Quiz 56
Perioperative management in patients with Chronic pain

SUNEETA GOLLAPUDY, M.D
ASSOCIATE PROFESSOR, DIVISION DIRECTOR - NEUROANESTHESIA,
MEDICAL COLLEGE OF WISCONSIN, MILWAUKEE, WI

QUIZ TEAM: SHOBANA RAJAN, M.D; SUNEETA GOLLAPUDY, MD; VERGHESE CHERIAN, M.D; HUI YANG, MD, PH.D; M. ANGELE THEARD, MD

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1. A 54 Y/O FEMALE PATIENT SCHEDULED FOR REDO T11- S1 REMOVAL OF HARDWARE AND FUSION. SHE HAS A PRESCRIPTION OF OXYMORPHONE AND OXYCODONE. PREOPERATIVE URINE DRUG SCREEN REVEALS LOW LEVELS OF MORPHINE AND HIGH LEVELS OF OXYMORPHONE. WHICH OF THE FOLLOWING IS TRUE REGARDING THIS PATIENT:

A. She takes oxycodone.
B. She takes codeine and oxycodone.
C. She takes oxymorphone.
D. She takes oxycodone, oxymorphone and morphine.
This is false.

The patient’s drug screen did not reveal any oxycodone despite her prescription for it. Oxymorphone is a metabolite of oxycodone and can be found in a drug screen for oxycodone. But the UDS cannot be negative for oxycodone. Oxycodone and its metabolites primarily undergo urinary excretion with less than 10% of the parent compound excreted unchanged. The patient’s story sounds suspicious. She may not be taking as much narcotics as she has been prescribed and that could be a problem when managing her perioperative pain management.
B. SHE TAKES OXYCODONE AND CODEINE.

This is false.

Codeine metabolizes to morphine and can show up in the UDS along with codeine. Low levels of morphine could be the result of consumption of morphine, heroin or poppy seeds. There is no oxycodone detected, hence this answer is incorrect.

C. SHE TAKES OXYMORPHONE.

This is true. UDS is strongly positive for oxymorphone and hence the patient is currently taking oxymorphone as prescribed.
D. SHE TAKES OXYCODONE, OXYMORPHONE AND MORPHINE

This is false. She could be taking unprescribed morphine or abusing heroine or just eating poppy seeds. High levels of oxymorphone in UDS suggest its usage, but she definitely is not taking oxycodone.

2. ALL ARE TRUE ABOUT PERIOPERATIVE USE OF METHADONE, **EXCEPT**: 

A. It reduces opioid use.
B. It increases serotonin and norepinephrine uptake.
C. It increases patient satisfaction.
D. It inhibits tolerance.

Go to Q3
A. IT REDUCES OPIOID USE.

This is true. Methadone is a unique µ- and δ-opioid agonist that has a rapid onset of effect (approximately 5 min) and a long duration of effect when used in larger doses (more than or equal to 20 mg). Gourlay et al. determined that the duration of postoperative pain relief was 19 to 21 h when doses of 20 to 30 mg of methadone were administered in the operating room and PACU and hence minimize usage of opioids in PACU and even on the floor.

This is not true. Methadone decreases serotonin and norepinephrine reuptake (like tramadol, venlafaxine, duloxetine), which may contribute to postoperative analgesia by influencing the sensorial and affective dimensions of pain processing. Elevation of these monoamines may play a role in antinociception and mood elevation.

C. IT INCREASES PATIENT SATISFACTION.

This is true. Because of the decreased opioid usage, lower pain scores in the postoperative phase and the mood elevation may seem to enhance patient satisfaction and improved quality of recovery.

Glen Murphy et al: Clinical Effectiveness and Safety of Intraoperative Methadone in Patients Undergoing Posterior Spinal Fusion Surgery A Randomized, Double-blinded, Controlled Trial; Anesthesiology 2017; 126:822-33
This is true. Methadone exerts an inhibitory effect on N-methyl-D-aspartate (NMDA) receptors, which are implicated in the development of opioid tolerance, hyperalgesia, and chronic pain.
A 30 Y/O patient is scheduled for urgent spine surgery for CSF leak and loose hardware. She is on Suboxone. **True** statement regarding perioperative management is:

A. Discontinue suboxone and start an opioid.
B. Continue suboxone and add an opioid with high mu receptor affinity.
C. Use of remifentanil helps in reducing opioid use intraoperatively.
D. Opioid requirement is minimized in patients on suboxone.
A. DISCONTINUE SUBOXONE AND START AN OPIOID.

This is not true. The half life of buprenorphine (suboxone = buprenorphine + naloxone) is 24-60 hrs. Generally patients require 72 hours for a complete wash out of the drug and in an urgent situation this is not possible. Also there is a fear of relapse of addiction. So an appropriate management would be to continue the drug with additional dosage or adding an opioid with high mu affinity, to the regime.

