**ALTO CLINICAL APPLICATIONS**

**Renal Colic**

1. Toradol 30 mg IV
2. Cardiac Lidocaine 1.5 mg/kg IV in 100 mL NS over 10 minutes (MAX 200 mg)
3. Acetaminophen 975 mg PO
4. 1 L NS bolus

**Musculoskeletal Pain (sprains, strains, or opiate naïve lower back pain)**

1. Acetaminophen 975 mg PO
2. Motrin 600 mg PO OR Toradol 30 mg IV/IM
3. Muscle Relaxant (choose one of the following)
	1. Flexeril 5 mg PO (patients >65 years old OR <70 kg OR concerns for somnolence)
	2. Flexeril 10 mg PO (patients >70 kg)
	3. Valium 5 mg PO
4. Lidoderm patch to most painful area, MAX 3 patches instruct patient to remove after 12 hours
5. Gabapentin (neuropathic component of pain)
	1. 300 mg PO (patients >65 years old OR <70 kg OR concerns for somnolence/naïve to med)
	2. 600 mg PO (patients >70 kg OR not naïve to med)
6. Trigger Point Injection with 1-2 mL of Marcaine 0.5% or Lidocaine 1%

**Acute on Chronic Radicular LBP (opiate tolerant)**

1. Acetaminophen 975 mg PO
2. Motrin 600 mg PO OR Toradol 30 mg IV/IM
3. Muscle Relaxant (choose one of the following)
	1. Flexeril 5 mg PO (patients >65 years old OR <70 kg OR concerns for somnolence)
	2. Flexeril 10 mg PO (patients >70 kg)
	3. Valium 5 mg PO
4. Gabapentin (neuropathic component of pain)
	1. 300 mg PO
5. Dexamethasone 8 mg IV
6. Lidoderm patch to most painful area, MAX 3 patches instruct patient to remove after 12 hours
7. Trigger Point Injection with Marcaine 0.5% or Lidocaine 1% 1-2 mL
8. Ketamine 0.3 mg/kg over 10 minutes
	1. Ketamine 0.1 mg/kg/hour

**Headache**

1. Reglan 10 mg PO/IV
2. 1 L 0.9% NS bolus
3. Motrin 600 mg PO Or Toradol 30 mg IM/IV
4. Tylenol 1000 mg PO
5. Cervical or Trapezius Trigger Point Injection with Marcaine 0.5% or Lidocaine 1%

**If <50% pain relief then**

1. Magnesium 1 gm IV over 60 minutes
2. Valproic Acid 500 mg/50 cc NS over 20 mins
3. Dexamethasone 4-8 mg IV

**If <50% pain relief then**

1. Haldol 5 mg IV

**Extremity Fracture or Joint Dislocation**

1. Ketamine Intranasal 0.5 mg/kg (concentration 50 mg/mL)
	1. MAX dose 50 mg; MAX volume per nare 1 mL
2. Nitrous Oxide titrate up to 70%
3. Tylenol 975 mg PO
4. Ultrasound Guided Regional Anesthesia (PRINT A PICTURE w/ new machine and scan into chart)
	1. Joint Dislocation
		1. Lidocaine 0.5 % peri-neural infiltration (MAX 5 mg/kg)
	2. Extremity Fracture
		1. Ropivacaine 0.5% peri-neural infiltration (MAX 3 mg/kg)

