

EVALUATES ADMINISTRATION OF OXYTOCIN DRUG IN MATERNITY AND ITS IMPLICATIONS: SHORT ARTICLE REVIEW

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Abstract

Introduction: Oxytocin exerts a variety of actions and involvement in a large number of physiological and pathological processes. **Objectives:** Study aims to evaluate Oxytocin use in Maternity setting, we examine foremost the availability, and to a lesser extent the administration of Oxytocin. As such, we assess the extent to which international unified guidelines have adhered to obstetric care. **Methods:** A plan was designed and a systematic search was conducted in PubMed and CINAHL. We screen the search on title and abstract after duplicates were removed (n = 100), 65 articles were examined in full-text and 28 papers met inclusion criteria. As the articles varied in methodology used for analysis of oxytocin levels, a descriptive synthesis was created. **Result:** The most studied routes, and doses of Oxytocin is a single 10-unit intramuscular (IM) dose or an intravenous (IV) Infusion of 20 to 40 units of Oxytocin in 1,000 ml of saline or lactated Ringer, s solution. Although, this one of the main focuses of midwifery work, it is surprising how little understand about how midwives can help women during these processes and how Oxytocin levels can be maintain. **Conclusion:** Currently, no standard recommendations regard the dose, rate, and duration of intravenous Oxytocin administration, nor is there a consensus on whether an intravenous bolus of Oxytocin should administer before starting an Oxytocin infusion Studies should perform to evaluate whether, patients at high risk for hemorrhage require a different Oxytocin infusion strategy than low-risk patients.

Keywords: Oxytocin-Maternity-Administration, Active Management Third Stage of Labor.

INTRODUCTION

There is no uniformly accepted international standard for administering Oxytocin, various international guidelines and publications report on low and high-dose Oxytocin regimens protocols. Establishing a national guideline on the criteria for and administration of Oxytocin to augment labor would eliminate the observed differences and minimized the risk of administration and medication errors

The Oxytocin crucial role describe in childbirth, early phase of postpartum period, and lactation. However, evidence for its direct involvement remains inconclusive or lacking in human reproduction and rarely involves measurement of Oxytocin blood plasma level [1].

It hypothesized that using oxytocin to speed up labor increases the risk of foetal hypoxia although it makes uterine contractions stronger and cuts down on the time between them. Earlier research identified an elevated risk of uterine hyperstimulation and abnormal fetal heart rate during oxytocin-assisted labor [2]. Oxytocin has a direct relaxing effect on vascular smooth

muscle lead to a transient decrease in systemic vascular resistance, resulting in hypotension and tachycardia, associated with the intravenous route when given by rapid bolus injection [3]. Oxytocin is the most efficacious treatment for postpartum hemorrhage, even if already used for labor induction or augmentation or as part of Active Management Third Stage of Labor (AMTSL).

The choice of a second line uterotonic based on patient-specific factors such as hypertension, asthma, the use of protease inhibitors [4]. Oxytocin was available for the use of induction in pregnant patients with a viable pregnancy and favourable cervix [5].

The primary goal of these interventions is to assist placental delivery, thereby allowing the uterus to contract and reduce blood flow across the endometrium [6]. A route of administration has a greater effect when combining with cord traction and uterine massage all are AMTSL interventions (WHO, 2012) recommended Oxytocin as the first uterotonic of choice [7].

Use of a postpartum Oxytocin protocol for the active management of the third stage of Labor, nearly halved the amount of Oxytocin administered without increasing number of patients experiencing PPH [8]. Augmentation of labor is the process of uterine stimulation using intravenous Oxytocin infusion to increase the frequency, duration, and intensity of contractions before the onset of spontaneous labor United States, misuse of Oxytocin is listed as one of the leading allegations in obstetric malpractice [9, 10].

Pharmacokinetics

Oxytocin distributes throughout the extracellular fluid and plasma binding is very low. When administered at the appropriate intravenous infusion rate, the uterine response starts gradually and usually reaches a steady-state within 20-40 minutes [11].

The Pharmacological role of Oxytocin

Oxytocin is also known as Pitocin, Syntocinon, Oxytocin, Endopituitrina, Oxytocin, and Oxytocin hormone, and Orasthin. It has a molecular formula of $C_{43}H_{66}N_{12}O_{12}S_2$, common types use are Pitocin and Syntocinon, the chemical resemblance to Oxytocin makes them an ideal drug of choice for various cases at the time of parturition [12]. Synthetic Oxytocin is one of the most frequently used medications in obstetric care and the common routine augmentation of labor [13].

