TITLE: **TRANSDERMAL SCOPOLAMINE DOES NOT DECREASE THE INCIDENCE OF NAUSEA AND VOMITING AFTER ALFENTANIL ANESTHESIA**

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The most prominent unwanted effect of narcotic anesthesia is postoperative nausea and vomiting. It is unpleasant to the patient and may prolong the patient's stay in the recovery room. Transdermal scopolamine has been reported to control nausea and vomiting successfully in patients receiving narcotic analgesics for control of postoperative pain.[1] We tested the efficacy of this prophylaxis in patients recovering from alfentanil anesthesia by comparing the effects of preoperatively-administered intramuscular and transdermal scopolamine to placebo.

After approval by the IRB, 60 consenting ASA class I to II patients scheduled to undergo anesthesia with alfentanil for elective gynecological and orthopedic operations were studied. The patients were randomly assigned to receive one of three prophylactic antiemetic regimens: (1) a scopolamine-free transdermal patch and a 1.0 ml intramuscular injection of normal saline, (2) a scopolamine-free transdermal patch and a 0.3 mg intramuscular injection of scopolamine, or (3) a scopolamine-containing transdermal patch and a 1.0 ml intramuscular injection of normal saline. One hour before surgery, identical appearing transdermal patches were placed on the skin behind the right ear, and the injection of normal saline or scopolamine was administered by an anesthesiologist who did not participate in the study. General anesthesia was induced with an intravenous infusion of alfentanil (50 to 80 μg/kg) and thiopental (2 to 3 mg/kg). An infusion of alfentanil (0.5 to 0.8 μg/kg/min) and inhalation of 66% nitrous oxide and oxygen were used to maintain anesthesia. In six patients, thiopental (50 mg,iv) and 0.3% isoflurane were used to deepen the level of anesthesia temporarily at the beginning of surgery. During recovery, patients were observed by a research technician who was unaware of the patients' antiemetic regimen. The time of discharge from the recovery room (RR) was determined clinically by the anesthesiologist responsible for care of the patient. The incidence of nausea and vomiting in the three groups of patients was compared using the chi-square test. Continuous data were compared using an analysis of variance.

The groups were similar in patient age, type and duration of operation, and dose of alfentanil. The incidence of nausea or vomiting was 37% in patients who received placebo, 53% after intramuscular scopolamine, and 67% after transdermal scopolamine ($p=0.07$). The length of stay in the RR was 142±78 min for patients who received placebo, 131±59 min for those who received intramuscular scopolamine, and 131±61 min after transdermal scopolamine ($p=0.58$).

The results of this study indicate that transdermal and intramuscular scopolamine are equally ineffective in decreasing nausea and vomiting in patients recovering from alfentanil anesthesia.

Reference: 1. Anesthesiology 69:A40, 1988

TITLE: *EFFECTS OF LIDOCAINE ANALOG QX-314 ON SINGLE CARDIAC SODIUM CHANNELS*

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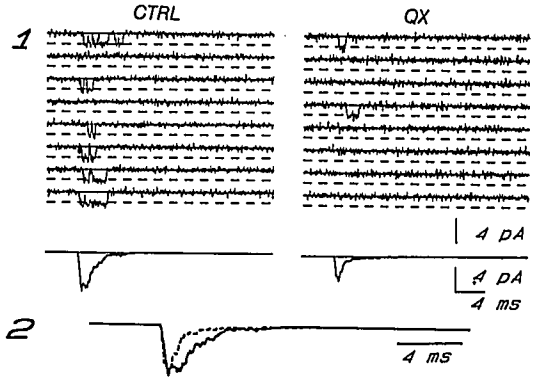
Local anesthetics (LA) profoundly inhibit the opening of cardiac Na currents, but the fundamental nature of this effect remains incompletely understood. The mechanism of LA action is believed to involve penetration of the cell membrane, and then binding of LA to the channel near its inner mouth. Such binding is thought to render the channel nonconducting[1]. This picture rests heavily upon the complicated interpretation of macroscopic current records from intact cells wherein the behavior of thousands of channels are tallied simultaneously. We re-examined the mechanism of LA action using a simplified system involving the study of several Na channels in cell-free patches of membrane in which the cytoplasmic side was exposed to a membrane-impermeant analog of lidocaine, QX-314 (QX). This experimental strategy permitted assessment of changes in single-channel gating properties while obviating the need to consider properties of LA diffusion in cell membranes.

Patch-clamp records of several Na channels were obtained from inside-out patches of membrane excised from guinea-pig ventricular myocytes. Pipettes contained (in mM): 140 NaCl, 2 $CaCl_2$, 10 HEPES-NaOH, pH 7.4. The bath solution was maintained at room temperature, and contained (in mM): 120 K-glutamate, 20 K-taurine, 5 KCl, 1 CaATP, 2 $MgCl_2$, 2 EGTA, and 10 HEPES-KOH, pH 7.4. Na channel openings were elicited during step depolarizations to -50 mV before and after exposure to 0.05-0.1 mM QX. Depolarizing steps were delivered every 0.5 sec from a holding potential of -130 mV.

Figure 1 shows the effects of 0.05 mM QX on a patch containing one channel. The sequence of consecutive sweeps during control and drug exposure demonstrates a marked reduction in the proportion of sweeps with at least one opening ("non-blanks"). This is a major feature that underlies the decrease in ensemble average current (bottom), despite no change in unitary current. Figure 2 addresses whether the



opening and closing properties of Na channels are changed by QX in non-blank sweeps. After normalization for differences in amplitude, the presence of QX abbreviates ensemble average currents (control=line, drug=dashed). This finding suggests that even when Na channels do open, they are quickly blocked by QX relative to transition rates of normal Na channel gating. These results were confirmed in a total of four patches.

Our results point to several important implications. (1) QX primarily decreases Na current by reducing the chances that a channel will open at all on a given depolarizing trial. (2) However, further decrement of Na current is mediated by fast QX block of Na channels that have managed to open during a voltage step. (3) The latter experimental result suggests that the rapidity of QX binding is on the time scale of the decay of ensemble currents.

References - 1. J Gen Phys (1977) 69:497-575.
2. Pflug Arch (1981) 391:85-100.