**References**

1. [Balakrishnamoorthy R](http://www.ncbi.nlm.nih.gov/pubmed/?term=Balakrishnamoorthy%20R%5BAuthor%5D&cauthor=true&cauthor_uid=25122642), Horgan I, [Perez S](http://www.ncbi.nlm.nih.gov/pubmed/?term=Perez%20S%5BAuthor%5D&cauthor=true&cauthor_uid=25122642), [Steele MC](http://www.ncbi.nlm.nih.gov/pubmed/?term=Steele%20MC%5BAuthor%5D&cauthor=true&cauthor_uid=25122642), [Keijzers GB](http://www.ncbi.nlm.nih.gov/pubmed/?term=Keijzers%20GB%5BAuthor%5D&cauthor=true&cauthor_uid=25122642). Does a single dose of intravenous dexamethasone reduce Symptoms in Emergency department patients with low Back pain and RAdiculopathy (SEBRA)? A double-blind randomised controlled trial. [*Emerg Med J.*](http://www.ncbi.nlm.nih.gov/pubmed/?term=Balakrishnamoorthy+2015) 2015 Jul;32(7):525-30.
2. [Blaivas M](http://www.ncbi.nlm.nih.gov/pubmed/?term=Blaivas%20M%5BAuthor%5D&cauthor=true&cauthor_uid=21883635), [Adhikari S](http://www.ncbi.nlm.nih.gov/pubmed/?term=Adhikari%20S%5BAuthor%5D&cauthor=true&cauthor_uid=21883635), [Lander L](http://www.ncbi.nlm.nih.gov/pubmed/?term=Lander%20L%5BAuthor%5D&cauthor=true&cauthor_uid=21883635). A prospective comparison of procedural sedation and ultrasound-guided interscalene nerve block for shoulder reduction in the emergency department. [*Acad Emerg Med*.](http://www.ncbi.nlm.nih.gov/pubmed/21883635) 2011 Sep;18(9):922-7.
3. [Colman I](http://www.ncbi.nlm.nih.gov/pubmed/?term=Colman%20I%5BAuthor%5D&cauthor=true&cauthor_uid=18541610), [Friedman BW](http://www.ncbi.nlm.nih.gov/pubmed/?term=Friedman%20BW%5BAuthor%5D&cauthor=true&cauthor_uid=18541610), [Brown MD](http://www.ncbi.nlm.nih.gov/pubmed/?term=Brown%20MD%5BAuthor%5D&cauthor=true&cauthor_uid=18541610), [Innes GD](http://www.ncbi.nlm.nih.gov/pubmed/?term=Innes%20GD%5BAuthor%5D&cauthor=true&cauthor_uid=18541610), [Grafstein E](http://www.ncbi.nlm.nih.gov/pubmed/?term=Grafstein%20E%5BAuthor%5D&cauthor=true&cauthor_uid=18541610), [Roberts TE](http://www.ncbi.nlm.nih.gov/pubmed/?term=Roberts%20TE%5BAuthor%5D&cauthor=true&cauthor_uid=18541610), [Rowe BH](http://www.ncbi.nlm.nih.gov/pubmed/?term=Rowe%20BH%5BAuthor%5D&cauthor=true&cauthor_uid=18541610). Parenteral dexamethasone for acute severe migraine headache: meta-analysis of randomised controlled trials for preventing recurrence. *BMJ.* 2008 Jun 14;336(7657):1359-61.
4. [Cleveland Clinic Algorithm](http://www.painmedicinenews.com/Clinical-Pain-Medicine/Article/09-15/Cleveland-Clinic-Algorithm-Reduces-Migraine-Opioid-Use-in-ED/33453/ses%3Dogst) (ctrl and click)
