

over  $100 \text{ kUL}^{-1}$  in the morning regarded themselves as being 'night persons'. Anaesthesiology is a stressful occupation due to long working hours, fatigue, demanding interpersonal relations, the need for sustained vigilance, unpredictability of work, fear of litigation, competence pressure and production pressure [4]. Chronic exposure to these factors can lead to stress disorders (burnout, drug addiction and suicide) and/or human error. Furthermore, it is natural to assume that medical trainees have a large burden of stress during their training period. We found in this pilot study that the medical trainees did not have much working hours-dependent stress. Rather, it was found that amylase concentration in the morning differed greatly depending on the lifestyle.

For Study 2, all of the trainees engaged in two kinds of surgery (neck/face and abdominal surgery) during the study period. The type of surgery was randomized, and the durations of surgery were similar ( $4.2 \pm 1.2 \text{ h}$  for neck/face surgery and  $3.8 \pm 1.4 \text{ h}$  for abdominal surgery;  $P = 0.309$ ). Although amylase concentrations did not change in trainees engaged in abdominal surgery ( $P = 0.152$ ), those in trainees engaged in neck/face surgery significantly increased ( $P = 0.004$ ). Interviews with the trainees after the study revealed that they felt severe stress when they had to move away from where they could immediately manage the airway.

Although it is still not clear whether measurement of salivary amylase accurately reflects the degree of stress felt by medical staff in the operating room, it is interesting that no relationship was found between work stress of medical trainees and daily work or duration of surgery. It is also inter-

esting that the medical trainees felt stress when they had to move away from the place where they could immediately manage the airway. Further investigation is needed to clarify the relationship between the degree of work stress and medical incidence due to human errors.

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### Acknowledgement

Support was provided solely from institutional and/or departmental sources. None of the authors have any financial interest in products related to this study.

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## Opioid-induced hyperalgesia or opioid-withdrawal hyperalgesia?

doi: 10.1017/S0265021507000506

### EDITOR:

We read with interest the letter by Dumont and colleagues [1]. They present a case of a 62-yr-old male undergoing revascularization of the right femoral artery who, due to chronic pain from his vascular

disease, received daily fentanyl-patch ( $75 \mu\text{g h}^{-1}$ ), tramadol 150 mg, paracetamol 3 g and amitriptyline 50 mg preoperatively. During anaesthesia, he received in total 6.3 mg remifentanyl over 5 h of surgery followed by 2 g paracetamol and 10 mg piritramide for postoperative analgesia. He complained of intense pain upon arrival in the ICU, and 2 mg of morphine intravenously increased the pain. Another 2 mg of morphine induced a similar result. The pain was managed with ketamine, and the authors concluded that this case was a good example of opioid-induced

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Accepted for publication 12 March 2007 EJA 4447  
First published online 14 June 2007

hyperalgesia. Furthermore, they suggested that remifentanyl in association with ketamine was useful in patients pretreated with opioids.

One possibility for this patient's pain in the postoperative period – and in our view the most likely one – however is not discussed, namely opioid-withdrawal hyperalgesia. Postoperative analgesia in patients who receive opioids for chronic pain is undoubtedly a challenge for anaesthesiologists and pain therapists. In clinical practice, chronic pain patients receiving strong opioids preoperatively show high inter-individual variability and sometimes extremely high postoperative demand for opioids. Depending on the chronic opioid dose, total cumulative doses of 30–45 mg piritramide within the first 1–2 h are common in these patients. These observations are in accordance with Rapp and colleagues [2], who found a more than three-fold (135.8 vs. 42.8 mg) increase in opioid demand in the first 24 h after surgery in patients with preoperative opioid consumption as compared with opioid-naïve patients.

In addition, we feel that postoperative analgesia is much more difficult to handle in chronic pain patients receiving remifentanyl as sole opioid intraoperatively as compared with those receiving long-acting  $\mu$ -opioid agonists like fentanyl or sufentanyl. Irrespective of the fact whether this patient's fentanyl patch was removed before surgery or not, we feel that the administration of 10 mg piritramide and 4 mg morphine for postoperative analgesia in this patient was simply not enough to provide sufficient analgesia.

It has been shown that enhanced pain sensations after cessation of a remifentanyl infusion are due to an acute withdrawal response, which cannot be modulated by *N*-methyl-D-aspartic acid receptor antagonists [3,4]. Therefore, we think that the therapeutic effect of ketamine observed by Dumont and colleagues is most likely due to its direct analgesic or hypnotic effect and not based on the reversal of pronociceptive mechanisms induced by remifentanyl. The increasing evidence for opioid-induced hyperalgesia should not lead to a restricted use of opioids in the perioperative period, especially not in patients who have a history of chronic opioid administration.

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## Comparison of LMA Unique, Ambu laryngeal mask and Soft Seal laryngeal mask during routine surgical procedures

doi: 10.1017/S0265021507000518

### EDITOR:

We read with interest the paper by Francksen and colleagues [1] comparing the LMA Unique, Ambu laryngeal mask and Soft Seal laryngeal mask. In a randomized controlled study, we compared the

performance of the LMA Unique with the Soft Seal laryngeal mask and the Cobra Perilaryngeal Airway [2]. We studied 320 consecutive patients in the three groups and found that the LMA Unique and Soft Seal laryngeal mask were of equal clinical performance. Ease of insertion between the two devices was very similar using a partially inflated cuff. In the Unique LMA group, a successful primary airway was established in 96% of patients on the first attempt, and in 4% of patients insertion failed at the second attempt. In the Soft Seal

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Accepted for publication 11 March 2007 EJA 4468  
First published online 7 June 2007