Administration of Oxytocin infusion

The Oxytocin infusion stops in the following situations and a medical review is requested; if an FHR trace pathological, Intrapartum haemorrhage occurs, Suspicion of uterine rupture, Signs of obstructed labor, Cord prolapse, and Contractions $\geq 5/10$ signs of fetal compromise [14]. Therapeutic dose, use: Oxytocin is chosen over other uterotonic drugs because it is an effective 2–3 minutes after injection has minimal adverse effects and is used in all women [15]. The dose uses for PPH-prophylaxis vary widely between practitioners and obstetric units, ranging from 2 IU to 10 IU (international units) for both intravenous bolus and intramuscular injections. There is a consensus that Oxytocin is an effective intervention to prevent PPH [16].

Objectives:

This study aims to evaluate Oxytocin use in an obstetrics setting, we examine foremost the availability, and to a lesser extent the administration of Oxytocin.

As such, we assess the extent to which international unified guidelines have adhered to obstetric care.

METHODS

A plan was designed, to determine the aim and procedures for the review and comprehensive systematic search was conducted in PubMed and CINAHL.

We screen the search on title and abstract after duplicates were removed (n = 100), 65 articles were examined in full-text and 33 papers met inclusion criteria and possibly relevant to study. Of these studies 32 were excluded because they did not fulfil the inclusion criteria. As the articles varied in methodology used for analysis of oxytocin levels, administration, advantages, side effects, and guidelines then a descriptive synthesis was created.

RESULT

The WHO recommendations, don't distinguish between augmentation in the first and second stages of labor [WHO, 2003a]. They suggest a starting dose of 2.5 units in 500ml of dextrose (or normal saline). The dose increased until three contractions lasting 40 seconds in 10 minutes is attaining a maximum infusion rate of 60 drops per minute [17]. The most studied routes, and doses of Oxytocin is a single 10-unit intramuscular (IM) dose or an intravenous (IV) Infusion of 20 to 40 units of Oxytocin in 1,000 ml of saline or lactated Ringer, s solution often infused at a rate of about 125 ml/HR. The onset of action of the IM dose is typically 3 to 5 minutes, while the onset of action of the IV dose is about 1 minute [10]. The American College of Obstetrics and Gynaecology (ACOG) advocates a low-dose regimen starting at 0.5-2 mu/min with incremental increases of one to 2 U every 15 to 40 minutes. A suggested high-dose regimen begins at 6 U/min with increases of three to 6 U every 15 to 40 minutes [18]. Guidelines from the Royal College of Obstetricians and Gynaecologists (RCOG7) recommend an intramuscular bolus dose of Oxytocin 10 IU after delivery, whereas the World Health Organization recommends Oxytocin 10 IU intramuscular or by slow intravenous injection [19]. All adjustments to the dose recorded on the CTG tracing, if not using electronic CTG records, signed and timed.

Recordings of the fetal heart record on the birth graph every 15 minutes in the first stage of labor and every 5 minutes in the second stage of labor [14]. Ensuring the safe use of Oxytocin and magnesium sulphate requires systemic approaches that may include policies and efforts to standardize processes, staff training and education, and environment and workflow redesign, all of which contribute to high-reliability care teams and a culture of patient safety. Although, this one of the main focuses of midwifery work, it is surprising how little understand about how midwives can help women during these processes and how Oxytocin levels to be maintain [20, 1].

DISCUSSION

Vannuccini et al. (18) supposed that oxytocin plays an important but not critical role in the initiation of childbirth. Another study by Erickson and Emeis (53) has shown that the administration of exogenous oxytocin during human childbirth can have negative consequences for breastfeeding [1].

A 2013 Cochran review²⁴ of studies explaining the use of Oxytocin for the treatment of ‘slow labor’ reviewed eight studies involving 1338 low-risk women in the first stage of spontaneous labor. In this review, Oxytocin did not reduce the need for cesarean sections or forceps deliveries, and neither did it increase the number of vaginal deliveries when compared with no treatment or delay Oxytocin treatment. Multidisciplinary education regards the physiology of the uterine contractions, the Pharmacological of Oxytocin, normal uterine activity, and institutional guidelines for the essential administration of Oxytocin [21, 22].