5. [Friedman BW](http://www.ncbi.nlm.nih.gov/pubmed/?term=Friedman%20BW%5BAuthor%5D&cauthor=true&cauthor_uid=26501533), [Dym AA](http://www.ncbi.nlm.nih.gov/pubmed/?term=Dym%20AA%5BAuthor%5D&cauthor=true&cauthor_uid=26501533), [Davitt M](http://www.ncbi.nlm.nih.gov/pubmed/?term=Davitt%20M%5BAuthor%5D&cauthor=true&cauthor_uid=26501533), [Holden L](http://www.ncbi.nlm.nih.gov/pubmed/?term=Holden%20L%5BAuthor%5D&cauthor=true&cauthor_uid=26501533), [Solorzano C](http://www.ncbi.nlm.nih.gov/pubmed/?term=Solorzano%20C%5BAuthor%5D&cauthor=true&cauthor_uid=26501533), [Esses D](http://www.ncbi.nlm.nih.gov/pubmed/?term=Esses%20D%5BAuthor%5D&cauthor=true&cauthor_uid=26501533), [Bijur PE](http://www.ncbi.nlm.nih.gov/pubmed/?term=Bijur%20PE%5BAuthor%5D&cauthor=true&cauthor_uid=26501533), [Gallagher EJ](http://www.ncbi.nlm.nih.gov/pubmed/?term=Gallagher%20EJ%5BAuthor%5D&cauthor=true&cauthor_uid=26501533). Naproxen With Cyclobenzaprine, Oxycodone/Acetaminophen, or Placebo for Treating Acute Low Back Pain: A Randomized Clinical Trial. [*JAMA.*](http://www.ncbi.nlm.nih.gov/pubmed/26501533) 2015 Oct 20;314(15):1572-80.
6. Fahmida Ghaderibarmi, Nader Tavakkoli, Mansoureh Togha.. Intravenous Valproate versus Subcutaneous Sumatriptan in Acute Migraine Attack. *Acta Medica Iranica* 2015. 53(10):633-636
7. [Ferrini R](http://www.ncbi.nlm.nih.gov/pubmed/?term=Ferrini%20R%5BAuthor%5D&cauthor=true&cauthor_uid=15330376), [Paice JA](http://www.ncbi.nlm.nih.gov/pubmed/?term=Paice%20JA%5BAuthor%5D&cauthor=true&cauthor_uid=15330376). .How to initiate and monitor infusional lidocaine for severe and/or neuropathic pain. [*J Support Oncol*.](http://www.ncbi.nlm.nih.gov/pubmed/15330376) 2004 Jan-Feb;2(1):90-4
8. [Galer BS](http://www.ncbi.nlm.nih.gov/pubmed/?term=Galer%20BS%5BAuthor%5D&cauthor=true&cauthor_uid=15563741), [Gammaitoni AR](http://www.ncbi.nlm.nih.gov/pubmed/?term=Gammaitoni%20AR%5BAuthor%5D&cauthor=true&cauthor_uid=15563741), [Oleka N](http://www.ncbi.nlm.nih.gov/pubmed/?term=Oleka%20N%5BAuthor%5D&cauthor=true&cauthor_uid=15563741), [Jensen MP](http://www.ncbi.nlm.nih.gov/pubmed/?term=Jensen%20MP%5BAuthor%5D&cauthor=true&cauthor_uid=15563741), [Argoff CE](http://www.ncbi.nlm.nih.gov/pubmed/?term=Argoff%20CE%5BAuthor%5D&cauthor=true&cauthor_uid=15563741). Use of the lidocaine patch 5% in reducing intensity of various pain qualities reported by patients with low-back pain. [*Curr Med Res Opin.*](http://www.ncbi.nlm.nih.gov/pubmed/15563741) 2004;20 Suppl 2:S5-12.
9. Gelfand AA, Goadsby PJ. A Neurologist’s Guide to Acute Migraine Therapy in the Emergency Room. *The Neurohospitalist*. 2012;2(2):51-59.
10. Herres J, Chudnofsky CR, Manur R, Damiron K, Deitch K. [The use of inhaled nitrous oxide for analgesia in adult ED patients: a pilot study.](http://www.ncbi.nlm.nih.gov/pubmed/26585197)*Am J Emerg Med*. 2016 Feb;34(2):269-73.
11. [Kranke P](http://www.ncbi.nlm.nih.gov/pubmed/?term=Kranke%20P%5BAuthor%5D&cauthor=true&cauthor_uid=26184397), [Jokinen J](http://www.ncbi.nlm.nih.gov/pubmed/?term=Jokinen%20J%5BAuthor%5D&cauthor=true&cauthor_uid=26184397), [Pace NL](http://www.ncbi.nlm.nih.gov/pubmed/?term=Pace%20NL%5BAuthor%5D&cauthor=true&cauthor_uid=26184397), [Schnabel A](http://www.ncbi.nlm.nih.gov/pubmed/?term=Schnabel%20A%5BAuthor%5D&cauthor=true&cauthor_uid=26184397), [Hollmann