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Мультимодальная аналгезия у детей

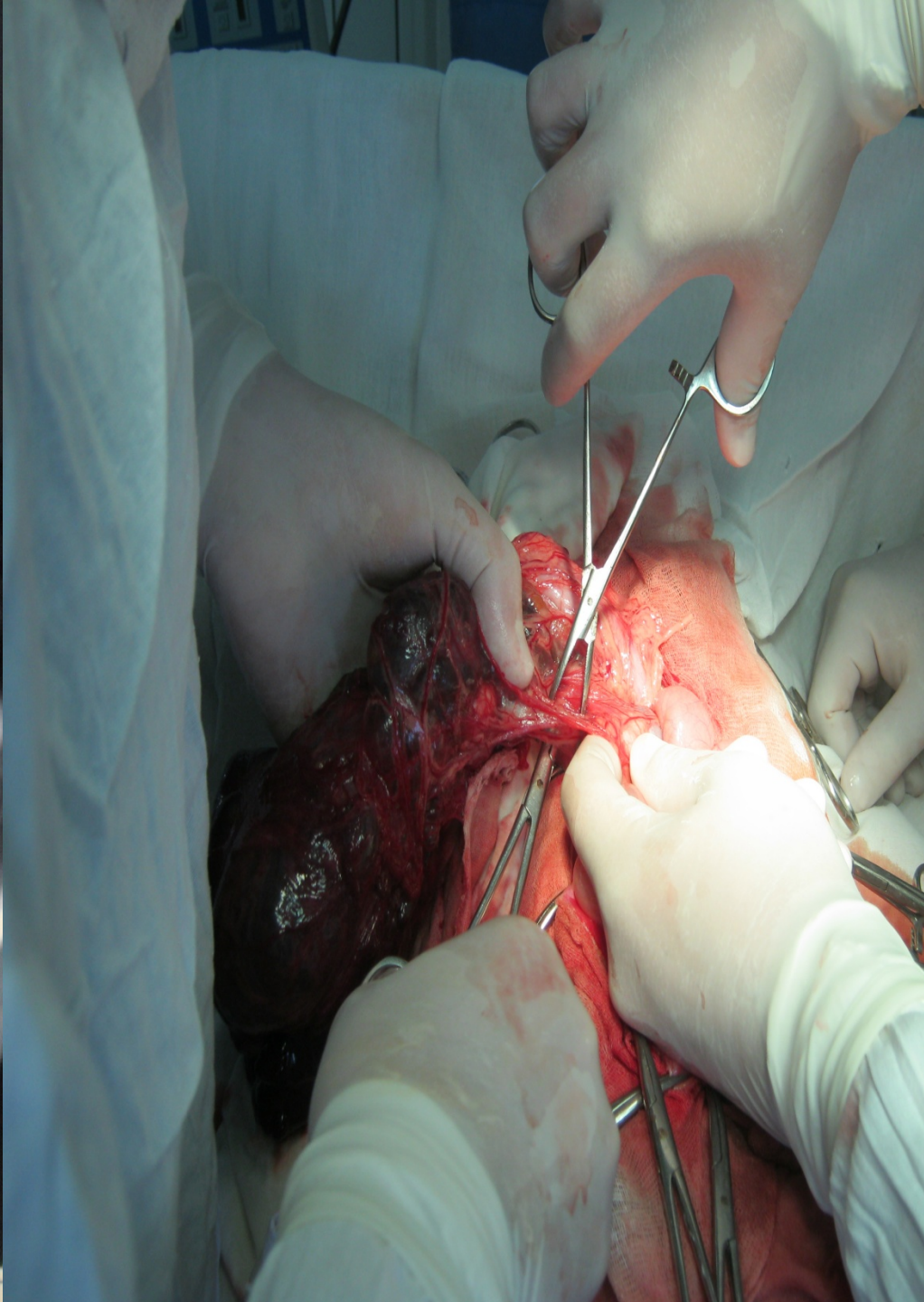
«21-22 апреля 2016 г.

Британо-Украинский симпозиум

Киев

Дмитриев Д.В



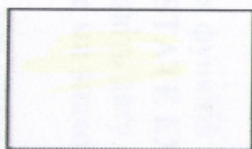




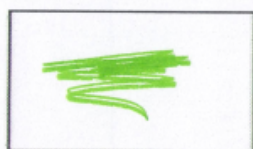
Пациент М, 8 лет
(стандартное анестезиологическое обеспечение)

Цветовая шкала Иленд

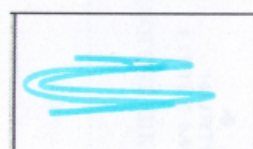
Нет боли
Не болит



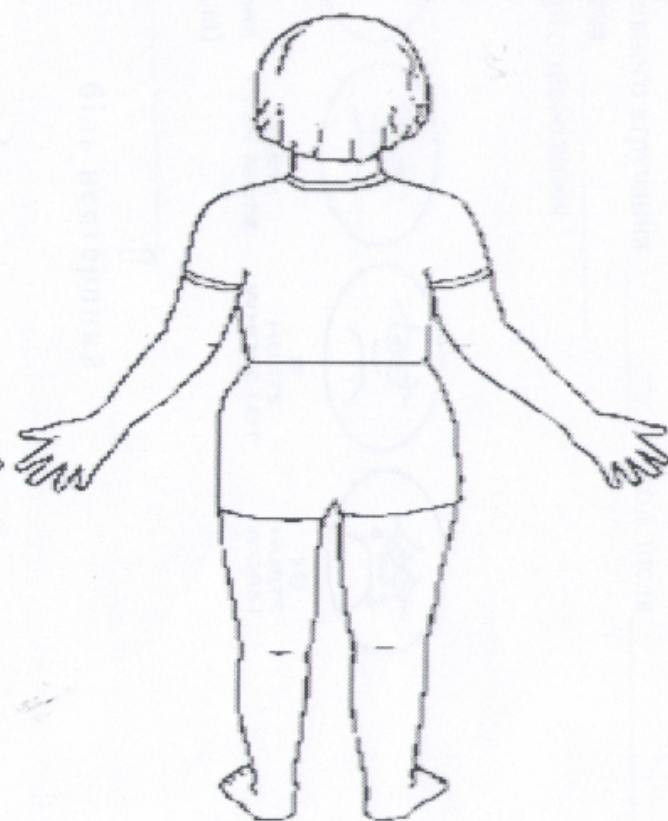
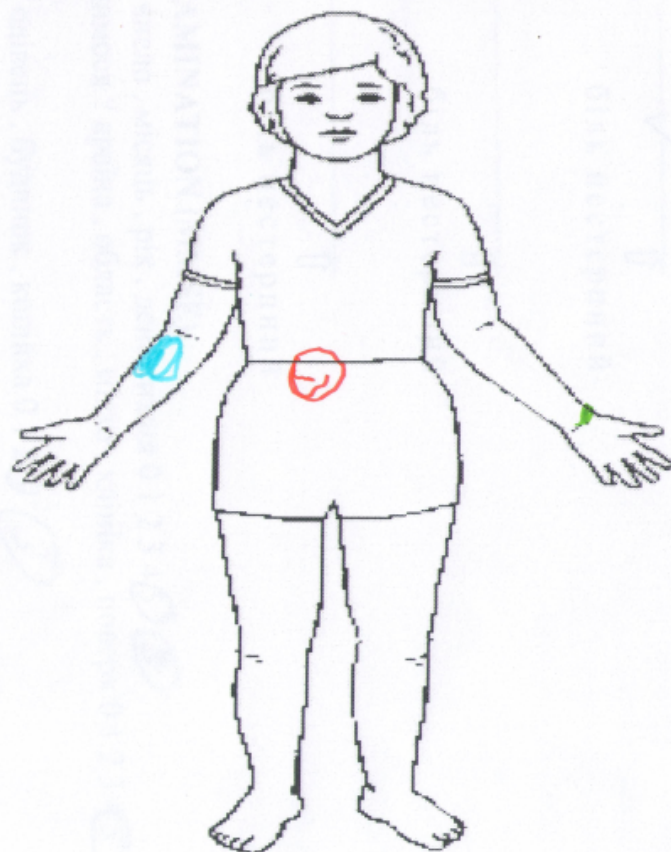
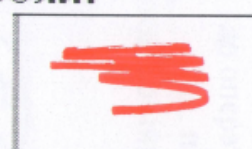
Легкая боль
Немного болит



