http://dx.doi.org/10.18623/rvd.v23.5760

ROLE OF ORAL PROGESTERONE FOR MAINTENANCE TOCOLYSIS AFTER INITIAL MANAGEMENT OF PRETERM LABOUR

PAPEL DA PROGESTERONA ORAL NA TOCOLÍSE DE MANUTENÇÃO APÓS O TRATAMENTO INICIAL DO PARTO PREMATURO

Article received on: 02/10/2026
Article accepted on: 03/20/2026

Zarnab Zahra*
*Sughra Shafi Medical Complex, Narowal, Pakistan
zarnabzahra@yahoo.com

Tasneem Hayat*
*Sughra Shafi Medical Complex, Narowal, Pakistan
tasneemhayyat@hotmail.com

Anum Hayat*
*Sughra Shafi Medical Complex, Narowal, Pakistan
anum.hayat@icloud.com

Dr Bushra Habib**
**Ibn Al Nafees Medical Center, Abu Dhabi, UAE.
dr.bh2006@gmail.com

Zahra Ali***
***Sir Ganga Ram Hospital, Lahore, Pakistan
zahraali455965@gmail.com

The authors declare that there is no conflict of interest

Abstract
Background: Premature labor that is characterized as a labor beginning before 37 weeks of gestation period is one of the major causes of morbidity and mortality among newborns in every part of the world. Tocolysis during maintenance after successful arrest of preterm labor is meant to extend pregnancy and to have more positive neonatal outcomes. Progesterone has been explored as a possible agent to use in maintenance therapy, but its effectiveness has proved inconsistent among different populations. Objective: To define the outcome of maintenance with oral progesterone tocolysis following initial management of the preterm labor. Methodology: The study was a descriptive longitudinal study done in the Department of Obstetrics and Gynecology at Sughra Shafi Medical Complex, Narowal from October 2025 to February 2026. Non-probability consecutive sampling was used to enroll 150 pregnant women aged 1840 years whose gestational age was above 32 weeks of pregnancy and had preterm labor. Following first line tocolytic care as per the conventional standards,

Resumo
Antecedentes: O trabalho de parto prematuro, caracterizado pelo início antes da 37ª semana de gestação, é uma das principais causas de morbidade e mortalidade entre recém-nascidos em todo o mundo. A tocolise durante a fase de manutenção, após a interrupção bem-sucedida do trabalho de parto prematuro, tem como objetivo prolongar a gravidez e obter resultados neonatais mais favoráveis. A progesterona tem sido explorada como um possível agente para uso na terapia de manutenção, mas sua eficácia tem se mostrado inconsistente entre diferentes populações. Objetivo: Definir o resultado da manutenção com tocolise por progesterona oral após o manejo inicial do trabalho de parto prematuro. Metodologia: O estudo foi um estudo descritivo longitudinal realizado no Departamento de Obstetrícia e Ginecologia do Complexo Médico Sughra Shafi, em Narowal, de outubro de 2025 a fevereiro de 2026. Foi utilizada amostragem consecutiva não probabilística para recrutar 150 mulheres grávidas com idades entre 18 e 40 anos, cuja idade gestacional era superior a 32 semanas de

patients administered 400 mg oral progesterone one time a day at nighttime to maintain tocolysis. Fetal corticosteroids (6 doses of 12 mg dexamethasone, administered intramuscularly every 12 hours) were also administered. Follow up of patients was to deliver. Outcomes were term delivery (37 weeks or more) and gestational age prolongation (days between therapy initiation and delivery). Data analysis was conducted using SPSS version 25. Results: Of 150 women who were enrolled in the study, mean maternal age was 28.4 years, standard deviation of 4.8 and mean gestational age at presentation 33.8±1.4 years. There was term delivery in 92 (61.3%) patients. The average extension of pregnancy term was 41.7±12.5 days. Delivery through vaginal birth was done in 98 (65.3%) patients and 52 (34.7%) patients had cesarean delivery. Conclusion: Oral progesterone seems to be a viable alternative during maintenance tocolysis following initial care of the preterm labor which greatly extends the pregnancy period and improves chances of a full-term birth. The resource-limited settings may benefit by using it to minimize complications of prematurity.

