**PAIN IN THE NECK**

Use of pain medication in head and neck cancer patients post-operatively

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**Disclosure**

- Nothing to disclose and no conflicts of interest.

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**Non-Pharmacological Pain Control Methods**

- ROM – neck and arm exercises for patients that undergo neck surgery to decrease muscle spasms.
- Electrostimulation – severe muscle spasms
- Massage – muscle pain and need for relaxation

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**Over-the-Counter**

- Uses: Starting medications and weaning off of pain medications
- Pros: Non-habit forming. Can use as intervals with narcotics pain meds for continuous relief
- Cons: Bleeding or liver damage.
- Patients have to be counseled on potentiation and overdose abilities. Especially when combined with stronger medications!!

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**Over-the-counter**

- NSAIDS - Ibuprofen, Motrin, Advil, Celebrex, Midol
- Naproxen – Aleve, Naprosyn
- Etodolac – Iodine, Lodine XL
- Diclofenac – Cataflam
- Ketorolac – Toradol
- Indomethacine – Indocin
- Meloxicam – Mobic
- Nambumetone – Relafen
- Daypro

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**NSAIDS**

- Dosing:
  - PEDS: 100mg/5ml availability
  - 10mg/kg dosing
  - Up to 6 months is max 50mg/kg/day
  - 6 months to 2 years max 40mg/kg/day
  - 2yrs and up: 40mg/kg/day
- Adults:
  - 300mg QID
  - 400mg/600mg/800mg TID
NSAIDS

- Mechanism of Action – Has not been determined. Analgesic and antipyretic properties thought to be due to prostaglandin synthetase inhibition.
- Pregnancy Category C, not for use in nursing patients

- Adverse reactions –
  - increased serious CV events
  - MI
  - Stroke
  - GI bleeding
  - elevated LFT’s
  - nausea
  - epigastric pain/ heartburn/ abdominal pain
  - anemia
  - edema

NSAIDS

- Medication Interactions:
  - May decrease antihypertensive effects of ACE Inhibitors.
  - Not for use with Aspirin due to increased adverse effects
  - May reduce the natriuretic effects of thiazide and loop diuretics.
  - Can increase lithium levels – monitor
  - Monitor for methotrexate toxicity
  - Monitor for use in patients with coumarin-type anticoagulants
  - Increased risk of renal toxicity in use of ACE inhibitors and diuretics

Tylenol/Acetaminophen

- Mechanism of Action:
  - Analgesic/antipyretic; thought to produce analgesia by elevation of the pain threshold and
  - Antipyresis through action on the hypothalamic heat-regulating center.
- Pregnancy Category: B
- Drug Interactions – Do not use with other medications containing APAP

Tylenol/Acetaminophen

- Dosing:
  - Peds:
    - 15mg/kg not to exceed 75mg/kg
  - Adults:
    - (Regular Strength) 2 tabs q4-6h while symptoms last. Max: 10 tabs/24 hrs for ≤10 days.
    - (Extra Strength) 2 tabs/caps/tbsp q6h while symptoms last. Max: 6 tabs/caps/tbsp in 24 hrs for ≤10 days.
    - (Arthritis Pain/8 Hour) 2 tabs q8h with water. Max: 6 tabs/24 hrs for ≤10 days

Tylenol/Acetaminophen

- How Supplied:
  - Cap/Tab: (Extra Strength) 500mg; Liquid: (Extra Strength) 500mg/15mL;
  - Sus: (Infants'/Children's) 160mg/5mL;
  - Tab: (Regular Strength) 325mg;
  - Tab, Chewable: (Jr. Meltaways) 160mg, (Children’s Meltaways) 80mg;
  - Tab, Extended Release: (Arthritis Pain/8 Hour) 650mg
Tylenol/Acetaminophen

- Adverse Reactions:
  - Severe liver damage may occur with doses >4000mg/24 hrs in adults, with >5 doses/24 hrs in children, with ≥3 alcoholic drinks everyday in adults, or taken with other APAP-containing drugs
  - D/C if pain gets worse or lasts for >10 days in adults (>5 days for children <12 yrs), if fever gets worse or lasts for >3 days, if new symptoms occur, or redness or swelling is present.
  - Each Tbsp Extra Strength Liquid contains 9mg Na while each tsp Children's Sus contains 2mg Na.

