COMPARISON OF EFFICACY OF NIFEDIPINE AND SALBUTAMOL IN THE TREATMENT OF PRETERM LABOUR

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ABSTRACT

Objective: To compare the efficacy of nifedipine and salbutamol in the treatment of preterm labour.

Methodology: This comparative clinical trial was conducted in the department of Obstetrics and Gynaecology Hayatabad Medical Complex Peshawar on 176 pre natal patients. All patients with preterm labour aged 15-45 years with any gravida or parity presenting through outpatient department (OPD) or emergency room (ER) with uterine contraction associated with cervical effacement and dilatation before 36 weeks and 6 days of gestational period were included in the study. Patients were divided into two groups by lottery method. Women in group A were put on tablet nifedipine while women in group B were given salbutamol. The drug was considered effective in case of cessation of the uterine contraction within 2 hours of initiation of the drug and continuation of the effect till minimum of 48 hours.

Results: Mean age was 28.53 ± 5.84 in group A and 28.26 ± 5.47 in group B. Nifedipine was found to be more effective than salbutamol in prolonging pregnancy for more than 48 hours, whereas no significance difference was found between the two drugs in delaying delivery after 1 week of pregnancy prolongation (30.68% versus 32.95%).

Conclusion: Nifedipine is more effective than salbutamol in the treatment of preterm labour.

Key Words: Nifedipine, Salbutamol, Preterm labour.

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INTRODUCTION

Preterm labour is defined as labour which occurs from the period of viability of the foetus (24 completed weeks of gestational age from the last menstrual cycle) until the completion of 37 weeks of gestation[1]. Preterm labour is a public health problem worldwide and complicates 5-10% of pregnancies and is the leading cause (70%) of neonatal morbidity and mortality[2]. It is a major health problem in term of loss of life, long term disability and has health care cost both in the developing and developed world and was responsible for nearly one million neonatal deaths in 2015[3].

The primary aim of treating preterm labour is to prolong delivery for at least 48 hours to allow the administration of antepartum corticosteroids to reduce the incidence of idiopathic respiratory distress syndrome which is a serious condition and the secondary aim is to arrange in utero transfer to a centre with neonatal intensive care facility and prolonging pregnancy in an attempt to improve perinatal and neonatal outcome[4,5]. A wide variety of agents have been advocated as suppressing uterine contraction which include beta agonists, calcium channel blockers, prostaglandin synthesis inhibitors, nitric oxide donors and oxytocin receptor antagonists[6]. Nifedipine, a calcium channel blocker reduces the influx into the muscles by inhibiting voltage activated calcium channels, acting as smooth muscle relaxant and thus inhibiting uterine contraction[7]. Salbutamol causes myometrial relaxation by binding to beta 2 adrenergic receptors. Although more than 80% of women with preterm labour who are treated with tocolytic agents have their pregnancies maintained for 24 to 48 hours, some data suggest that tocolysis maintains pregnancy for longer period. Some studies showed the efficacy of nifedipine to be 43% as compared to 33% with salbutamol, whereas other studies showed the opposite results as salbutamol (54%) to be more efficacious than nifedipine (44%)[8,9]. The other reported efficacy of nifedipine to be 75% and that of salbutamol as 84%.

Early detection and effective management are important steps for preventing preterm labour which accounts for 35% of all health care spending on the neonates and children born prematurely. This study compared the efficacy of nifedipine and salbutamol in prolongation of pregnancy for more than 48 hours. This may address the controversy in literature regarding the use of salbutamol and nifedipine in the treatment of preterm labour.

METHODOLOGY

It was a comparative study conducted in the department of Obstetrics and Gynaecology, Hayatabad Medical Complex, Peshawar from March 2017 to February 2018. Sample size was calculated to be 88 in each group keeping 75% proportion of efficacy of nifedipine[10] and 54% proportion of efficacy of salbutamol[9] in the treatment of preterm labour, with 95% confidence interval and 90% power of test, using WHO sample size formula. Consecutive sampling was used in the study.