Умеренная боль
Болит сильнее



Сильная боль
Очень сильно
болит



ОПРЕДЕЛЕНИЕ IASP

Постоперационной боли

Постоперационная боль - «неприятное сенсорное и эмоциональное переживание, связанное с действительным или возможным повреждением тканей или описываемое на основе такого повреждения».

Гипералгезия — лат. *hyperalgesia* от др.-греч. ὑπερ- — «сверх» и ἄλγος — «боль, страдание») — аномально высокая чувствительность организма к болевым стимулам.

•

Актуальность проблемы

- Предупреждение и лечение послеоперационной боли остаются одной из основных проблем современной хирургии.
- Несмотря на обширный арсенал опиоидных и неопиоидных анальгетиков, адекватность послеоперационной анальгезии по данным литературы не превышает 30–70 %.
- Выбор метода послеоперационного обезболивания зачастую обусловлен традициями конкретного медицинского учреждения и опытом врача.

Dolin S., Cashman J., Bland J. Effectiveness of acute postoperative pain management: I. Evidence from published data. // Br.J.Anaesth. – 2002. – V.89. – P.409– 423.

6636 детей и
взрослых в
исследовании
из них 54 %
испытывали
боль

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« Previous PAIN Volume 87, Issue 1, Pages 51-58, 1 July 2000 Next »

Pain in children and adolescents: a common experience

[Christel W Perquin](#) , [Alice A.J.M Hazebroek-Kampschreur](#), [Joke A.M Hunfeld](#), [Arthur M Bohnen](#), [Lisette W.A van Suijlekom-Smit](#), [Jan Passchier](#), [Johannes C van der Wouden](#)

Little is known about the epidemiology of pain in children. We studied the prevalence of pain in Dutch children aged from 0 to 18 years in the open population, and the relationship with age, gender and pain parameters. A random sample of 1300 children aged 0–3 years was taken from the register of population in Rotterdam, The Netherlands. In the Rotterdam area, 27 primary schools and 14 secondary schools were selected to obtain a representative sample of 5336 children aged 4–18 years. Depending on the age of the child, a questionnaire was either mailed to the parents (0–3 years) or distributed at school (4–18 years). Of 6636 children surveyed, 5424 (82%) responded; response rates ranged from 64 to 92%, depending on the subject age and who completed the questionnaire. Of the respondents, 54% had experienced pain within the previous 3 months. Overall, a quarter of the respondents reported chronic pain (recurrent or continuous pain for more than 3 months). The prevalence of chronic pain increased with age, and was significantly higher for girls ($P<0.001$). In girls, a marked increase occurred in reporting chronic pain between 12 and 14 years of age. The most common types of pain in children were limb pain, headache and abdominal pain. Half of the respondents who had experienced pain reported to have multiple pain, and one-third of the chronic pain sufferers experienced frequent and intense pain. These multiple pains and severe pains were more often reported by girls ($P<0.001$). The intensity of pain was higher in the case of chronic pain ($P<0.001$) and multiple pains ($P<0.001$), and for chronic pain the intensity was higher for girls ($P<0.001$). These findings indicate that chronic pain is a common complaint in childhood and adolescence. In particular, the high prevalence of severe chronic pain and multiple pain in girls aged 12 years and over calls for follow-up investigations documenting the various bio-psycho-social factors related to this pain.

Anesthesiologist



Dr Viscusi, an anesthesiologist, comments on current clinical guidelines for multimodal analgesia

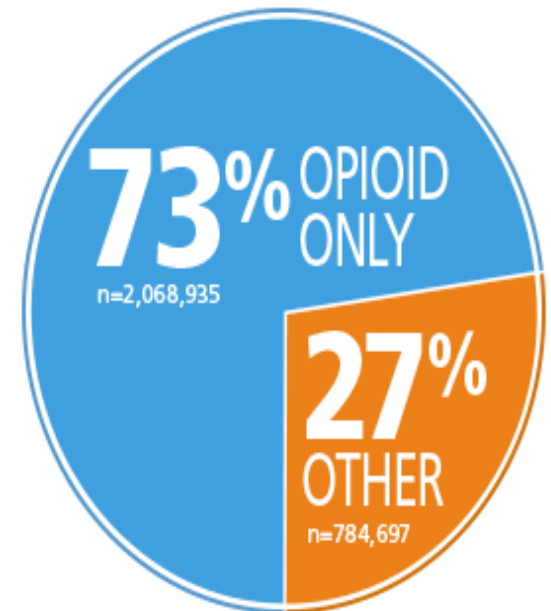
Eugene Viscusi, MD

Play

Treatment of acute pain remains suboptimal

Opioids have historically been the foundation for acute pain management^{1,2}

- In a 2014 research database of 2,853,632 patients, 73% of inpatients treated with IV analgesia received IV opioid monotherapy



Неадекватное обезболивание в послеоперационном периоде у детей:

В стационаре:

- удлинняет время пребывания в ОИТ, стационаре
- увеличивает частоту ре-госпитализаций
- повышает риск и частоту инфекционных осложнений
- способствует гиперкоагуляции, тромбозам
- повышает интраабдоминальное давление
- способствует развитию острой дыхательной недостаточности

Отдаленные последствия :

- Нарушение сна, страх и т.д
- Патологическое болевое поведение

Основные принципы лечения

- Послеоперационная боль является осложнением хирургического вмешательства, ее следует устранять и предупреждать.
- Для того чтобы анальгезия была эффективной, ее следует четко планировать. Обезболивающие средства необходимо назначать до появления боли или прежде чем она станет нестерпимой.
- При проведении рациональной послеоперационной анальгезии препараты следует вводить в определенные часы и инфузионно.
- Назначение большого количества препаратов имеет свои преимущества: их сочетание позволяет достичь синергического эффекта, уменьшить дозы некоторых лекарственных средств.
- Детям предпочтительнее вводить препараты перорально, ректально, внутривенно или перидурально (при отсутствии возможности установить внутривенные катетеры).

