



Oxytocin Regimens for Labour Augmentation and Its Effect on Perinatal Outcomes: A Narrative Review

Neema Acharya ^{a≡}, Priyanka Singh ^{a⊖}, Monisha Singh ^{b#} and Priyanjali Sinha ^{a⊖*}

^a Department of Obstetrics and Gynecology, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Sawangi, Wardha, India.

^b Banaras Hindu University, Uttar Pradesh, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i60A34533

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/77745>

Review Article

Received 10 October 2021
Accepted 13 December 2021
Published 20 December 2021

ABSTRACT

Background: The issue of childbirth, stimulation of labor is very important for successful childbirth and the birth of healthy babies. Obstetricians play main role in providing and rising Maternal and Child Health (MCH) care facilities. One amongst the goal of MCH care is safe delivery with smart fetomaternal outcome. The hormone plays vital role to cut back rates of caesarean birth once used for management of dystocia. Interventions with oxytocin particularly at high doses would lead to adverse effects on fetal heart rate and uterine tachysystole which occurs due to reduction in blood flow during contraction in intervillous spaces. The purpose of use of oxytocin is for physiological birth and for successful delivery practices. For augmentation of labour hormone regimens are low-dose (1-3 milli units/min) and high dose (4-7 milli units/min). Studies have shown high-dose of hormone causes hyperstimulation to womb. It's been mentioned that there's decrease in induction to delivery time at meta-analysis.

Augmentation of labour is that the method of accelerating the frequency of contractions to facilitate a labour. The principal methodology for achieving augmentation of labour varies in the use and approach. Oxytocin is widely used for each induction and augmentation of labour. Interventions with oxytocin particularly at high doses would lead to adverse effects on fetal heart rate and uterine

[≡] Professor and Head of Department;

[⊖] Junior Resident;

[#] Senior Resident;

*Corresponding author: E-mail: Priyanka.singh044@gmail.com;

tachysystole which occurs due to reduction in blood flow during contraction in intervillous spaces. The purpose of use of oxytocin is for physiological birth and for successful delivery practices. These results reinforce the need to reflect on a change in care during delivery. Thus, this will help health care professional for better understanding on use and its effect during labour which will help in proper decision making for augmentation of labour.

Keywords: Oxytocin; labour; dose; augmentation of labour; caesaren; high dose; low dose.

1. INTRODUCTION

Obstetricians play main role in providing and rising maternal and kid health (MCH) care facilities. The goal of MCH care is safe delivery with smart fetomaternal outcome. Although obstetrical delivery is finished ordinarily for safe fetomaternal outcome in high risk cases and abnormal labour, when compared to duct delivery [1,2]. It conjointly will increase monetary burden on health care system. Dystocia and failure to progress in labour is one of the adverse events to be taken care in obstetrics for fetomaternal outcome. The drug oxytocin is given to extend contractions and range of spontaneous births with high dose regimens leading to hyperstimulation of the uterus. The three P's for progress of labour are Passage (pelvis), Passenger (foetus) and Power (uterine contraction). The observance of progress of labour includes dilatation of cervix, rotation and descent of the vertebrate head relying upon the period and frequency of contractions. Oxytocin is the commonest worldwide induction agent used for augmentation of labour. It's accustomed cause regular co-ordinated contractions from the structure to cervix throughout induction of labour. Increase in infusion, titrated to the strength and frequency causes uterine contractions [3]. The aim of this review is to summarize the safety and effectiveness of oxytocin of each high dose and low dose used for the labour stimulation and augmentation at term.

2. METHODOLOGY

The literature reviewed during this narrative article is obtained from articles from numerous databases like PubMed, Scopus, Web of Science and numerous national and international medical specialty and medical specialty associations victimisation MeSH-compliant.

2.1 Physiological Effects of Oxytocin

Hormone Oxytocin was 1st utilized by trickle for labour induction back in 1948 by Theobald et al. Later, in 1953, it had been the primary peptide

synthesized by Du Vigneaud et al. The half-life of hormone is 2-3 minutes. It's been shown that it takes forty minutes to attain plasma concentration in a steady state. The sensitivity of hormone will increase with advanced fetal age. The dose is titrated and exaggerated each 20-30 min till regular contractions are achieved (3-4 each ten minutes). Although Oxytocin hormone for augmentation of labour and its use for induction of labour remains controversial. Oxytocin infusion will be withheld or stopped with decrease in fetal heart rate and left lateral propped up position is given to the women for good fetomaternal outcome. A Cochrane review of comparison the employment of hormone alone for induction of labour compared with other prostaglandins all over that the latter most likely will help increase the probabilities of delivery inside twenty four hours.

