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TITLE: THE ENHANCEMENT OF RADIAL ARTERY FLOW BY NITROBID^R

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INTRODUCTION.

Radial artery puncture and cannulation are an increasingly common technique for blood pressure and blood gas monitoring. Beginners are often frustrated by vessel spasm, and multiple attempts may increase the incidence of major complications.¹

Although previous investigators have used lidocaine infiltration to minimize spasm, at least one author reports precipitation of spasm.² Further, the wheal raised may obscure careful vessel palpation.

We felt that a vasodilator could be used to enhance local radial artery flow and facilitate successful arterial puncture with minimal trauma and without systemic pharmacologic effect.

METHODS.

Healthy ASA I volunteers were monitored using digital plethysmography and doppler flow. Radial artery flow was first assessed by Allen's test.³ Plethysmography was done with the PVR III Pulse Volume Recorder and doppler flows using the DII Bidirectional Doppler from Life Science.

After baseline flows, $\frac{1}{4}$ inch of 2% nitroglycerin ointment (Nitrobid^R-Marion) was applied to the skin in a thin film overlying the radial artery for 30 minutes prior to flow studies. The effects of ulnar compression and blunt needle stimulation of the radial artery were then observed. Doppler and plethysmographic flows on opposite hands were recorded pre and post Nitrobid^R applications.

RESULTS.

Flow observations were compiled and the following data generated:

1) Ulnar artery compression significantly decreased radial artery flow at baseline (mean 25% decrease) and post Nitrobid^R application (mean 18% decrease) in spite of normal Allen's tests.

2) In all volunteers, radial artery flow increased post Nitrobid^R with at least one flow monitor.

The changes in flow varied widely, but were generally more marked (+25% mean) measuring plethysmographic flows than measuring doppler flows (+8% mean).

At least one volunteer in each series showed a decreased flow with at least one monitor compared to baseline.

3) Provocation with a blunt needle simulating arterial puncture did not produce evidence for decreased flow (i.e. spasm) below that of the patient's baseline except in one volunteer.

4) There was no evidence for systemic side effects in any volunteer.

DISCUSSION.

Nitrobid^R ointment applied over the radial artery will enhance flow and arterial dilatation making it less responsive to noxious stimuli. Nitrobid^R ointment 30 minutes prior to cannulation, especially if coupled with local anesthetic infiltration, should minimize vasoconstriction to stimulation and maximize conditions for successful cannulation with minimal trauma and subsequent thrombosis.

It is anticipated that results of these studies can be used to establish a protocol for arterial cannulation with Nitrobid^R augmentation on patients in the operating room and intensive care unit.

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