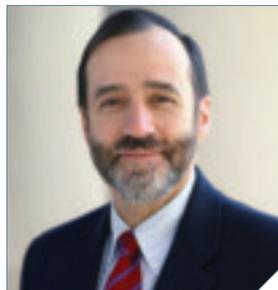


Editorial

» Robert L. Barbieri, MD Editor in Chief



Give vasopressin to reduce bleeding in gynecologic surgery

📌 5 units, in a very dilute solution, is plenty

Surgery on the uterus often causes significant hemorrhage—violaceous blood welling ominously from open veins and scarlet blood squirting vigorously from transected arteries, raising the heart rate of patient and surgeon alike.

To reduce blood loss during an operation, gynecologic surgeons often take the preventive step of injecting a dilute solution of vasopressin into the uterus or cervix before they start the procedure. That practice is a sound one: In randomized clinical trials, injection of vasopressin has been demonstrated to reduce blood loss in several gyn surgical procedures, including myomectomy, hysterectomy, abortion, and conization.¹⁻⁶

A persistent concern, however, is that injection of vasopressin is, occasionally, associated with bradycardia and cardiac arrest, especially if injection is made into a blood vessel inadvertently. An unresolved issue is identifying the optimal dilution and dose of vasopressin that will reduce blood loss and minimize the risk of cardiac arrest.

What is your intraop regimen to reduce surgical blood loss?

Instant Poll
📌 on page 14

Vasopressin is effective at reducing blood loss

As I noted, clinical trials have shown that vasopressin reduces blood loss during several gyn surgical procedures (see “Vasopressin is a uterotonic in the nonpregnant uterus,” page 14). Two studies of interest looked at:

Pregnancy termination. 337 pregnant women undergoing termination of pregnancy were randomized to preprocedure injection into the cervix of either 20 mL of 1% mepivacaine solution or 4 units of vasopressin diluted (at 0.2 U/mL) in 1% mepivacaine. For women at 19 weeks’ gestation, or later, measured mean blood loss was 400 mL in the mepivacaine group and 179 mL in the vasopressin-mepivacaine group.⁴

Conization of the cervix. Ninety-two women undergoing conization were randomized to injection of saline or ≤ 3 units of vasopressin diluted in saline (0.1 U/mL) into the cervix.⁵ Blood loss averaged 136 mL in the saline group and 35 mL in the vasopressin-saline group.

Occasionally, there is associated bradycardia and cardiac arrest

In gynecologic surgery, bradycardia with subsequent cardiac arrest is a frightful and shocking development.

Cautionary case

Consider the report of a laparoscopic myomectomy,⁷ during which 11.2 units of vasopressin was injected into the myometrium at a dilution of 0.2 units/mL. Two minutes after injection, the patient’s heart rate fell to 58 bpm, then to 35 bpm; cardiac arrest followed—all in 5 minutes.

The patient was given 1 mg epinephrine, 0.5 mg of atropine, and 100% oxygen; chest compressions were initiated. Effective cardiac activity was reestablished. The heart rate was initially measured at 150 bpm; blood pressure, 220/140 mm Hg. Both vital signs gradually returned to normal range.

The surgical procedure was discontinued.

What might have caused these events?

It’s thought that a vasopressin-induced increase in blood pressure causes a vagal-mediated decrease in the heart rate. The vasoconstrictive effects of vasopressin may, simultaneously, cause coronary artery vasospasm, resulting in cardiac ischemia.

In many of the case reports of vasopressin-induced bradycardia and cardiac arrest, the dose of vasopressin administered, as in the case just described, exceeded 5 units,^{8,9} or the vasopressin was injected into a vessel unintentionally.¹⁰

CONTINUED ON PAGE 14

Instant Poll

How would you prevent hemorrhage in this high-risk surgical patient?

A 24-year-old G₀ who has von Willebrand disease is scheduled for cervical conization to treat a high-grade squamous intraepithelial lesion.

What is your preop regimen to reduce blood loss at surgery?