Обоснование использования НПВС для лечения послеоперационной боли у детей

а) большинство препаратов для наркоза которые используются в детской практике не обладают или имеют незначительный анальгетический эффект

б) предупреждает развитие центральной сенситизации, вызванной повреждением при разрезе (перекрывает только период операции);

в) предупреждает развитие центральной сенситизации, вызванной повреждением и воспалением при разрезе (перекрывает период операции и ранний послеоперационный период).

Проблемы использования НПВС для лечения послеоперационной боли у детей

а) большинство НПВС которые обладают выраженным анальгетическим эффектом разрешены для использования в детской практике с 16 лет.

б) большинство разрешенных в нашей стране у детей НПВС не имеют инъекционной формы (парентеральной формы)

в) многие детские анестезиологи используют НПВС основываясь на своем опыте (off - label), используя неадекватные дозы препаратов.

так жить нельзя!



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Возможные пути решения

Pediatric Anesthesia

Pediatric Anesthesia

Volume 22 Supplement 1 July 2012

**Good Practice in Postoperative
and Procedural Pain Management
2nd Edition, 2012**

**A Guideline from the Association of Paediatric
Anaesthetists of Great Britain and Ireland**

- Мультимодалая аналгезия
- Преемтив аналгезия
- Эпидуральная анестезия
- Блокады периферических нервов
- Нефармакологические методы

but differences in efficacy and side effects between regimens are observed. Epidural opioids improve analgesia but side effects are more frequent. The side effect profile may be related to the individual properties of specific opioids: morphine, fentanyl, and hydromorphone were of comparable analgesic efficacy in one study; respiratory depression, somnolence, and retention of urine were higher in the morphine group; PONV and urinary retention had the lowest incidence with hydromorphone (285). Single-dose epidural morphine was equianalgesic with increasing dose (11.2, 15, and 20 $\mu\text{g}\cdot\text{kg}^{-1}$), but the incidence of PONV increased with dose (300). In a study comparing bupivacaine + fentanyl with bupivacaine (both with adrenaline), the fentanyl group had superior analgesia and did not require rescue opioid but had a higher incidence of PONV, whereas the bupivacaine group required more bupivacaine and 10/26 (38%) required rescue opiates and antiemetic therapy, itching only occurred in the fentanyl group (286).

Epidural vs peripheral nerve block

A comparison of continuous epidural block with continuous popliteal nerve block for major foot surgery showed no difference in pain or rescue analgesia, but adverse effects and patient satisfaction were improved with peripheral nerve block (290). In congenital club foot surgery, a comparison of single-shot caudal anesthesia with

Comparisons between peripheral nerve blocks and intravenous morphine in pelvic osteotomy (283) and patella realignment surgery (284) demonstrate reduced pain scores, reduced morphine consumption and a reduction in the incidence of sedation with the use of peripheral nerve blocks.

A number of successful series of peripheral nerve blocks have been described, including popliteal nerve block (288,290,292–294,303), fascia iliaca compartment block (288,303,304), sciatic nerve block (289,291,295,305), psoas compartment block (287,293), and femoral nerve block (284,304).

Continuous LA infusion vs PCRA/PCEA

PCRA (Ropivacaine 0.2%) showed similar efficacy to a continuous regional technique, with a lower total dose of LA for popliteal and fascia iliaca blocks (303). In a comparison of PCEA vs CEA, again efficacy was similar and a lower dose of LA used (306).

Systemic analgesia with NSAID and paracetamol can be combined with intravenous opioid or regional analgesia. In one study, a combination of paracetamol and ketoprofen significantly decreased pain scores and IV morphine requirements compared to either drug alone (299). In a case series of patients undergoing club foot surgery and long bone osteotomy, ketorolac reduced IV morphine usage and associated GI effects



Я не буду этого делать.

Я не могу это сделать (не умею, не получится)

Я хочу это сделать!

Как мне это сделать?

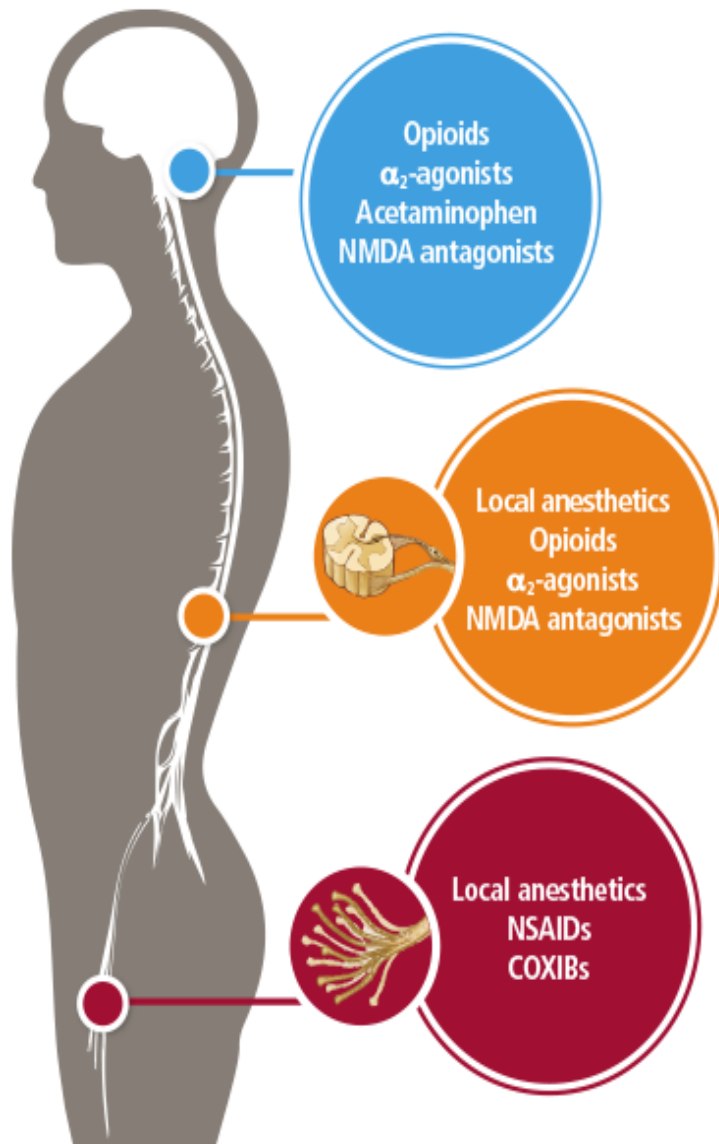
Я попытаюсь...