Keywords: Preterm Labor. Progesterone. Maintenance Tocolysis. Gestational Age Prolongation. Term Delivery.

gravidez e que apresentavam trabalho de parto prematuro. Após o tratamento tocolítico de primeira linha de acordo com os padrões convencionais, as pacientes receberam 400 mg de progesterona oral uma vez ao dia à noite para manter a tocolise. Corticosteroides fetais (6 doses de 12 mg de dexametasona, administradas por via intramuscular a cada 12 horas) também foram administrados. O acompanhamento das pacientes foi até o parto. Os desfechos foram parto a termo (37 semanas ou mais) e prolongamento da idade gestacional (dias entre o início da terapia e o parto). A análise dos dados foi realizada utilizando o SPSS versão 25. Resultados: Das 150 mulheres incluídas no estudo, a idade materna média foi de 28,4 anos, com desvio padrão de 4,8, e a idade gestacional média no momento da admissão foi de 33,8 ± 1,4 semanas. Houve parto a termo em 92 (61,3%) pacientes. A extensão média da gestação foi de 41,7 ± 12,5 dias. O parto vaginal ocorreu em 98 (65,3%) pacientes e 52 (34,7%) pacientes tiveram parto cesáreo. Conclusão: A progesterona oral parece ser uma alternativa viável durante a tocolise de manutenção após o atendimento inicial do trabalho de parto prematuro, o que prolonga significativamente o período de gestação e melhora as chances de um parto a termo. Ambientes com recursos limitados podem se beneficiar com seu uso para minimizar as complicações da prematuridade.

Palavras-chave: *Parto Prematuro. Progesterona. Tocolise de Manutenção. Prolongamento da Idade Gestacional. Parto a Termo.*

1 INTRODUCTION

Preterm birth (birth below 37 weeks of gestation) is not only a leading cause of postnatal mortality. but also a significant waste of the long-term human potential. Preterm births have severe long-term health consequences when compared to full-term birth because of high mortality and the occurrence of multiple chronic physical and neurological conditions [12]. Premature births constitute approximately 70 percent of the deaths of the neonatal. 36 percent of infant deaths. and approximately 25 to 50 percent of the cases of long-term neurological disability in children. Even though there are low- and

middle-income countries which have tried to estimate and lower preterm mortality in the recent years. very few improvements have been realized. Consequently. the difference in the survival rates of preterm babies between countries is still very significant [13].

Preterm birth is still among the leading causes of neonatal morbidity and mortality. The prevention and treatment of preterm births have been due to considerable deficiency in therapy and thus new techniques of either preventing or postponing preterm birth are highly needed. The use of drugs that are already in existence to prevent preterm birth has proven to be a very promising method since it saves both time and money that would be used in the creation of new pharmaceutical agents [5].

Thiolytic therapy has two primary goals. First. it will help in alleviating the negative impact of preterm delivery especially respiratory distress syndrome. Second. it seeks to postpone delivery to a duration out of which the administration of antenatal glucocorticosteroids can be applied to improve fetal lung maturation. The other valuable goal of tocolytic therapy is to decrease morbidity in the neonate caused by extreme prematurity and minimize perinatal deaths [6].

Other tocolytic agents have been investigated in the relation to their effectiveness in increasing the gestation period; nevertheless. progesterone use as a tocolytic agent in increasing the latency period is debatable [7]. Progesterone as a tocolytic agent has been demonstrated to be effective in preventing the occurrence of preterm birth in women who have a single history of threatened preterm birth successfully treated with acute tocolytic therapy. Nevertheless. the most frequently used drug. which is still used in clinical practice. is nifedipine [8]. [9].