- recombinant Factor VIIa
- IV desmopressin infusion before surgery and again postop
- an estrogen-progestin contraceptive started 2 weeks before surgery to increase the factor VIII concentration
- an IV tranexamic acid bolus before surgery and again postop
- none of the above

What's your preferred preventive measure? Weigh in at obgmanagement.com

Find out what your colleagues' preferences are when Instant Poll results are published in an upcoming issue

Vasopressin is a uterotonic in the nonpregnant uterus

The fraternal twins oxytocin and vasopressin are both secreted from the posterior pituitary gland. Both are nanopeptides that differ only in two amino acids.

Oxytocin binds to a myometrial cell-surface oxytocin receptor, thus increasing concentrations of intracellular cyclic adenosine monophosphate (cAMP), resulting in uterine contractions.

Vasopressin regulates plasma volume, blood pressure, and osmolality. It causes vasoconstriction by acting through the vasopressin (V₁) receptor and exerts its antidiuretic action through the V₂ receptor in the kidney. The major mechanism by which vasopressin reduces blood loss is vasoconstriction.

Vasopressin also stimulates uterine contractions by acting through myometrial V_{1a} receptors. Unlike oxytocin receptors, which are plentiful in the term uterus but far less abundant in the nonpregnant uterus, vasopressin receptors are present in the myometrium of both pregnant and nonpregnant women.¹

Administering vasopressin to nonpregnant women can therefore induce uterine contractions and the symptom of dysmenorrhea. A vasopressin antagonist will attenuate those effects.²

References

1. Wing DA, Goharkhay N, Felix JC, Rostamkhani M, Naidu YM, Kovacs BW. Expression of the oxytocin and V1a vasopressin receptors in human myometrium in differing physiologic states and following misoprostol administration. *Gynecol Obstet Invest.* 2006;62(4):181-185.
2. Liedman R, Grant L, Igidbashian S, James I, McLeod A, Skillern L, Akerlund M. Intrauterine pressure, ischemia markers, and experienced pain during administration of a vasopressin V1a receptor antagonist in spontaneous and vasopressin-induced dysmenorrhea. *Acta Obstet Gynecol Scand.* 2006;85(2):207-211.

The optimal dose and dilution of vasopressin continues to be controversial.

What is an optimal dose and dilution?

Sparse high-quality data guide the selection of an optimal dosage and dilution of vasopressin. But, as with most pharmacotherapeutic agents that produce adverse effects at a high dosage, it is often wise to use the lowest that is efficacious.¹¹ The clinical literature suggests several guidelines that may help reduce the likelihood and severity of adverse effects of vasopressin (see "Using vasopressin? Reduce the risk of adverse effects with these procedural tips," page 15).

On the path to surgical nirvana

No gynecologic surgical procedure is more rewarding than one completed successfully with minimal blood loss; with the operating field as pristine at the end as it was at the beginning; with one sponge with a spot of blood; and with the patient safely in the recovery room. Vasopressin has a role in reaching for this ideal, but you must use it in dilution and at a low total dosage. 🎯



OBG@QHC.COM

References

1. Frederick J, Fletcher H, Simeon D, Mullings A, Hardie M. Intramyometrial vasopressin as a haemostatic agent during myomectomy. *Br J Obstet Gynaecol.* 1994;101(5):435-437.

Using vasopressin? Reduce the risk of adverse effects with these procedural tips

Solution

Dilute the vasopressin in the range of 0.1 to 0.2 U/mL. Avoid concentrations >1 U/mL.

Vitals

Alert the anesthesiologist and the surgical team before you inject vasopressin, so that they are vigilant for changes in vital signs. Don't inject if vitals are unstable.

Insufflation

The pneumoperitoneum necessary for laparoscopic surgery may increase the risk of bradycardia.¹ The combined pneumoperitoneum and intravascular injection of vasopressin is likely to increase the risk of cardiovascular changes.

Injection

Double-check that you are not injecting into a blood vessel by carefully testing the results of negative aspiration applied to the syringe.

Dosage

Don't exceed a total dosage of approximately 5 units. Using a solution of 0.1 U/mL, the maximum injection is 50 mL.