The study was conducted after taking approval from hospital ethics and research committee. The purpose and benefits of the study were explained to all women and a written informed consent was obtained. Preterm labour was diagnosed by the presence of regular uterine contractions before 37 weeks of gestation associated with cervical effacement and dilatation[11]. All patients with preterm labour aged 15-45 years with any gravida or parity, presenting through OPD or ER department, with uterine contraction associated with cervical effacement and dilatation before 36 weeks and 6 days of gestational period were included in the study. Patients with intrauterine deaths detected through ultrasonography and those with premature rupture of membranes on speculum examination were excluded from the study. Patients with nifedipine or salbutamol allergy and with known cardiac diseases and patients with vaginal infection leading to preterm labour were also excluded from the study, as all these conditions would have acted as confounders.

All women were subjected to detailed history and clinical examination. Foetal monitoring was done through auscultation. All patients were randomly allocated into two groups by lottery method. Women in group A were put on tablet nifedipine 20 mg stat followed by 10 mg three times a day, while women in group B were given salbutamol infusion of 5 mg diluted in 500cc of 5% dextrose at 10 drops per minute for 6 hours and then maintained at 4 mg tablet twice a day. Patients' blood pressure and pulse rate were monitored 4 hourly for 48 hours and then 12 hourly till delivery of the baby or 37 completed weeks of gestation. Uterine contractions were monitored by abdominal palpation with hand and counting number and duration of contractions for 10 minutes. Patients were asked about symptoms including headache, nausea, vomiting and palpitations. Chest auscultation was done and serum electrolytes were checked daily to rule out salbutamol induced pulmonary edema and hypokalaemia respectively. The drug was considered effective in case of reduction in uterine contractions to 4 contractions per hour within first 24 hours of initiation of either drug. All the above-mentioned information including name, age and address were recorded in a pre-designed proforma.

All data was stored and analysed in SPSS version 20. Descriptive statistics like mean + standard deviation was calculated for quantitative variables like age, gravida, parity and period of gestation. Frequencies and percentages were calculated for categorical variables like efficacy. Student t-test was used to compare the efficacy of both nifedipine and salbutamol while keeping a p-value < 0.05 as significant. All results were presented on tables and graphs.

RESULTS

The age ranged from 18 to 38 years (Mean age was 28.53 ± 5.84 years in group A and 28.26 ± 5.47 years in group B). Demographic distribution of patients is given in the table 1. Pre term labour characteristics of patients at presentation are given in the table 2. Side effects were observed in some patients as given in table 3. Nifedipine was found to be significantly more efficacious than salbutamol in prolonging pregnancy for more than 48 hours (p value=0.03), whereas no significant difference was found between the two drugs in delaying delivery after 1 week of pregnancy prolongation (p value=0.13) (Table 4).

DISCUSSION

Preterm labour is a common cause of neonatal mortality and morbidity with an incidence of 4-10 % and is a common cause of antenatal patient admissions in the hospital[12]. We found that nifedipine had better efficacy and safety than salbutamol to prolong pre-term labour. Nifedipine is considered to be the better tolerated and

Table 1: Demographic distribution of patients

	Group A (n=88)	Group B (n=88)	p-Value
Age	28.53 ± 5.84	28.26 ± 5.47	0.24
Parity	2.64 ± 1.73	2.83 ± 1.52	0.32
Gestational age	32.85 ± 2.76	33.24 ± 2.48	0.38

Table 2: Labour characteristics at presentation

	Stages	Group "A (n=88)	Group "B" (n=88)
Number of uterine contractions / 10 minutes	1 -3	54 (61.36%)	49 (55.68%)
	> 3	34 (38.63%)	39 (44.31%)
Cervical dilatation in cm	< 5	46 (52.27%)	48 (54.54%)
	> 5	42 (47.72%)	40 (45.45%)
Cervical effacement	< 50%	53 (60.22%)	50 (56.82%)
	> 50%	35 (39.77%)	38 (43.18%)

