



# Can we sooth the subconscious during general anaesthesia?

## Carefully chosen words and music might reduce postoperative pain

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Around the globe, more than 200 million people have surgery each year, mostly under general anaesthesia.<sup>1</sup> Although often a concern for patients, awareness—the explicit recall of events—under anaesthesia is rare (<2 per 1000 general anaesthetics<sup>2</sup>). However, a state of connected consciousness, when patients respond to external stimuli while under general anaesthesia but do not experience any explicit recall, is more common (50 to 300 per 1000).<sup>3</sup> Typically, any signs of awareness or connected consciousness are perceived unfavourably; understandably anaesthesia providers and their patients strive to avoid any negative experience or recall of unpleasant surgical stimuli.<sup>4,5</sup> As highlighted in the linked paper, however, a state of connection to the external environment without recall might also represent an opportunity to improve patients' perioperative outcomes.<sup>6</sup>

In their multicentre trial at five German tertiary care centres, Nowak and colleagues (doi:10.1136/bmj.m4284) found that in adults receiving general anaesthesia for elective surgeries of 1-3 hours duration, exposure to a recording of therapeutic suggestions accompanied by relaxing music led to a small (4 mg morphine) reduction in opioid consumption during the first 24 hours after surgery—a 16% absolute reduction in the number of patients requiring any opioid and a statistically, but not clinically, significant decrease in pain scores.<sup>6</sup>

The implications of Nowak and colleagues' study may be paradigm-changing from several perspectives. Firstly, their intervention is a relative outlier in the anaesthesia evidence base. While most interventions studied in anaesthesia focus on drug treatment,<sup>7</sup> these authors explored the clinical effect of a non-drug technique. Non-drug approaches to anaesthesia are not entirely new—for example, Belgian anaesthetist Marie-Elisabeth Faymonville, showed the feasibility and benefits of hypnosedation 25 years ago.<sup>8,9</sup> This technique—a combination of hypnosis, light drug sedation, and local anaesthesia—is now common in some European countries, including France<sup>10</sup> and Belgium.<sup>11</sup> These techniques are, however, less well known in primarily English speaking Western jurisdictions. Therefore, the robust multicentre data from Nowak and colleagues might raise awareness of this inexpensive, potentially effective, and seemingly safe non-drug option for clinicians and patients worldwide.

Nowak and colleagues' findings, along with those of other recent randomised trials, have begun to shine a spotlight on the possibility that the subconscious might be an important target for improving patient experience and outcomes. One multicentre randomised trial found that hypnosis can reduce pain

and anxiety in peripheral intravenous placement,<sup>12</sup> whereas another single centre trial showed that intentional use of nocebo-type language, setting expectations of a negative result,<sup>13</sup> can increase pain during infiltration of local anaesthetic.<sup>14</sup> If the findings from these and Nowak and colleagues' studies prove to be replicable and generalisable, the range of potential applications could be wide.

Before such findings are widely implemented, some limitations should also be addressed. Randomised trials exist on a continuum of designs between explanatory (to determine the effects of an intervention under ideal conditions) and pragmatic (to determine the effects of a trial under usual conditions).<sup>15,16</sup> The work of Nowak and colleagues largely aligns with an explanatory design.<sup>17</sup> They employed strict inclusion and recruitment criteria in hospitals limited to tertiary care centres, tightly controlled intraoperative and postoperative care, and had strict follow-up procedures. Furthermore, although opioid consumption and pain scores are valued by patients,<sup>18-20</sup> these early outcomes are largely proximal surrogates on the causal pathway from an intraoperative intervention to improved medium and long term recovery. In fact, their explanatory design might, in part, explain the surprising finding that their effect sizes in a multicentre trial were larger than those previously reported in single centre studies.<sup>21</sup>

Moving forward, important questions remain as trial data begin to emerge that challenge the dominant belief that patients under general anaesthesia lack any connection to the external environment. Firstly, emerging evidence suggests that music therapy modifies pain through emotions, which can activate the endocrine system and physiological function. This raises the intriguing possibility that the same emotional mediator was operating in Nowak and colleagues' anaesthetised participants.

Secondly, while Nowak and colleagues used a single German music track, music therapy is not homogenous. Just as a drug effect depends on dose, concentration, timing, and individual patient's characteristics, music's effect may depend on the rhythm, tone, volume, and listeners' characteristics (such as different levels of musical training).<sup>22</sup> For example, some music is known to activate waves in the brain that induce a state of deep relaxation, whereas other types modify different electroencephalogram signals.<sup>23,24</sup> Thirdly, while Nowak and colleagues used evidence based verbal suggestions, spoken language might be as complex as music. People from different cultures, for example, could react differently to the same words.

Personalisation of therapeutic suggestions and music could potentially yield greater effects.

Finally, as outpatient surgical volumes increase,<sup>25</sup> surgical populations continue to age,<sup>26</sup> and patient reported outcomes increase in priority,<sup>27</sup> future trials should evaluate the effectiveness of therapeutic suggestion in pragmatic trials enrolling a wider population of patients and focused on important, patient reported measures of recovery.<sup>28</sup>

Although multicentre trials often bring a definitive answer to a research question, this trial is very much the beginning of an important line of inquiry that may change future practice.

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