

Oxytocin Safety Interest Group (OxytocinSIG)

Recommendations for Global Implementation of Safe Oxytocin Use Practices



Background

Intravenous (IV) oxytocin is used antepartum to induce labor in patients with a medical indication, to stimulate or reinforce labor in selected cases of uterine inertia, and as an adjunct in the management of an incomplete, inevitable, or elective abortion. Used postpartum, IV oxytocin is indicated to produce uterine contractions during the expulsion of the placenta, and to prevent or control postpartum bleeding or hemorrhage.¹⁻³ Therefore, oxytocin is needed in all obstetric care areas with consistency of practice amongst all provider types (e.g., anesthesia, obstetrics, midwives, perinatal nursing) whether using low doses for labor induction or augmentation, commonly measured in milliunits, or at higher doses to prevent or treat postpartum hemorrhage (PPH), commonly measured in units.

However, improper administration of oxytocin can cause hyperstimulation of the uterus, which in turn can result in fetal distress, the need for an emergency cesarean section, or uterine rupture. Multiple **International Medication Safety Network (IMSN)** member countries have identified that there are substantial risks involved with the use of oxytocin and have reported significant patient harm from related errors. ^{4–6}

As a result, the executive committee formed the **IMSN Oxytocin Safety Interest Group (OxytocinSIG)** to further address the safe use of oxytocin globally. In a series of OxytocinSIG meetings held in 2022, IMSN members shared firsthand experience with a variety of risks, close calls, errors, and adverse events associated with the use of oxytocin (**Table 1**).

International Medication Safety Network

The International Medication Safety Network (IMSN) is an international network of safe medication practice centers established with the aim of improving patient safety. This is achieved by operating medication error reporting programmes and producing guidance to minimize preventable harms from medicine use in practice. IMSN promotes safer medication practice to improve patient safety internationally.

For more information: www.intmedsafe.net/about/



Table 1. Identified Risks Associated with Oxytocin Use

Inappropriate/unnecessary use in labor induction in low-risk patient populations
Lack of a standardized dosing regimen
Confusion with look-alike and sound-alike medications
Inappropriate use of brand names or unsafe abbreviations
Non-standardized or non-centralized preparation of oxytocin infusions
Use of multiple oxytocin infusion concentrations/preparations
Insufficient monitoring of beyond-use dates of pre-prepared solutions
Reliance on manually programmed infusion pumps without automated safeguards in place
Mix-ups with infusion tubing
Mix-ups with dosing/infusion rates
Use/availability of oxytocin in the direct patient care area without appropriate orders and communication among healthcare providers

Goal

Through the collaboration of IMSN members, the goal of these recommendations is to aid in the implementation of safe practices surrounding the use of oxytocin throughout the medication-use process in order to prevent the errors identified.

Building a Response to Oxytocin-Related Errors

The following safety recommendations were developed based on the collective experiences and learnings from IMSN member countries and should be considered for implementation in global oxytocin use initiatives. The recommendations shared below follow the medication use process and address errors occurring during each stage.



General

- Oxytocin has been identified as a potentially hazardous drug for healthcare workers and ancillary staff to
 handle in their third trimester of pregnancy by the National Institute for Occupational Safety and Health
 (NIOSH) in the United States, but not by other global agencies. When possible, reduce unnecessary
 exposure of at-risk staff (e.g., women in their third trimester) to the medication and ensure appropriate
 labeling (e.g., appropriate auxiliary warning labels).⁷
- Increase the number of drug name letters required in electronic searches to a minimum of five (5) letters to avoid confusion with other similarly spelled medications (e.g., oxy**CODONE**).

Procurement and Planning for Oxytocin Shortages

- Evaluate the use of oxytocin and avoid drug waste.
 - Use a single, standard concentration for both antepartum and postpartum to avoid oxytocin waste, when possible.⁸
 - Where possible, purchase premixed solutions.
 - Centralize the preparation of oxytocin infusions to avoid unnecessary waste.
- Consider procuring different product presentations, when available, to avoid look-alike vials or ampules (e.g., purchase vials if the ampules can be confused with other drug ampules or vice versa).
- Consider using alternative agents (e.g., carbetocin) if supply chain disruptions and shortages limit the availability of oxytocin.^{9,10}

Storage

- · Ampules and Vials
 - Evaluate how vials and ampules are stored to avoid the risk of look-alike mix-ups.
- Solutions
 - Avoid storing other IV infusion solutions in similar-sized containers in the same area to avoid mix-ups (e.g., magnesium sulfate solutions, hydrating solutions).
- Storage Management
 - Ensure that the cold chain is maintained throughout the use cycle.¹¹

- Ensure premixed or compounded solutions of oxytocin are stored appropriately in birthing areas to ensure product stability.
- Implement strategies to avoid confusion with look-alike or sound-alike medications (e.g., auxiliary labeling on vials, infusion bags, bins, automated dispensing cabinet screens) and warn users about the risk.
- Utilize barcode scanning, where available, when receiving, dispensing, and loading oxytocin into automated dispensing cabinets or other storage locations.