2.2 Dose Regimens of Oxytocin

The comparison of oxytocin with high-dose or low-dose regimen supports completely different parameters. These are quantity of beginning dose, rate of progressive dose and intervals of step-up. The high-dose regimens varied across the various trials; the range of beginning of the dose is four to ten milli-unit/minute (mU/min), with will increase in dose starting from four to 7 mU/min and most rates starting from four to 90 mU/min. The Low-dose programme commences infusion at a spread of 1-4 mU/min, with rate will increase starting from one to 2 mU/min and most rates move between 1 and 32 mU/min as mentioned in one systematic review. Intervals of step-up of hormone doses vary from 15 minutes to 60 minutes across the trials.

2.3 Efficacy and Safety of High Dose and Low Dose of Oxytocin for Augmentation of Labour

Oxytocin regimens for labour induction are typically high-dose (4-6 mU/min) or low-dose (1-1.5 mU/min). The study results discovered that

there have been exaggerated caesarean rate related to contraction abnormalities. An intermediate-dose of hormone was hand-picked that was ascertained to indicate lower caesarean rate compared with the high-dose regimen of oxytocin. Hence, within the study an intermediate-dose hormone programme was most well-liked to the high-dose programme for augmentation of labour [4]. Low-dose oxytocin is usually recommended to avoid events like tachysystole and foetal distress. The use of high-dose hormone had no role in management of delay in labour however but related to lower frequency of obstetrical delivery rates [5]. In a study with completely different regimens of high dose and low dose, there was no distinction in obstetrical delivery rate or instrumental delivery rates associated with infant outcomes. Therefore, either of the 2 regimens are acceptable to be used for induction of labour [6]. High-dose was conjointly related to a rise in spontaneous deliveries and a shortened labour. whereas the chance of hyperstimulation was exaggerated with high-dose hormone, there was no proof of a rise in adverse maternal or infant outcomes with this approach to worrisome on maternal-fetal outcome [7]. Women receiving early hormone had, on average, a shorter interval between randomisation and birth of 2 hrs shorter, 95% CI; 3 trials, 1083 women). 2 trials indicated no important distinction between the comparison teams within the range of woman undelivered twelve hours of randomisation (RR zero.32, 95% CI 0.07 to 1.43; 2 trials, 1042 women). However, trial (60 women) did not show a bearing between the hyperstimulation of uterus with foetal heart rated (RR vi.66, 95% CI 0.39 to 112.6. there have been no variations ascertained within mode of instrumental delivery (RR one.17, 95% CI 0.72 to 1.88; 5 trials, 1200 women) .2 trials have collected data on women's views of their experiences in giving birth indicated no variations in maternal -foetal outcomes satisfaction between the different dose regimens of oxytocin in labour augmentation.

2.4 Efficacy and Safety of High Dose and Low Dose of Oxytocin on Perinatal Outcome

The results of this study by Hidalgo-LopezosaEt al show that the employment of oxytocin is related to exaggerated obstetrical delivery rates which may be injurious to have an effect on each mother and fetus, However, it had no adverse effects on meconium stained liquor, advanced

infant revitalisation and 5-min apgar score of the baby. These results facilitate professional for deciding the results of the employment of hormone throughout labour, which may be helpful for decision-making in clinical apply [8]. The study by Zhang J et al. study the dose of 4 mu/min high-dose oxytocin is related to increase in the speed of obstetrical delivery and adversely affect on perinatal outcomes. High dose of oxytocin was related to decrease in chorioamnionitis, meconium stained liquor in the baby. The low dose of hormone ranging from one mU/min reduces 1st stage of labour [9].

2.5 Efficacy and Safety of High Dose and Low Dose of Oxytocin for Augmentation of Labour at Term: Systematic Review

We enclosed 9 irregular controlled trials involving 2391 pregnant woman during this review. The quality of the trials were of moderate overall. All trials compared giving a high dose versus a low dose of oxytocin for induction of labouring patients. The induction to delivery interval was considerably shorter with high-dose compared to low-dose oxytocin. The mode of delivery by caesarean section was comparatively on higher side when compared with other various doses of hormone for induction and augmentation of labour. No trials provided any data concerning the woman with hyperstimulation of uterus during labour with any worsen neonatal outcome. The trials were at moderate to high risk of bias overall giving different research and intervention with different regimens of oxytocin for augmentation of labour. The definition of high- and low-dose protocols and therefore the outcomes measured varied significantly across the trials.