B. CONTINUE SUBOXONE AND ADD AN OPIOID WITH HIGH MU RECEPTOR AFFINITY.

This is True. Since it is an emergent case there is no time to wean the suboxone, it should be continued throughout the perioperative period. Buprenorphine has a high affinity for the mu-opioid receptor (Ki- inhibition constant= 0.2157nM) than the most commonly used mu-opioid receptor agonist and hence better analgesia can be achieved by using opioids with low Ki values such as hydromorphone, fentanyl and morphine, rather than using opioids with weak affinity to the mu-opioid receptor and high Ki (5-10 times that of buprenorphine) like– tramadol, hydrocodone.

This is not True. Remifentanil has a very high Ki – 21, which is 100 times than buprenorphine, hence has very low affinity to the mu-opioid receptors and would provide minimal analgesia. Also, patients on chronic buprenorphine exhibit hyperalgesia and remifentanil can exaggerate that response and leads to higher requirements of anesthetics and narcotics intraoperatively. Hence, remifentanil may be avoided in such patients.
D. OPIOID REQUIREMENT IS MINIMIZED IN PATIENTS ON SUBOXONE

This is not True. Because of the high affinity of buprenorphine for the µ receptor, activation of the nociceptin receptor, and buprenorphine-induced hyperalgesia, buprenorphine patients have severe postoperative pain more frequently than opioid naive patients, and hence their requirements of opioid increases.

4. ALL ARE TRUE ABOUT CHRONIC POSTCRANIOTOMY PAIN (CCP), EXCEPT:

A. CCP is pain that persists 2-3 months after a craniotomy.
B. Infratentorial procedures are more prone for CCP.
C. Frontal craniotomy is associated with higher pain scores.
D. Mitigating acute post craniotomy pain may prevent development of CCP.
A. CCP IS PAIN THAT PERSISTS 2-3 MONTHS AFTER A CRANIOTOMY

This is true. Chronic post craniotomy pain is pain that persists after 2-3 months of surgery and affects up to 30% of the patients. Females and younger patients have the highest incidence. Older patients were more tolerant.

B. INFRATENTORIAL PROCEDURES ARE MORE PRONE FOR CCP

This is true. Chronic post craniotomy pain is more severe and more common in infratentorial than supratentorial craniotomies. The reasons could be adhesions between dura and brain or bone, traction on the dura, dissection of the temporalis muscle and suboccipital muscles, peripheral nerve entrapment or CSF leak.

C. FRONTAL CRANIOTOMY IS ASSOCIATED WITH HIGHER PAIN SCORES.

This is false. Frontal craniotomy is associated with lower pain scores, whereas the sub-temporal and sub-occipital approaches yielded high pain scores. The amount of postoperative pain depends on the extent of muscle damage and deflection.

D. MITIGATING ACUTE POST CRANIOTOMY PAIN MAY PREVENT DEVELOPMENT OF CCP

This is true. The severity of acute post surgical pain predicts the development of chronic pain. Hence steps taken to mitigate/prevent acute pain can help prevent development of CCP.

Regional infiltration with long acting local anesthetic could reduce the development of neuropathic pain.

Surgical maneuvers like restoring the muscular function, rigid fixation of bone flaps, dura closure without any tension, multimodal analgesia and nonpharmacological/behavioral interventions could reduce severity of acute post surgical pain.

5. CHRONIC PAIN PATIENTS ON OPIOIDS CAN DEVELOP HYPERALGESIA. ALL ARE TRUE ABOUT OPIOID INDUCED HYPERALGESIA (OIH) IN THE PERIOPERATIVE PERIOD, EXCEPT:

A. NMDA receptor activation results in central sensitization.
B. Methadone can mitigate OIH.
C. Use NMDA receptor antagonists to prevent OIH.
D. Alpha 2 antagonists can attenuate OIH.
A. NMDA RECEPTOR ACTIVATION RESULTS IN CENTRAL SENSITIZATION

This is true. Glutaminergic system and activation of NMDA receptors result in the development of central sensitization and development of OIH.

B. METHADONE CAN MITIGATE OIH

This is true. Methadone, a pure mu receptor agonist is also an NMDA antagonist. It also has incomplete cross-tolerance properties which can help alleviate OIH and neuropathic pain in low doses. Reducing the dose of opioid by 40-50% before a scheduled surgery and adding low dose methadone can help with OIH in the perioperative period.

C. USE NMDA RECEPTOR ANTAGONISTS TO PREVENT OIH.

This is true. Since NMDA activation is the cause of OIH, an NMDA antagonist would help alleviate OIH or reduce its intensity. Ketamine is a Non-competitive antagonist of the phencyclidine binding site of NMDA receptor and hence has a role in chronic neuropathic pain and also in OIH. The addition of ketamine to a remifentanil – propofol regimen in a TIVA reduced movement in the patient who was requiring high doses of TIVA.

This is false. Alpha-2 agonists like clonidine and dexmedetomidine attenuated OIH. When combined with NMDA antagonists they abolish opioid induced post-infusion secondary hyperalgesia.