POSTOPERATIVE PAIN MANAGEMENT IN PEDIATRICS

PRESENTED BY: JENIFER LICHTENFELS, M.D.

OBJECTIVES

- PHARMACISTS
  - Identify risk factors for narcotic-induced respiratory depression in children with OSA
  - State the current recommendations for perioperative pain management in children with OSA
  - Compare benefits and side effects of narcotics and NSAIDS in general surgery and orthopedic surgery in children
  - Acknowledge the importance of and adopt a position of “Narcotic Stewardship”

- TECHNICIANS
  - Recognize two serious complications of adenotonsillectomy (AT) in children
  - Explain why the FDA issued a black box warning regarding the use of codeine in children after AT
  - Acknowledge the importance of “Narcotic Stewardship”

- GENERAL PRINCIPLES OF PAIN PREVENTION AND INTERVENTION
  - POSTOP ENT MANAGEMENT
  - POSTOP GENERAL SURG MANAGEMENT
  - POSTOP ORTHOPEDIC MANAGEMENT
  - THE WORSENING U.S. OPIOID EPIDEMIC
  - NARCOTIC STEWARDSHIP

RISK FACTORS ASSOCIATED WITH INCREASED POSTOPERATIVE PAIN

- PREOPERATIVE ANXIETY
- AGE
- OBESITY
- ETHNICITY AND RACE

THE 3 P’S OF PAIN PREVENTION AND INTERVENTION

PHARMACOLOGICAL

PSYCHOLOGICAL

PHYSICAL

PAIN ASSESSMENT AND MANAGEMENT OF A CHILD

PAIN ASSESSMENT—WHEN?
ON ADMISSION AND ONCE A SHIFT
BEFORE/INTRAOPERATIVE PAINFUL PROCEDURES OR
SURGICAL INTERVENTIONS

PAIN ASSESSMENT—HOW?
USE DEVELOPMENTALLY APPROPRIATE TEST
PIPP, PIPP, FAC, VERBAL RATING SCALE, NONCOMMUNICATIVE

MANAGEMENT AND INTERVENTIONS

PAIN MANAGEMENT

PHARMACOLOGICAL
- GIVE ANALGESICS REGULARLY
- USE LEAST INVASIVE ROUTE

PHYSICAL
- MASSAGE
- DISTRACTION

PSYCHOLOGICAL
- EXPLAIN TO CHILD AND PARENT
- PRESSURE RELAXATION
- LIFE OR BEHAVIORAL HEALTH REASSESS

THE END
Adenotonsillectomy (AT) is the most common surgical treatment for obstructive sleep apnea (OSA) in childhood. OSA during childhood has a prevalence of 1-5%. First line medical treatment includes nasal steroids, leukotriene inhibitors, oral or topical decongestants. Many of these children end up with surgical intervention for persistently disturbed sleep, excessive daytime sleepiness, daytime neurobehavioral and mood disorders. 530,000 AT’s for OSA in children annually.

OBSTRUCTIVE SLEEP APNEA

POSTOP COMPLICATIONS OF ADENOTONSILLECTOMY

Major
- Respiratory Compromise
- Hemorrhage

Minor
- Pain
- Nausea
- Vomiting
- Dehydration

AT FOR OSA
- AT extubation, 43.3% with O2 desaturation
- In PACU, 63.3% required O2
- 5-fold increased risk of respiratory complications

AT FOR RECURRENT TONSILLITIS
- AT extubation, 8.6% with O2 desaturation
- In PACU, 10% required O2
- 2.5-fold increased risk of hemorrhage

RISK OF RESPIRATORY COMPROMISE OR HEMORRHAGE

CODEINE METABOLISM

In most individuals ~10% of an administered codeine dose is metabolized to the bioactive analgesic, morphine. The metabolism is controlled by the CYP2D6 enzyme pathway. The gene encoding CYP2D6 is highly polymorphic and shows a gene-dose effect.

- Poor metabolizers—Metabolize <10% codeine to morphine, 5-10% patients
- Extensive metabolizers (EM)—Normal metabolism, 77-92% patients
- Ultra-rapid metabolizers (UM)—Multiple gene copies resulting in >10% conversion of codeine to morphine more quickly, and the risk of morphine overdose, 1-2% patients
THE CODEINE CONUNDRUM

- Commonly acetaminophen-codeine was used for post-op AT pain control
- 2009, case report of a toddler death post-AT who was found at postmortem to be an ultra-rapid metabolizer (UM) of codeine
- May 2012, 3 additional deaths; 2-UM and 1-Em metabolizer
- FDA issued warning in August, 2012 warning of the rare but life-threatening respiratory compromise in OSA children following T-/A treated with codeine or other analgesics that utilize CYP2D6
- January 2013, FDA update reports 13 additional children with fatal or near fatal respiratory compromise with appropriate dosages of codeine; 8/13 were tonsillectomy patients

PRACTICE SHIFT FOLLOWING THE 2012 BLACK BOX WARNING

- Increased use of morphine and oxycodone postoperatively
- Reluctance to use NSAID’s because of concerns of an increased risk of bleeding
- Intravenous administration of acetaminophen and dexamethasone to preemptively treat pain and nausea

MCMASTER UNIVERSITY, THE HOSPITAL FOR SICK CHILDREN, 2012-2014 STUDY COMPARED IBUPROFEN AND MORPHINE POST-AT

- Faces pain scale on post-op Days 1 & 5
- Objective Pain Scale scores on post-op Days 1 & 5
- # of days until back to normal diet
- # of children with post-tonsillectomy bleeding events