Я могу это сделать!

Я это сделаю!

Это же так просто!

Intervention at various points along the pain pathway³⁻⁶



Multimodal analgesia can help optimize pain management with less opioids^{7,8}

- Multimodal analgesia combines 2 or more analgesic agents or techniques that act by different mechanisms to provide analgesia with better pain relief and less opioids^{7,8}
- Multimodal analgesia is supported by a significant number of societies and organizations, including
 - Surgical Pain Consortium⁹
 - The Joint Commission⁷
 - Agency for Healthcare Research and Quality¹⁰
 - American Society of Anesthesiologists⁸
 - American Society for Pain Management Nursing¹¹
 - American Society of PeriAnesthesia Nurses¹²
 - American Geriatrics Society¹³
 - Society of Critical Care Medicine¹⁴

Preventive analgesia for postoperative pain control: a broader concept

This article was published in the following Dove Press journal:
Local and Regional Anesthesia
29 April 2014
Number of times this article has been viewed

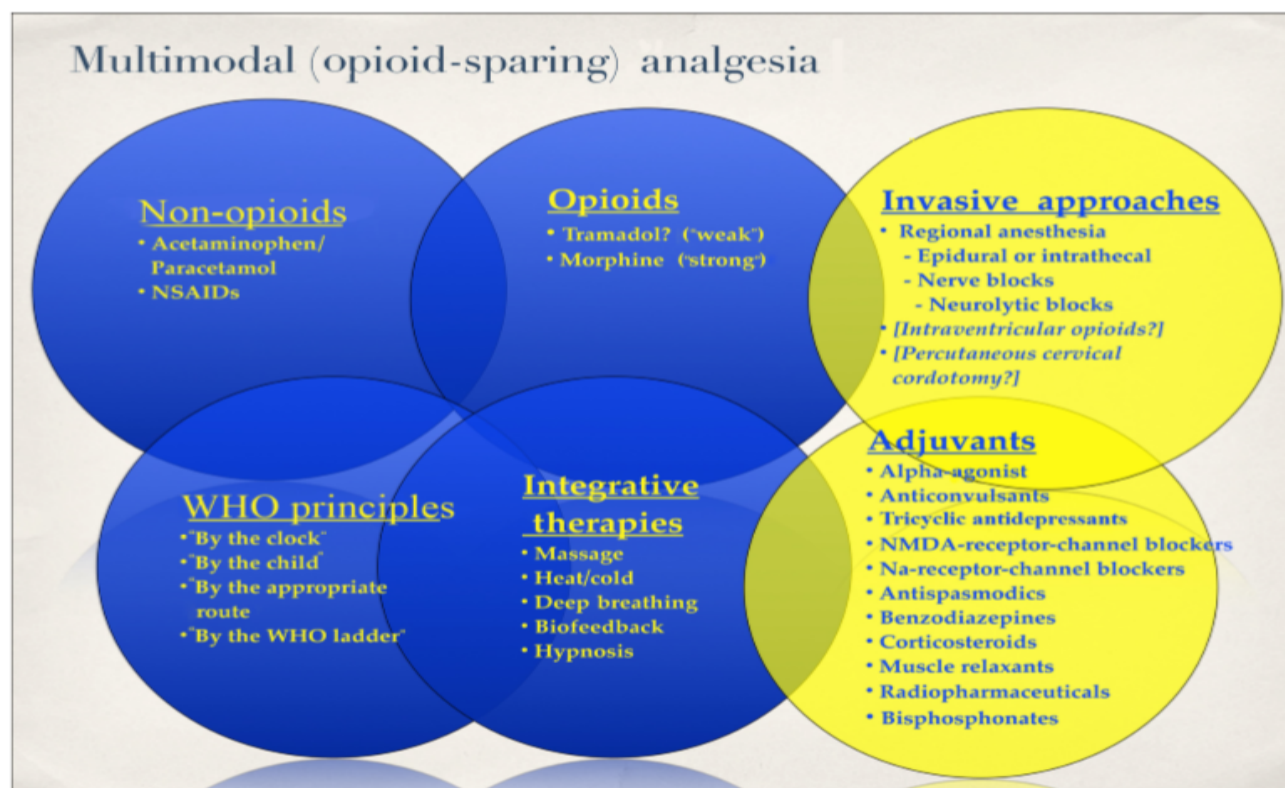


Figure 1 Managing children in acute cancer pain: multimodal "opioid-sparing" analgesia.

Notes: Blue circles show the standard approach; yellow circles show an advanced management approach in select cases.

Abbreviations: NSAIDs, nonsteroidal anti-inflammatory drugs; WHO, World Health Organization; NMDA, N-methyl-D-aspartate.

RESEARCH ARTICLE

Open Access

The efficacy of intravenous paracetamol versus dipyrrone for postoperative analgesia after day-case lower abdominal surgery in children with spinal anesthesia: a prospective randomized double-blind placebo-controlled study

Esra Caliskan^{1,3*}, Mesut Sener¹, Aysu Kocum¹, Nesrin Bozdogan Ozyilkan¹, Semire Serin Ezer² and Anis Aribogan¹

Methods: Sixty children scheduled for elective lower abdominal surgery under spinal anesthesia were randomized to receive either intravenous paracetamol 15 mg/kg, dipyrrone 15 mg/kg or isotonic saline. The primary outcome measure was pain at rest, assessed by means of a visual analog scale 15 min, 30 min, 1 h, 2 h, 4 h and 6 h after surgery. If needed, pethidine 0.25 mg/kg was used as the rescue analgesic. Time to first administration of rescue analgesic, cumulative pethidine requirements, adverse effects and complications were also recorded.