Opiods

- Mechanism of Action:
  - Related to Opiod receptors in the CNS
  - Pregnancy Category – C; Not for use in nursing; Crosses the placenta

- Adverse Reactions: Acute liver failure, lightheadedness, dizziness, sedation, N/V, respiratory depression.

Hydrocodone

- Mechanism of Action:
  - Narcotic: Suspected to related to opioid receptors in the CNS.
  - APAP: Regulated in the hypothalamus heat-regulating centers. Inhibits prostaglandin synthetase
  - Uses: Moderate to moderately severe pain; Antitussive

Opiods

- Interactions with Coumadin:
  - There is conflicting evidence of a minor interaction between these two medications.
  - APAP may potentiate the hypoprothrombinemic effect of warfarin and other oral anticoagulants, although data are somewhat conflicting and the mechanism of interaction is unknown.

- Interactions:
  - Diuretics – reduce the efficacy of diuretics by inducing release of antidiuretic hormone. Can lead to urinary retention and sphincter spasms, esp. in men with enlarged prostates.
  - Anticholinergics – increased risk of urinary retention and severe constipation which can lead to paralytic ileus.

- Interactions:
  - Additive CNS depression with other narcotics, antihistamines, antipsychotics, anti-anxiety agents, or other CNS depressants (including alcohol); reduce dose.
  - Increased effect of antidepressants or hydrocodone with MAOIs or TCAs.
  - Increased risk of acute liver failure with alcohol ingestion.
**Hydrocodone/ Lortab**

- **Dosing:**
  - **Peds:** Solution q4-6hr PRN pain
  - > 2 years - adjust to severity of pain.
  - 0.1-0.15mg/kg; not to exceed 75mg/day
  - FYI: elixir contains 7% alcohol

- **Adults:** Adjust dose according to severity of pain and response. Elderly: start at lower end of dosing range
  - (5mg-500mg / 5mg-325mg) Usual: 1 or 2 tabs q4-6h PRN. Max: 8 tabs/day.
  - (7.5mg-500mg, 10mg-500mg) Usual: 1 tab q4-6h PRN. Max: 6 tabs/day.
  - (Sol) Usual: 1 tbsp q4-6h PRN. Max: 6 tbsp/day.

- **Antitussive effect can suppress ability to clear secretions in pulmonary patients. Use with care.**

- **Decreased dosing in Renal Impairment**

- **Decreased dosing in Hepatic Impairment**

**Tramadol/ Ultracet**

- **Mechanism of Action:**
  - **Tramadol:** Centrally acting synthetic opioid analgesic; not established. Thought to bind to µ-opioid receptors and weakly inhibit reuptake of norepinephrine and serotonin.
  - **APAP:** Nonopiate, nonaspirin analgesic, and antipyretic.

- **Uses:** Short-term (≤5 days) management of acute pain.

- **Pregnancy Category C:** Not for use in nursing
- **Peds Dosing:** Not for use in peds
- **Adult Dosing:**
  - Initial: 2 tabs q4-6h PRN for ≤5 days. Max: 8 tabs/day. CrCl <30mL/min: Max: 2 tabs q12h.
  - Elderly: Start at lower end of dosing range.

- **How supplied:**
  - Tab: (Tramadol-APAP/Ultracet-APAP) 37.5mg-325mg
  - Ultram ER 110mg, 200mg, 300mg – DO NOT CRUSH, CHEW, or CUT

- **Interactions:** CNS depressants increase risk of CNS/respiratory depression. CYP2D6 inhibitors and CYP3A4 inhibitors reduce metabolism clearance and increase risk of adverse reactions. CYP3A4 inducers altered exposure.

- Increased seizure risk with SSRIs, TCA’s, other tricyclic compounds, MAOI’s, opioids, neuroleptics. Also impair tramadol metabolism leading to serotonin syndrome.

- Possible digoxin toxicity and altered warfarin effects
**Tramadol/Ultram/Ultracet**

- **Interactions:**
  - Taken with Rifampicin will increase the metabolism of Tramadol by 67%.
  - Rifampicin is used in tx of all forms of TB, Brucelosis, and infectious disease that are resistant to other abx.

