Effects of Oxytocin on Blood Pressure during Anesthesia

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Oxytocin in moderate doses is generally considered innocuous. Its cardiovascular effects have been thought to be minimal since the introduction of pure oxytocin not contaminated with vasopressin. It recently came to the authors' attention that oxytocin injected into primates caused transient hypotension,1 probably due to peripheral vasodilatation, and was associated with reflex tachycardia. Hendricks and Brenner2 studied three patients, one man and two postpartum women (saline abortion) and found a rapid transient hypotensive effect of intravenous administration of oxytocin. Bonica3 has presented several studies showing a hypotensive effect of bolus doses of oxytocin in parturients. The circulatory effects of oxytocin in women in early pregnancy (8 to 12 weeks) are not known. Therefore, we proposed to study the effects of a bolus injection of oxytocin in women in the first trimester of pregnancy.

MATERIALS AND METHODS

Eleven women, 19 to 31 years of age, weighing 103 to 251 pounds in the first trimester of pregnancy, were anesthetized with thiopental, 4 mg/kg; anesthesia was maintained with N2O, 70 per cent, and O2 30 per cent. Intubation was accomplished following administration of succinylcholine, 60–80 mg; a slow infusion of succinylcholine was used to maintain paralysis. The patients were then ventilated at a tidal volume of 700 ml and a rate of 14/min. A minimum of 5 minutes was allowed to elapse between any two drugs administered. An 18-gauge arterial cannula was introduced into a radial artery and attached to a Statham P23 strain gauge and an Electronics for Medicine recorder with rapid writer. Each patient was also monitored with continuous EKG. The cervix was dilated and suction curetage was performed. Approximately 500 ml Ringer's lactate solution was infused during this period. A slight increase in blood pressure was noted after dilatation of the cervix. Following dilatation, oxytocin, 0.1 units/kg, was injected rapidly, and the responses of blood pressure and EKG were observed. The oxytocin used in this study was synthetic Pitocin stabilized with 0.5 per cent chloretone.1

RESULTS

Blood pressure decreased in every patient following oxytocin injection, the average decrease in mean arterial pressure being 45 per cent (table 1). This decrease in blood pressure occurred 20 to 30 seconds after injection and lasted 210 seconds. The most severe hypotensive episode was a 68 per cent decrease in mean arterial pressure, from 100/60 to 30/20 torr. The lowest mean arterial pressure was 23 torr. At the other end of the scale, the least impressive pressure decrease was from 160/80 to 110/70 torr, a

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decrease in mean arterial pressure of 25 per cent.

Tachycardia developed in all but one of our patients, coinciding with the hypotension. The average increase in heart rate was 20 per cent. There was no evidence of cardiac arrhythmia during the hypotensive period. The tachycardia followed the hypotension after an interval of 5 to 10 seconds.

Two of our patients received a second dose of oxytocin as a continuous infusion (10 U/1,000 ml). No change in blood pressure was found. Two additional patients were given a second bolus dose of 0.1 U/kg, and both showed a smaller (20 per cent) decrease in mean arterial pressure.

Discussion

Oxytocin, usually 10 units, is frequently given as a bolus injection after delivery or during section abortions. It is not general knowledge among anesthesiologists that this has any harmful effect. In our study of young healthy women, mean blood pressure decreased 25–65 per cent and systolic pressure decreased 31–70 per cent. Although these decreases were transient in our cases, a blood pressure decrease of this magnitude could be quite dangerous in a patient with already compromised circulation because of hypovolemia or intrinsic heart disease. From the work of Spurgeon et al. in monkeys and Kitchin et al. in man, it appears that this effect is primarily due to vasodilatation and decreased peripheral resistance and not to a decrease in myocardial contractility. We conclude that oxytocin should be given slowly as a dilute solution to avoid its hypotensive effects.

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