Corticosteroids to relieve postoperative pain

BACKGROUND

Postoperative pain is a common experience after endodontic treatment, occurring in up to 58% of patients after root canal procedures. The pain can cause patients and clinicians to become dissatisfied with the result of the intervention, so pain management is an important part of endodontic treatment. Various pharmacologic agents have been used to manage pain, including nonsteroidal anti-inflammatory drugs (NSAIDs), acetaminophen, and corticosteroids. Corticosteroids work by inhibiting phospholipase A2 and leukotrienes at the site of tissue injury. Such injury is probably a major factor contributing to the experience of postoperative endodontic pain. A literature review and meta-analysis were done to determine the efficacy of corticosteroids against postoperative endodontic pain as well as identify factors that alter the outcome.

METHODS

The PubMed, Cochrane Central Register of Controlled Trials, Scopus, Web of Science, and Google Scholar databases were searched for relevant randomized clinical trials using corticosteroids to manage postoperative endodontic pain in adult patients. Eighteen trials were considered acceptable, comprising 1028 patients. The outcome measure was pain intensity scores 6, 12, and 24 hours after the endodontic procedure. Meta-regression analysis was done to evaluate associations between effect sizes and study-level covariates.

RESULTS

The patients had a diagnosis of either irreversible pulpitis or pulpal necrosis and received either corticosteroids or a placebo. The endodontic procedure was done in 1 or multiple sessions. Variations between the studies included corticosteroid type and dosing scheme, as well as whether rescue medications were allowed. All studies used a visual analog score to assess pain. Seven studies used dexamethasone in doses from 0.75 to 30 mg, 4 used betamethasone in doses of 2 and 4 mg, 2 used prednisolone 30 mg, 2 used triamcinolone 1 mg, 1 used methylprednisolone, and 1 used Meticortelone. Administration was done preoperatively, intraoperatively, or postoperatively. The routes of administration included orally, intraligamentary, intramuscularly, intracanally, and supraperiosteally. Rescue medications were allowed in 9 trials and included oral ibuprofen and/or acetaminophen when needed. Four studies excluded these patients from the trial; the others did not. Follow-up ranged from 6 to 24 hours after surgery.

At 6 hours, pain scores were significantly lower for patients receiving corticosteroids compared to those receiving placebo. Meta-regression analysis identified drug type, drug dosage, and use of rescue medication as significant predictors of the 6-hour pain scores. Prednisolone obtained better pain relief than either betamethasone or dexamethasone, which were similar in their effects.

At 12 hours, patients receiving corticosteroids reported significantly lower pain scores than those who received placebo. Meta-regression revealed that type and dose of drug, use of rescue medication, and intention-to-treat (ITT) analysis were significant predictors of pain scores. Prednisolone again proved better at relieving pain than betamethasone and dexamethasone, which had similar effects.

At 24 hours, pain scores were significantly lower for patients receiving corticosteroids compared to those treated with placebo. Meta-regression analysis showed no covariate influences on the treatment effect at this point in time.

DISCUSSION

Over the first 24 hours after root canal therapy, corticosteroid administration achieved a significantly lower pain score in patients compared to the effects of placebo. The covariates identified to explain the heterogeneity of treatment effects between trials included drug type and dosage, ITT analysis, and use of rescue medication.

Clinical Significance

The analgesic effects of prednisolone were superior to those of other corticosteroids as well as placebo in patients who had endodontic treatment. The type and dose of drug used as well as the ITT analysis and use of rescue medication influenced the outcome of drug administration in terms of pain experienced by the patients. Thus corticosteroids, particularly prednisolone, might be a good option for relieving postoperative pain for up to 24 hours after endodontic treatment.

Shamszadeh S, Shirvani A, Eghbal MJ, et al; Efficacy of corticosteroids on postoperative endodontic pain: A systematic review and meta-analysis. *J Endod* 44:1057-1065, 2018

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FLUORIDE

Racial/ethnic influences on fluorosis

BACKGROUND

A 9 percentage point increase in the prevalence of very mild or greater fluorosis was seen in children and adolescents age 6 to 19 years based on a comparison of data gathered from 1999 to 2002 and data gathered from 1986 to 1987. A higher prevalence of enamel fluorosis was shown in the National Health and Nutrition Examination Survey (NHANES) 1999-2002 among non-Hispanic blacks compared to non-Hispanic whites. It was hypothesized that certain racial/ethnic groups of US children may experience an enhanced effect of fluoridation compared to others. A review of the data was done to determine whether the effect of water fluoride level on enamel fluorosis differs among various racial/ethnic groups of children.

METHODS

The data were taken from the National Survey of Oral Health of US School Children 1986-1987. This dataset is a unique entity because it used a national probability sample of US schoolchildren and collected data on the children's time-specific fluoride exposures. It's the only nationwide dataset of US children that collected detailed information on fluoride exposure and enamel fluorosis. The prevalence of enamel fluorosis among children age 7 to 17 years old was documented, with associations between race/ethnicity and enamel fluorosis determined by logistic regression modeling after controlling for age, gender, water fluoridation, other sources of fluoride, and region of residence.

RESULTS

The estimated adjusted odds ratios for the presence of any degree of enamel fluorosis was 1.3 for non-Hispanic Black children, 0.9 for Hispanic children, and 0.8 for non-Hispanic other groups compared to non-Hispanic White children. No statistically significant difference between groups was present. Only other sources of fluoride and water fluoridation at 0.7 to 1.2 ppm were statistically significant.

Exposure to fluoridated water increased the odds of developing enamel fluorosis but water fluoridation at 0.7 to 1.2 ppm was the same for all the various groups. Hispanic children were at statistically significantly higher odds for developing enamel fluorosis at a lower level of fluoridation, specifically, 0.3 to less than 0.7 ppm, compared to other Hispanic children exposed to fluoridation.

DISCUSSION

African-American children and children of other racial and ethnic groups experienced similar odds of developing enamel fluorosis. Racial or ethnic factors did not alter the effect of water fluoridation on enamel fluorosis. When researchers study enamel fluorosis, they should recognize that explanations other than race or ethnicity should be considered when fluorosis appears to be higher in certain groups.

Clinical Significance

A limitation of this study is the fact that the survey dataset used is 30 years old and may not reflect fluorosis patterns seen today. However, this dataset is the only one publicly available that measures both fluorosis and fluoride exposure in children. In addition, there are several factors that would result in a higher prevalence of enamel fluorosis over the past 30 years, such as measurement error caused by systematically classifying a higher proportion of enamel defects as enamel fluorosis. The analysis does rightfully suggest that lowering the optimal range of drinking water fluoridation to a single value of 0.7 ppm would not only protect against enamel fluorosis but also deliver that protection to all racial and ethnic groups of children. It's also important to track the effects of a lower exposure to fluoride to ensure that dental caries protection is still being delivered.

Arora S, Kumar JV, Moss ME: Does water fluoridation affect the prevalence of enamel fluorosis differently among racial and ethnic groups? *J Pub Health Dent* 78:95-99, 2018

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