ERAS® CARDIAC Turnkey Order Set (TKO): Multimodal Analgesia

TKO Orders: Summary of Evidence:

BOLD = Class I/IIA (or equivalent) recommendations across all sources. *ITALICIZED* = inconsistently Class I/IIA (or equivalent), Class IIB, or supported by evidence published in peer-reviewed journals.

Decisions regarding order inclusion were made based on estimated benefit, risk, cost, implementation complexity, and generalizability. Each of these orders should be considered based on local institutional priorities, resources, practices, and expertise.

Sources of Recommendations for TKO development:

Australian and New Zealand College of Anaesthetists (ANZCA)[1], Enhanced Recovery After Surgery Cardiac Society (ERASC)[2], Peri-Operative Quality Initiative (POQI)[2], and Society of Cardiovascular Anesthesiologists (SCA)[3]

Preoperative			
Order	**Route**	**Dose**	**Administration Instructions**
Communication			**Please review and record any analgesic medications (including OTC) that the patient has taken in the past 24-hours.**
Communication			**Please inform MRP if the patient has taken any analgesic medications in the past 24-hours.**
Acetaminophen	**PO**	**1000 mg Once**	**Confirm with MRP prior to administration with history of liver disease.**
Communication			*Please complete screening tools "Risk for Persistent Post-operative Opioid Use" and "Risk for Post-operative Chronic Pain".*
Communication			*Contact MRP and consider Pain Specialist consultation for patients with history of complex chronic pain or pre-operative opioid dependence.*
CHOOSE ONE			
Gabapentin	*PO*	*300 mg Once*	*Withhold if age > 75 or GFR < 30*
Pre-gabalin	*PO*	*150 mg Once*	*Withhold if age > 75 or GFR < 30*
Hydromorphone CR	*PO*	*3 mg Once*	*If age > 75 or weight < 60 kg*
Hydromorphone CR	*PO*	*6 mg Once*	*If age < 75 and weight > 60 kg*

Intraoperative			
Order	**Route**	**Dose**	**Administration Instructions**
Dexmedetomidine	**IV – infusion**	**0.2-0.7 mcg/kg/hr**	**Initiate post-induction, continue on transfer to ICU, discontinue following extubation. Consider continuing post-extubation for inadequate analgesia.**
Ketamine	**IV - bolus**	**0.5 mg/kg**	**Administer pre-incision, followed by infusion.**
Ketamine	**IV – infusion**	**0.1-0.3 mg/kg/hr**	**Initiate following Ketamine bolus. Discontinue on chest closure.**
Lidocaine	**IV - bolus**	**1.5 mg/kg**	**Administer pre-incision, followed by infusion**
Lidocaine	**IV – infusion**	**1.0 mg/kg/hr**	**Initiate following Lidocaine bolus. Discontinue on chest closure.**
Dexamethasone	*IV -bolus*	*0.2 mg/kg*	*Administer pre-incision*
Magnesium	*IV -bolus*	*30 mg/kg*	*Administer pre-incision, followed by infusion*
Magnesium	*IV – infusion*	*10 mg/kg/hr*	*Initiate following Magnesium bolus. Discontinue on chest closure.*
Methadone	*IV-Bolus*	*0.3 mg/kg*	*Administer pre-incision*

	Postoperative			
	Order	**Route**	**Dose**	**Administration Instructions**
	Communication			**Assess and record patient reported pain at rest and with movement QID.**
	Communication			**Record patient reported pain (0-10/10 scale).**
	Communication			**Record patient reported pain using CPOT (Critical Care Pain Observation Tool) if the patient is non-verbal.**
	Communication			**Assess and record patient reported analgesic side-effects QID.**
	Communication			**Ensure current analgesia requirements have been reviewed by MRP prior to discharge planning.**
CHOOSE ONE	**Acetaminophen**	**PO**	**650 mg QID**	**Confirm with MRP prior to administration with history of liver disease. Continue until discharge.**
	Acetaminophen	**PO**	**1000 mg TID**	**Confirm with MRP prior to administration with history of liver disease. Continue until discharge.**
	Paracetamol	**IV**	**650 mg QID**	**Confirm with MRP prior to administration with history of liver disease. Consider switching to PO acetaminophen when tolerating oral intake. Continue until discharge.**
	Paracetamol	**IV**	**1000 mg TID**	**Confirm with MRP prior to administration with history of liver disease. Consider switching to PO acetaminophen when tolerating oral intake. Continue until discharge.**
	Dexmedetomidine	**IV-infusion**	**0.1-0.4 mcg/kg/hr**	**Discontinue following extubation. Consider continuing at lower dose until discharge from ICU for inadequate analgesia.**
	Hydromorphone	**IV Q2-4H PRN**	**0.2-0.4 mg**	**Administer for pain > 3/10 and no other analgesic options available. Confirm with MRP prior to administration with history of liver disease. Stop and re-evaluate after 3 days.**
	Hydromorphone	**PO Q4H PRN**	**0.5-1 mg**	**Administer for pain > 3/10 and no other analgesic options available. Confirm with MRP prior to administration with history of liver disease. Stop and re-evaluate after 3 days**
	Communication			*Contact MRP and consider Pain Specialist consultation for refractory post-operative pain > 6/10.*
	Communication			*Contact MRP and consider Transition Pain Service consult for patients requiring opioid analgesia prior to discharge.*
CHOOSE ONE	*Gabapentin*	*PO*	*100 mg TID*	*Withhold if age > 75 or GFR < 30. Titrate dose if analgesia is ineffective. Stop and re-evaluate after 5 days, or prior to discharge.*
	Pre-gabalin	*PO*	*25 mg BID*	*Withhold if age > 75 or GFR < 30. Titrate dose if analgesia is ineffective. Stop and re-evaluate after 5 days, or prior to discharge.*
CHOOSE ONE	*Ketorolac*	*IV*	*15 mg Q8H PRN*	*Withhold if patient has history of chronic kidney disease or if current GFR < 60. Stop after 3 doses.*
	Celecoxib	*PO*	*200 mg BID*	*Withhold if patient has history of chronic kidney disease or if current GFR < 60. Stop and re-evaluate after 3 days.*
	Naproxen	*PO*	*500 mg BID*	*Withhold if patient has history of chronic kidney disease or if current GFR < 60. Stop and re-evaluate after 3 days.*
	Tramadol	*PO*	*25-50 mg Q4H PRN*	*Confirm with MRP prior to administration with history of liver disease. Stop and re-evaluate after 3 days.*

References:

1. Shug SA. Acute pain management: scientific evidence, fourth edition, 2015. Med J Aust. 2016 May 2;204(8):315-7.
2. Grant MC. Pain management and opioid stewardship in adult cardiac surgery: Joint consensus report of the PeriOperative Quality Initiative and the Enhanced Recovery After Surgery Cardiac Society. J Thorac Cardiovasc Surg. 2023 Jan 28:S0022-5223(23)00089-2.
3. Makkad B. Practice Advisory for Preoperative and Intraoperative Pain Management of Thoracic Surgical Patients: Part 1. Anesth Analg. 2023 Apr 20.