



COMPARITIVE EFFICACY OF DROTAVERINE HYDROCHLORIDE VS VALETHAMATE BROMIDE ON CERVICAL DILATATION IN ACTIVE LABOUR

Obstetrics & Gynaecology

Dr. Kurapati Sarmista

Postgraduate, Department of Obstetrics and Gynaecology, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, West Godavari District, Andhra Pradesh 534005, India

Dr. K. Vandana

Professor, Department of Obstetrics and Gynaecology, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, West Godavari District, Andhra Pradesh 534005, India

ABSTRACT

Background: Labour involves painful uterine contractions and cervical changes leading to delivery. Prolonged labour increases maternal and fetal risks. Antispasmodics like Drotaverine and Valethamate have been used to accelerate labour by promoting cervical dilation. **Objective:** To compare the effectiveness and side effects of Drotaverine hydrochloride and Valethamate bromide in shortening the active phase of labour. **Methods:** A prospective study of 400 women in active labour was conducted at Alluri Sitarama Raju Academy of Medical Sciences, Eluru (June 2022–2024). Patients were randomly assigned to receive either Drotaverine or Valethamate intramuscularly. **Results:** Active phase duration: Drotaverine group – 178.31 min, Valethamate group – 346.31 min. Injection to end of first stage: Drotaverine – 168.89 min, Valethamate – 228.12 min. Injection to delivery: Drotaverine – 192.56 min, Valethamate – 249.13 min. No serious adverse effects noted; minor side effects were more frequent with Valethamate (All results $p < 0.0001$). **Conclusion:** Drotaverine significantly reduces the duration of the active phase of labour and is better tolerated, with fewer side effects compared to Valethamate bromide.

KEYWORDS

INTRODUCTION

Labour is a complex, multifactorial process involving myometrial contractions, cervical ripening and dilatation, and the eventual expulsion of the fetus and placenta. The process relies on the polarity of the uterus, maintained by the active contractions of the upper uterine segment. These contractions exert force on the cervix, leading to its gradual dilatation. A prolonged first stage of labour is most commonly attributed to cervical spasm or dystocia, which can result from inflammation, injury, or fibrosis of the cervix. Various agents such as spasmolytics, tranquilizers, and prostaglandins have been used to address this issue, but many are associated with adverse effects on both the mother and fetus.

Drotaverine Hydrochloride is a relatively new cervical dilator and a phosphodiesterase-4 enzyme inhibitor. Drotaverine, a benzyl isoquinoline derivative, works by increasing intracellular cyclic adenosine monophosphate (cAMP) levels, resulting in smooth muscle relaxation. While it does not inhibit uterine contractions, it effectively relaxes the smooth muscles of the lower uterine segment and cervix, facilitating labour without affecting active contractions. It is considered safe for both mother and fetus and has no known drug interactions.

Valethamate Bromide (Epidosin) is a quaternary ammonium compound used to aid cervical dilatation. It exhibits anticholinergic, antispasmodic, musculotropic, and neurotropic properties, with a mechanism of action similar to atropine. Although it acts quickly and is effective, its use is often limited by side effects such as dry mouth, facial flushing, nausea, vomiting, nervousness, dizziness, and hypotension—primarily due to its action on vascular smooth muscle.

MATERIALS AND METHODS

This prospective study was conducted in the Department of Obstetrics and Gynaecology, Alluri Sitaramaraju Academy of Medical Sciences, Eluru from June 2022 – June 2024 after obtaining approval from the institutional ethical committee and informed consent from the study subjects.

Inclusion Criteria

- Term pregnancy in active labour with an initial cervical dilatation of 3-4 cm and cervical effacement of 75%.
- Vertex presentation
- Effective uterine contraction
- No cephalopelvic Disproportion
- No high risk factors.

Exclusion Criteria

- Medical disorders Complicating pregnancy
- Absolute indication of Cesarean section
- Malpresentation
- Women with previous Cesarean section
- Hypersensitivity to Drotaverine Or Valethamate.

