"To Give or Not To Give" – A Comparative Study of Pre-operative Medications as Adjuvants to Local Anaesthetic Effect during Pulp

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ABSTRACT

Aim: The aim of this study is to compare the effects of different medications administered to children regularly and to identify whether these medications reduce the sensation of pain during access opening and extirpation of pulp. **Method:** 100 children between the ages of 6 to 11 years needing pulp therapy were selected and randomly divided into five groups group 1 -Paracetamol + Ibuprofen combination, group 2 - Menfenamic acid – 100mg/250 mg, group 3 – Antibiotic – amoxicillin 125 mg/250mg, group 4—h folic acid acting as a positive control, group 5 – no medication as a negative control. Medication was administered 30 minutes before procedure. The visual analogue scale was used to score the perception of pain. **Results:** interestingly, the group who were not administered any medication showed significantly less experience of pain on access opening followed by the group who were administered mefenamic acid (P value >0.020). **Conclusion:** The findings suggest that in children, unlike in adults, the non-pharmacological means of reducing anxiety would be more effective rather then pharmacological reduction of pain.

Introduction

Pain is a highly complex and multidimensional phenomenon which attracts attention, regardless of real or apparent tissue damage forcing one to take action in relieving or alleviating its presence.

As Pedodontists our primary aim is to provide painless and comfortable treatments to children. Dental caries involving the pulp is a common occurrence in the pediatric population, necessitating pulp therapy in them. In today's busy and fast paced work environment there are often times when we cannot attend to a child in pain immediately. As a solution some of us prescribe analgesics and antibiotics prior to pulp therapy in the belief that it will reduce the discomfort of pulp therapy. There is a sizable literature available with regard to the use of analgesic as both preoperative and post-operative medication in adults but there is limited literature to identify this in children.

Lack of profound anesthesia in teeth with inflamed pulp is a well know clinical fact. Prophylactic administration of acetaminophen or a non-steroidal anti-inflammatory drug like ibuprofen has been shown to reduce or prevent postoperative dental pain (Hargreaves KM, Hutter JW. Endodontic pharmacology: pain management strategies. Pathways of pulp 2002)

"To Give or Not to Give" – pre operative medication to children is a question that haunts Pedodontists everyday. Is the giving of pre operative medication justified in children or is it a myth where by we take an effective treatment in adult and adopt it in children.

The aim of this study is to compare the effects of different medication administered to children regularly and to identify whether these medication reduce the sensation of pain during access opening and extirpation of pulp.

Materials and Methods

Patient selection:-

- 100 children between the ages of 6 to 11 years reporting to the Dept of Pedodontics and Preventive dentistry with one or more carious teeth requiring pulp therapy.
- Pre operative behaviourial assessment was done on the patients using the Frankl behaviourial scale. Only the children who demonstrated positive or definitely positive behaviour in the pre-treatment evaluation were inducluded.
- All parents were informed about the treatments and treatment procedures and an informed consent was obtained.
- Patient should be free of any systemic conditions.
- Patient should show no contraindications to NSAIDS or Local Anaesthesia.
- Child should not be under any sort of medications except for the prescribed medications for treatment one week prior to the study.
- Child should be indicated to undergo pulp therapy in either vital primary or permanent molars. Teeth were selected for pulp therapy on the basis of clinical and radiographic findings.

Operator:-

- Medication was administered by a single operator.
- The operator performing the pulp therapy was blinded to the medication administrated.

Medications used:

- Paracetamol + Ibuprofen combination (IBUCLIN JR/ COMBIFLAM)
- Menfenamic acid – 100mg/250 mg (Meftal/Meftalp)
- Antibiotic – amoxicillin 125 mg/250 mg (MOX)
- Folic acid tablets as a placebo (FOLVITE)

Groups:

The patients were randomly divided in to 5 groups according to the medication administered.

- Group 1 – IBUCLIN JR/ COMBIFLAM
- Group 2 – Meftal 250 mg/ Meftal kid

- Group 3 – Antibiotic + Analgesic administered upto a week prior to treatment (Tab Mox 250mg/ Tab Mox Kid 125mg + Combiflam/Ibuclin Jr)
- Group 4 – Folic acid tablets, as placebo
- Group 5 – no medication administered

Clinical Procedure

Diagnosis of irreversible pulpitis was confirmed in all the patients by corroborating clinical and radiographic findings.

