

Complications of Oxytocin in Induction of Labour

Prof. Sathiya Latha Sarathi, Prof. S. Semmalar,

Vice Principal & HOD of Obstetrics and Gynaecological Nursing Dept, ,

Medical and Surgical Nursing Dept, Sree Balaji College of Nursing, Chrompet, Chennai, India

Abstract: Oxytocin is the drug more commonly used for mother during first stage of labour for the purpose of induction and progression of labour process. At the same time, misuse of oxytocin administrations results in serious adverse effects to mother and baby. Hence to have the guidelines for safe delivery, protocol for oxytocin induction was developed.

Key words: Oxytocin, Medical induction, Maternal and fetal ill effects, Protocol for oxytocin induction.

I. Introduction

Childbirth is a most pleasurable event to the mother at the same time it is also a life-threatening event to her. Hence, ensuring safe childbirth is the responsibility of a maternity nurse by promoting and preserving the health of the mother and fetus from conception to childbirth. To ensure safe delivery, various measures have been used when needed to induce labour. They are two kind of induction-medical induction and surgical induction.

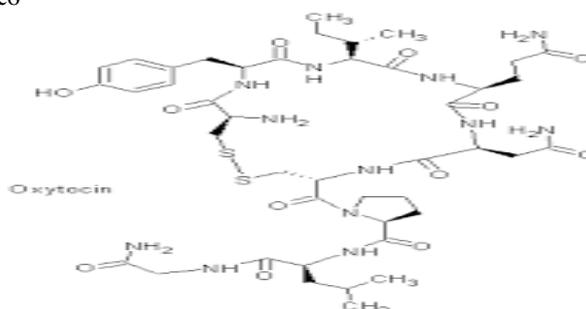
Medical Induction

Oxytocin is the drug administered intravenously which is more commonly used for the mother during the first stage of labour for the purpose of induction and progression of labour process. Another induction method is a cervical application of Cytotec Gel. It is used to soften the cervix in the preparation of induction.

Dunn (1990), stated "Intravenous administration of oxytocin helps in an effective method of initiating uterine contractions to induce labour. Its effect on uterine contraction depends upon the dosage used".

Chemistry Of Oxytocin

Oxytocin is a short neuropeptide consisting of 9 amino acids residue with disulphide bond between two cysteine residue in position 1&6



It is secreted by posterior pituitary along with ADH. Pituitary extract was first used in labour in 1909. Vigneaud in 1963 separated oxytocin and ADH. Both are synthesized in supra optic and Para ventricular nuclei of hypothalamus and stored in nerve in neurohypophysis endings. It circulates in an unbound form cleared from maternal circulation by kidney and liver. Oxytocin was the first polypeptide hormone synthesized and in 1995 Nobel Prize in Chemistry was awarded for this to Vigneaud and co workers.

Action Of Oxytocin During Labour

Oxytocin is a hormone naturally released from the posterior pituitary gland. Synthetic preparations of oxytocin are also available under the trade name as syntocin or pitocin. Oxytocin drugs, act on the oxytocin receptor sites in the myometrial cells of the uterus and the uterine blood vessels and causes excitability of the myometrial cells, increasing the strength of the muscle contraction and supporting propagation of the contraction (movement of the contraction from one myometrial cell to the next) which helps in improving the labour progress.

Physiology Of Labour

When a woman goes into natural labour, her baby initiates labour. Thus when the baby is "ready", contractions start and they will stronger and longer as time goes on. If the baby is finding it difficult, labour

will slow or even stop as in posterior presentations. Baby is using the contractions to turn and get in a good position. During each contraction, the long muscle bands running vertically pull the cervix up as the strong mass of muscles at the top of the uterus push down. The horizontal muscle tightens but just a bit to make sure baby is aligned properly and help the baby to move down. As labour progresses, the mass of the muscle of the fundus gets thicker because it is pulling up the cervix and away from the birth canal while the baby is moving lower. The baby moves faster to two or three stations (from above the level of Ischial spine, -2 station, -1 station; when the presenting part is at the level of Ischial spine, 0 station; when the presenting part below the level of Ischial spine; +1 station and +2 station) quickly after the cervix is dilated.

Complications Of Oxytocin

William (1993), explained oxytocin is potentially dangerous to the woman and fetus. When the contractions increase in frequency, strength and length above normal levels the fetal and placental circulation may be impaired and fetal distress may result. Birth injuries may result from being propelled too rapidly through the birth canal. Tetanic contraction can result in abruptio placenta and rupture of the uterus, adversely affecting the woman and the fetus. Cervical lacerations occur due to rapid passage of the fetus through the cervix and amniotic fluid embolism is additional dangers for the woman. These dangers can be minimized by carefully monitoring the drug administration, the character of contractions and the condition of the fetus. Overdose of oxytocin, injudicious administration of the drug, poor maternal and fetal assessment results in serious maternal and fetal complications.