MW](http://www.ncbi.nlm.nih.gov/pubmed/?term=Hollmann%20MW%5BAuthor%5D&cauthor=true&cauthor_uid=26184397), [Hahnenkamp K](http://www.ncbi.nlm.nih.gov/pubmed/?term=Hahnenkamp%20K%5BAuthor%5D&cauthor=true&cauthor_uid=26184397), [Eberhart LH](http://www.ncbi.nlm.nih.gov/pubmed/?term=Eberhart%20LH%5BAuthor%5D&cauthor=true&cauthor_uid=26184397), [Poepping DM](http://www.ncbi.nlm.nih.gov/pubmed/?term=Poepping%20DM%5BAuthor%5D&cauthor=true&cauthor_uid=26184397), [Weibel S](http://www.ncbi.nlm.nih.gov/pubmed/?term=Weibel%20S%5BAuthor%5D&cauthor=true&cauthor_uid=26184397). Continuous intravenous perioperative lidocaine infusion for postoperative pain and recovery*.* [*Cochrane Database Syst Rev.*](http://www.ncbi.nlm.nih.gov/pubmed/26184397) 2015 Jul 16;7.
12. [Linde M](http://www.ncbi.nlm.nih.gov/pubmed/?term=Linde%20M%5BAuthor%5D&cauthor=true&cauthor_uid=23797677), [Mulleners WM](http://www.ncbi.nlm.nih.gov/pubmed/?term=Mulleners%20WM%5BAuthor%5D&cauthor=true&cauthor_uid=23797677), [Chronicle EP](http://www.ncbi.nlm.nih.gov/pubmed/?term=Chronicle%20EP%5BAuthor%5D&cauthor=true&cauthor_uid=23797677), [McCrory DC](http://www.ncbi.nlm.nih.gov/pubmed/?term=McCrory%20DC%5BAuthor%5D&cauthor=true&cauthor_uid=23797677). Valproate (valproic acid or sodium valproate or a combination of the two) for the prophylaxis of episodicmigraine in adults. [*Cochrane Database Syst Rev.*](http://www.ncbi.nlm.nih.gov/pubmed/23797677) 2013 Jun 24;6
13. Moore RA, Derry S, Wiffen PJ, Straube S, Aldington DJ. [Overview review: Comparative efficacy of oral ibuprofen and paracetamol (acetaminophen) across acute and chronic pain conditions.](http://www.ncbi.nlm.nih.gov/pubmed/25530283) *Eur J Pain*. 2015 Oct;19(9):1213-23
14. [Cohen V](http://www.ncbi.nlm.nih.gov/pubmed/?term=Cohen%20V%5BAuthor%5D&cauthor=true&cauthor_uid=26581934), [Motov S](http://www.ncbi.nlm.nih.gov/pubmed/?term=Motov%20S%5BAuthor%5D&cauthor=true&cauthor_uid=26581934), [Rockoff B](http://www.ncbi.nlm.nih.gov/pubmed/?term=Rockoff%20B%5BAuthor%5D&cauthor=true&cauthor_uid=26581934), [Smith A](http://www.ncbi.nlm.nih.gov/pubmed/?term=Smith%20A%5BAuthor%5D&cauthor=true&cauthor_uid=26581934), [Fromm C](http://www.ncbi.nlm.nih.gov/pubmed/?term=Fromm%20C%5BAuthor%5D&cauthor=true&cauthor_uid=26581934), [Bosoy D](http://www.ncbi.nlm.nih.gov/pubmed/?term=Bosoy%20D%5BAuthor%5D&cauthor=true&cauthor_uid=26581934), [Hossain R](http://www.ncbi.nlm.nih.gov/pubmed/?term=Hossain%20R%5BAuthor%5D&cauthor=true&cauthor_uid=26581934), [Likourezos A](http://www.ncbi.nlm.nih.gov/pubmed/?term=Likourezos%20A%5BAuthor%5D&cauthor=true&cauthor_uid=26581934), [Jellinek-Cohen SP](http://www.ncbi.nlm.nih.gov/pubmed/?term=Jellinek-Cohen%20SP%5BAuthor%5D&cauthor=true&cauthor_uid=26581934), [Marshall J](http://www.ncbi.nlm.nih.gov/pubmed/?term=Marshall%20J%5BAuthor%5D&cauthor=true&cauthor_uid=26581934). Development of an opioid reduction protocol in an emergency department. [Am *J Health Syst Pharm.*](http://www.ncbi.nlm.nih.gov/pubmed/26581934) 2015 Dec 1;72(23):2080-6.