100 children were randomly divided into 5 groups. There were 20 children in each group. In groups 1, 2 and 4 the children were given the medication half an hour before treatment.

Each operator was given a questionnaire and explained the visual analogue scale which had been used to grade the pain felt by the child.

After half an hour, topical anesthetic gel (5% lidnocaine) on a cotton roll was applied to the injection site. This was followed by the injection of the Local anesthesia. To check if adequate anesthesia had occurred soft tissue signs were confirmed.

The pulp therapy procedure was performed with a rubber dam isolating the working field. Access opening was done. The pulp chamber was deroofed. The operator was asked to score the pain experience of the child using the visual analogue scale. The scale used to measure pain was the revised Wong-Baker facial image pain scale.

The self-reporting pain experience of the children was measured using the facial image pain scale after access opening and then again after pulp extirpation. Following which treatment was completed.

If for any reason local anesthesia was not successful the child was recalled and the procedure was repeated.

Results

100 patients, 48 boys and 52 girls, aged between 6 to 11 years participated. Each group comprised 20 patients each. Group1 were administered either ibuclin JR (combination of paracetamol and ibuprofen) or combiflam based on age and body weight of the child. Group2 were administered mefenamic acid, Group 3 were administered both antibiotics and analgesic (amoxicillin + ibuclin JR). Group 4 were administered the placebo and Group5 were not given any medication.

On access opening across all groups
52 children – scored 0
29 children – scored 2
12 children – scored 4
4 children – scored 8
3 children – scored 10

52 children had no pain on access opening. 81 children scored 2 or less indicative of having experienced hardly any pain. Most of these children were in group 5 (no medication) followed by group 2 (mefenamic acid). This difference was statistically different at a significanc of 5% level with a P-value of 0.020

		On access opening
Medication used	MEAN	SD
Ibuprofen +combiflam	2.90	3.14
Mefenamic Acid	1.40	2.35
Antibiotic+analgesic	1.30	1.34
Folic acid	2.10	2.63
No medication	0.70	1.87

On extirpation of pulp across all groups
45 children – scored 0
40 children – scored 2
10 children – scored 4
3 children – scored 6
1 child – scored 8
1 child – scored 10

On extirpation of pulp 45 children experienced no pain and 85 children scored below 2. None of the groups showed any statistical significance a larger no of children in the mefenamic acid group showed lower scores on extirpation of pulp followed by the antibiotic + analgesic group.

		On extirpation of pulp
Medications used	MEAN	SD
Ibuprofen+combiflam	2.10	2.55
Mefenamic acid	1.10	1.37
Antibiotic + analgesic	1.10	1.37
Folic acid	2.30	1.75
No medication	1.20	1.88

Discussion

Alleviating pain is of utmost importance when treating dental patients, as it has far reaching effects for both the patient and the clinician alike.

Anesthetizing mandibular teeth with an inferior alveolar nerve block has been regarded as one of the most technically difficult local anesthesia injections. In the absence of pulpal or periapical pathosis, inferior alveolar nerve block provides clinically adequate anesthesia for restorative dentistry 85 to 90% of the time. However, in cases of irreversible pulpitis, the rate of success is greatly reduced; reportedly as low as 20%.

It has been suggested that inflammation and infection lower tissue pH altering the ability of local anesthetic to provide clinically adequate pain control (Malamed SF, Handbook of local anesthesia, 1997). Various studies have concluded that there are several reasons for this failure in healthy or inflamed pulp. The reasons include pulpitis anatomic differences, concentration of anesthetic agent, volume of anesthetic solution, patient's level of anxiety and a patient's past history with successful anesthesia. These articles have concluded that local anesthetics are less effective for inflamed pulp, with failure rates at 30 to 80 %. It has been suggested that if pulpal inflammation can be reduced before anesthesia delivery, local anesthesia might be more successful.

O'Keefe (1976) showed a significant relationship in endodontic patients between pre-operative, operative and post-operative pain levels. Patients presenting with extreme pre-operative discomfort were more likely to have the same degree of discomfort both operatively and postoperatively.

The aim of this study was to see whether the administration of premedication in children had any effect on their perception of pain operatively or are there other factors which dictate a child's perception of pain.

The recording of pain is difficult, especially in children, and the accuracy of recording pain can be challenged because of the subjective and personal nature of pain. Numerous pain recording devices exist, including biological measurements, behaviourial observation and self- report.