Repeat dose

Vasopressin has a relatively short half-life in circulation. Repeat injection, 45 to 60 minutes after the first, may be safe.

Nicotine

Does your patient smoke or use a nicotine replacement medication? Be especially cautious about the possible synergistic effect that nicotine plus vasopressin may have on vasoconstriction.

Cardiovascular pitfalls

Be cautious about using vasopressin in a patient who has established coronary artery or myocardial disease.

Reference

1. Reed DN, Duff JL. Persistent occurrence of bradycardia during laparoscopic cholecystectomies in low-risk patients. *Dig Surg*. 2000;17(5):513-517.
2. Kongnyuy EJ, Wiysonge CS. Interventions to reduce haemorrhage during myomectomy for fibroids. *Cochrane Database Syst Rev*. 2009;(3):CD005355.
3. Okin CR, Guido RS, Meyn LA, Ramanathan S. Vasopressin during abdominal hysterectomy: a randomized controlled trial. *Obstet Gynecol*. 2001;97(6):867-872.
4. Schulz KF, Grimes DA, Christensen DD. Vasopressin reduces blood loss from second-trimester dilatation and evacuation abortion. *Lancet*. 1985;2(8451):353-356.
5. Sabol ED, Gibson JL, Bowes WA Jr. Vasopressin injection in cervical conization. A double-blind study. *Obstet Gynecol*. 1971;37(4):596-601.
6. Martin-Hirsch PL, Kitchener H. Interventions for preventing blood loss during the treatment of cervical intraepithelial neoplasia. *Cochrane Database Syst Rev*. 2000;(2):CD001421.
7. Hobo R, Netsu S, Koyasu Y, Tsutsumi O. Bradycardia and cardiac arrest caused by intramyometrial injection of vasopressin during a laparoscopically assisted myomectomy. *Obstet Gynecol*. 2009;113(2 pt 2):484-486.
8. Hung MH, Wang YM, Chia YY, Chou YM, Liu K. Intramyometrial injection of vasopressin causes bradycardia and cardiac arrest—report of two cases. *Acta Anaesthesiol Taiwan*. 2006;44(4):243-247.
9. Martin JD, Shenk LG. Intraoperative myocardial infarction after paracervical vasopressin infiltration. *Anesth Analg*. 1994;79(6):1201-1202.
10. Frishman G. Vasopressin: if some is good, is more better? *Obstet Gynecol*. 2009;113(2 pt 2):476-477.
11. Nezhat F, Admon D, Nezhat CH, Dicorpo JE, Nezhat C. Life-threatening hypotension after vasopressin injection during operative laparoscopy, followed by uneventful repeat laparoscopy. *J Am Assoc Gynecol Laparosc*. 1994;2(1):83-86.

PELVIC SURGERY DVD SERIES

OBG
MANAGEMENT



OWN ONE OR ALL 10 SETS IN THE SERIES

These remarkable state-of-the-art DVDs utilize detailed surgical drawings, extensive video footage of cadaver dissections and live surgical demonstrations to teach a variety of pelvic surgical procedures. Renowned specialists narrate, covering indications, techniques and how to avoid complications of a variety of pelvic reconstructive procedures. More than 20 hours of video footage.

DVD Titles Include:

- Sling Procedures from A to Z
- Vaginal Correction of Anterior and Posterior Vaginal Wall Prolapse With and Without Vaginal Hysterectomy
- Techniques to Correct Enterocele and Vaginal Vault Prolapse
- Challenging Cases in Urology and Urogynecology
- Evaluation of Women With Lower Urinary Tract Symptoms With and Without Pelvic Organ Prolapse—Including Urodynamic Testing
- Surgical Management of Congenital, Acquired and Iatrogenic Lesions of the Vagina and Urethra
- Surgery for Posterior Pelvic Floor Abnormalities

THANK YOU
FOR ORDERING
FROM
OBG
MANAGEMENT

For details and to purchase, visit
www.obgmanagement.com/pelvicdvds