Original Article

Comparative study of transdermal NTG versus oral nifedipine with respect to neonatal outcome in patients with preterm labour

Anuradha[1], Bhanu Mahajan[2], Shahana Jabeen[3], Parikh Rana[4], Rajni Razdan[5]

[1,2]Sr. Resident, [3]PG. Student, [4]Consultant, [5]Professor, Department of Obstrectics and Gynaecolgy, SMGS Hospital, GMC Jammu, Jammu and Kashmir, INDIA.
Email: ashthappa1971@gmail.com

Abstract

Background: Preterm birth remains one of the main causes of perinatal mortality and long-term morbidity. More than 70% of the total perinatal mortality can be attributed to preterm birth. **Aims and Objectives:** To study of transdermal NTG versus oral Nifedipine in treatmnent of Pretern labour with respect to neonatal outcome. **Methodology:** This randomized study was conducted in the department of obstetrics and Gynaecology, SMGS Hospital, Jammu over a period of one year. Women with preterm labour between 26 weeks and 34 weeks gestation were studied. Preterm labour is defined as presence of regular and painful uterine contractions at the rate of 4 contractions in 20 minutes, with the evidence of cervical changes as effacement and/or dilatation. Total 50 patients were enrolled, 25 were in transdermal nitroglycerine group (study group) and 25 in oral nifedipine group (control group). After delivery, parameters of perinatal outcome were recorded including period of gestation, live born or still birth, weight of new born, apgar score at 1minute and 5 minutes, admission to neonatal intensive care unit (NICU) and history of respiratory distress syndrome. The statistical analysis done by un-paired t-test. **Result:** Apgar score of the neonates at birth with respect to response to the treatment. When studied it was seen that those who were born before 48 hours of initiation of therapy had a mean apgar score of 5.5 ± 3.01 and those who were born after 48 hours of initiation of therapy had mean apgar score of 8.5±1.15, and it was seen that the difference was statistically highly significant ($p<0.0001$). The mean brithweight of neonates in the study group was 2.39±0.59 kg and in the control group 2.59±0.73 kg. the difference of mean birth weight in two groups was not statistically significant. The mean length of stay in the neonatal intensive care unit of neonates in the study group was 1.6 days and in control group was 2.13 days. The difference was statistically not significant. The overall neonatal outcome in the two groups was not statistically significant. **Conclusion:** It was seen that those who were born before 48 hours of initiation of therapy had a mean apgar score less and those who were born after 48 hours of initiation of therapy had good apgar score. The overall neonatal outcome in the two groups was not statistically significant means both of the drugs are equally effective.

Key Words: Transdermal NTG, Oral Nifedipine, Neonatal outcome.

***Address for Correspondence:**
Dr. Anuradha, Sr. Resident, Department of Obstrectics and Gynaecolgy, SMGS Hospital, GMC Jammu, Jammu and Kashmir, INDIA.
Email: ashthappa1971@gmail.com

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INTRODUCTION

PRETERM birth remains one of the main causes of perinatal mortality and long-term morbidity. More than 70% of the total perinatal mortality can be attributed to preterm birth[1]. Delivery prior to a gestational age (GA) of 37 weeks occurs in 6 to 7% of all pregnancies, although this rate is 1 to 2% for deliveries prior to a GA of 32 weeks, and the overall incidence is increasing[2]. One of the most important etiologies of perinatal morbidity and mortality is preterm labor (PTL), which could result in neonatal death or permanent sequela as well as additional costs to the healthcare system[3]. To manage this problem, tocolytic agents have been used to reduce perinatal

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morbidity and mortality by delaying the time of delivery. Such a delay has several advantages, including allowing sufficient time for the optimum effect of corticosteroids on the pulmonary system of the fetus, promoting increased consultation with perinatologists and pediatricians, and facilitating the transfer of the neonate to a referral hospital or medical center equipped with a neonatal intensive care unit (NICU), relevant trained staff, and special equipment[4]. Magnesium sulfate, β-adrenergic receptor agonists, prostaglandin inhibitors, calcium channel blockers, oxytocin antagonists, and nitric oxide donors are the tocolytic agents that have typically been applied to control PTL, and each of them has its own individual pros and cons in terms of maternal and fetal effects[5-7]. GTN, a nitric oxide donor, has been shown to produce a significant decrease in the contractility of human myometrium in pregnant and non-pregnant women in vitro[8-11]. In 1994, Lees *et al*.[12] reported that transdermal nitroglycerin patches suppressed uterine contractions in all 20 episodes of preterm labor that occurred in 13 consecutive women enrolled in a pilot study, and they hence suggested that this nitric oxide donor could be an effective and safe tocolytic agent. The actual introduction of transdermal nitroglycerin for controlling preterm labor dates back to 1996, when it was beneficial in ten women[13].