Self report is considered to be the most accurate method of recording pain as pain perception varies in individuals. Visual analogue scales are the easiest for children to use and have been shown too employed successfully when testing for the effects of analgesia. O' Donnell et al (2007) conducted a pilot study of 3 visual analogue scales to determine which was the easiest. They were the Wong and Baker Pain Scale, the Barts and the London Paediatric Pain Ladder and a Colour Intensity Ladder. The WBPS was chosen as being the easiest by almost 85%.

The use of ibuprofen as well as other NSAID in managing pain in patients with endodontic problems has been shown to be effective. A limitation of this drug however is what has been referred to as the 'ceiling effect' (Desjardins & Cooper 1998). Despite administration of an increased dosage the patient may not experience sufficient relief. Supplementing the initial dosage with a second drug that acts in an alternative manner may allow sufficient analgesia. Another commonly used analgesic to control dental pain is acetaminophen. It is a weak inhibitor of peripheral prostaglandin synthesis and it is active in the central nervous system. This is the action via which it causes inhibition of central analgesia induced by pain producing neurotransmitters.

The analgesics prescribed by dentists in India commonly, been seen to be either a combination of paracetamol and ibuprofen or mefenamic acid. This is the reason why these drugs were included in the study due to their easy availability and their known analgesic effect.

As observed in the results obtained almost 70 – 80 % of children scored above 2 meaning they either didn't feel any pain or even if they did it was very mild that it did not cause them any form of discomfort. Another element of contradiction in the results were that children who were not given any medication showed the lowest scores i.e. least amount of discomfort irrespective of their age this was followed by those children who were administered mefenamic acid.

Staci R Ianiro et al in 2007 have stated that the administration of premedication with acetaminophen or a combination of acetaminophen and ibuprofen on the success of inferior alveolar nerve block for teeth with irreversible pulpitis appears promising although there is no statistically significant difference versus the placebo.

These results show that unlike in adults, in children the perception of pain or discomfort operatively is not dependent much on the medication administered to them but depended more on the behavior management adopted by the pedodontist to decrease the child's anxiety levels.

In children it has been observed that it is the local anaesthetic injection that produces pain and anxiety in them (Asarch T et al,1999). Thus there have been continual efforts to search for techniques that make injections less painful. Some of these techniques have been behavioral modulations, such as reframing and using distraction and suggestions.

There is a strong relationship between a child's dental anxiety and a successful dental treatment (Wright GZ, 2000) and also between anxiety and pain. Painful dental operations cause fear, whereas fear and anxiety increases the amount of perceived pain. Factors other than tissue damage that have been suggested to affect or have involvement in the experience of pain include emotion, previous painful experiences, pre-existing dental pain, anxiety, gender and age. (Primosch RE, Nichols Dl, Courts FS J Dent Child 1996; Seymour R, Meechan J, Blair G Br J Oral Maxillofac Surg 1985).

Therefore another reason why in this study most children may have shown lower scores are because most of the participants were rated 3 or 4 on the Frankl scale. Out of 100 children only 2 showed scores of 8 and only one child showed a score of 10 on the Wong and Baker Pain Scale. These children become uncooperative after the administration of local anesthesia thus making them more anxious. Thus they may have felt more pain then the majority of children due to their increased anxiety levels and preconceived idea of dental treatment. To understand this better the children anxiety levels showed also have been analysed and score.

Visual analogue scales are the easiest in children to use and are shown to be employed successfully when testing for the effects of analgesia. (Beyer et al,1990). The chosen scale was used in the study for its simplicity in understanding it in children as young as 5 years. Though the scale used has been proven to be effective, it has its own limitations thru the various age groups who used it thereby giving a varied interpretation. As the understanding of the scale, is dependent on the patience of the dentist in explaining the scale properly. In our case the scale had to be translated into the local language for a better understanding by the child. Some amount of clarity may have been lost in translation. Also the children found it difficult to differentiate between scores 6, 8 and 10 due to similar pictures and almost similar description which may be a challenge for the child to differentiate.

Therefore a conclusion from this study is that anxiety plays the mot important role in the perception of pain in children. Therefore we should be cautious in administering medication whether analgesics or antibiotics to children until absolutely necessary. Instead we should understand

the concept of non-pharmacological management of pain in children and spend a few earnest minutes to remove all preconceived fear in children. In this way we will be able to increase our efficiency in treating children.

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