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**Oxycodone**

- **Mechanism of Action:** Opioid receptor Agonist
- **Uses:** Moderately Severe acute and chronic pain
- **Interactions:** Acetaminophen overdose. Intermitant prolongation of PT with patients on warfarin.
- **Pregnancy Category B:** use with care in nursing

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**Oxycodone**

- **Peds Dosing:**
  - 0.05-0.15mg/kg PO q4-6hours
  - Max Dose: 5mg/dose
  - Renal impairment:
    - CrCl 10-50: decrease dose by 25%
    - CrCl <10: decrease dose by 50%
    - Dialysis: no supplement

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**Oxycodone**

- **Adult Dosing:**
  - Individualize dose.
  - Opioid-Naive: Initial: Tablets - 5-15mg q4-6h PRN. Titrnate: Adjust dose based upon response.
  - Solution: 5mg/5mL opioid naive or 20mg/5mL for opioid tolerant
  - Closely observe and adjust dose based upon response for conversion from non-oxycodone Opioid or from a Controlled-release oral oxycodone.

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**Oxycodone**

- **Adult Dosing:**
  - Maint: Periodically reassess the continued need for opioid therapy, especially for noncancer-related pain.
  - Cessation: Gradually taper dose.
  - Hepatic/Renal Impairment: Initiate dose conservatively and monitor closely.
  - Elderly: Start at lower end of dosing range

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**Oxycodone**

- **Adverse Reactions:**
  - Respiratory depression/arrest, circulatory depression, cardiac arrest, hypotension, shock, N/V, constipation, headache, pruritus, insomnia, dizziness, asthena, somnolence.
  - paralytic ileus, acute or severe bronchial asthma or hypercarbia.
**Oxycontin**

- **Mechanism of Action:** Pure µ-receptor opioid agonist. Specific CNS opioid receptors have been identified throughout the brain and spinal cord and are thought to play a role in analgesic effect.

- **Uses:** Moderate to severe chronic pain that requires around-the-clock analgesic.

- **Weaning:** MUST Taper off.

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**Oxycontin**

- **Adult Dosing:**
  - Individualize dose.
  - Initial: First Opioid Analgesic: 10mg q12h.
  - Conversion from other Oral Oxycodone: 1/2 of total daily dose q12h.
  - Conversion from other Opioids: Begin with 1/2 of the estimated daily requirement, then divide into 2 doses taken 12 hrs apart; provide rescue medication.
  - Conversion from Transdermal Fentanyl: 10mg q12h for each 25mcg/hr fentanyl transdermal patch 18 hrs following removal of patch.

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**Oxycontin**

- **Adult Dosing:**
  - Titrate: Determine dose that provides adequate analgesia and minimizes adverse reactions. May increase total daily dose by 25-50% of current dose every 1-2 days, or each time an increase is clinically indicated.
  - Periodically reassess the continued need for opioid analgesics during chronic therapy, especially for noncancer-related pain (or pain associated with other terminal illnesses).

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**Oxycontin**

- **Adult Dosing:**
  - Hepatic Impairment: Start at 1/3 to 1/2 the usual starting dose followed by careful dose titration.
  - Renal Impairment: Follow conservative dose initiation and adjust accordingly.
  - Peds: Do not use in peds patients.

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**Oxycontin**

- **How Supplied:**
  - Tab, Controlled-Release: 10mg, 15mg, 20mg, 30mg, 40mg, 60mg, 80mg
  - Contraindications:
    - **CANNOT BE CRUSHED FOR G-TUBE USE**
    - If patient cannot swallow pills must try other options, ie. Fentanyl Patches, Morphine Elixir, or IV medication or PCA pump
    - Not for use for PRN analgesia

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**Oxycontin**

- **Interactions:**
  - CNS Depressants – increases the risk of respiratory depression, hypotension, sedation, or coma.
  - Muscle Relaxants – Can enhance neuroblocking muscular blocking action, increased respiratory depression.
  - Inhibitors of CYP3A4 – (macrolide abx – erythromycin, azole-antifungals – ketoconazole, protease inhibitors – ritonavir) can increase plasma concentrations of oxycodone. This can prolong opioid effects.
**Oxycodone**

- **Interactions:**
  - Inducers of CYP3A – (rifampin, carbamazepine, phenytoin) can increase metabolism of oxycodone. Decreases effectiveness of the medication requiring increased doses.
  - Mixed agonist/antagonist – (pentazocine, nalbuphine, butorphanol) may reduce effectiveness and may precipitate withdrawal symptoms.