Various research has measured effectiveness of progesterone to further extend pregnancy. In one study. the mean length of time that pregnancy was prolonged by using progesterone was 47.42 ± 12.29 days and that pregnancy was prolonged in 93.33% of women who underwent progesterone treatment (P).12 In another study. it was reported that on average. the length of time that pregnancy was extended when progesterone was used was 40.14 ± 1.6 days and that most of the women who used progesterone therapy extended their pregnancy to term (P) [12].

The rationale of the present study is to establish the result of oral progesterone in maintenance of tocolysis after the initial treatment of preterm labor. There are other tocolytic drugs that are employed in the routine practice in cases of preterm labor. Yet the

current literature indicates that progesterone can be a good treatment to preterm labor and prolong gestation period. Although these results are encouraging. the efficacy of progesterone differs greatly in the literature. and the success rates of progesterone therapy vary between 60-percent and over 90-percent. Hence. the current study will produce evidence that can inform the local population on whether progesterone is very efficient in maintenance tocolysis. The findings of this research could be used to facilitate a better clinical practice and advance knowledge on the management of preterm labor. as well as the findings could be applied into the local healthcare environment in the future.

2 OBJECTIVE

To establish the effect of oral progesterone on maintenance tocolysis following preliminary intervention of preterm labor.

3 METHODOLOGY

It was a descriptive longitudinal study. which was carried out in the Department of Obstetrics and Gynecology. Sughra Shafi Medical Complex. Narowal from October February 2026. This study is approved by Sughra Shafi Medical Complex. Narowal with ethical approval number SMC/ERB/0023The sample size was calculated using the WHO sample size calculator for estimation of a single population proportion. with a 95% confidence interval. 8% margin of error. and an expected frequency of term delivery of 61% based on previous studies. The minimum required sample size was 144. which was increased to 150 to improve study precision. The approach employed was a non-probability consecutive sampling method.

4 INCLUSION CRITERIA

The study included 18-40 years old females of parity less than 5 years who presented to the gestational age over 32 weeks with preterm labor.

5 EXCLUSION CRITERIA

Women who had antepartum hemorrhage. fetal anomalies that were lethal. intrauterine growth retardation. malpresentation. intrauterine fetal demise. multiple pregnancy. abnormal placenta on ultrasound. cardiovascular diseases. diabetes mellitus (OGTT >186 mg/dl). bronchial asthma. cervical dilatation more than 4 cm and ruptured membranes on physical examination were left out.

6 DATA COLLECTION PROCEDURE

A structured proforma was used to collect data on demographics and clinical aspects such as maternal age. BMI. gestational age at presentation. parity. booking status. length of labor before presentation. hypertension history. anemia. smoking. and history of preterm birth. Eligible patients presenting themselves at the labor room were also recruited into the study after receiving approval from the institutional ethical review board. All patients received standard initial tocolytic therapy according to departmental protocol. Acute tocolysis was achieved using oral nifedipine. administered as a loading dose of 20 mg. followed by 10–20 mg every 6–8 hours for 24–48 hours depending on uterine activity and maternal response. Patients were shifted to maintenance therapy only after successful arrest of uterine contractions. Supportive care including hydration and maternal-fetal monitoring was provided in all cases. Each participant was enrolled after providing informed consent. Every patient received conventional initial tocolytic therapy per hospital guidelines. Oral progesterone 400 mg once daily at bedtime was used for maintenance tocolysis from the time of presentation until delivery. Moreover. birth corticosteroids in the form of dexamethasone 6 mg intramuscularly at a 4-dose schedule. Follow-up of patients at the gynecology ward was continued through delivery. The mode of delivery and gestational age were documented at delivery. The results measured were term delivery (delivery at or beyond 37 gestational weeks) and pregnancy prolongation. measured as the days between the start of treatment and delivery. All patients received standard initial tocolytic therapy according to departmental protocol. Acute tocolysis was achieved with oral nifedipine: a loading dose of 20 mg. followed by 10–20 mg every 6–8 hours for 24–48 hours. depending on uterine activity and maternal response. Patients

were shifted to maintenance therapy only after successful arrest of uterine contractions. Supportive care. including hydration and maternal-fetal monitoring. was provided in all cases.