Results: There were no significant differences in age, sex, weight, height or duration of surgery between the groups. Pain scores were significantly lower in the paracetamol group at 1 h ($P = 0.030$) and dipyrrone group at 2 h ($P = 0.010$) when compared with placebo. The proportion of patients requiring rescue analgesia was significantly lower in the paracetamol and dipyrrone groups than the placebo group (vs. paracetamol $P = 0.037$; vs. dipyrrone $P = 0.020$). Time to first analgesic requirement appeared shorter in the placebo group but this difference was not statistically significant, nor were there significant differences in pethidine requirements, adverse effects or complications.

Conclusion: After lower abdominal surgery conducted under spinal anesthesia in children, intravenous paracetamol appears to have similar analgesic properties to intravenous dipyrrone, suggesting that it can be used as an alternative in the early postoperative period.

ORIGINAL ARTICLE

Opioid-sparing effects of perioperative paracetamol and nonsteroidal anti-inflammatory drugs (NSAIDs) in children

Ivan Wong^{1,2}, Celia St John-Green² & Suellen M. Walker^{1,3}

Keywords

pain; postoperative; child; analgesics;
opioid; analgesics; non-narcotic;
anti-inflammatory agents; nonsteroidal

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Summary

Background and Objectives: Perioperative pain in children can be effectively managed with systemic opioids, but addition of paracetamol or nonsteroidal anti-inflammatory drugs (NSAIDs) may reduce opioid requirements and potentially improve analgesia and/or reduce adverse effects.

Methods: A systematic literature search was conducted to identify trials evaluating postoperative opioid requirements in children and comparing NSAID and/or paracetamol with placebo. Studies were stratified according to design: continuous availability of intravenous opioid (PCA/NCA) vs intermittent 'as needed' bolus; and single vs multiple dose paracetamol/NSAIDs. Primary outcome data were extracted, and the percentage decrease in mean opioid consumption was calculated for statistically significant reductions compared with placebo. Secondary outcomes included differences in pain intensity, adverse effects (sedation, respiratory depression, postoperative nausea and vomiting, pruritus, urinary retention, bleeding), and patient/parent satisfaction.

Results: Thirty-one randomized controlled studies, with 48 active treatment arms compared with placebo, were included. Significant opioid sparing was reported in 38 of 48 active treatment arms, across 21 of the 31 studies. Benefit was most consistently reported when multiple doses of study drug were administered, and 24 h PCA or NCA opioid requirements were assessed. The proportion of positive studies was less with paracetamol, but was influenced by dose and route of administration. Despite availability of opioid for titration, a reduction in pain intensity by NSAIDs and/or paracetamol was reported in 16 of 29 studies. Evidence for clinically significant reductions in opioid-related adverse effects was less robust.

Conclusion: This systematic review supports addition of NSAIDs and/or paracetamol to systemic opioid for perioperative pain management in children.

Clinical Pharmacology of Paracetamol in Neonates: A Review

Gian Maria Pacifici, MD, PhD¹, Karel Allegaert, MD, PhD^{2,*}



¹ Translational Department and New Technologies in Medicine and Surgery, University of Pisa, Pisa, Italy

² Neonatal Intensive Care Unit, Division of Woman and Child, University Hospitals Leuven, Leuven, Belgium

Paracetamol is commonly used to control mild-to-moderate pain or to reduce opioid exposure as part of multimodal analgesia, and is the only compound recommended to treat fever in neonates.

Paracetamol clearance is lower in neonates than in children and adults. After metabolic conversion, paracetamol is subsequently eliminated by the renal route. The main metabolic conversions are conjugation with glucuronic acid and with sulphate. In the urine of neonates sulphated paracetamol concentration is higher than the glucuronidated paracetamol level, suggesting that sulfation prevails over glucuronidation in neonates. A loading dose of 20 mg/kg followed by 10 mg/kg every 6 hours of intravenous paracetamol is suggested to achieve a compartment concentration of 11 mg/L in late preterm and term neonates. Aiming for the same target concentration, oral doses are similar with rectal administration of 25 to 30 mg/kg/d in preterm neonates of 30 weeks' gestation, 45 mg/kg/d in preterm infants of 34 weeks' gestation, and 60 mg/kg/d in term neonates are suggested. The above-mentioned paracetamol doses for these indications (pain, fever) are well tolerated in neonates, but do not result in a significant increase in liver enzymes, and do not affect blood pressure and have limited effects on heart rate. In contrast, the higher doses suggested in extreme preterm neonates to induce closure of the patent ductus arteriosus have not yet been sufficiently evaluated regarding efficacy or safety. Moreover, focussed pharmacovigilance to explore the potential causal association between paracetamol exposure during perinatal life and infancy and subsequent atopy is warranted.

STUDY PROTOCOL

Open Access

The PICHFORK (Pain InCHildren Fentanyl OR Ketamine) trial comparing the efficacy of intranasal ketamine and fentanyl in the relief of moderate to severe pain in children with limb injuries: study protocol for a randomized controlled trial

Andis Graudins^{1,3,5*}, Robert Meek^{1,3}, Diana Egerton-Warburton^{1,3,5}, Robert Seith^{2,3}, Trentham Furness^{1,4} and Rose Chapman^{3,4}



Safety of post-operative epidural analgesia in the paediatric population: A retrospective analysis

Ramakrishna Chaitanya Kasanavesi,¹ Suhasini Gazula, Ravikanth Pula,¹ and Nagarjuna Thakur¹

Author information ► Copyright and License information ►

Table 2

List of all complications encountered in the audit

Complications	Total number (n=70)	Percentage
At the time of insertion		
Failure to identify space	00	0
Blood tap	02	2.85
Wet tap	00	0
Epidural haematoma	00	0
Nerve injuries	00	0
Drug errors	00	0
During maintenance of epidural		
Catheter migration	00	0
Peri-catheter leaks	11	15.71
Transient bradycardia	01	1.42
During removal		
Infections	00	0
Catheter breakage	00	0
Others*		
Catheter disconnections	14	20

*Not a complication but needing frequent anaesthetist reviews and or/hindrance to nursing

CONCLUSION

Go to: ☐

EIA seems to be a safe and effective method of providing analgesia to children. However, all children should be monitored in tertiary level dedicated paediatric ICU to improve safety profile.

Transversus abdominis plane block in children: a multicenter safety analysis of 1994 cases from the PRAN (Pediatric Regional Anesthesia Network) database.

Long JB¹, Birmingham PK, De Oliveira GS Jr, Schaldenbrand KM, Suresh S.

Author information

Abstract

BACKGROUND: Currently, there is not enough evidence to support the safety of the transversus abdominis plane (TAP) block when used to ameliorate postoperative pain in children. Safety concerns have been repeatedly mentioned as a major barrier to performing large randomized trials in children. The main objective of the current investigation was to determine the incidence of overall and specific complications resulting from the performance of the TAP block in children. In addition, we evaluated patterns of local anesthetic dosage selection in the same population.