**Morphine**

- **Mechanism of Action:**
  - Opioid analgesic; precise mechanism unknown. Specific CNS opiate receptors and endogenous compounds with morphine-like activity have been identified throughout the brain and spinal cord and are likely to play a role in the expression and perception of analgesic effects, on the receptors in the medulla.

**Uses:**
- Relief of moderate to severe acute and chronic pain where use of an opioid analgesic is appropriate.
- (Sol, 100mg/5mL) Relief of moderate to severe acute and chronic pain in opioid-tolerant patients

How supplied:
- Sol: 10mg/5mL [100mL, 500mL], 20mg/5mL [100mL, 500mL], 100mg/5mL [30mL, 120mL]; Tab: 15mg*, 30mg* *scored

**Peds Dosing:**
- <6mo: 0.1mg/kg PO q3-4hr
- 6-12mo: 0.2-0.5mg/kg PO q4-6hr
- 6-12mo alternate: ER – 0.3-0.6mg/kg PO q 12hr

**Adult Dosing:**
- Titrate dose based on response to initial dose. Start the elderly at lower end of dosing range.
- Opioid-Naive Patients: Initial: 10-20mg (sol) or 15-30mg (tab) q4h PRN for pain.
- Conversion from Parenteral to PO Formulation: Anywhere from 3-6mg PO dose may be required to provide pain relief equivalent to 1mg parenteral dose.
- Maintain: Continue to reevaluate with special attention to the maintenence of pain control and side effects.
- Periodically reassess the continued need for opioid analgesic use during chronic use especially for non-cancer-related pain (or pain associated with other terminal illness).

**Renal dosing:**
- CrCl <10 decrease by 50%
- CrCl 10-50 decrease by 25%

**Pregnancy Catagory C:** Not for use in nursing women

**Monitoring:**
- Monitor for respiratory depression, CSF pressure elevation, orthostatic hypotension, syncope, hypotension, aggravation of convulsions / seizures, and other adverse reactions.
Dilaudid

- Mechanism of Action:
  - Management of pain where opioid analgesic is appropriate. (HP) Management of moderate to severe pain in opioid-tolerant patients who require higher doses of opioids

- Uses:
  - Management of pain where opioid analgesic is appropriate. (HP) Management of moderate to severe pain in opioid-tolerant patients who require higher doses of opioids

- Adult Dosing:
  - Titrate individual dose. Reassess periodically after the initial dose.
  - (Inj) Opioid-Naive Patients: SQ/IM: Initial: 1-2mg q2-3h PRN. Titrate: Adjust dose according to severity of pain or adverse events, and patient's underlying disease and age.
  - IV: Initial: 0.2-1mg q2-3h given slowly, over at least 2-3 min depending on dose. Titrate: Adjust dose based on response.
  - Elderly/Debilitated: May be lowered to 0.2mg.
  - Hepatic/Renal Impairment: Initial: 25-50% the usual starting dose depending on degree of impairment. (HP) Base starting dose on the prior dose of an alternate opioid.
  - Tab/Sol: Nonopioid Tolerant: Initial: 2-4mg q4h.

- How supplied:
  - Tab: 2mg, 4mg, 8mg* scored
  - Inj: 1mg/mL, 2mg/mL, 4mg/mL, (HP) 10mg/mL [1mL, 5mL, 50mL], 250mg; Sol: 1mg/mL [475mL];
  - Pregnancy Category C: not for use in nursing
  - Monitor:
    - Signs/symptoms of respiratory depression, hypotension, increasing airway resistance, apnea, miosis or abuse, addiction, tolerance or dependence, allergic/anaphylactic reactions, anaphylactic episodes, hypersensitivity, seizures, myoclonus, alleviation of pain, and other adverse reactions. Monitor BP and cardiac output.