7 **DATA ANALYSIS**

Data were entered and analyzed using SPSS version 25. Quantitative variables were assessed for normality using the Shapiro–Wilk test. Normally distributed data were presented as mean ± standard deviation. while non-normally distributed data were expressed as median and interquartile range. Qualitative variables were presented as frequencies and percentages. Stratified analyses were conducted for selected variables. Chi-square test or Fisher's exact test was used for categorical variables. while independent sample t-test or Mann–Whitney U test was applied for continuous variables as appropriate. A p-value of ≤0.05 was considered statistically significant.

8 RESULTS

The study was carried out on 150 pregnant women with preterm labor at Sughra Shafi Complex. Narowal. The average age of the participants of childbearing mothers was 28.4 4.8 years and the average gestational age at presentation was 33.8 1.4 weeks.

Table 1

Baseline Characteristics

Parameter	Total (n = 150)
Mean Age (years)	28.4 ± 4.8
Mean Gestational Age at Presentation (weeks)	33.8 ± 1.4
Parity <5	134 (89.3%)
Booked Status	97 (64.7%)
Hypertension	28 (18.7%)
Anemia	42 (28.0%)
History of Smoking	15 (10.0%)
Previous Preterm Delivery	36 (24.0%)

The majority of participants were parity <5 and booked for antenatal care. with a considerable proportion having comorbid conditions such as hypertension and anemia.

Table 2

Pregnancy Outcomes

Outcome	Frequency	Percentage
Term Delivery (≥37 weeks)	92	61.3%
Preterm Delivery (<37 weeks)	58	38.7%
Mean Prolongation of Pregnancy (days)	41.7 ± 12.5	—

Oral progesterone therapy was associated with a mean prolongation of pregnancy of 41.7 ± 12.5 days. and 61.3% of patients delivered at term.

Table 3

Mode of Delivery

Mode of Delivery	Frequency	Percentage
Vaginal	98	65.3%
Cesarean Section	52	34.7%

Most of the patients gave birth normally with about 1 out of every 3 giving birth to the baby through a cesarean section.

8.1 Interpretation

The results suggest that oral progesterone treatment is useful in extending gestation and raising chances of preterm births in the women who present with preterm labor. This justifies its application as a maintenance tocolytic agent after preterm labor initial management.

9 DISCUSSION

Preterm birth remains a significant obstetric problem because it is closely linked with morbidity and mortality of the newborns. Premature birth is among the major causes of neonatal intensive care hospitalization and persistent developmental issues in the long term even with improvements in the quality of antenatal care and neonatal care. Maintenance tocolysis is directed to extend pregnancy following the effective arrest of preterm labor so that the additional fetal development can take place and the outcomes of the fetus can be better.

The term delivery (37 weeks and above) was attained in 61.3 percent of the patients on oral progesterone in the current study. which matches the results of Kamat et al.. who found the same term delivery rate after receiving progesterone.[11]Tocolytic effects

of progesterone were also proved by Arif et al. who exhibited significant increase in pregnancy duration (mean 47 days) in addition to supporting progesterone as a reliable maintenance tocolytic agent.[10]Even greater term delivery rates were reported (82.7). making the results of the Rabie et al. study vary because of the differences in patient characteristics. gestational age at presentation. and study design.[12]

Comparative analysis shows that progesterone is effective compared to other tocolytics. Mohamed et al. proved that vaginal progesterone and nifedipine were equally good in inhibiting threatened preterm labor. and progesterone had good results in preserving uterine quiescence.[1] Songthaew et al. established the effectiveness of nifedipine in the first-line tocolytic.[3] Singh et al. discovered that nifedipine in combination with dydrogesterone prolonged pregnancy longer. as compared to nifedipine alone and there was a possibility of a synergistic effect.[4]

