PedsCases Podcast Scripts

This is a text version of a podcast from Pedscases.com on "**Managing Pain & Distress in Children Undergoing Brief Diagnostic and Therapeutic Procedures – CPS Podcast.**" These podcasts are designed to give medical students an overview of key topics in pediatrics. The audio versions are accessible on iTunes or at www.pedcases.com/podcasts.

Managing Pain & Distress in Children Undergoing Brief Diagnostic and Therapeutic Procedures – CPS Podcast

Developed by Dr. Anastasia Zello, Dr. Evelyne Trottier and Dr. Samina Ali for PedsCases.com.
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Introduction:

My name is Anastasia Zello. I am a second-year pediatrics resident at the University of Alberta. This podcast was produced by PedsCases and the Canadian Paediatric Society and will be discussing the CPS Position Statement "Managing Pain and Distress in Children Undergoing Brief Diagnostic and Therapeutic Procedures." This podcast was made in collaboration with the authors of the statement, Dr. Evelyne Trottier, pediatric emergency physician at the CHU Sainte-Justine and assistant clinical professor at l'Universite de Montreal in Montreal, Quebec, as well as Dr. Samina Ali, a pediatric emergency physician at the Stollery Children's Hospital and professor of Pediatrics and Emergency Medicine at the University of Alberta in Edmonton.

In this podcast we will be discussing approaches to pain management in infants, children, and youth undergoing common, but painful, minor medical procedures. More invasive procedures, painful medical conditions, pain management in neonatal units, and IV procedural sedation and analgesia are beyond the scope of this podcast.

By the end of the podcast, listeners should be able to:

- Identify frequently performed minor pediatric diagnostic and therapeutic procedures that require pain and distress management
- List simple, evidence-based strategies for managing pain and distress in children
- Be able to combine simple pain and distress-minimizing strategies to improve the patient, caregiver, and health care experience

Common medical procedures used to assess and treat patients can cause significant pain and distress, particularly in children. Examples include IV cannulation, blood draws, lumbar punctures, wound repairs, and diagnostic imaging of suspected fractures or dislocations. Under-treated pain has short and long-term negative consequences for both children and their families. Despite many existing best practice strategies to manage pain and ample evidence for their effectiveness, suboptimal care is still consistently reported.

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Pain is multifactorial. Thus, it has been shown that combining strategies is often more effective than using one strategy alone and can also facilitate procedural success for health care professionals. The CPS recommends combining the 3-P – physical, psychological, and pharmacological strategies – approach to minimize pain and distress. We will explore these strategies through a series of cases.

Case #1 – Needle Procedures

Tommy is a 4-year-old boy from a First Nations community who presents to the emergency department with vomiting and diarrhea. He has a known past medical history of MCAD deficiency, a metabolic disorder that prevents the conversion of fats to energy during periods of decreased oral intake. After your full assessment, you conclude his symptoms are consistent with viral gastroenteritis. His grandmother (Kokum) hands you his metabolic crisis protocol that instructs you to do blood work and provide supplemental IV fluids. Let's discuss an approach to pain and distress management in this child with regards to intravenous placement – beginning with physical strategies.

An upright position, rather than the traditional approach of lying on a bed has been shown to increase children's comfort during procedures such as IV insertions or vaccinations, by enhancing the child's sense of control. Smaller children may sit on their caregiver's lap. Secure, comforting or 'hugging' holds serve to assist, rather than restrain, the child.

Psychological strategies are highly effective in children beyond the infant period. These include: preparation, distraction, and deep breathing. Let's explore these further:

Children over the age of 4 years generally benefit from simple information regarding what to expect. Explaining the steps of a procedure, receiving sensory information about what they might feel (e.g., cold, wet, pressure), seeing the medical supplies that will be used, and offering realistic choices or roles related to the procedure helps children to feel more in control.

Of note, similar to their children, parents also require preparation regarding what to expect and what they can do to help with positioning and distraction as well as what might be best to say during a procedure. Advise parents to avoid false or premature reassurances, such as: "This won't hurt," "It's all over." The end of a procedure cannot always be predicted reliably, nor the effectiveness of pain control guaranteed.

Distraction strategies (like reading a story, listening to music, watching an animated video or playing an interactive game) are effective in reducing the pain perceived and distress related to a variety of painful procedures. Distraction is the most widely studied psychological strategy for needle-related procedural pain and distress in children over the age of 2. Engaging children in non-procedure-related conversation can also help to shift their attention away from painful stimuli and, when appropriate, humour can be used to alleviate tension.

Deep breathing can be used as a relaxation strategy to reduce perceived pain if distraction alone is not sufficient. For example, the health care professional may ask the child to "Take a deep breath in and blow out slowly." Common tools, like a pinwheel or bubble blowing, may help promote deep breathing and offer distraction.