- Peds Dose:
  - <6mo: 0.005mg/kg SC/IV q 2-6hr; start with 0.005 and adjust up or 0.0015mg/kg/hr
  - >6mo >50kg: 2-4mg PO q3-6hr; 1-2mg SC/IV q3-6hr or may use 0.3mg/hr
  - Cough: 6-12yr: 0.5mg PO q3-4hr
  - Cough: >12yr 1mg PO q3-4hr
  - No supplement for dialysis (HD/PD)

- Interactions:
  - Use with caution and in reduced dosages with other CNS depressants (eg, general anesthetics, phenothiazines, centrally-acting antihistamines, tranquilizers).
  - May cause severe hypotension with phenothiazines, general anesthetics, or other agents which compromise vasomotor tone.
  - Mixed agonist/antagonist analgesics (eg, pentazocine, nalbuphine, butorphanol, buprenorphine) may reduce analgesia and/or precipitate withdrawal symptoms; use with caution.
  - (PO) Avoid with alcohol.
  - (Inj/HP) MAOIs may potentiate action; allow at least 14 days after d/c treatment with MAOIs before starting therapy.
**Fentanyl**

- Mechanism of Action: Narcotic analgesic; produces analgesic and sedative effects. Alters respiratory rate and alveolar ventilation, which may last longer than analgesic effects.
  - **Uses:**
    - For analgesic action of short duration during the anesthetic periods, premedication, induction and maintenance, and in the immediate postoperative period (recovery room) as the need arises.
    - For use as a narcotic analgesic supplement in general or regional anesthesia. For administration with a neuroleptic (eg, droperidol inj) as an anesthetic premedication, for the induction of anesthesia, and as an adjunct in the maintenance of general and regional anesthesia.

**Fentanyl**

- Adult Individualize Dosing:
  - Adjunct to General Anesthesia: Low-Dose: Total Dose: 2mcg/kg for minor surgery. Maint: 2mcg/kg.
  - Moderate Dose: Total Dose: 2-20mcg/kg for major surgery. Maint: 2-20mcg/kg or 25-100mcg IM or IV if surgical stress or lightening of analgesia.
  - Additional dosage selected must be individualized, especially if the anticipated remaining operative time is short.

**Fentanyl**

- Peds Dosing:
  - 2-12 yrs: Individualize dose. Induction/Maint: 2-3mcg/kg.
  - Adult individualize dosing:
    - Premedication: 50-100mcg IM 30-60 min prior to surgery.
    - Adjunct to Regional Anesthesia: 50-100mcg IM or slow IV over 1-2 min.
    - Postop: 50-100mcg IM, repeat q1-2h PRN.
    - General Anesthetic: 50-100mcg/kg with oxygen and a muscle relaxant. Max: 150mcg/kg.
  - Elderly/Debilitated: Reduce dose

**Fentanyl**

- Pregnancy Category C: Not for use in nursing
- Adverse Reactions:
  - Respiratory depression, apnea, rigidity, bradycardia.

**Fentanyl**

- How Supplied:
  - Inj: 50mcg/mL [5mL]
- Adult Dose:
  - Analgesia: 50-100mcg IV/IM x 1 30-60min prior to OR
  - Anesthesia adjunct: 2-50mcg/kg IV X 1; 2mcg/kg for low dose; 2-20mcg/kg moderate dose; 20-50mcg/kg high dose
  - Pain: 50-100mcg IV q1-2hr PRN; 0.5-1.5mcg/kg/hr IV PRN

**Fentanyl**

- Peds Dose:
  - 1-3yo: 2-3mcg/kg IV q1-4hr; or use 1-2mcg/kg x 1 then 0.5-1mcg/kg/hr
  - 3-12yo: 2mcg/kg IV q1-4hr; or use 1-2mcg/kg x 1 then 0.5-1mcg/kg/hr
  - >12yo: 0.5-1mcg/kg IV q 1-4hr or 1-2mcg/kg x 1 then 0.5-1mcg/kg/hr
  - Sedation: 5-10mcg/kg IV x 1; then 1-5mcg/kg/hr
**Fentanyl Patch**

- Peds Doses:
  - >2yo; use conversion table for dose on current opioid intake.
  - May increase dose q3-6days.
  - Opioid tolerant pts may require q48hr dosing
  - Do not Cut patches
  - Renal and Hepatic dosing; 50% of dose
  - Drug effects can persist >24hrs after removal