Maternal and Fetal Ill Effects

Administration of oxytocin to the mother during the first stage of labour need not be a routine procedure but recent trends indicate that oxytocin drugs are used to expedite the labour progress. At the same time health care professionals should bear in mind the serious adverse reaction of oxytocin drugs if they are misused. Brown, W.R.(1984), describes the serious maternal and fetal ill effects of oxytocin.

Maternal ill effects:

- Hyper stimulation of the uterus results in Hypercontractability, which in turn may cause the following:
 - Abruptio Placenta
 - Rapid labor and birth causing lacerations of cervix, Vagina, perineum, uterine atony, fetal trauma.
 - Uterine rupture
 - Water intoxication manifested by nausea, Vomiting, Hypertension, tachycardia, cardiac arrhythmia and when injection oxytocin is given in electrolyte free solution.

A Research study about "uterine rupture" conducted by the department of obstetrics and gynecology, Madras Medical College concluded that misuse of oxytocin drugs is the major cause of uterine rupture".

Fetal ill effects:

- Hyper contractility of a maternal uterus causes fetal hypoxia that results in fetal distress.
- Hyperbilirubinemia. (Aris 1993)
- Trauma from rapid birth.

Reported Cases Of Maternal And Fetal Complications

Case-I

In this case study, maternal complications were reported by manufacturers of oxytocin drugs. Woman of Para 2, 38 years and 39th weeks of pregnancy with diagnosis of uterine inertia was administered oxytocin 2.0 unit IV at 10.00 AM and the infusion rate was increased to 20 mu/minute which resulted in uterine rupture. Laparotomy revealed massive hemorrhage in the abdominal cavity and lacerations in posterior uterine wall.

Case-II

A comparative study of oxytocin induction/ PGE₂ instillation foley catheter insertion on induction and outcome of labour was conducted in Madras Medical College & Hospital. In this case study included that 25 year old Multigravida woman (G₃P₁L₁A₁) post-dated by 11 days was administered oxytocin drip on 31/10/96 at 12.15 PM. Labour pain started with second pint of oxytocin drip at 7:00 PM. At 11.36 PM, the patient complained of a sudden agonizing pain followed by cessation of uterine contractions. Following that her pulse was 100/min., BP was 100/70 mm Hg and there was severe tenderness over the lower abdomen and loss of uterine contour with absence of fetal heart rate with moderate vaginal bleeding. Laparotomy was done. Evidence of rupture uterus was found, there was a dead male fetus weighing about 3.3 kg, lying in the peritoneal cavity. Subtotal hysterectomy was done.

Case-III

When the author was working as clinical instructor for midwifery students, she had the opportunity to witness the case of fetal death due to administration of the oxytocin drugs. 26 year old, primigravida woman with prolonged second stage of labour was administered 5U of oxytocin in 1 pint of ringer lactate solution at 12.45 PM. The infusion rate was increased to maximum and the entire oxytocin drip was emptied by 2.00 PM. As a result, the mother delivered a baby with no APGAR score and the baby was dead.

The above reports emphasize the judicious administrations of oxytocin drugs and its adverse effects. A careful monitoring is warranted for the promotion of safe delivery. The reasons for improper oxytocin administration according to the author may be due to:

- No availability of protocols for oxytocin induction in the hospitals
- Shortage of nurses in the maternity units
- Availability of more technical nurses in comparison to professional nurses in maternity units.
- Lack of knowledge about the administration of oxytocin drugs, its monitoring and serious adverse reactions.
- Inadequate provision for in-service education for the technically qualified nurses.

Brodsky and Pelzer (1991), emphasized “a written protocol for the management of oxytocin induction based on current standards of practice should be established in every birth settings and accurate, regular documentation should be made in the woman’s chart and should be made available for nursing personnel.

Oxytocin induction protocol can also be useful

- ❖ To secure the maternal and fetal well-being
- ❖ To prevent maternal and fetal complications
- ❖ To ensure safe delivery
- ❖ To safeguard the nursing personnel

Hence, the author developed a protocol for nurses on oxytocin induction to mothers during the first stage of labour which is essential for the satisfactory and safe childbirth.

Protocol For Oxytocin Induction

Protocol for Maternity Nurses on oxytocin induction to mothers during first stage to labour in maternity ward

I.Pre-Preparation for Oxytocin Induction

- ❖ Obtain obstetrician order before starting oxytocin induction
- ❖ Ensure following preliminary assessment to start oxytocin induction
- Indications for induction
- Contraindications for induction
- Assess Bishop’s score as follows

S.No	Inducibility features	Score 0	Score 1	Score 2	Score 3	Total
1	Cervical dilation	Os closed	1-2	3-4	5 or more	0-3
2	Cervical effacement (or)cervical canal length(cm).	>2-0 30%	1-2 40-50%	0.5-1 60-70%	<0.5 80% or more	0-3
3	Consistency of cervix	Firm	Medium	Soft	-	0-2
4	Position of cervix	Posterior	Middle	Anterior	-	0-2
5	Station of fetal Head	-3	-2	-1,0	+1,+2	0-3
Minimum Score required for oxytocin induction : 6						
Over all total score =0-13						

- ❖ Obtain informed consent from patient’s partner/relatives
- ❖ Explain techniques and rationale for administering the oxytocin to the woman and her relatives.