There are also more complex psychological techniques like hypnosis and while they do work, they require advanced training, and we won't go into detail about it here.

The most effective pharmacologic management strategies for needle procedures is topical anesthetics. Of the topical anesthetic creams available, rapid-acting Ametop and Maxilene remain our preferred pharmacological options for IV placement pain management because of their earlier onset of action compared to EMLA (30 minutes instead of 60). When patients are stable enough to wait 30 minutes, using either of these before needle procedures is recommended, especially when combined with other physical and psychological strategies.

Back to the case. The triage nurse had already applied Maxeline to a few strategic areas on Tommy's arm and hand on arrival to ensure the best experience for him. Tommy requests to sit on his grandmother (Kokum)'s lap during the IV placement. You ask his Kokum to gently "hug" Tommy's arm against her body while the nurse searches for an IV placement site. Additionally, a child life specialist is present and engages Tommy by playing a seek and find game – encouraging him to find different images on a giant 'I Spy' game on the wall. Blood work and a peripheral IV are complete.
Our next case involves an infant – let's look at some age-specific strategies for younger patients.

Case #2 - Infant Strategies

Amy, a 3-week-old infant, is brought to the emergency department by her very worried parents for a one-day history of fever, poor feeding, and increased sleepiness. Her temperature at triage is 39.1. Following a thorough history and physical exam, you decide she needs a full septic work-up to rule out a serious bacterial infection. This includes a blood draw, urine collection, and lumbar puncture. Using the multimodal "3P" approach, how can you reduce the pain experience from these procedures? First you prepare for bloodwork and IV insertion.

There are numerous physical pain management strategies specific to infants. These include breastfeeding, pacifier use, swaddling, and skin-to-skin care (also called "kangaroo care"). Breastfeeding can be a multimodal comfort strategy, simultaneously offering skin-to-skin contact, the comfort of sucking and rocking, and (likely) the transfer of endogenous opiates in breast milk.

Psychological strategies are not employed for young infants, however preparation for parents can be helpful. You should explain the procedure to parents so that they know what to expect and help them remain calm during the procedure. Families should be encouraged to be present for procedures and their comfort positioning can reduce pain through the procedure.

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One pharmacologic option for infants is oral sucrose. Sucrose has been studied extensively in infants less than 1 month, and may be effective up to 12 months old, and is effective for pain reduction in procedures such as heel pokes, venipunctures, lumbar puncture, and immunization. Its usefulness has been clearly shown in both the pre-term and term neonates. The recommended dosing is one to 2 mL of 24% to 33% sucrose. You should give a few drops of sucrose two minutes prior to the procedure and then continue to administer it during. **Can Amy benefit from these strategies?**

Amy is bundled in a warm blanket while her mother breastfeeds her. Blood work is drawn and the bedside nurses places a peripheral IV simultaneously. Sucrose was readily available at the bedside, however Amy's breastfeeding and swaddling were sufficient to manage her pain and distress. Step 1 done! Now onto the urine collection:

While sterile urine collection techniques such as urinary catheterization have been the standard for years, novel clean catch methods are being increasingly used as non-painful alternatives to urethral catheterization in non-toilet trained children. For example, the catch method by the Spanish authors Herroros et al., which involves bladder stimulation using gentle tapping in the suprapubic area and paravertebral massages, or the method by the Australian authors Kauffman et al., the "Quick Wee", which involves gentle suprapubic cutaneous stimulation using gauze soaked in cold fluid, found increased procedural success rates in infants with a reported contamination rate of approximately 15%. If you would like to learn more about these approaches, there are links to videos in the CPS statement.

If this technique is not effective or contamination is suspected, urethral catheterization is an alternative, which can be uncomfortable for the infant. Simultaneous use of both topical and intra-urethral 2% lidocaine gel do not seem to be effective in reducing pain with urethral catheterization-associated in children less than 2 years old. Sucrose appears to have some analgesic effect for catheters in neonates but may not be effective in older infants.

You discuss the various options with Amy's parents and they request a less invasive approach using a clean catch method. Amy spontaneously voids after 1 minute of stimulation! Her parents, initially very anxious, are showing confidence in your and the bedside nurse's skills and express comments of overall satisfaction. However, you know your job isn't done – Amy still needs a lumbar puncture to rule out meningitis.

For LPs, topical local anaesthetic should be applied first, when time permits, followed by injected lidocaine to achieve deeper tissue anesthetic. When urgency does not permit applying cream, 1 mL of injected 1% lidocaine without epinephrine should still be used.

Oral sucrose can be also be added during this procedure in infants, as well as the psychological strategies discussed earlier – however positioning of the baby may impede some of these interventions. Of note, in older children, mild sedation or anxiolysis with nitrous oxide is often needed for lumbar punctures given the procedure is inherently quite distressing for children.