3. RECOMMENDATIONS

- The use of a package of care ("active management of labour") for prevention of delay in labour.
- In intact membranes, Amniotomy ought to be performed wherever possible before beginning of infusion with oxytocin.
- The aim for a most of three – four contractions in 10 minutes during augmentation with oxytocin in labour.
- Prescribe and record the dose of hormone being delivered (i.e. minute).

- Continuous CTG monitoring is employed for induction or augmentation of labour with oxytocin.

4. CONCLUSION

The use of high dose of oxytocin is related to considerably shorter labour however might end in hyperstimulation of womb and foetal distress and low dose of oxytocin motivate contractions safely and will increase each frequency and force of contractions. Titration of oxytocin infusion and constant fetomaternal management and measures would facilitate to revert back fetal heart changes or contraction abnormalities. Augmentation of labour can facilitate to enhance success rate. Various trials and studies are required to be created for safety of patient whereas rising medical speciality outcomes to be used of normal protocols for constant. The evidences supported completely different regimens of oxytocin doses and quality of study is of bigger concern. But there's scant proof for different maternal and infant outcomes on low dose versus high doses regimens of oxytocin [10,11].

CONSENT

It's not applicable.

ETHICAL APPROVAL

It's not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Budden A, Chen LJ, Henry A. High-dose versus low-dose oxytocin infusion regimens for induction of labour at term. *Cochrane Pregnancy and Childbirth Group, editor. Cochrane Database Syst Rev [Internet]; 2014.* [cited 2020 Dec 12]. Available: <http://doi.wiley.com/10.1002/14651858.CD009701.pub2>
2. Kernberg A, Caughey AB. Augmentation of labour: A review of oxytocin augmentation and active management of labour. *Obstet Gynecol Clin North Am.* 2017;44(4):593–600.
3. Endocrinology of parturition [Internet]; 2020. [Cited 2020 Dec 14]. Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3659907/>
4. Kenyon S, Tokumasu H, Dowswell T, Pledge D, Mori R. High-dose versus low-dose oxytocin for augmentation of delayed labour. *Cochrane Pregnancy and Childbirth Group, editor. Cochrane Database Syst Rev [Internet]. 2013.* [Cited 2020 Dec 7]. Available: <http://doi.wiley.com/10.1002/14651858.CD007201.pub3>
5. Hidalgo-Lopezosa P, Hidalgo-Maestre M, Rodríguez-Borrego MA. Labour stimulation with oxytocin: effects on obstetrical and neonatal outcomes. *Rev Lat Am Enfermagem [Internet]; 2016;24.* [cited 2021 May 31] Available: <https://www.scielo.br/j/rlae/a/RVcQ6KDg65jfXSnmyfctRq/?lang=en>
6. Zhang J, Branch DW, Ramirez MM, Laughon SK, Reddy U, Hoffman M, et al. Oxytocin regimen for labour augmentation, labour progression, perinatal outcomes. *Obstet Gynecol.* 2011;118(201):249–56.
7. Manjula BG, Bagga R, Kalra J, Dutta S. Labour induction with an intermediate-dose oxytocin regimen has advantages over a high-dose regimen. *J Obstet Gynaecol.* 2015;35(4):362–7.
8. Selin L, Wennerholm U-B, Jonsson M, Dencker A, Wallin G, Wiberg-Itzel E, et al. High-dose versus low-dose of oxytocin for labour augmentation: A randomised controlled trial. *Women Birth J Aust Coll Midwives.* 2019;32(4):356–63.
9. Prichard N, Lindquist A, Hiscock R, Ruff S, Tong S, Brownfoot FC. High-dose compared with low-dose oxytocin for induction of labour of nulliparous women at term. *J Matern Fetal Neonatal Med.* 2019;32(3):362–8.
10. Liu J, Yi Y, Weiwei X. Effects of increased frequency, high dose and pulsatile oxytocin regimens on abnormal labour delivery. *Med Sci Monit Int Med J Exp Clin Res.* 2018;24:2063–71.
11. Mori R, Tokumasu H, Pledge D, Kenyon S. High dose versus low dose oxytocin for

augmentation of delayed labour. In: The Cochrane Collaboration, editor. Cochrane Database of Systematic Reviews [Internet]. Chichester, UK: John Wiley &

Sons, Ltd; 2011 [cited 2020 Dec 12]. p. CD007201.pub2.

Available:<http://doi.wiley.com/10.1002/14651858.CD007201.pub2>

© 2021 Acharya et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:

<https://www.sdiarticle5.com/review-history/77745>