To the editor:

In the February, 1977, issue of the AANA Journal, Mr. William Ronk's article, "Regional/perfusion Analgesia", gives the basic considerations and outlines the technique for the administration of this type of block. However, I found that he made several erroneous statements, as well as omitted some of the most important considerations and underlying principles.

Mr. Ronk noted that adequate premedication is essential; however, it is essential not only so that the block can be successfully administered, but also so that the block can be administered with a greater margin of safety. One of the major goals of premedication with this type of block is to provide some protection against the incidence of systemic toxic reactions by increasing the threshold of the cerebral cortex. Both diazepam and barbiturates have this effect; however, diazepam is perhaps more effective in accomplishing this with fewer side effects.

Regional perfusion analgesia, commonly known as a Bier block, is contraindicated in some patients and must be kept in mind when considering this technique. Patients with peripheral vascular disease, where the use of a pneumatic tourniquet is contraindicated, should be excluded from this procedure. This technique is not advocated for patients with an infected extremity, when squeezing of the limb with the Esmarch® may serve to spread infection.

Patients with a history of drug sensitivity, with liver dysfunction or disease, and patients who are malnourished or debilitated are also precluded from this technique. Since local anesthetics, such as lidocaine and procaine, possess a quinidine-like action on the myocardium and the Purkinje system, this procedure should be used cautiously in patients with a questionable cardiac status or those in heart block.

Mr. Ronk is correct in that cocaine vasoconstricts via its sympathomimetic action. He also states that lidocaine has no effect on vessels; however, studies indicate that lidocaine, like procaine, relaxes vascular smooth muscle, thereby resulting in vasodilation.

The site of injection can be any vein that lies distal to the tourniquet, but it is felt that selecting a vein as close to the operative site as is feasible will result in a more rapid onset and more complete analgesia. It is thought that this occurs because the anesthetic solution diffuses into the lesion more completely and in a relatively more concentrated state.

When the local anesthetic solution is injected into the exsanguinated limb, it diffuses from the veins into the surrounding tissues, where it produces its action on the small nerve fibers and perhaps on the main nerve trunks. The precise mode of action as well as the exact site of action remains speculative.

Mr. Ronk describes for us how to mix the anesthetic solutions he uses, but he fails to share with us how he calculates the dosages of these drugs. In using lidocaine, a dose of 3 mg/kg of body weight of a 0.5% solution is advocated and provides a wide margin of safety. The maximum dose should not exceed 500 mg. An accepted dose of bupivacaine is 1.25 mg/kg of a 0.25% solution with a maximum dose of 200 mg.

Contrary to the information contained in Mr. Ronk's article, vasoconstrictors should not be used with this type of block. The addition of vasoconstrictors does not offer any benefits to this technique and could produce dangerous side effects.

In order to achieve an even distribution of the anesthetic, the volume of the solution must be taken into consideration. Moore suggests a volume of 50 ml for the upper extremity of an adult and 100 ml for the adult lower extremity. It is therefore necessary to coordinate the desired volume with the calculated dose of the local anesthetic for each patient. The concentration of the anesthetic solution will often need to be diluted so that this harmony with the volume can be achieved.

In his article, Mr. Ronk stated, "At the completion of the surgical procedure, the cuff is deflated; and the sensations and muscle tone return in a few minutes. Toxic effects are not a problem but their possibility should always be borne in mind." He neglects to inform us that it is at this point, after the deflation of the tourniquet, where toxic reactions will most frequently occur. On the other hand, if proper technique has not been ascribed to or if the tourniquet has failed during the course of the anesthetic, toxic effects may be present sooner.