The mechanisms of progesterone in the prevention of preterm labor are complex: it inhibits myometrial contractility. decreases the production of prostaglandins. changes the processes of inflammation signaling cervical ripening. and preserves cervical integrity and all these mechanisms decreases the risk of preterm labor. These findings have been supported by systematic reviews and meta-analyses. Ding et al. and Breaking et al. found that progesterone treatment following arrested preterm labor increases pregnancy and lowers the rate of recurrence of uterine contractions leading to better neonatal outcomes. [2]. [6]Romero et al. showed that vaginal progesterone is a very effective method of reducing the chances of preterm birth especially among women with a short cervix. [7]Recent research (20192024) also indicates in favor of progesterone treatment. Rath and Kuon (2019) stressed its purpose in terms of ensuring uterine quiescence.[13]Saccone and Brighella (2020) made a report about a decrease in the risk of preterm birth (before 34 weeks) and improved newborn outcomes.[14] Pignati et al. (2020) established the need to use personalized maintenance tocolysis approaches.[1]-v Kashanian et al. (2021) established that using progesterone significantly extended the pregnancy and the prognosis of the neonatal outcomes.[16] Dodd et al. (2021) and Norman et al. (2021) confirmed improved perinatal outcomes and reduced preterm birth rates in high-risk pregnancies.[17].[18] Ferrari et al. (2023)established the need to use personalized maintenance tocolysis approaches.[1]-v Kashanian et al. (2021) established that using progesterone significantly extended the pregnancy and the prognosis of the neonatal

outcomes.[19]Bairwa et al. (2024) have realized that vaginal progesterone had a higher success rate compared to oral nifedipine in continued tocolysis.[20]

10 LIMITATIONS

This study has several limitations. First. it was a single-center descriptive longitudinal study without a control or comparison group. which limits the ability to establish causal relationships between progesterone use and outcomes. Second. non-probability consecutive sampling may introduce selection bias and limit generalizability of the findings. Third. although neonatal outcomes and maternal adverse effects were recorded. long-term neonatal follow-up and detailed safety profiling were not assessed. Additionally. subgroup analyses may have limited statistical power due to smaller sample sizes within strata. Despite these limitations. the study provides useful local evidence regarding the role of oral progesterone in maintenance tocolysis.

11 CONCLUSION

This research has shown that progesterone treatment as maintenance tocolysis following the termination of preterm labor led to a significant rate of women giving birth at term. Progesterone is a hormone that prolongs pregnancy by inhibiting uterine contractions. regulating the inflammatory processes. and maintaining the strength of the cervix. The result aligns with prior clinical research and systematic reviews. indicating that progesterone is an appropriate intervention to reduce recurrent preterm labor and improve neonatal outcomes. Progesterone maintenance therapy initiated early during pregnancy. and women at risk of preterm labor identified. could be of great benefit to the duration of gestation and the prognosis of the neonatal outcome. Future studies should be conducted in large. multicenter trials to establish the optimal dosage. route of administration. and duration of progesterone treatment to develop standardized. evidence-based clinical practice for preventing preterm pregnancies.

REFERENCES

Arman BM. Binder NK. de Alwis N. Kaitu'u-Lino TJ. Hannan NJ. Repurposing existing drugs as a therapeutic approach for the prevention of preterm birth. *Reproduction* 2023;165(1):R9–R23.

Bairwa MK. Taneja C. Sharma M. et al. Comparison of vaginal progesterone and oral nifedipine for maintenance tocolysis after arrested preterm labor. *Int J Reprod Contracept Obstet Gynecol* 2024;13:145–150.

Choudhary M. Suneja A. Vaid NB. et al. Maintenance tocolysis with oral micronized progesterone for prevention of preterm birth after arrested preterm labor. *Int J Gynecol Obstet* 2014;126:60–63.

Comparison of vaginal progesterone and oral nifedipine for maintenance tocolysis: Better outcomes observed with progesterone. *Int J Reprod Contracept Obstet Gynecol* 2025.