The study comprised two groups of patients in established labour, who were randomly assigned using computer-generated numbers to receive either Drotaverine (Group I) or Valethamate Bromide (Group II). All participants had cervical dilation of 3 to 4 cm and regular uterine contractions at the time of enrolment. Group I (n=100): Received 40 mg of intramuscular (IM) Drotaverine in the supine position. The injection was repeated after 2 hours if cervical dilation remained less than 7 cm, with a maximum of three doses. Group II (n=100): Received 8 mg of IM Valethamate Bromide at hourly intervals, up to a maximum of three doses. Maternal and fetal conditions were monitored continuously, with any abnormalities managed accordingly. Uterine activity—including the frequency and duration of contractions—was assessed every 30 minutes. Per vaginal examinations were performed at the onset of labour, at the time of drug administration, and hourly thereafter. Additional examinations were conducted if further doses were required.

The relationship between drug administration and uterine contractions was carefully observed and documented. All stages of labour were recorded graphically on a Partograph. If labour did not conclude spontaneously within 12 hours, it was considered a failure of labour acceleration, and alternate methods of delivery were considered. Outcome variables included: Injection-to-delivery interval, Total number of drug doses required, Route of delivery, Incidence of operative interventions, Duration of the first, second, and third stages of labour, Amount of blood loss, Third-stage complications (e.g., cervical tear, retained placenta, postpartum hemorrhage) Fetal outcomes such as live or stillbirth, birth weight, and Apgar scores at 1 and 5 minutes were also recorded. Both mother and newborn were followed up for at least 48 hours post-delivery to monitor any delayed complications.

RESULTS :

Table 1: Duration of Labor Stages

	DROTAVERINE	VALETHAMATE
1ST STAGE	184.82 min	214.99 min
2ND STAGE	35.62 min	35.7 min
3RD STAGE	7.27 min	7.82 min

Table 2 : No. Of Injections In Different Groups

NO. OF INJECTIONS	DROTAVERINE HYDROCHLORIDE		VALETHAMATE BROMIDE	
	n	%	n	%
1	100	50	20	10
2	67	33.3	54	26.7
3	33	16.7	126	79.2

Table 3 : Injection To Delivery Interval In Minutes

	DROTAVERINE HYDROCHLORIDE	VALETHAMATE BROMIDE
--	---------------------------	---------------------

PRIMIGRAVIDA	192.2	225.5
MULTIGRAVIDA	97.7	128.2

Table 4: Rate Of Cervical Dilatation Cm/Hr:

	DROTAVERINE HYDROCHLORIDE	VALETHAMATE BROMIDE
PRIMIGRAVIDA	2.2	1.47
MULTIGRAVIDA	2.31	1.55

DISCUSSION

Labour is characterized by uterine contractions that lead to cervical effacement and dilation, culminating in childbirth. Difficult labour, or dystocia, may arise due to prolonged or arrested phases, often caused by cervical spasm or abnormalities such as hypertrophic stiffness or atresia. Successful vaginal delivery depends on complete cervical dilation.

To manage cervical dystocia, spasmolytic agents like drotaverine and valethamate bromide (epidosin) are commonly used. Drotaverine, a musculotropic antispasmodic, promotes cervical dilation by inhibiting phosphodiesterase and relaxing smooth muscle without suppressing uterine contractions, resulting in shorter labour duration and minimal side effects. Valethamate bromide, with anticholinergic and parasympatholytic properties, also facilitates cervical relaxation, offering rapid onset with limited adverse effects.

The study grouped participants by age: 18–20, 21–24, 25–28, and 29–32 years. Most participants in both the Drotaverine and Valethamate groups were aged 21–24 years (37.5% and 42%, respectively), with fewer participants in the older age groups. A statistically significant difference in age distribution was observed (Chi-Square = 27.88, $P = 0.001$). Other studies reported similar trends, with mean participant ages around 22–23 years and no major differences between groups.

Obstetric history was also analyzed. In the Drotaverine group, 71.0% were primigravida and 29.0% multigravida; in the Valethamate group, 70.5% were primigravida and 29.5% multigravida. Overall, 78.2% of participants were primigravida, while 21.8% were multigravida. The Chi-Square test (value: 38.69, $P = 0.001$) indicated significant differences in obstetric status among groups, suggesting uneven group matching that may influence interpretation of study outcomes.