MATERIAL AND METHODS

This randomized study was conducted in the department of obstetrics and Gynaecology, SMGS Hospital, Jammu over the period of one year. Women with preterm labour between 26 weeks and 34 weeks gestation were studied. Preterm labour is defined as presence of regular and painful uterine contractions at the rate of 4 contractions in 20 minutes, with the evidence of cervical changes as effacement and/or dilatation. Women with singleton pregnancy, Gestational age between 26 weeks and 34 weeks, Presence of regular painful contraction occurring at the rate of 4 per 20 minutes, Cervical dilatation of greater than 1 cm and less than 4 cm, Cervical effacement 80% or more, Women with intact membranes were included into the study while the patients of Antepartum haemorrhage, Foetal anomalies incompatible with life, Intrauterine death of foetus, Pregnancy induced hypertension, Bronchial asthma, Imminent pre-eclampsia and eclampsia, Associated heart disease or renal disease. Multiple gestation, Cervical dilatation more than 4 cm, Sensitivity to nitroglycerine, Failure to give consent were excluded from the study. Fifty-seven patients were presented with features of preterm labour during the said study period, but it was seen that out of these 57 patients, contractions subsided after 1 hours of bed rest and hydration in 4 patients, and 3 patients were lost to follow –up, hence were not the candidates for tocolytic therapy. Total of 50 patients were enrolled -25 were in transdermal nitroglycerine group (study group) and 25 in oral nifedipine group (control group). After delivery, parameters of perinatal outcome were recorded including period of gestation, live born or still birth, weight or new born, apgar score at 1minute, 5 minutes, admission to neonatal intensive care unit (NICU) and history of respiratory distress syndrome. Any untoward problem during labour such a premature rupture of membranes, prolonged labour, postpartum hemorrhage were also noted. The statistical analysis done by un-paired t-test.

RESULT

Table 1: Relationship of Apgar score with respect to response to the treatment

Apgar score	<48 hours		>48 hours	
	Nitroglycerine (study group) (n=25)	Nifedipine (control group) (n=23)	Nitroglycerine (study group) (n=25)	Nifedipine (control group) (n=23)
Count	3	1	23	22
Mean ± SD	5.5±3.01		8.5±1.15	

(P<0.0001)

The above table shows the relationship of apgar score of the neonates at birth with respect to response to the treatment. It was seen that those who were born before 48 hours of initiation of therapy had a mean apgar score of 5.5 ± 3.01 and those who were born after 48 hours of initiation of therapy had mean apgar score of 8.5±1.15, and it was seen that the difference was statistically highly significant (p<0.0001).

Table 2: Neonatal outcome

Outcome	Nitroglycerine (study group) (n=25)	Nifedipine (control group) (n=23)	P=value
Birth weight(kg)	2.39±0.59	2.59±0.73	NS
Transient tachypnea Of new born	1(4%)	2(8.69)	NS
RDS	1(4%)	1(4.34%)	NS
NICU stay days	1.6	2.13	NS

Data was available for 25 cases in study group and 23 cases in the control group. The mean brith weight of neonates in the study group was 2.39±0.59 kg and in the control group 2.59±0.73 kg. the difference of mean birth weight in two groups was not statistically significant. One baby in the study group and two in the control group had transient tachypnea at birth. There were 2 cases of respiratory distress syndrome, one in each group. The mean length of stay in the neonatal intensive care unit of neonates in the study group was 1.6 days and in control group was 2.13 days. The difference was statistically not

significant. The overall neonatal outcome in the two groups was not statistically significant.

DISCUSSION

In present study, 92% babies born to mothers who received nitroglycerine and 95.65% of babies in nifedipine group were alive and healthy. There was one fresh still birth (due to prematurity) and one neonatal death in nitroglycerine in present study, which was delivered at 35.56 weeks with birth weight 2.80 kg. the infant died after 20 hours of birth due to erratic feeding with aspiration. There was one neonatal death in nifedipine group, which was delivered at 29.28 weeks of gestational with birth weight of 1.2 kg. baby died after 44 days due to septicemia.

Table 3: Perinatal mortality rate

Trial	Perinatal mortality rate (%)
Nitroglycerine	
Lees *et al*. (1999)[14]	2.1
Smith *et al*. (1999)[15]	5.8
Present study (2009) NTG	8
Present study (2009) Nifedipine	4.3

There was 2 neonatal deaths in the nithroglycerine group (2.1%) in the study by lees *et al*. (1999). One in the study by smith *et al*. (1999) and none in smith *et al*. (2007) in study by papatosonis *et al*. (1997).

CONCLUSION

It was seen that those who were born before 48 hours of initiation of therapy had a mean apgarscore less than those who were born after 48 hours of initiation of therapy had good apgar score so these drugs are effective after 48 hrs. of start Present study (2009) Nifedipine. The overall neonatal outcome in the two groups was not statistically significant means both of the drugs are equally effective.

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