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You explain the procedure to Amy's parents in more detail and give them the choice to be present during the lumbar puncture. Amy's mother requests to remain at the bedside and you encourage her to sit at the head of the bed and gently stroke Amy's head. You ask an experienced nurse to help hold Amy in the appropriate position for the procedure.

Fortunately, the triage nurse had already applied a topical anesthetic cream, Maxilene, when Amy arrived as they had anticipated the septic workup and it has now been in place for over 30 minutes. You deepen the local analgesia using 0.5ml of injected lidocaine in a 1ml syringe. To be most effective, part of the sucrose dose is administered around 2 minutes before the injection and the rest during the needle insertion.

Amy initially cries with positioning, but settles quickly. You are able to collect sufficient CSF sample and send it off to the lab. You debrief afterwards with the other health care professional involved in Amy's care and everyone agrees that, despite implementing additional strategies to minimize pain and distress in the infant, there was little delay in the care Amy received.

Are you getting the hang of this? Let's work through one more case to solidify some of the strategies we've discussed, as well as introduce some case-specific ones.

Case #3 – Lacerations and Fractures

Rahim, a previously healthy 7-year-old boy, comes into the emergency department after a fall on the school playground. He complains of localized pain in his left wrist. You are suspicious of an isolated radial fracture, however bruising and swelling limit your physical exam. You decide he needs an x-ray of the joint. He also has a 2 cm gaping laceration above his right eyebrow; bleeding is controlled, however the laceration will need to be closed. He fits low-risk criteria for traumatic head injury. How can we reduce pain and distress when dealing with fractures and lacerations?

When a fracture or a dislocation injury is suspected, analgesia combined with immobilization and icing should be provided before X-ray. Ibuprofen appears to be superior to acetaminophen for alleviating pain associated with musculoskeletal injuries and is equivalent to oral morphine, but without the opioid adverse effects. For moderate-to-severe pain, intranasal fentanyl appears promising because it can be quickly administered and acts rapidly. This topic will be discussed in a future CPS statement and is beyond the scope of this podcast.

Following his dose of ibuprofen, Rahim appears to be quite comfortable. You ensure he has a sling and a cool ice bag prior to sending him to radiology. He returns from x-ray and his imaging shows a buckle fracture. You apply a Velcro splint for comfort. Rahim now needs his laceration repaired. What can we do to minimize pain and distress for Rahim and his caregiver during this procedure?

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Tissue glues are an acceptable alternative to sutures for the repair of simple, clean traumatic lacerations on tension-free surfaces and reduce both procedure times and pain. Sterile adhesive strips can enhance reinforcement. There is no difference in short- or long-term cosmetic outcome compared with sutures. When sutures are required, prioritize absorbable sutures, which are at least as good as non-absorbable sutures for cosmetic outcomes and infection rate when used in areas of low tension, in order to avoid distress caused by suture removal.

For laceration repairs, topical anesthetics such as LET gel (which is made up of lidocaine, epinephrine, and tetracaine) are recommended to reduce pain. Application should also be considered before tissue adhesive procedure because wound cleaning, examination, and closure are facilitated with better pain management. LET is effective in 30 minutes and helps achieve wound hemostasis. LET is contraindicated for patients less than 3 months old, on mucosal surfaces and in large, deep or contaminated wounds.

When LET gel is not sufficient to manage pain or a repair is urgent, local infiltration with lidocaine or a nerve block should be performed before suturing. Strategies to reduce injection pain include adding bicarbonate to the lidocaine in a 1:10 volume ratio, warming the injection solution to body temperature, and injecting the solution slowly, using a small gauge needle.

In addition to combined pain management strategies, some children still require short-acting anxiolysis or sedation, like nitrous oxide or intranasal midazolam, to alleviate distress and minimize movement.

Let's go back to our case:

After briefly explaining the procedure to Rahim using age-appropriate language, you ensure he is in a comfortable position for the procedure with a trusted caregiver near by. Distraction techniques are introduced as you begin the laceration repair with absorbable sutures– Rahim plays a counting game on an iPad with his father. During the procedure, you reassess Rahim for any signs of pain and distress by observing his facial expressions and checking in on him every so often. The procedure is a success! Rahim leaves the emergency department happy with a sticker in hand.

In summary, pediatric pain should always be assessed and respected. Anticipate and treat pain and distress for all children. Failure to address children's pain has long-lasting consequences, for the child, their family, and healthcare professionals. Health professionals are encouraged to choose minimally invasive approaches and, when a painful procedure is unavoidable, to use a combination of simple, multimodal strategies to improve the patient, parent, and health care professional experience.

Thank you for listening!

References:

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