First Stage of Labor:

Drotaverine Group: 184.82 minutes

Valethamate Group: 214.99 minutes

Second Stage of Labor:

Drotaverine Group: 35.62 minutes

Valethamate Group: 35.74 minutes

Third Stage of Labor:

Drotaverine Group: 7.15 minutes

Valethamate Group: 7.27 minutes

The ANOVA test showed statistically significant differences across all stages ($P = 0.001$), with the Drotaverine Group demonstrating the shortest durations, thereby enhancing labor outcomes.

Supporting Evidence from Other Studies:

Sunita et al., Sinhasane H et al., and Palii SB et al. found significantly shorter durations in the Drotaverine Group, particularly in the active phase of labor. For instance, Sinhasane H et al. observed a duration of 3 hours 50 minutes for Drotaverine vs. 6 hours 15 minutes in the Control Group (for primigravidae).

Sharma et al. concluded that Drotaverine accelerated labor more rapidly than Valethamate Bromide, with fewer side effects. Prathyusha IN et al. found Drotaverine reduced the active phase of the first stage by over an hour compared to other drugs. Selvaraj SM and Jogi SR reported similar trends, with the active phase and second stage of labor being significantly shorter in the Drotaverine Group.

These findings consistently highlight Drotaverine's effectiveness in reducing labor duration across multiple studies. The study evaluated postpartum complications, primarily postpartum hemorrhage (PPH) and vaginal lacerations, across two groups: Drotaverine, and Valethamate.

Key Findings:

- Drotaverine Group: 2% had PPH, 1.5% had lacerations, and 96.5% reported no complications.

- Valethamate Group: 2% had PPH, 1.5% had lacerations, and 96.5% had no complications.
- Overall, 1.7% reported PPH, 1.5% had lacerations, and 96.8% had no complications.

Statistical Analysis

A Chi-Square test ($P = 0.93$) revealed no significant difference in complication rates among the groups, indicating that the drugs do not significantly impact postpartum complications.

Comparison with Other Studies:

Multiple studies (Sunita et al., Palii SB et al., Selvaraj SM et al., and Jogi SR et al.) corroborate the low occurrence of PPH and lacerations with minimal complications in treatment groups.

Exceptions include Sinhasane H et al., noting an increased cervical tear rate in the Valethamate Group, and Prathyusha IN et al., with two unilateral tears in the Drotaverine Group. Overall, the findings suggest that these drugs are safe with comparable rates of postpartum complications.

Drotaverine Group:

Headache: 0.5% (1 participant)

Maternal tachycardia: 2.0% (4 participants)

Nausea: 1.0% (2 participants)

Vomiting: 2.5% (5 participants)

94% had no adverse effects.

Valethamate Group:

Headache: 0.5% (1 participant)

Maternal tachycardia: 2.0% (4 participants)

Nausea: 0.5% (1 participant)

Photophobia: 0.5% (1 participant)

Vomiting: 1.5% (3 participants)

95% had no adverse effects.

Overall, 96.3% reported no adverse effects across all groups. A Chi-Square test ($P = 0.16$) found no statistically significant difference among the groups.

Comparison with Other Studies:

Studies (Sunita et al., Palii SB et al.) showed the Valethamate Group experienced more adverse effects, such as vomiting, tachycardia, and dryness of mouth, aligning with findings here. Sinhasane H et al. noted higher adverse effects in the Valethamate Group (e.g., transient fetal tachycardia).

Drotaverine was consistently associated with fewer adverse effects across studies. Prathyusha IN et al. observed no adverse neonatal outcomes, and maternal safety was favorable. Selvaraj SM et al. and Jogi SR et al. reported higher side effects in the Valethamate Group (56%) compared to the Drotaverine Group (12%).

In conclusion, both Drotaverine and Valethamate showed some adverse effects, with Drotaverine generally being better tolerated. The study analyzed birth weights across two groups (Drotaverine, Valethamate), categorized into four ranges (<2.5 kg, 2.5–3.0 kg, 3.1–3.5 kg, 3.6–4.0 kg).