Adverse drug reactions
- Sedation
- Constipation
- Vomiting
- Nausea
- Confusion
- Dizziness
- Night terrors
- Refusing fluids
- Anorexia
- Agitation
- Fever
- Diarrhea

SECONDARY OUTCOMES

- FACES PAIN SCALE DAY 1 & 5 0.29
- OBJECTIVE PAIN SCALE DAY 1 & 5 0.95
- # DAYS BACK TO PRE-OP DIET 0.89
- # POST-OP BLEEDING EVENTS 0.67
- # ADVERSE DRUG REACTIONS 0.16-0.51

CURRENT RECOMMENDATIONS FOR ANALGESIA FOR AT

- INTRA-OPERATIVE
  - 10MG/KG ACETAMINOPHEN RECTALLY OR 1.5MG/KG IV
  - DEXAMETHASONE 0.1-0.5MG/KG IV
  - ONDANSETRON 0.1MG/KG IV
  - SHORT-ActING OPIOID, FENTANYL 1MC/G/KG IV
- POST-OPERATIVE
  - IBUPROFEN 15MG/KG QHPR INITIALLY ROUTINE, THEN PRN
  - ACETAMINOPHEN 15MG/KG QHPR PRN
GENERAL SURGERY

CONSIDERATIONS

- UNDERLYING SURGICAL PATHOLOGY
  - RUPTURED APPENDIX WITH OPEN LAPAROTOMY VS. "LAP-APPY"
- TAKE INTO ACCOUNT OTHER RISK FACTORS
  - ANXIOUS, OBESE ADOLESCENT AFRICAN-AMERICAN FEMALE
  - DEVELOPMENTALLY DELAYED WITH POOR COMMUNICATION
  - PARENTAL HELP IN REPORTING USUAL SIGNS AND EXPRESSION OF PAIN
- PREVIOUS HISTORY OF SURGERY
  - WHAT WORKED WELL AND WHAT DID NOT

ORTHOPEDIC PAIN

- 2007 STUDY FROM OTTOWA, CANADA
- RANDOMIZED CHILDREN AGED 6-17 Y.O. TO INITIAL ANALGESIA WITH IBUPROFEN (10MG/KG), ACETAMINOPHEN (15MG/KG) OR CODEINE (1MG/KG)
- PAIN SCALES (VAS) AT PRESENTATION, 30, 60, 90, 120 MIN. NO SIGNIFICANT PAIN IMPROVEMENT OR DIFFERENCE BETWEEN GROUPS AT 30 MIN.
- AT 60 MIN ONLY THE IBUPROFEN GROUP HAD SIGNIFICANTLY, P <.001, BETTER PAIN CONTROL AND ACHIEVED ADEQUATE ANALGESIA. P <.001, COMPARED TO ACETAMINOPHEN OR CODEINE.

MUSCULOSKELETAL TRAUMA

UPPER AND LOWER EXTREMITY SURGERY

STRONGLY RECOMMEND CONSIDERATION OF SITE-SPECIFIC PERIPHERAL REGIONAL ANESTHESIA AS PART OF MULTIMODAL ANALGESIA PLAN


NSAID USE AS PART OF MULTIMODAL ORTHOPEDIC PAIN MANAGEMENT

SOME RELUCTANCE BECAUSE OF ANIMAL MODEL STUDIES SHOWING DELAYED BONE FUSION

OBSERVATIONAL EVIDENCE IN ADULTS, NO RCT, OF HIGH DOSE NSAIDS AND NONUNION IN SPINAL FUSION SURGERY

PEDIATRIC LITERATURE, RETROSPECTIVE REVIEWS, NO ASSOCIATION OF NSAIDS AND NONUNION IN SPINAL SURGERIES

CLEARLY NEEDED PROSPECTIVE RCT

OUR NARCOTIC EPIDEMIC

WHAT IS THE COMMON DENOMINATOR?

In 2014, the five states with the highest rates of death due to drug overdose were West Virginia, New Mexico, New Hampshire, Kentucky and Ohio.

ALTERNATIVES OPTIONS FOR TREATMENT OF BACK PAIN, MIGRAINES, SURGICAL PAIN NSAIDS +/- ACETAMINOPHEN, PHYSICAL THERAPY, ACUPUNCTURE, CHIROPRACTIC CARE, COGNITIVE BEHAVIOR THERAPY

IMPEDIMENTS INSURANCE NON-COVERAGE, HIGH CO-PAY FOR ALTERNATIVE TREATMENTS, RELATIVE LOW COST OF NARCOTIC RX, PATIENT DEMAND FOR RX

STRATEGIES OPIOID RX'S LOW DOSES AND FOR LIMITED PERIOD OF TIME, CLOSE ATTENTION TO STATE MONITORING PROGRAMS, STEER ABUSING/ADDICTED PATIENTS TO TREATMENT PROGRAMS

NARCOTIC RX'S LOW DOSES AND FOR LIMITED PERIOD OF TIME, CLOSE ATTENTION TO STATE MONITORING PROGRAMS, STEER ABUSING/ADDICTED PATIENTS TO TREATMENT PROGRAMS
# TURN THE TIDE

- Surgeon General's, Dr. Vivek Murthy, Campaign Fighting the Opioid Epidemic
- Safe and Effective Management of Pain
- http://turnthetiderx.org/

# REFERENCES