Technique: Route-Intravenous
Rate-Initial drop rate 3-4 drops/minute

Rationale: Initiate labour
Improve labour

- ❖ Prepare the oxytocin solution as per order
- a) Add 5U of oxytocin to 500ml of ringer lactate or normal saline solution.(primigravida)
OR
- b) Add 2.5 U of oxytocin to 500ml of ringer lactate or normal saline solutions.
- ❖ Check BP, pulse, temperature, contraction pattern, fetal heart rate (FHR) and fetal activity before oxytocin induction.
- ❖ Position the mother in left lateral

- ❖ Keep the mother nil per oral.

II. Administration of oxytocin

- ❖ Solution with oxytocin is flagged with a label containing (date, time and dose)
- ❖ Start the IV line & prepared solution is connected with IV line.
- ❖ Begin induction at 3-4 drops/minute or as per order
- ❖ Increase dose 5 drops/min, at every 30 minutes interval or as per order.
- ❖ Maintain the same dose when
 - Duration of contraction is 40 to 45 seconds
 - Frequency of contraction is 2 to 3 minutes interval
- ❖ Monitor partograph

III. Emergency measures

- ❖ Discontinue the drug on reportable conditions like uterine hyper stimulation, maternal exhaustion, tachycardia, hypo tension, non-reassuring fetal heart rate (FHR) pattern, meconium stained liquor etc.
- ❖ Turn the mother on left side
- ❖ Administer oxygen at 2 to 3 lit/minute by facemask
- ❖ Inform the obstetrician

IV. Documentation

- ❖ Document in the nurse's record about dose, amount, time of beginning, increasing dose, maintaining dose and also reason for discontinuing the oxytocin if necessary.
- ❖ Document about reactions of mother and fetus which includes.
 - Maternal vital signs such as temperature, pulse, respiration, blood pressure and contraction pattern.
 - Fetal heart rate (FHR)
 - Progress of labour
 - Nursing interventions.

II. Conclusion

Maternity nurse must bear in mind about the serious maternal and fetal complications of oxytocin drug during labour. They should also know the relationship between physiology of normal labour and pharmacokinetics of the oxytocin during labour process. Judicious administration of oxytocin and careful monitoring of the women in labour are the important responsibility of the nursing care professionals.

References

- [1]. Banack Connie. **Artificial oxytocin induction.** Journal of Maternal and neonatal health. 170 : 1999,pp240-244
- [2]. Brodsky, Pelzer. **Rational for the revision of oxytocin administration protocol** Journal of obstetrics, Gynaecology and Neonatal nursing, 20(6): November 1991,pp 440-444.
- [3]. Cardoza Pearce. **oxytocin Administration.** Asia Journal of obstetrics and Gyneacology .17(1): 1990, pp15-24.
- [4]. Cunningham A. **Perinatal damage in childbirth.** Nursing Mirror.158(1):1984 .pp9-12
- [5]. Davis . **Protocol for nurses on oxytocin induction** Journal of nurse midwifery. 38(9):1992pp 322-328
- [6]. Driscoll O, etal. **Intravenous oxytocin .** Journal of Maternal and fetal investigation.4(4): 1990,pp17-21
- [7]. Dunn . **Intravenous oxytocin Administration.** Journal current Obstetrics and Gyneacology.72(6): 1990,pp165-175
- [8]. Jackson D. **Induction of labour.** Journal of nurse midwifery ,39(4): July 1998, pp 191-213
- [9]. John Wilson .**Child birth complications** ,Journal of nurse midwifery .31: July 1998,pp 240-244
- [10]. Kohel L. **Oxytocin Pharmacodynamics.** Journal of Endocrinology. 38(2):March 1993,pp 425-435
- [11]. Levino K. **Induction and Augmentation of labour.** American journal of Obstetrics and Gyneacology.157:1991,pp1-3
- [12]. Reader J Sharon ,et al. Maternity Nursing –Family New born and Women's Health care .18TH EDITION ,Philadelphia : Lippincott Raven publishers,1997
- [13]. Ruth Bevis. Caring for Women –Obstetrics Gynaecology Nursing.4th Edition, England: Bailliere Tindal Publications,1991
- [14]. Seitchick J ., **Oxytocin Augmentation.** American journal of Obstetrics and Gyneacology.144: 1993,pp899-9059.
- [15]. Shenon,et al. Maternity Nursing .3rd edition, Philadelphia : Mosby company,1991.
- [16]. Williams's et al. Textbook of Obstetrics .20th edition .Philadelphia: Mosby publications, 1997.
- [17]. Zizel E.Erna. Obstetrics Nursing. 8th edition. New York: Mac Million company,1994