Table 3: Side effects of the drugs

Side effects	Group A (n=88)	%age	Group "B" (n=88)	%age	p-Value
Nausea/ vomiting	24	25.90%	26	30.90%	0.041
Headache	23	22.5%	26	21.24%	0.036
Palpitations	23	24.77%	24	27.27%	0.033
Hypotension	18	27.45%	24	18.59%	0.362

Table 4: Prolongation of pregnancy

Prolongation of pregnancy	Group A (n=88)	%age	Group "B" (n=88)	%age	p-Value
<24 hours	11	12.50%	23	26.43%	0.05
24-48 hours	17	19.32%	18	20.45%	0.47
48 hours to 1 week	33	37.50%	18	20.65%	0.03
> 1 week	27	30.68%	29	32.95%	0.16
Total	88	100%	88	100%	

is superior to other calcium channel blockers and magnesium sulfate[13]. It can prolong delivery and thus has indirect effect on better neonatal outcome. In our study, pregnancy was prolonged for more than 48 hours whereas small proportion of patients still progressed to delivery within 24 hours. The most common side effect noted with nifedipine group was drop in blood pressure affecting 20.45% of the patients whereas the most common side effect with salbutamol was nausea and vomiting affecting 40.91% of the patients making nifedipine a better choice for treatment in comparison with salbutamol.

We studied 176 patients with 88 patients in each group with preterm labour with age range from 18 years to 38 years. Mean age was 28.53 + 5.84 in group A and 28.26 + 5.47 in group B. Patients in both groups presented with uterine contraction and cervical effacement. Both drugs had common side effects including nausea, vomiting, headache, palpitations and hypotension. These side effects were more common in group B receiving salbutamol 8 mg/day. Patients treated with salbutamol showed that pregnancy was prolonged for more than 48 hours in 51.13 % of the patients. In a study conducted by Songthamwat S and Nan C showed that nifedipine caused prolongation in pregnancy for more than 48 hours in 77.6% of the patients and failed to prolong delivery in 10% of patients[14]. In another study done by Maher MA and Sayyad TM, they showed that nifedipine delayed labour for more than 48 hours in 68.6% of patients which is almost similar to the results of our study (68.18%)[15].

The efficacy and safety profile of nifedipine to mother and foetus in comparison with other drugs has been proved in many studies[16]. Korejo et al. showed that nifedipine administration was associated with minimal side effects (6%) as compared to salbutamol (28%)[17]. In another study carried out by Hayes it was found that the adverse effects of salbutamol (58%) were much more than that of nifedipine (27%)[18]. Various other drugs have also been used for prolongation of pregnancy, like beta blockers, prostaglandin antagonists but all these have adverse effects on maternal health. In our study, we gave nifedipine through oral route and needed less frequent monitoring in comparison to salbutamol which is administered through intravenous route and needs strict observation of patients. The same observation was made by Zulfiqar B and Iftikhar R[19]. Nifedipine has been compared with tocolytic agents other than salbutamol

and has been found to be safer and more efficacious in delaying premature births. Irrespective of the cause of preterm labour, the primary aim is to delay pregnancy and allow the foetus to mature[20].

In addition to efficacy, the results of our study showed that nifedipine has a much better safety profile and is thus a better tocolytic agent in treatment of preterm delivery.

CONCLUSION

Nifedipine is more effective than salbutamol in prevention of preterm labour. Nifedipine is easy to administer, requires minimum surveillance as compared to salbutamol which is administered intravenously and needs close monitoring due to potential side effects on maternal and foetal health.

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CONTRIBUTORS

SA conceived the idea, designed the study and wrote initial manuscript. AN and AN helped in executing the plan after going through the study protocol, data collection, interpretation and revising the manuscript. RK and SB reviewed the draft critically, carried out corrections and supervised the whole study. All authors contributed significantly to the submitted manuscript.