

## A Suspected Allergic Reaction to Lidocaine

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## CASE REPORT

A 48-year-old white man was admitted for a hemorrhoidectomy scheduled for 12:00 PM the following day. Physical examination disclosed no abnormalities. No history of allergy was obtained. Dilaudid, 10 mg, and Diazepam, 10 mg, i.m., were given for premedication at 11:00 AM on the day of operation. In the operating room a Bardic 16-gauge angiocath was placed in a left forearm vein after three attempts, and infusion of 1,000 ml of lactated Ringer's solution was started.

Preanesthetic evaluation revealed a quiet, fit-looking patient, pulse 80 per minute, blood pressure 140/80 mm/Hg. Caudal anesthesia was selected and the patient was placed on the operating table in the prone position with a bolster under his pelvis. The area to be operated upon was cleaned with tincture of Zephiran and draped. Procaine hydrochloride, 1 per cent, was used for the skin wheal and infiltration. A 16-gauge needle was inserted by the staff anesthetist (the resident having made four unsuccessful attempts) and a Bard 3.5-French gauge catheter left *in situ*. An attempt to aspirate blood or cerebrospinal fluid through the catheter had negative results. A test dose of 5 ml of 1.5 per cent lidocaine with 1:200,000 epinephrine was then injected.

Almost at once the patient complained of difficulty in breathing, precordial discomfort and generalized weakness. He looked pale, was agitated and sweating. He was immediately turned to the supine position. The pulse showed a marked bradycardia of 50 beats/min, blood pressure had dropped to 120/75 mm Hg, and there were numerous red blotchy heals on the anterior chest wall. The ECG showed coronary sinus rhythm. Atropine, 0.6 mg, was injected intravenously and oxygen was administered by mask. The patient's condition improved rapidly, and ten minutes later he had apparently recovered fully, the pulse rate being 76 beats/min and blood pressure 135/80 mm Hg.

It was decided to cancel the operation, and the patient was returned to the recovery room for observation. Before this, another attempt had been made to aspirate material through the catheter, again with negative results, and it was removed. When a general anesthetic was administered two days later no problems were encountered.

Because this incident occurred with use of a small amount of lidocaine (75 mg) it was thought advisable to test the patient for possible drug sensitivity. Intranasal and intradermal wheal tests both proved negative. Nevertheless, the patient was advised of the possibility that he is allergic to lidocaine.

## DISCUSSION

Systemic toxic reactions occurring after injection of a local anesthetic are due to either a high blood level of the drug or true allergy. In 98 per cent or more of such instances a systemic reaction indicates an overdose, *i.e.*, a concentration of the drug in the blood which is high for that particular individual.<sup>1</sup> An easily understandable classification of systemic toxic reactions to local anesthetic drugs by Moore,<sup>2</sup> modified from those of Sadove *et al.*,<sup>3</sup> and Collins,<sup>4</sup> suggests that the reaction in this patient was due to one of the following: high blood-level of the drug; vasopressor reaction to epinephrine; psychogenic reaction; or allergic reaction.

*High Blood Level*

Usually, toxic reactions follow the use of large quantities of local anesthetics. In this case 75 mg were given (200 mg of plain lidocaine and 500 mg with epinephrine are regarded as safe maximum doses<sup>4</sup>). Unless the injection was made intravascularly, it is unlikely that a toxic level could have been obtained. The initial systemic reaction to high blood level is usually manifested by tachycardia and hypertension, though with massive overdosage severe hypotension and bradycardia may be seen.<sup>5</sup> Bradycardia is not a usual initial reaction to overdose,<sup>5</sup> and skin wheals certainly are not characteristic.

*Vasopressor Reactions to Epinephrine*

These closely resemble reactions to local anesthetic agents themselves, and may be difficult to diagnose in some cases.<sup>2</sup> In fact, overdose of epinephrine is the second most common cause of systemic reactions during or following regional anesthesia.<sup>5</sup> However, the

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cardinal signs, tachycardia and hypertension, were absent in this case.

### *Psychogenic Reaction*

Patients are often fearful of nerve-block procedures. As a result, some develop dizziness, faintness, marked perspiration, tachycardia, and pallor,<sup>5</sup> often even before any solution has been injected. Singh<sup>6</sup> reported two cases in which reactions to very small doses of lidocaine (about 30 mg and 20 mg, respectively) occurred almost immediately. Both patients perspired, became pale, had respiratory distress and bradycardia. One became unconscious. Both were sitting up when the injection was made. Sharpston,<sup>7</sup> commenting on these reports, stated, "an excellent clinical description of vaso-vagal syncope was given." He concluded that fear was a likelier cause of the reaction than the drug.

Our patient certainly became apprehensive. Though well premedicated and calm upon entering the operating room, he was subjected to three intravenous punctures for the infusion and five attempts were necessary to place the caudal needle. However, the reaction was not typical of a vaso-vagal attack.