- Adult Dose:
  - Taper to pt use conversion table for dose on current opioid intake.
  - May increase dose q3-6days.
  - Opioid tolerant pts may require q48hr dosing
  - Do not Cut patches
  - Renal and Hepatic dosing; 50% of dose
  - Drug effects can persist >24hrs after removal

**Fentanyl**

- Interactions:
  - Severe and unpredictable potentiation with MAOIs; appropriate monitoring and availability of vasodilators and β-blockers for HTN treatment is indicated.
  - Additive or potentiating effects with other CNS depressants (eg, barbiturates, tranquilizers, narcotics, general anesthetics); reduce dose of other CNS depressants.
  - Reports of cardiovascular (CV) depression with nitrous oxide.

- Drug Interactions:
  - Alteration of respiration with certain forms of conduction anesthesia (eg, spinal anesthesia, some peridural anesthetics).
  - Decreased pulmonary arterial pressure and hypotension with tranquilizers (eg, droperidol).
  - May increase BP in patients with/without HTN with droperidol
  - May cause CV depression with diazepam

**Relistor**

- Mechanism of Action:
  - Opioid antagonist; peripherally acting μ-opioid receptor antagonist in tissues such as GI tract, thereby decreasing constipating effects of opioids without impacting opioid-mediated analgesic effects on the CNS

- Uses:
  - Treatment of opioid-induced constipation in patients with advanced illness who are receiving palliative care, when response to laxative therapy has not been sufficient
  - Contraindications:
    - Known/suspected mechanical GI obstruction
Relistor

- **Pediatric Dosing:**
  - <38 kg (<84 lbs) or >114 kg (>251 lbs): 0.15 mg/kg; calculate inj volume by multiplying weight in lbs by 0.0054 or weight in kg by 0.0075 and round up volume to nearest 0.1 mL.

- **Adult Dosing:**
  - Severe Renal Impairment (CrCl <30 mL/min): Reduce dose by one-half. Do not prescribe prefilled syringes to patients requiring dosing calculated on a mg/kg basis; prescribe only in patients requiring an 8 mg or 12 mg dose.

- **How Supplied:**
  - Inj: 12 mg/0.6 mL [vial, prefilled syringe], 8 mg/0.4 mL [prefilled syringe]

- **Adverse Reactions:**
  - Abdominal pain, flatulence, nausea, dizziness, hyperhidrosis, diarrhea.

- **Warnings/Precautions:**
  - D/C therapy if severe/persistent diarrhea occurs and/or worsening abdominal symptoms develop during treatment. GI perforations (eg, stomach, duodenum, colon) reported in advanced illness associated with localized/diffused reduction of structural integrity in the wall of GI tract (eg, cancer, peptic ulcer, Ogilvie's syndrome).
  - Use beyond 4 months or in patients with peritoneal catheters has not been studied.

- **Pregnancy Category:** B

### Case #1

- **55 year old female presents with recurrent T3N2bM0 BOT SCCa following course of CXRT. Outside PET/CT and CT scans confirm node involvement. Pt has hx of cardiac stents in the last month and is on Pradaxa. She has been taking 800 mg Ibuprofen TID and Hydrocodone 5 mg/500 mg every 4 hours. She states she sometimes take aspirin or tylenol when the other medications aren’t enough to cover her throat and ear pain.**

- **Pt undergoes wide local excision and RFFF reconstruction, tracheostomy, and PEG-tube placement and right MRND. She is on Heparin drip and 325 mg ASA for flap viability.**
  - What pain medication does she need in the ICU?
  - How soon can you restart Pradaxa?
  - What tube medication do you wean her to for when she goes home?

### Case #2

- **77 year old male presents with positive FNA for PTCA. He is on Coumadin for A-fib. Has long hx of back and cervical neck pain from MVA. He takes oxycodone 10/325 QID for his back pain.**
  - What pain medication will you give after his total thyroidectomy?
  - What non-pharmaceutical pain control is important not to forget?
Case #3

- 21 year old TB positive patient comes in with large dental abscess that is drained in the OR. Pt has had multiple abx for infections. He is currently on Rifampin for his TB treatment.
- What pain medication should you not give?