

## ARTICLE TITLE AND BIBLIOGRAPHIC INFORMATION

**Bader JD, Bonito AJ, Shugars DA. Cardiovascular Effects of Epinephrine on Hypertensive Dental Patients. Evidence Report/Technology Assessment Number 48.**

AHRQ Publication No. 02-E006.

## LEVEL OF EVIDENCE

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## PURPOSE

To identify the additional risks of adverse cardiovascular outcomes to controlled and uncontrolled hypertensive individuals represented by the use of epinephrine-containing anesthetic solutions and epinephrine-impregnated retraction cords during dental treatment.

## SOURCE OF FUNDING

(Prepared by Research Triangle Institute under Contract No. 290-97-0011.) Rockville, MD: Agency for Healthcare Research and Quality; July 2002.

## TYPE OF STUDY/DESIGN

Systematic review

# There Is Minimal Risk for Adverse Events in Hypertensives Associated with the Use of Epinephrine in Local Anesthetics

## SUMMARY

### Study selection

The authors conducted searches of MEDLINE, EMBASE, and the Cochrane Controlled Trials Register to identify reports involving cardiovascular and hemodynamic outcomes associated with the use of epinephrine in the dental treatment of hypertensive individuals. The authors identified 373 local anesthetic and 33 retraction cord reports using the stated search criteria. Of these, 6 reports of local anesthesia met inclusion criteria. None of the retraction cord studies met inclusion criteria.

### Subjects

The 6 included studies comprised 325 subjects, of whom 177 were identified as hypertensive. Of these, 14% were identified as taking medication for control of hypertension.

### Exposure (Intervention)

The authors included the use of epinephrine in local anesthetic solutions and gingival retraction cord. In all studies the local anesthetic involved was 2% lidocaine, and epinephrine concentrations were divided between 1:100,000 (3 studies) and 1:80,000 (3 studies).

### Primary Outcome Measure

One or more of the following were considered as appropriate cardiovascular parameters: blood pressure, heart rate, cardiac output, plasma epinephrine concentration, or EKG changes including transient arrhythmias; or adverse events: headache, syncope, angina, hypertensive crisis, longer-term arrhythmia, cerebral vascular accident, or myocardial infarction among hypertensive individuals.

### Main Results

Five studies reported changes in blood pressure and heart rate with use of epinephrine in local anesthesia. Although hypertensive patients receiving epinephrine had a slight increase in blood pressure and heart rate (4 mm Hg and 6 bpm) beyond the baseline increase associated with the dental procedure alone, no adverse outcomes were reported in these studies.

### Conclusion

The authors expressed concern that the literature was of low quality but concluded, given the available evidence, that the occurrence of adverse events, even in uncontrolled hypertensives, associated with the use of epinephrine in local anesthetics is low. No information is available to quantify the risk of using epinephrine-impregnated gingival retraction cord in hypertensive individuals.

**COMMENTARY AND ANALYSIS**

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**Weaknesses and strengths**

The strength of this review is the thorough search conducted by the authors and their review of over 300 publications. Unfortunately, only 6 studies met the inclusion criteria and, taken together, these failed to adequately report several important outcomes. The major concern is the lack of information reported on potential for interaction between epinephrine and medications taken for hypertension.

**Importance for clinical practice**

Dentists should be aware that dental procedures often produce anxiety in patients and are associated with an increase in both systolic and diastolic blood pressure as well as heart rate. The use of epinephrine can further increase both systolic blood pressure and heart rate

(4 mm Hg and 6 bpm) beyond the increases associated with the dental procedures alone. The existing evidence suggests that any risks associated with this increase in blood pressure and heart rate are minimal among hypertensive individuals. Unfortunately, no evidence is available to support the safety of epinephrine-containing retraction cord in hypertensive patients. Given that nearly 25% of adults in the United States are hypertensive, research fully characterizing potential risk from epinephrine use in dentistry is indicated.

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