### *Systemic Allergic Reactions*

Allergy is an all-inclusive term embracing anaphylaxis, idiosyncrasy, susceptibility, hypersensitivity, etc., covering the whole field of antigen-antibody reactions.<sup>8,9</sup> It is a "condition of unusual or exaggerated specific susceptibility to a substance which is harmless in similar amounts for the majority of members of the same species." These occur infrequently and in all probability constitute fewer than 2 per cent of systemic toxic reactions.<sup>1</sup> Sadove *et al.*<sup>2</sup> stated, "only after errors of judgment in quantity and concentration of the drug and technical faults of administration have been ruled out is it permissible to postulate any one of these states (allergy)."

In Moore's<sup>1</sup> opinion, a true allergy to a local anesthetic agent is characterized by one or more of the following: dermatitis, angio-neurotic edema, hypotension, wheals, itching, asthmatic breathing and "clinical anaphylactic shock." Only reactions which occur following

the use of small or infinitesimal amounts of local anesthetic drugs and are characterized by these signs and symptoms can be described as allergic. The appearance of cutaneous wheals is an important diagnostic point. Cul-len<sup>10</sup> stated that 99 per cent of all reactions to local anesthetic agents are not allergic unless accompanied by the sudden onset of cutaneous wheals, edema, hypotension and other phenomena associated with this type of reaction.

Anaphylactic shock is a specific reaction occurring in experimental animals as a result of protein sensitization. The use of the term has been extended to cover reactions in man which apparently result from a similar physiologic mechanism. Sometimes the term anaphylactoid is used to describe them. This reaction in man characteristically is heralded by syncope, shock, and severe respiratory distress. The onset is abrupt, usually occurring after the administration of minute quantities of drugs. In anesthesia the drugs most often responsible have been the local anesthetics.<sup>11</sup>

Morriset<sup>12</sup> reported a case of a healthy 20-year-old man who had an immediate fatal anaphylactic reaction from 0.8 ml of a 2 per cent solution of lidocaine, used in a local anesthetic in preparation for a dental procedure. Allen<sup>13</sup> reported a case of drug sensitivity with caudal analgesia using 1.5 per cent metycaine. However, a total of 28 ml (420 mg) was given prior to the reaction, which by today's standards is a toxic dose. While drug allergy is readily suspected in a given case, proof is sometimes another matter.<sup>9</sup> Probably fewer than 2 per cent of systemic reactions to local anesthetic drugs are allergic. However, it is important to determine the cause of a reaction so that, if it is an allergy, the patient may be so informed. Vaughan and Black<sup>9</sup> even go so far as to state that members of the patient's family should be investigated, since heredity often plays an important part in allergy.

Our patient was tested for possible sensitivity in the postoperative period, with negative results. Bonica<sup>5</sup> considers that the intradermal wheal test is of doubtful value. In fact, skin tests are more often negative than positive even though the drug is allergenic.<sup>9</sup>

It has been suggested that the intranasal test is a more reliable indicator of possible sensitivity.<sup>14</sup> However, in this patient it was negative also. Most authorities believe that these tests are unreliable and, therefore, impractical.<sup>9</sup>

#### CONCLUSION

Of the four postulated possible mechanisms for the reaction, the strongest care is made for an allergic phenomenon, the most important features of which were the wheals on the chest wall and clinical anaphylactic shock. The reaction followed a small amount of lidocaine, and all technical errors of administration were excluded insofar as possible.

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#### Drugs

**POSTOPERATIVE ANALGESIA** The analgesic effects of m-(1-methyl-3-propyl-3-pyrrolidinyl) phenol, (CI-572) were investigated in 125 adult patients with postoperative pain for which an oral analgesic normally would have been indicated. Five medications (identically prepared and packaged) were used as follows: placebo; CI-572 in 25-, 50-, and 100-mg doses; and meperidine, 100 mg. Each medication was given to 25 patients. They were asked to grade their pain (mild, moderate or severe) before receiving a single dose of medication. A full-time trained nurse acting as clinical investigator visited each patient at hourly intervals for six hours. She recorded her impression of pain relief (0 = none, 1 = poor, 2 = moderate, and 3 = good). She also recorded the presence and severity of any side effects. The patient graded his pain at each interval. A log-dose/response relationship (based on average scores) was established for CI-572. The 100-mg dose was significantly more effective than the 50-mg dose. The latter dose was approximately equivalent to 90 mg of meperidine. There were statistically significant differences between the effects of the placebo and all other medications except CI-572 at the 25-mg dose level. Dizziness (following the high dose of CI-572) was the only notable side effect. (Parkhouse, J., and Wright, V.: Postoperative Analgesia with CI-572, Canad. Med. Ass. J. 99: 887 (Nov.) 1968.)