<2.5 kg (Low Birth Weight):

Drotaverine Group: 26.0% (52 newborns)

Valethamate Group: 16.5% (33 newborns)

2.5–3.0 kg (Most Common Range):

Drotaverine Group: 53.5% (107 newborns)

Valethamate Group: 59.5% (119 newborns)

3.1–3.5 kg:

Drotaverine Group: 19.0% (38 newborns)

Valethamate Group: 21.0% (42 newborns)

3.6–4.0 kg (Least Common Range):

Drotaverine Group: 1.5% (3 newborns)

Valethamate Group: 3.0% (6 newborns)

Overall Distribution Across All Groups:

<2.5 kg: 16.8% (101 newborns)

2.5–3.0 kg: 61.2% (367 newborns)

3.1-3.5 kg: 19.2% (115 newborns)
3.6-4.0 kg: 2.8% (17 newborns)

Statistical Analysis

A Chi-Square test ($P = 0.001$) revealed statistically significant differences in birth weight distributions among groups. The Drotoverine Group had a notably higher proportion of low birth weight newborns. This indicates that the birth weights of newborns differ significantly between the three groups, with Drotoverine potentially associated with more cases of low birth weight.

CONCLUSION

In conclusion, the study demonstrates that Drotaverine Hydrochloride significantly reduces the duration of all stages of labor without increasing the risk of adverse maternal or neonatal outcomes, making it a highly effective and safe option for managing active labor. While Valethamate Bromide also proved to be a safe alternative. Both drugs were well-tolerated, with low incidences of complications and adverse effects, and comparable neonatal outcomes across all groups. Therefore, Drotaverine Hydrochloride emerges as the preferred choice for enhancing labor efficiency and outcomes.

Conflict of Interest: None.

Disclaimer: Nil.

REFERENCES

1. Prakash P, Rohtagi R. A Comparison of efficacy and side effects of drotaverine hydrochloride and valethamate bromide in augmentation of labour. *Int. J. Heal. Clin. Res.* 2021;4(22):146-7.
2. Lowe NK. The nature of labor pain. *Am J Obstet Gynecol.* 2002;186(5):S16-S24.
3. Bryant WM, Greenwell JE, Weeks PM. Alterations in collagen organization during dilatation of the cervix uteri. *Surg Gynecol Obstet.* 1968;126(1):27-39.
4. Rao KB. Prolonged and obstructed labour. In: Arulkumaran S, Penna LK, Rao KB editors. *The management of labour.* 2nd edition, India: Orient Longman Private Ltd; 2005: 340-9.
5. Labour WP. A Practical Guide: The Partograph Part I, Principles and Strategy WHO. World Health Organisation. Division of Family Health. Maternal Health and Safe Motherhood Programme. *Safe Motherhood Practical Guide: WHO/FHE/MSM/93.8.* 1994.
6. O'Driscoll K, Foley M, MacDonald D. Active management of labor as an alternative to cesarean section for dystocia. *Obstet Gynecol.* 1984;63(4):485-490.
7. Jayashree S, Ajjammanavar V, Sujatha MS. Comparison of drotaverine and valethamate bromide in first stage of labor. *Int J Biol Med Res.* 2013;4(2):3215-8.
8. Tile R, Jamkhandi S. To study the efficacy and safety of Drotaverine hydrochloride in augmentation of labour. *Obg Rev: J Obstet Gynecol.* 2019;5(1):77-82.
9. Ahmad S, Rauf B, Shafiq A. Use of Spasfan in labour. *J Himont Med.* 2002;1:14-8.
10. Gitanjali B. Valethamate bromide: Is there any proof of efficacy and safety for its use in labor? *J Pharmacol Pharmacother.* 2010;1(1):2-3.
11. Chin JR, Henry E, Holmgren CM, et al. Maternal obesity and contraction strength in the first stage of labor. *Am J Obstet Gynecol* 2012;207:129.e1-6.
12. Buhimschi CS, Buhimschi IA, Malinow AM, Weiner CP. Intrauterine pressure during the second stage of labor in obese women. *Obstet Gynecol* 2004;103:225-30.
13. Jacobson JD, Gregerson GN, Dale PS, Valenzuela GJ. Real-time microcomputer-based analysis of spontaneous and augmented labor. *Obstet Gynecol* 1990;76:755-8.
14. Steer PJ, Carter MC, Beard RW. The effect of oxytocin infusion on uterine activity levels in slow labour. *Br J Obstet Gynaecol* 1985;92: 1120-6.
15. Friedman EA, Cohen WR. The active phase of labor. *American Journal of Obstetrics & Gynecology.* 2023; S1037-1049