–15].

A bronchoscopy contains different diagnostic procedures. The most frequent diagnostic procedures performed throughout the bronchoscopy, in our study, were BAL (Bronchoalveolar Lavage),

Table 1: Linear model of predictors of STAI state immediately before bronchoscopy, with 95% bias corrected and accelerated confidence intervals reported in parentheses [21]. (Model 1: N= 143, R² = .04; Model 2: N = 136, R² = .84).

<table>
<thead>
<tr>
<th>Model</th>
<th>b</th>
<th>SE</th>
<th>β</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>Constant</td>
<td>41.26 (37.95 to 44.56)</td>
<td>1.67</td>
<td>P &lt; .0001*</td>
</tr>
<tr>
<td>Group</td>
<td>-5.31 (-9.94 to -0.68)</td>
<td>2.34</td>
<td>-0.19</td>
<td>P = .025*</td>
</tr>
<tr>
<td>Model 2</td>
<td>Constant</td>
<td>0.81 (-3.45 to 5.08)</td>
<td>2.16</td>
<td>P = .706</td>
</tr>
<tr>
<td>Group</td>
<td>-1.17 (-3.09 to 0.76)</td>
<td>0.98</td>
<td>-0.04</td>
<td>P = .234</td>
</tr>
<tr>
<td>STAI State at arrival</td>
<td>0.87 (0.77 to 0.96)</td>
<td>0.05</td>
<td>0.80</td>
<td>P &lt; .0001*</td>
</tr>
<tr>
<td>STAI Trait at arrival</td>
<td>0.17 (0.07 to 0.28)</td>
<td>0.05</td>
<td>0.13</td>
<td>P = .001*</td>
</tr>
<tr>
<td>Gender</td>
<td>-2.38 (-4.41 to -0.35)</td>
<td>1.03</td>
<td>-0.09</td>
<td>P = .022*</td>
</tr>
</tbody>
</table>

Figure 1: Patients’ overall perception of the sounds in connection with the procedure. The horizontal lines represent the median within the group [21].
BB (Brush Biopsy) and EBUS (Endobronchial Ultrasound) (Figure 2).

Despite the sedation with midazolam and fentanyl we saw, interestingly, a significant effect on P-cortisol between patients who had an EBUS performed (n = 67) and patients who had not (n = 84) (Table 2). The number of patients analyzed are of course not sufficient to draw a final conclusion, but it might indicate that having an EBUS performed is more stressful for the patient, and perhaps the means of sedation should be adjusted to this higher stress level.

Different means of sedation during EBUS has been investigated before, and comparing deep sedation with moderate sedation there has been found a comparable diagnostic yield and safety profile between moderate sedation and deep sedation, and most patients would repeat the procedure if necessary both with deep sedation and moderate sedation [16–19]. The most commonly reported symptom was cough with moderate sedation reported by Jeyabalan and Medford [19]. Viedma et al reports a prospective observational study conducted with five different combinations of sedation including both deep sedation and moderate sedation. They also include a questionnaire for patients about their comfort during the EBUS. They report high comfort during both deep sedation and moderate sedation. In the article it is not stated if there are any significant differences between the groups regarding discomfort and satisfaction with the procedure, but it seems to be quite the same, and their conclusion is that all the means of sedation are tolerated, and that most patients are willing to undergo an EBUS more, if necessary, with both deep sedation and moderate sedation [20].

Regardless whether deep sedation or moderate sedation is the best means of sedation for EBUS that was not the focus of our study, we focused on whether music could relieve anxiety for patients suffering from possible lung cancer undergoing bronchoscopy. We found no effect on anxiety when adjusting for gender and baseline anxiety, but patients in the music group rated the sound in the operating theatre more positively than the no-music group.

**References**


**Table 2:** Analysed with Mann-Whitney U test.

<table>
<thead>
<tr>
<th>Time of sample of p-cortisol</th>
<th>P-cortisol value with no EBUS performed (n = 84)</th>
<th>P-cortisol value with EBUS performed (n = 67)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 min after termination of the bronchoscopy</td>
<td>243 nmol/l (IQR 175)</td>
<td>283 nmol/l (IQR 208)</td>
<td>0.03*</td>
</tr>
<tr>
<td>60 minutes after termination of the bronchoscopy</td>
<td>170 nmol/l (IQR 131)</td>
<td>237 nmol/l (IQR 146)</td>
<td>0.005*</td>
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</tbody>
</table>