METHODS: This was an observational study using the Pediatric Regional Anesthesia Network database. A complication from the TAP block was defined by the presence of at least one of the following intraoperative and/or postoperative factors: puncture of the peritoneum or organs, vascular puncture, cardiovascular, pulmonary and/or neurological symptoms/signs, hematoma, and infection. Additional analyses were performed to identify patterns of local anesthetic dosage.

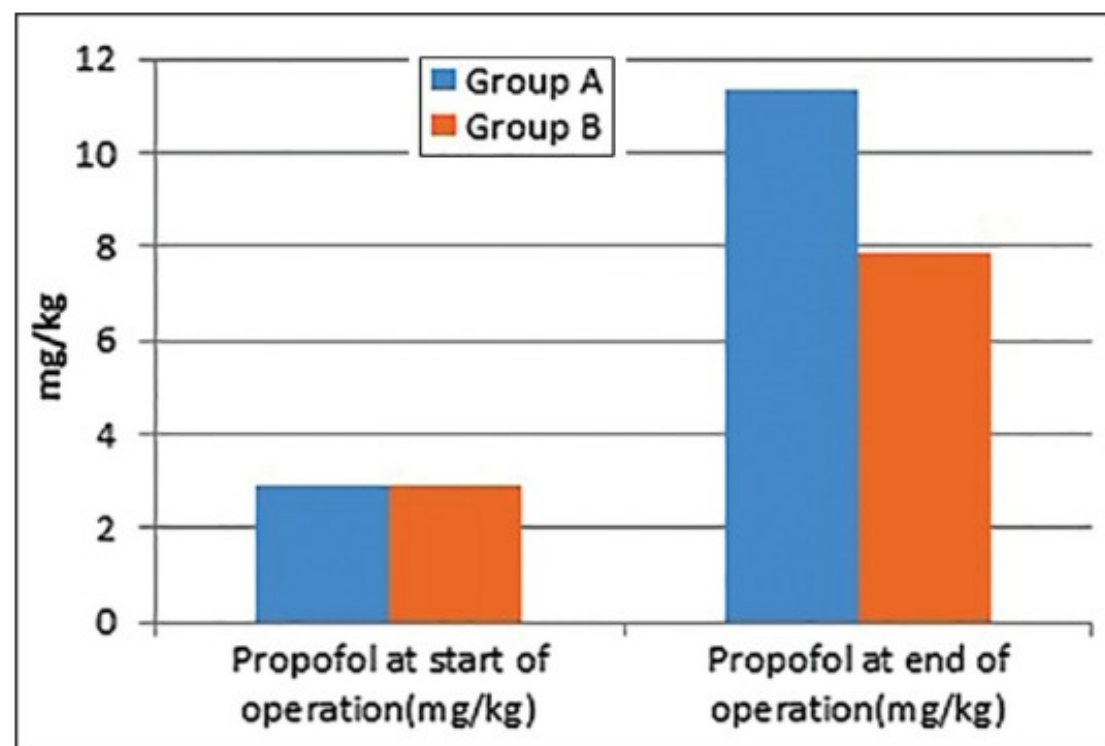
RESULTS: One thousand nine hundred ninety-four children receiving a TAP block were included in the analysis. Only 2 complications were reported: a vascular aspiration of blood before local anesthetic injection and a peritoneal puncture resulting in an overall incidence of complications (95% CI) of 0.1% (0.02%-0.3%) and a specific incidence of complications (vascular aspiration or peritoneal puncture) of 0.05% (0.0054%-0.2000%). Neither of these complications resulted in additional interventions or sequelae. The median (95% range) for the local anesthetic dose per weight for bilateral TAP blocks was 1.0 (0.47-2.29) mg of bupivacaine equivalents per kilogram; however, subjects' weights were not sufficient to explain much of the variability in dose. One hundred thirty-five of 1944 (6.9%; 95% CI, 5.8%-8.1%) subjects received doses that could be potentially toxic. Subjects who received potentially toxic doses were younger than subjects who did not receive potentially toxic doses, 64 (19-100) months and 108 (45-158) months, respectively ($P < 0.001$).

CONCLUSIONS: The upper incidence of overall complications associated with the TAP block in children was 0.3%. More important, complications were very minor and did not require any additional interventions. In contrast, the large variability of local anesthetic dosage used can not only minimize potential analgesic benefits of the TAP block but also result in local anesthetic toxicity. Safety concerns should not be a major barrier to performing randomized trials to test the efficacy of the TAP block in children as long as appropriate local anesthetic dose regimens are selected.

A study of the effect of caudal epidural block on bispectral index targeted propofol requirement in children: A comparative study

[Abhishek Banerjee](#), [Bibhukalyani Das](#), [Dipankar Mukherjee](#), and [Moushumi Khanra](#)