15. [Soleimanpour H](http://www.ncbi.nlm.nih.gov/pubmed/?term=Soleimanpour%20H%5BAuthor%5D&cauthor=true&cauthor_uid=22559856), [Hassanzadeh K](http://www.ncbi.nlm.nih.gov/pubmed/?term=Hassanzadeh%20K%5BAuthor%5D&cauthor=true&cauthor_uid=22559856), [Vaezi H](http://www.ncbi.nlm.nih.gov/pubmed/?term=Vaezi%20H%5BAuthor%5D&cauthor=true&cauthor_uid=22559856), [Golzari SE](http://www.ncbi.nlm.nih.gov/pubmed/?term=Golzari%20SE%5BAuthor%5D&cauthor=true&cauthor_uid=22559856), [Esfanjani RM](http://www.ncbi.nlm.nih.gov/pubmed/?term=Esfanjani%20RM%5BAuthor%5D&cauthor=true&cauthor_uid=22559856), [Soleimanpour M](http://www.ncbi.nlm.nih.gov/pubmed/?term=Soleimanpour%20M%5BAuthor%5D&cauthor=true&cauthor_uid=22559856). Effectiveness of intravenous lidocaine versus intravenous morphine for patients with renal colic in the emergency department. [*BMC Urol.*](http://www.ncbi.nlm.nih.gov/pubmed/22559856) 2012 May 4;12:13.
16. [Singh A](http://www.ncbi.nlm.nih.gov/pubmed/?term=Singh%20A%5BAuthor%5D&cauthor=true&cauthor_uid=18976336), [Alter HJ](http://www.ncbi.nlm.nih.gov/pubmed/?term=Alter%20HJ%5BAuthor%5D&cauthor=true&cauthor_uid=18976336), [Zaia B](http://www.ncbi.nlm.nih.gov/pubmed/?term=Zaia%20B%5BAuthor%5D&cauthor=true&cauthor_uid=18976336).. Does the addition of dexamethasone to standard therapy for acute migraine headache decrease the incidence of recurrent headache for patients treated in the emergency department? A meta-analysis and systematic review of the literature. [*Acad Emerg Med.*](http://www.ncbi.nlm.nih.gov/pubmed/18976336) 2008 Dec;15(12):1223-33
17. [Vigneault L](http://www.ncbi.nlm.nih.gov/pubmed/?term=Vigneault%20L%5BAuthor%5D&cauthor=true&cauthor_uid=21061107), [Turgeon AF](http://www.ncbi.nlm.nih.gov/pubmed/?term=Turgeon%20AF%5BAuthor%5D&cauthor=true&cauthor_uid=21061107), [Côté D](http://www.ncbi.nlm.nih.gov/pubmed/?term=C%C3%B4t%C3%A9%20D%5BAuthor%5D&cauthor=true&cauthor_uid=21061107), [Lauzier F](http://www.ncbi.nlm.nih.gov/pubmed/?term=Lauzier%20F%5BAuthor%5D&cauthor=true&cauthor_uid=21061107), [Zarychanski R](http://www.ncbi.nlm.nih.gov/pubmed/?term=Zarychanski%20R%5BAuthor%5D&cauthor=true&cauthor_uid=21061107), [Moore L](http://www.ncbi.nlm.nih.gov/pubmed/?term=Moore%20L%5BAuthor%5D&cauthor=true&cauthor_uid=21061107), [McIntyre LA](http://www.ncbi.nlm.nih.gov/pubmed/?term=McIntyre%20LA%5BAuthor%5D&cauthor=true&cauthor_uid=21061107), [Nicole PC](http://www.ncbi.nlm.nih.gov/pubmed/?term=Nicole%20PC%5BAuthor%5D&cauthor=true&cauthor_uid=21061107), [Fergusson DA](http://www.ncbi.nlm.nih.gov/pubmed/?term=Fergusson%20DA%5BAuthor%5D&cauthor=true&cauthor_uid=21061107). Perioperative intravenous lidocaine infusion for postoperative pain control: a meta-analysis of randomized controlled trials. [*Can J Anaesth*.](http://www.ncbi.nlm.nih.gov/pubmed/?term=vidneault+intravenous+lidocaine) 2011 Jan;58(1):22-37.

Copyright© 2015 St. Joseph’s Healthcare System All Rights Reserved