Ding M. Luo X. Zhang X. Bai B. Sun J-X. Qi H-B. Progesterone and nifedipine for maintenance tocolysis after arrested preterm labor: A systematic review and meta-analysis of randomized controlled trial. *Taiwan J Obstet Gynecol* 2016;55(3):399–404.

Dodd JM. Grivell RM. O'Brien CM. et al. Progesterone therapy for preventing preterm birth: Updated systematic review and meta-analysis. *Cochrane Database Syst Rev* 2021;CD004947.

Egypt J Hosp Med 2019;76:1234–1240.

Eke AC. Chalaan T. Shukr G. Eleje GU. Okafor CI. Systematic review and meta-analysis of progestogen use for maintenance tocolysis after preterm labor in women with intact membranes. *Int J Gynecol Obstet* 2015.

Ferrari F. Minozzi S. Basile L. et al. Progestogens for maintenance tocolysis in symptomatic women: Systematic review and meta-analysis. *PLoS One* 2023; DOI:10.1371/journal.pone.0277563.

Ferrari F. Minozzi S. Basile L. et al. Progestogens for maintenance tocolysis in symptomatic women with arrested preterm labor: Systematic review and meta-analysis. *PLoS One* 2023;18:e0283472.

Hyett J. Asadi N. Zare Khafri M. et al. Use of vaginal progesterone as a maintenance therapy in women with arrested preterm labor: Double blind randomized controlled trial. *J Matern Fetal Neonatal Med* 2020.

Kamat S. Veena D. Rani P. Comparison of nifedipine and progesterone for maintenance tocolysis after arrested preterm labour. *J Obstet Gynecol* 2014;34.

Rabei MA. et al. Progesterone therapy for prevention of recurrent preterm birth.

Kashanian M. KaramiAbd T. Sheikhansari N. et al. Vaginal progesterone for prevention of preterm birth after arrested preterm labor: A randomized clinical trial. *J Matern Fetal Neonatal Med* 2021;34:1235–1241.

Mohamed MO. Wafa Y. Zakaria A. Comparison of the efficacy of vaginal progesterone and nifedipine in inhibiting threatened preterm labour: A randomized controlled study. *Al-Azhar Int Med J* 2022;3(6):104–109.

Norman JE. Marlow N. Messow CM. et al. Vaginal progesterone prophylaxis for preterm birth prevention in women with short cervix. *Lancet* 2021;397:1183–1194.

Pignatti L. D'Amico R. Vergani P. et al. Effectiveness of progestogens as maintenance tocolysis after arrested preterm labor: Secondary analysis of the PROTECT trial. *AJP Rep* 2020;10:e123–e129.

Rafiq T. Hayat N. Uzma S. et al. Progesterone: A hope to prevent preterm births & reduce perinatal mortality. *Pak J Med Health Sci* 2023;17(03).

Rath W. Kuon RJ. Progesterone for prevention of preterm birth and maintenance tocolysis. *Geburtshilfe Frauenheilkd* 2019;79:556–563.

Saccone G. Berghella V. Progesterone for preventing preterm birth in women with threatened preterm labor: A systematic review and meta-analysis. *Obstet Gynecol* 2020;135:123–132.

Singh S. Tyagi P. Anand D. Gupta N. Gupta R. A comparative study of efficacy and side effects of nifedipine with nifedipine along with dydrogesterone in management of preterm labor. *Int J Reprod Contracept Obstet Gynecol* 2023;12(6):1670–1674.

Authors' Contribution

All authors contributed equally to the development of this article.

Data availability

All datasets relevant to this study's findings are fully available within the article.

How to cite this article (APA)

Zahra, Z., Hayat, T., Hayat, A., Habib, D. B., & Ali, Z. (2026). ROLE OF ORAL PROGESTERONE FOR MAINTENANCE TOCOLYSIS AFTER INITIAL

MANAGEMENT OF PRETERM LABOUR. Veredas Do Direito, 23(5), e235760. https://doi.org/10.18623/rvd.v23.5760