Figure 1

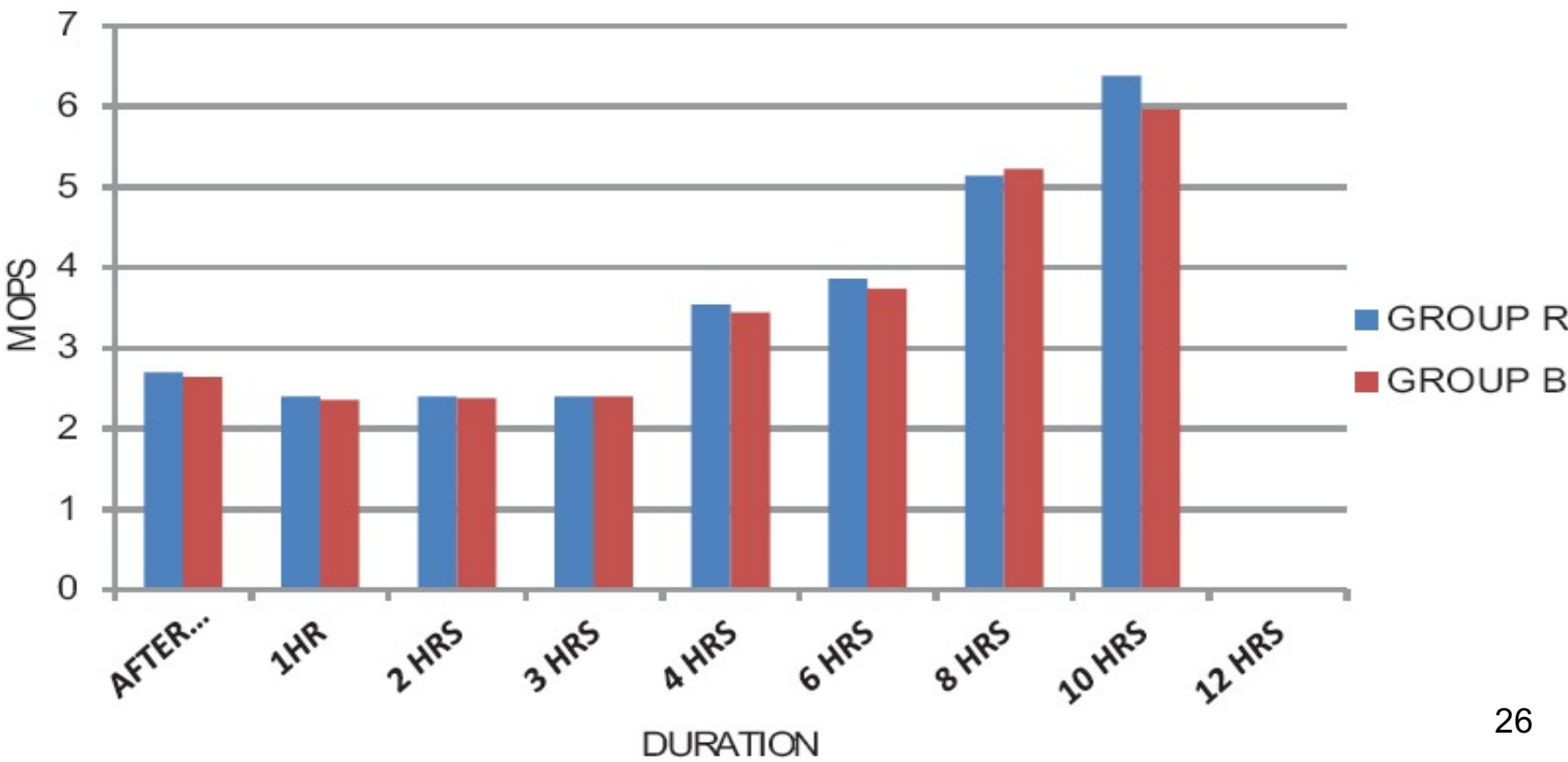


Distribution of propofol consumption during the intraoperative period maintaining bispectral between 40 and 60 in the bar diagram

Comparative study of ultrasound-guided paravertebral block with ropivacaine versus bupivacaine for post-operative pain relief in children undergoing thoracotomy for patent ductus arteriosus ligation surgery

Kolli S Chalam, Sathya Swaroop Patnaik, C Sunil, and Tripti Bansal

Figure 3



Safety of pediatric continuous interscalene block catheters placed under general anesthesia: a single center's experience

H. Gurnaney^{1,2}, W. T. Muhly^{1,2}, F. W. Kraemer^{1,2}, G. Cucchiaro³ and A. Ganesh^{1,2}

¹Department of Anesthesiology and Critical Care Medicine, The Children's Hospital of Philadelphia, Philadelphia, PA, USA

²Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA

³Department of Anesthesiology and Critical Care Medicine, Children's Hospital Los Angeles, Los Angeles, CA, USA

Methods: A total of 154 interscalene catheters were placed at a single institution between April 2006 and December 2011 using a modified lateral approach. All catheters were placed with the patient under general anesthesia. The patients discharged home with the catheters were followed-up with daily phone calls until removal of the catheter.

Results: Of the 154 patients with an interscalene CPNB, 132 (85.7%) were discharged home with the interscalene CPNB in place. The success rate for the catheters was 92.1% (CI: 86.9–95.7%). The most common reason for catheter failure (6%) was early dislodgement (within 24 h). In addition to these 12 patients, 3 other patients had adverse events related to the interscalene CPNB.

Conclusion: Interscalene catheter placement under general anesthesia and management on an outpatient basis is feasible in the pediatric population and is associated with a low rate of catheter-related complications.

The Safety and Effectiveness of Patient-controlled Analgesia in Outpatient Children and Young Adults With Cancer: A Retrospective Study.

Anghelescu DL¹, Zhang K, Faughnan LG, Pei D.

+ Author information

Abstract

BACKGROUND: Patient-controlled analgesia (PCA) is safe and effective in hospitalized children; however, data regarding its use for outpatients are limited. The aims of the study are to determine the safety of outpatient PCA and to compare the standard and proxy PCA groups.

METHODS: All patients receiving outpatient PCA over 54 months were included in this retrospective study. Data regarding age, sex, diagnosis, PCA initiation/discontinuation circumstances, patient versus proxy-authorized PCA type, opioid doses, pain scores, and complications were collected. Nonparametric tests (Wilcoxon-Mann-Whitney test for comparing 2 groups or Kruskal-Wallis rank-sum test for comparing >2 groups) were used to compare duration of PCA use, opioid doses, pain scores, and circumstances of initiation and discontinuation of outpatient PCA.

RESULTS: Forty-five patients used 69 outpatient PCAs. The complication rate was 0.36%. The starting mean MED (mg/kg/d) was 1.67 when initiation was for an outpatient and 4.04 for those discharged from the hospital with PCA; this difference was not statistically significant ($P=0.13$). The analysis of mean opioid doses in relationship to the circumstances for the discontinuation of the outpatient PCA revealed a significantly higher dose (mg/kg/d) in the group of patients who died (19.54) than in the group with a change of status to inpatient or transfer to another hospital or hospice (3.70) and in the group in which PCA was discontinued because pain management no longer required a PCA (1.19). The mean opioid daily doses and pain scores were significantly higher at the end of life ($P<0.0001$).

CONCLUSIONS: Outpatient PCA use for children and young adults with cancer is safe.

Peripheral nerve catheters in children: an analysis of safety and practice patterns from the pediatric regional anesthesia network (PRAN).

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+ Collaborators (36)

+ Author information

Abstract

BACKGROUND: Peripheral nerve catheters (PNCs) are used with increasing frequency in children. Although adult studies have demonstrated safety with this technique, there have been few safety studies in children. The main objective of the current investigation was to examine the incidence of PNC complications in children undergoing surgery.

METHODS: This is an observational, multi-institutional study using the Pediatric Regional Anesthesia Network (PRAN) database. Data pertaining to PNCs were entered prospectively into a secure, online database by each participating centre. Patient characteristics, anatomic location, localization techniques, medications used, and complications were recorded for each catheter. All complications and any sequelae were followed until resolution.

RESULTS: There were 2074 PNCs included in the study. 251 adverse events and complications were recorded, resulting in an overall incidence (95% CI) of complications of 12.1% (10.7-13.5%). The most common complications were catheter malfunction, block failure, infection, and vascular puncture. There were no reports of persistent neurologic problems, serious infection, or local anaesthetic systemic toxicity, resulting in an estimated incidence (95% CI) of 0.04% (0.001-0.2%). Patients who developed an infection had used the catheters for a greater number of days, median (IQR) of 4.5 (3-7) days compared with 3 (1-3) days in the patients who did not develop an infection, $P < 0.0001$.