It is generally agreed that cycling of the tourniquet at the termination of the surgical procedure is essential to prevent the release of a bolus of the anesthetic drug into the systemic circulation. The most frequently described method for cycling is to deflate the tourniquet for 5 seconds and then reinflate it.
for 45 seconds. This process is then repeated four or five times. Cycling should not begin until 30-45 minutes after the anesthetic drug has been injected. This time is necessary to allow the drug to diffuse from the veins and become fixed within the tissue.² ⁶ ⁸ ⁹

The toxicity of local anesthetics, regardless of their route of administration, is dependent on the plasma concentration. Toxic reactions are most frequently a result of either a very high plasma concentration or a sudden sharp rise in the plasma concentration. Cycling of the tourniquet results in both a lower and a delayed peak plasma concentration. Therefore, both the total dosage of the anesthetic drug and the rate at which the drug is systemically released are important factors in toxic reactions.⁶

The symptoms of toxicity usually appear within 2.5 minutes after the release of the tourniquet and rarely after 10 minutes.⁶

The initial signs and symptoms of toxicity result from cortical stimulation. These early signs most consistently include the presence of a metallic taste, tinnitus, blurred vision, dizziness, euphoria, and perioral numbness. They may also include slurred speech, headache, restlessness, apprehension, nausea and vomiting, and muscle tremors or twitching. These symptoms are of little clinical significance within themselves; but, they do announce the fact that a toxic reaction does exist and thereby alert us to the possibility that the reaction may progress to unconsciousness, convulsions, cardio-vascular collapse, and respiratory collapse. The development of these more serious complications indicates that the cerebral cortex and medulla have been overstimulated with the end result being depression of these vital areas.²

Treatment of systemic toxic reactions depends on the signs and symptoms demonstrated, and these should be treated as they occur.² Mr. Ronk states that the treatment of convulsive-respiratory failure includes ventilation with air or oxygen. However, these complications produce a tremendous increase in the basal metabolic rate and, therefore, a similar increase in oxygen utilization. Oxygen must be administered in order to meet increased needs and to avoid hypoxia. It is of interest to note that a study by de Jong, et al, suggests that the administration of barbiturates to treat a major toxic reaction, may serve to compound the cardiovascular depressant action of local anesthetics. He suggests that diazepam may be the drug of choice.¹

Regional perfusion anesthesia is an extremely useful anesthetic and should be included in the anesthetist's repertoire. Before employing this type of anesthetic, as with any type of anesthetic, we must have a full and complete understanding of the technique, the method of action, the pharmacology and dosage of the drugs that are to be used, the compatibility of the technique and the drugs with any pathophysiologic condition that may exist within the patient, the compatibility with the surgical procedure, and the potential complications, including the symptoms and the treatments. However, I found that Mr. Ronk's article supplied for the readers of the Journal little more than a recipe for the administration of this anesthetic. The amount of vital information omitted, the number of errors, and the list of references indicates to me that he did little research into this method of analgesia.

It is my feeling that articles presented in our professional Journal should provide us with accurate, up-to-date, and comprehensive information about the subject being presented; and this information should be presented in a coherent fashion. Mr. Ronk's article does not meet any of these standards. The failure to meet these criteria compromises the professional standards of our Journal, as well as misleads the reader.

MARY PATRICIA O'CONNELL, CRNA
Captain, U.S. Army Nurse Corps
Fort Polk, Louisiana

REFERENCES
Eastern...the official airline of the American Association of Nurse Anesthetists Convention.

They know how to make your air travel arrangements.
Eastern Airlines has set up a special CONVENTION DESK* within their Reservations Department to handle all air travel arrangements between your home city and Miami or Ft. Lauderdale. The DESK will be staffed with knowledgeable, responsible personnel who will know all about the convention. Eastern's reservations' coordinators will provide the following services:

Transportation
Eastern will handle your travel arrangements, even if you do not live in a city served by them. Just call the special unlisted toll-free number listed below and they will book you on Eastern or the airline of your choice.

Ticketing
Eastern will mail your tickets directly to you and charge the fare to your credit card or include an invoice for payment... or you may arrange to pick up your tickets from your local travel agent.

Fares
In some cases, discount air fares may be available. Eastern's convention coordinators will work out the lowest fare for you.

Other Services
Eastern will also be able to suggest things to do and see during your free time... assist in making car rental reservations and will arrange for optional pre and post-convention tours.

To make your air travel arrangements, call toll free:
1-800-327-1295
(in Florida 1-800-432-1217)
*Convention Sales Hours: 9:00AM-5:30PM., Mon.-Fri.