Prescribing

- Review treatment protocols and assess recommendations for oxytocin use in patients with unfavorable benefit/risk balance. In particular, gain awareness and avoid exposing patients to those with the least evidence of benefit (e.g., during spontaneous labor).
- Require the use of standard order sets to prescribe oxytocin for labor induction/augmentation and control of postpartum bleeding to ensure correct dosing and patient monitoring.
 - Identify standard treatments and other safety measures for oxytocin-induced uterine tachysystole.
- Utilize indication-guided prescribing if using electronic prescribing systems.
- Limit the use of verbal orders to emergencies or when the prescriber is in a sterile field. When a verbal order is needed, require that the order is written down and read back to the prescriber.
- Avoid the use of medication name abbreviations or discontinued brand names. Use only generic medication names in electronic prescribing systems and when communicating verbally. Some examples to avoid:
 - The use of "SYNTO" can lead to confusion between Syntocin (oxytocin) and Syntometrine (oxytocin and ergometrine)
 - The use of "PIT" can lead to confusion between Pitocin (oxytocin) and Pitressin
 - The use of "OXY" can lead to confusion between oxytocin and oxyCODONE products.
- Standardize how oxytocin doses, concentration, and rates are expressed (e.g., in written and electronic ordering forms and on prepared infusion bags). Communicate oxytocin infusion and bolus orders in terms of the dose rate (e.g., dosage/time) and not volume rate (e.g., volume/time) to lessen the opportunity for misinterpretation.
- Avoid the use of the abbreviation "mU" for milliunit.

Preparation and Dispensing

- When possible, standardize to a single concentration and volume for both antepartum and postpartum oxytocin infusions.⁴
- Centralize the preparation of oxytocin infusions in the pharmacy to standardize preparation; ensure sterility; help avoid unnecessary waste; and avoid look-alike, sound-alike (LASA) mix-ups with other medications and solutions available in patient care areas.
- Check the expiration date of oxytocin vials and label compounded infusion bags with an appropriate beyond-use date.
- Before distributing prepared oxytocin infusion bags to birthing areas, boldly label both sides of the bags to differentiate them from plain hydrating solutions and other infusions, such as magnesium sulfate.
- If oxytocin infusions must be prepared in birthing areas, require an independent double check of each preparation and provide preprinted product labels and auxiliary warning labels to affix to prepared bags.
- Consider using tamper evident caps on prepared oxytocin infusion bag injection ports to avoid inappropriate manipulation (e.g., adding more oxytocin).

Administration and Monitoring

- Oxytocin should not be brought into the immediate patient care area until required and ordered.
 - The availability of oxytocin within delivery suites can lead to inappropriate administration without an order or consent, or it may be confused with other similar-looking infusion bags.
- If available, utilize barcode scanning of oxytocin vials/ampules and/or infusion bags prior to administration.
- Check beyond-use dates and change infusion bags when indicated, according to local policies and regulatory requirements.
- Label the oxytocin infusion IV tubing just above the injection port closest to the patient and just above the infusion pump.
- When setting up the infusion, trace the line from the infusion bag to the pump, and from the pump to the patient (or vice versa), to ensure correct line attachment and to avoid mix-ups with similar-looking infusions.

- Employ an independent double check of pump programming and line tracing prior to starting the oxytocin infusion.
- When available, administer oxytocin infusions via smart infusion pumps with an engaged dose error-reduction system (DERS). DERS programming should utilize the dose rate (e.g., milliunits/minute) for infusion programming.
 - If infusion pumps are not utilized, ensure the availability of rate calculation/titration references for providers.
- Any oxytocin (or other drugs) prepared in syringes or bags for administration must be labeled appropriately. If handing off prepared doses to other providers, ensure clear communication and documentation to avoid inadvertent administration of medications meant for the mother to the child, or vice versa.

Patient Education⁶

- Provide written and verbal communication utilizing appropriate reading levels in the patient's primary language to ensure patient understanding of oxytocin use, risks to both the mother and child, and symptoms to watch for and report.
- Educate patients about oxytocin use early in their pregnancy.
- Engage patients/families in the birthing process by encouraging them to ask questions about oxytocin.
- Clearly communicate with the patient if it is determined that oxytocin is necessary for the augmentation or induction of labor prior to starting the infusion.

Monitoring

• Ensure appropriate monitoring of the patient's fluid status (both intake and output), blood pressure, frequency of uterine contractions, and heart rate of the unborn fetus.

Rationale

These selected risk-reduction strategies include recommendations that can help avoid errors and significant patient harm related to the use of oxytocin through all phases of the medication-use process. The risk-reduction strategies include high-leverage forcing functions and computerization in addition to less technologically based recommendations. These key improvements must be accompanied by low-leverage strategies, such as staff education, patient education and counseling, and warnings and reminders. Combining low-, moderate-, and high-leverage strategies work to exponentially enhance safe oxytocin utilization. Additionally, adding safety strategies upstream in the medication-use process may help prevent other downstream risks. For example, utilization of centrally compounded and standardized oxytocin solutions may reduce errors associated with vial or ampule mix-ups that occur downstream during preparation in obstetric care areas.

Implementation

IMSN acknowledges that healthcare organizations in different parts of the world vary in the availability of technologies (e.g., electronic health records, infusion pumps, automated dispensing cabinets) and resources (e.g., central pharmacy compounding programs). However, the recommendations in this document represent what are believed to be the safest for providing care to patients receiving oxytocin. While the recommendations may not all be achievable everywhere, organizations should work to identify those that can be implemented at each step of the medication-use process and consider the remaining recommendations as future goals to work towards. These recommendations should be reviewed, discussed, and adapted in your organization by an interdisciplinary team that includes prescribers, nurses, pharmacists, and any other healthcare practitioners who need to assist with implementing the changes. Start by evaluating your current processes, and then determine where and how these recommended safety improvements can be implemented. After making any changes, evaluate the revised processes to identify any new issues or outstanding safety gaps.

Continue to report errors involving oxytocin through your normal reporting programs and to IMSN, so that we may continue to evaluate the safe use of oxytocin and other medications around the world.

Premixed solutions are currently not available globally except from outsourced compounding pharmacies in some countries. IMSN urges the global pharmaceutical industry to make premixed oxytocin solutions available everywhere, as soon as possible.

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