Legends to Supplementary Figures

**Supplementary Figure 1:** A step-wise, severity-based opioid-sparing approach to acute pain analgesic therapy with use of non-opioid adjuvants. Adaptation of the WHO (World Health Organization) Analgesic Step Ladder from the consensus guideline published in 1986 for cancer pain. (Redrawn by Perry Ng).

**Supplementary Figure 2:** Schematic representation of the mechanisms of Anti-nociception (activated by Opioids) and Pro-nociception (blocked by ketamine, lidocaine and pregabalin etc.) and their interplay in acute postoperative pain. (Adapted from John Penning's original work with permission from Patrick Sullivan’s Ottawa Anesthesia Primer, 2012 Edition, Echo Publishers, Ottawa. Redrawn by Perry Ng).

**Supplementary Figure 3:** The ‘new’ Ottawa Acute Pain Ladder demonstrating the 'stabilization' of the acute pain step-wise approach when pronociceptive mechanisms are addressed at any step with ketamine, lidocaine and/or pregabalin. (Original artwork by Perry Ng).

**Supplementary Figure 4:** Ensuring safety of IV lidocaine infusions: The use of intravenous PCA (Patient Controlled Analgesia) Y-connector with an integral anti-siphon (to prevent free-flow due to gravity) and an anti-reflux valve (to prevent reflux into main intravenous line). (Original artwork by Perry Ng).
Step 1
Nonopioid analgesics
± Adjuvant therapy

Step 2
Weak opioid analgesics
± Nonopioid analgesics ± Adjuvant therapy

Step 3
Potent opioid analgesics
± Nonopioid analgesics ± Adjuvant therapy

Pain severity
Nociception

Pain

Hyperalgesia

Pro-Nociceptive Modulation

Pregabalin, Lidocaine, Ketamine

Nociception → Pain

Analgesia

Opioids

Anti-Nociceptive Modulation
ACUTE NOCICEPTIVE PAIN

PRONOCICEPTION / HYPERALGESIA

Opioid Analgesics
Morphine, Hydromorphone, Fentanyl, Oxycodone

Weak Opioids
Tramadol

Foundational Drugs
Acetaminophen, NSAIDs

Non Opioid Adjuvants
Pregabalin, Lidocaine, Ketamine

The New “Ottawa” Ladder in Acute Pain?