CONCLUSIONS: Our data support the safety of placing PNCs in children, with adverse event rates similar to adult studies. Catheter problems are common, yet minor, in severity.

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Guidelines on the Management of Postoperative Pain

Management of Postoperative Pain: A Clinical Practice Guideline From the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council

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Table 3. Options for Components of Multimodal Therapy for Commonly Performed Surgeries

Type of Surgery	Local, Intra-articular or Topical				
	Systemic Pharmacologic Therapy	Techniques*	Regional Anesthetic Techniques*	Neuraxial Anesthetic Techniques*	Nonpharmacologic Therapies†
Thoracotomy	Opioids‡ NSAIDs§ and/or acetaminophen Gabapentin or pregabalin§ i.v. ketamine¶		Paravertebral block	Epidural with local anesthetic (with or without opioid), or intrathecal opioid	Cognitive modalities TENS
Open laparotomy	Opioids‡ NSAIDs§ and/or acetaminophen Gabapentin or pregabalin§ i.v. ketamine¶ i.v. lidocaine	Local anesthetic at incision i.v. lidocaine infusion	Transversus abdominis plane block	Epidural with local anesthetic (with or without opioid), or intrathecal opioid	Cognitive modalities TENS
Total hip replacement	Opioids‡ NSAIDs§ and/or acetaminophen Gabapentin or pregabalin§ i.v. ketamine¶	Intra-articular local anesthetic and/or opioid	Site-specific regional anesthetic technique with local anesthetic	Epidural with local anesthetic (with or without opioid), or intrathecal opioid	Cognitive modalities TENS
Total knee replacement	Opioids‡ NSAIDs§ and/or acetaminophen Gabapentin or pregabalin§ i.v. ketamine¶	Intra-articular local anesthetic and/or opioid	Site-specific regional anesthetic technique with local anesthetic	Epidural with local anesthetic (with or without opioid), or intrathecal opioid	Cognitive modalities TENS
Spinal fusion	Opioids‡ Acetaminophen‡ Gabapentin or pregabalin§ i.v. ketamine¶	Local anesthetic at incision		Epidural with local anesthetic (with or without opioid), or intrathecal opioid	Cognitive modalities TENS
Cesarean section	Opioids‡ NSAIDs§ and/or acetaminophen	Local anesthetic at incision	Transversus abdominal plane block	Epidural with local anesthetic (with or without opioid), or intrathecal opioid	Cognitive modalities TENS
CABG	Opioids‡ Acetaminophen Gabapentin or pregabalin§ i.v. ketamine¶				Cognitive modalities TENS

Abbreviation: CABG, coronary artery bypass grafting.

NOTE. Blank cells indicate techniques generally not used for the procedure in question.

*Intra-articular, peripheral regional, and neuraxial techniques typically not used together.

†Use as adjunctive treatments.

‡Use i.v. PCA when parenteral route needed for more than a few hours and patients have adequate cognitive function to understand the device and safety limitations.

§May be administered preoperatively.

¶On the basis of panel consensus, primarily consider for use in opioid-tolerant or otherwise complex patients.

SFORL guidelines

Non-pharmacological treatment of post-tonsillectomy pain

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to be used, the parents need to be given appropriate information and staff need appropriate training [10] (level of evidence 2).

3.2. Local treatments

3.2.1. Cold

Horii et al. [11] (level of evidence 3) reported that rinsing the tonsillar fossae with physiological saline at 4°C for 10 minutes at end of surgery significantly reduced immediate postoperative pain.

Likewise, Sylvester et al. [12] (level of evidence 1) reported that drinking iced water immediately after surgery reduced pain scores between 15 minutes and 1 hour postoperatively; there was, however, no residual benefit by the 4th hour.

3.2.2. Mouthrinses, sprays and mouthwashes

Fedorowicz et al.'s 2013 review [13] covered all published studies of mouthrinses, sprays and mouthwashes in post-tonsillectomy pain. Five of the 7 selected studies used benzydamide hydrochloride solutions [14–18], 1 hydrogen peroxide [19] and 1 lidocaine [20] (level of evidence 1); only the last study reported benefit in terms of pain, and only for the first 3 postoperative days. The methodological defects of these studies, however, precluded any of the treatments being formally recommended.

3.2.3. Honey

Boroumand et al. showed that 5 days' daily consumption of honey significantly reduced pain scores and analgesic intake for the first 3 days following tonsillectomy [21] (level of evidence 1).

3.2.4. Chewing gum

Schiff, in 1982, reported analgesic effects of chewing gum postoperatively [22] (level of evidence 4). Hanif and Frosh, in contrast, reported delayed normalization of feeding and increased duration of post-tonsillectomy pain [23] (level of evidence 1). Chewing gum should therefore not be used as a treatment.

3.2.5. Speech therapy

Postoperative voice exercises, mobilizing the soft palate muscles (closed phonemes), with 25 phonemes repeated 10 times a day for 10 days, significantly reduced post-tonsillectomy pain in children [24] (level of evidence 2). This was, however, a Turkish study, and the phoneme list is not directly transposable into French – although an equivalent list could easily be put together.

3.3. Acupuncture and derived techniques

The use of acupuncture in tonsillectomy has mainly been studied in terms of postoperative nausea and vomiting. Efficacy in terms of pain has been little assessed.

3.4. Other general-route treatments

3.4.1. Homeopathy

Robertson et al., in 2007, reported reduced postoperative pain after intake of *Arnica montana* 30ch for the first 7 days following tonsillectomy [32] (level of evidence 1).

3.4.2. Omega 3, polyamines

There have been no studies in the context of tonsillectomy. Data on the effects of dietary omega 3, omega-3/omega-6 ratio and polyamines point to reduced hyperalgesia in chronic pain and in postoperative pain in general surgery with low-polyamine diet (orange-based) [33–35] (level of evidence 1).

4. Conclusion

The present literature review found that complementary techniques exist which could be used in the management of post-tonsillectomy pain. Most of the studies were methodologically rigorous, but the small number of reports per technique precludes formulating recommendations. In the present context of restriction of the analgesic armamentarium, it would be worth examining some of these techniques, in view of the relative lack of side effects. Well-conducted prospective studies could confirm or invalidate the data on complementary techniques presently found in the literature.

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Через 12
часов после
операции
резекции 6-7
сегмента
печени



Через 36 часов
(я вже хочу в
палату до
мами...)



**Д-з: микросфероцитоз
Миньковского-Шафара**

**Через 24 часа после
спленэктомии
(неплохо как для первых
суток после операции?)**

**Аналгезия - transversus
abdominis plane block
(TAP)**





СПАСИБО ЗА ВНИМАНИЕ