Numerous randomize control trials in a high-resource settings has failed to prove a link between oxytocin labor induction and unfavourable neonatal outcomes. Contrarily, we discovered a higher risk of new born resuscitation, a low Apgar score, and infant death before to discharge among women who had oxytocin-assisted labor, which raises possibility that using oxytocin to hasten labor can be hazardous in settings with limited resources [2].

AWHONN published updated staffing guidelines in 2010 and recommended a 1:1 nurse-to-patient ratio for patients receiving Oxytocin for induction/augmentation of labor. Also, Cochran systematic reviews report a reduction in the risk of PPH by 50-60% and prophylactic Oxytocin, effective at any dose ranging from 3 IU to 10 IU, compared with placebo. These results are consistent with the findings of recent studies that support the use of low doses of Oxytocin to prevent uterine a tony [23, 3&24].

A retrospective study approved by the North-western University Institutional Review Board, finds that the use of a postpartum Oxytocin protocol for the active management of the third stage of Labor, nearly halved the amount of Oxytocin administered without increasing number of patients experiencing PPH [8].

A review of the data resulted in a joint statement in 2004 by the International Confederation of Midwives and International Federation of Gynaecologist’s and Obstetricians endorsing the need for all deliveries attended by a caregiver trained in AMTSL, which should include routine use of utero tonic, controlled cord traction, and uterine massage [25]. Data from the Consortium on Safe Labor are used by Zhang et al. A total of 15,054 women from six hospitals were eligible for the analysis, however, we found no reduction in the caesarean delivery rate amongst the high dose group. It may, in turn, reduce the risk of meconium staining, Chorio amenities and new born fever in multiparous [26]. Consequently, having a clinical guideline on the use of Oxytocin for inducing and/or augmenting labor is the first step towards safer administration, and has the potential to eliminate inter-institutional variations and minimized the risk of administrative errors [27]. Currently, no standard recommendations regard the dose, rate, and duration of intravenous Oxytocin administration, nor is there a consensus on whether an intravenous bolus of Oxytocin should administer before starting an Oxytocin infusion [28]. In

addition, a Swedish research by Ekelin et al. discover most of midwives believed that using oxytocin to hasten labor was generally unneeded and overused [29].

Oxytocin is a commonly used and effective utero tonic medication, in spite of a questions about bolus dose, infusion dosage, necessity, and bolus injection rate still need to verification.

The dose suggested in peripartum haemorrhage prophylaxis guidelines are not supported by randomized controlled, double-blind trials; rather, they are solely backed by expert opinion and studies with weak levels of evidence. A prophylactic dose of oxytocin bolus 0.5-3U is thought to be helpful and 7.72 U/h is the optimal dosage for prophylactic oxytocin infusion [30].

Postpartum synthetic oxytocin regimens used comparatively higher doses with shorter duration compared to labour, giving greater but transient maternal oxytocin elevations. Total postpartum dose was comparable to total intrapartum dose following vaginal birth, but post-caesarean dosages were higher [31].

In order, to prevent PPH for all births, the latest WHO recommendation released in 2018, call for 10 IU of intramuscular or intravenous oxytocin. This dosage can be split into a smaller intravenous bolus and an infusion, and un associated with a high rate of side effects. Identification of ideal intravenous oxytocin regimen during a caesarean operation is one of the crucial research topics suggested by WHO [32].

Observed that oxytocin is a very powerful drug and agreed that it should be used with attention due to the increased risk of sid effects, particularly hypoxic ischaemic encephalopathy in the baby if used at a dose causing too frequent contractions [33].

CONCLUSION

Studies should perform to evaluate whether, patients at high risk for hemorrhage require a different Oxytocin infusion strategy than low-risk patients, and a better understanding of the underlying mechanisms will affect and enhance future obstetrics, particularly the work of midwives.

Finding of ideal intravenous oxytocin regimen during a caesarean operation is one of main research priorities.

There is no uniformly accepted international standard for administering Oxytocin, various international guidelines and publications report on low and high-dose Oxytocin regimens protocols.

Establishing a national guideline on the criteria for and administration of Oxytocin to augment labor would eliminate the observed differences and minimized the risk of the ideal intravenous oxytocin regimen during a caesarean operation is one of the main research priorities.

The importance of highlighting the need for an obstetrician or senior midwife to review the woman and fetus in cases of a pathological CTG, as this may be an indication for birth to be expedited.

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